



SLOVENSKI STANDARD

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Okna in vrata - Odpornost pri ponavljajočem odpiranju in zapiranju - Preskusna metoda

Windows and doors - Resistance to repeated opening and closing - Test method

Fenster und Türen - Dauerfunktionssprüfung - Prüfverfahren

Fenêtres et portes - Résistance à l'ouverture et fermeture répétée - Méthode d'essai

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Doors and windows

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EUROPEAN STANDARD
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**Windows and doors - Resistance to repeated opening and
closing - Test method**

Fenêtres et portes - Résistance à l'ouverture et fermeture
répétée - Méthode d'essai

Fenster und Türen - Dauerfunktionsprüfung - Prüfverfahren

This European Standard was approved by CEN on 27 October 2012.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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EN 1191:2012 (E)

Foreword

This document (EN 1191:2012) 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of an identical text or by endorsement, at the latest by June 2013, and conflicting national standards shall be withdrawn at the latest by June 2013.

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 EN 1191:2000.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

The most important changes compared with the previous version EN 1191:2000 are:

- reference velocities for manually operation scaled according to weight;
- different velocities for translatory, rotatory and tilt movement;
- force level for operation of fastening system clearly described;
- more precise description of the testing cycles;
- minor mode of operation and cleaning and maintenance mode of operation defined;
- termination criteria incorporated;
- new normative Annexes A to I integrated (see Scope).

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

Introduction

This European Standard describes one of the test methods that are called up in the product standards for windows and pedestrian doorsets.

The Annexes of this European Standard are to be in line with the relevant hardware standards but they are not direct copies of them.

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1 Scope

This European Standard specifies the method to be used to determine the resistance to repeated opening and closing of windows and pedestrian doorsets when subjected to repeated opening and closing.

It applies to all construction materials and operating systems for any window or pedestrian doorset, including gaskets and building hardware, in normal operating conditions.

The parts concerned in the testing are the frame, the opening component (including any additional moving components e.g. an inactive sash/leaf) and all essential and directly involved building hardware, including operating devices, for example, the handle.

The testing does not include any hardware whose operation is not directly involved in the opening and closing of the moving components: added-on fastening systems such as peg-stays or cabin hooks or bolts, nor, unless specified, any independently installed stops (not connected to the complete assembly) such as a wall or ground-mounted stop.

NOTE 1 The Annexes provide more details on the testing procedures that may differ from the main part of this European Standard and are mandatory:

- Annex A applies to Tilt and Turn, Tilt-First, Turn-Only, or Tilt-Only windows and door-height windows;
- Annex B applies to Sliding, Lift and Slide or Lift and Slide and Tilt windows and door-height windows;
- Annex C applies to Tilt and Slide windows and door-height windows;
- Annex D applies to Fold and Slide windows and door-height windows;
- Annex E applies to horizontal and vertical pivot windows and door-height windows;
- Annex F applies to Vertical Sliding windows;
- Annex G applies to side-hung casements and top-hung windows, opening outwards (including reversible windows);
- Annex H applies to side-hung single and double action pedestrian doorsets excluding power operated doors;
- Annex I applies to power-operated (automatic) side-hung single action pedestrian doorsets.

NOTE 2 In this European Standard the term door-height window is used for windows that are used for the passage of pedestrians, i.e. as a pedestrian doorset.

2 Normative references

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

EN 179, *Building hardware — Emergency exit devices operated by a lever handle or push pad, for use on escape routes — Requirements and test methods*

EN 1125, *Building hardware — Panic exit devices operated by a horizontal bar, for use on escape routes — Requirements and test methods*

EN 1154:1996,¹⁾ *Building hardware — Controlled door closing devices — Requirements and test methods*

EN 1158:1997,²⁾ *Building hardware — Door coordinator devices — Requirements and test methods*

EN 12046-1, *Operating forces — Test method — Part 1: Windows*

EN 12046-2, *Operating forces — Test method — Part 2: Doors*

EN 12217, *Doors — Operating forces — Requirements and classification*

EN 12400, *Windows and pedestrian doors — Mechanical durability — Requirements and classification*

EN 12519:2004, *Windows and pedestrian doors — Terminology*

EN 13115:2001, *Windows — Classification of mechanical properties — Racking, torsion and operating forces*

EN 14600:2005, *Doorsets and openable windows with fire resisting and/or smoke control characteristics — Requirements and classification*

EN 16005, *Powered operated pedestrian doorsets — Safety in use — Requirements and test methods*

prEN 16361, *Power operated pedestrian doors — Product standard, performance characteristics — Pedestrian doorsets, other than swing type, initially designed for installation with power operation without resistance to fire and smoke leakage characteristics*

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3 Terms and definitions (standards.iteh.ai)

For the purposes of this document, the terms and definitions given in EN 12519:2004 and the following apply.

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3.1 <https://standards.iteh.ai/catalog/standards/sist/en-1191-2013>
moving component e2592039c26/sist-en-1191-2013

window sash or door leaf which is moved, opened or closed

3.2

active moving component

leaf of a multi-leafed window or door, intended to be moved first to provide opening

3.3

inactive moving component

leaf of a multi-leafed window or door, intended to be moved after the active leave

3.4

mode of operation

motion of the moving component as either translatable or rotary

Note 1 to entry: Some hardware systems allow for a combination of several modes of operation, for example, Tilt and Turn windows or folding windows which combine rotary and translatable operations.

3.5

main mode of operation

intended principal type of operation and distance or angular travel as specified by the manufacturer

1) This document is impacted by the stand-alone amendment EN 1154:1996/A1:2002.

2) This document is impacted by the stand-alone amendment EN 1158:1997/A1:2002.

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Note 1 to entry: Windows or pedestrian doorsets might feature multiple main modes of operation, such as tilting and sliding.

3.6**minor mode of operation**

secondary type of operation intended for occasional use

Note 1 to entry: Operating the moving component for cleaning or maintenance purposes is not considered a main or minor mode of operation.

3.7**cleaning or maintenance mode of operation**

additional type of operation not in everyday use

3.8**cycle**

series of operations

Note 1 to entry: Involving opening a moving component, including releasing any fastening systems, moving open to the open position, returning to the closed position and re-engaging any fastening systems. The cycle might consist of several modes of operation that might be tested separately or combined.

Note 2 to entry: For example, a Tilt and Slide window can be tested in a cycle combining the tilting and sliding operations or it can be tested separately by carrying out the tilt cycles first and then the sliding cycles.

3.9**part cycle**

series of operations applicable to a single mode of operation and/or limited distance or angular travel

Note 1 to entry: If the test specimen can be operated in more than one main mode of operation, for example, tilting and sliding, the cycle may be tested in part cycles accordingly. In doing so, the part cycles need to be carried out in such a manner that no steps from the cycle are repeated.

Note 2 to entry: All part cycles need to be carried out on the same test specimen.

3.10**number of cycles**

quantity of cycles completed applied to the cycle or part cycle accordingly

Note 1 to entry: In accordance with the classification following EN 12400 or EN 14600 as appropriate.

3.11**operating device**

building hardware component, for example, the window or door handle, enabling the user to operate the fastening system and/or the moving component

3.12**fastening system**

building hardware component or set that keeps the moving component in the closed and fastened position, i.e. latched and/or locked and/or electric systems

3.13**closing edge**

outermost edge of the moving component furthest from the axis of rotation

3.14**reference velocity**

for translatory operation, actual velocity of the moving components; for rotary operation, velocity of the closing edge

3.15**rest time**

time in seconds of a stationary period for the following:

- between one change of direction of operation;
- between the completion of a moving component's operation and the subsequent fastening system's operation;
- between the completion of a fastening system's operation and the subsequent moving component's operation;
- between two cycles

3.16**power operated pedestrian doorset and window**

doorset for pedestrian passage only/window with one or more moving components that is moved, at least in one direction, by an external energy supply (e.g. electrically) instead of manual or stored mechanical energy

4 Test equipment**4.1 Test rig**

The test rig shall be designed and constructed to be capable of adjustment for test specimens and shall be sufficiently rigid to withstand the induced forces without undue deflection.

Alternatively test specimen linked to prEN 16034 can be tested in supporting construction as described in EN 1634-1 in order to get a maximum range of direct application.

A sub-frame may be used into which the test specimen is mounted.

4.2 Operating equipment

4.2.1 Motion controlled actuators — hydraulic, pneumatic or electric torque and linear cylinders or any appropriate mechanisms, having features consistent with:

- a) the reference velocities to be used;
- b) the mass of the moving component and the friction forces involved;
- c) the applied loads, if relevant, to produce dynamic forces;
- d) the duration of the test.

4.3 Measuring equipment

The following equipment shall be used:

- cycle counter;
- velocity and time measurement equipment accurate to $\pm 5\%$;
- force and mass measuring equipment accurate to $\pm 2\%$;
- dynamometer and torque-meter accurate to $\pm 3\%$;

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- measuring tape, EC-precision class II;
- dial gauges and callipers accurate to $\pm 0,1$ mm.

4.4 Velocity measurement

The measurement of the reference velocity shall be carried out over a measuring distance with a maximum of 70 mm for turning and sliding and a max of 30 mm for tilting. The end of the measuring distance shall be at a distance of 5 ± 0 mm from the moving component's position where the reference velocity shall be reached. In the case of asymmetrically positioned moving components, the reference velocity shall be measured on the main closing edge.

NOTE Individual velocity measurements have been identified and are shown in the relevant Annexes.

5 Test requirements**5.1 General**

All specifications described in this European Standard shall be adhered to, unless stated otherwise in the Annexes.

5.2 Number of cycles

The cycle is repeated either for a specified number of times or until failure occurs or the operating force set for the test is exceeded.

The number of cycles is either set prior to starting the test or the test is carried out until failure occurs.

Each part cycle shall have the same number of part cycles as required for the mode of operation.

NOTE The lowest number of part cycles causing failure is used for classification purposes.

5.3 Reference velocity**5.3.1 Manual operation**

The reference velocity of a manually operated moving component depends on its mass and on its operation which can be translatory, rotary, or tilting.

The reference velocities are specified in Table 1 with a tolerance of ± 10 %.

Table 1 — Reference velocities for manually operated moving components

Mass (M) kg	Operation		
	Translatory m/s	Rotary m/s	Tilt m/s
$M \leq 65$	0,25	0,50	0,50
$65 < M \leq 100$	0,20	0,35	0,50
$100 < M \leq 150$	0,16	0,30	0,41
$150 < M \leq 200$	0,14	0,25	0,35
$200 < M \leq 300$	0,12	0,20	0,29
$M > 300$	0,10	0,18	0,25
For fire resisting and/or smoke control pedestrian doorsets and openable windows, refer to EN 14600.			
NOTE A consistent energy of 2,03 J (translatory), 1,56 J (rotary) and 3,125 J (tilt mode) is the basis for calculating the respective mass and velocity.			

5.3.2 Mechanical operation

5.3.2.1 Self-closing devices

If the moving component is mechanically operated, for example, via self-weight, springs or any other mechanism and if the velocity is adjustable, the reference velocity shall be set in accordance with the provisions laid down for opening and closing in the relevant product standard. For controlled door closing devices, opening and closing shall be set as specified in EN 1154. The uncontrolled door closing devices should refer to prEN 15887. If no product standard is available, or the product standard does not include any provisions for opening and closing, the reference velocity during a cycle or a part cycle shall be set as defined in Table 1. If not adjustable, the reference velocity shall be the actual velocity.

5.3.2.2 Power-operation

The velocities for power-operated doorsets/windows shall be set to a present level by the client or stated in a relevant product standard, e.g. prEN 16361 or a supporting standard like EN 16005.

5.4 Rest time

This shall be at least 1 s but shall not exceed 4 s for manually operated moving components. For motor operated moving components, the rest time shall be established with the client prior to the test.

5.5 Operation of the fastening systems

For manually operated fastening systems the operating force applied by the operating equipment shall not exceed 150 % of the last measurement of the operating forces necessary to release and secure the fastening systems (see 7.4). If deemed necessary during the test, subsequent adjustments of the operating equipment may be carried out in order to enable the test to proceed.

This operating force shall be determined in accordance with EN 12046-1 or EN 12046-2.

The operating forces shall be measured with moderate velocity, in a jerk-free and jolt-free manner.

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The same specifications shall apply to the operation of the hardware during the repeated opening and closing test, unless specified otherwise in the system specifications.

A load on the hardware's espagnolette by means of overtwisting is not intended. The motion-sequence shall be carried out 'path-controlled' to the target positions in order to satisfy the operational cycle.

Ensure that the moving component is in the closed position before the operation equipment applies a force on the operating device. EN 13115:2001, Table 1 specifies the resistance to operating forces for each class, for example, a hand operating device with a measured operating torque of between 5 Nm and 10 Nm represents Class 1, therefore a force of not greater than $100 \text{ N} \times 1,5 = (150 \pm 10) \text{ N}$ shall be applied as the (gasket) compression force (not applicable for doors).

For power operated fastening systems (either partially or totally) the amplitude of the force shall be that set by the mechanism itself.

6 Preparation for testing

Test specimens shall be stored and tested in a non-destructive environment within the ranges of 15 °C to 30 °C and 25 % to 75 % RH.

Specimens which are intended to be glazed should be supplied with all glazing carried out in accordance with the window/door manufacturer's specification, or an adequately rigid timber, plastic or metal material may be used with additional weights.

Any additional weights are to be mounted equally on the outside and inside of the infilled panel so that the centre of gravity and mass replicate the replaced glazed unit. The mounting of the infilling that replaces the glazing unit shall be representative to the glazing system.

The mass of the moving component shall be measured prior to testing.

In respect of the type, number and position of fixing devices, the installation of the specimen in the testing or sub-frame shall comply with the relevant code of practice, if any, or if none, with the manufacturer's instruction for installation in buildings. These fixings shall not hinder the operation of the opening components, nor of any hardware involved in the test.

Windows or pedestrian doorsets designed to be incorporated in, or form part of a proprietary wall or partition system, should be installed in such a system and the composite construction fitted into the test surround.

Test equipment shall act at the position of normal operation. It shall be balanced so that the dead load applied on the operating point does not increase, in any position, the weight of the moving components by more than 5 %.

Adjustment and lubrication in accordance with the manufacturer's instructions shall be carried out before the test.

Conducting away of any heat (for example, cooling or extending the rest time) shall be carried out as agreed between the testing laboratory and the manufacturer.

7 Test procedure

7.1 Pre-test operation

With the test specimen installed in accordance with Clause 6, and before taking initial measurements, the moving component shall be subjected manually or automatically, if power operated, to five operating cycles.

7.2 Initial measurements

All necessary measurements shall be taken and documented, especially:

- the operating forces in accordance with EN 12046-1 or EN 12046-2;
- the mass of the moving component;
- the dead load applied to the operating point.

7.3 General cycle description

7.3.1 General

The orientation of the test specimen shall be appropriate for its intended use.

In the case of cycles, all main modes of operation are repeated to the specified number of cycles or until failure.

The following sequence applies.

7.3.2 Initial position

The initial position of the moving component is the closed and fastened position.

7.3.3 Stand-by position

The fastening system is released via the operating equipment with moderate velocity as intended in use; this is then followed by the rest time.

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7.3.4 Opening cycle

7.3.4.1 Opening system without restrictor

On completion of the rest time, the moving component is set in motion accelerating in a jerk-free and jolt-free manner.

The reference velocity in accordance with Table 1 shall be reached at an opening angle of 60 ° or 60 % of the stroke, and held up to an opening angle of 70° or 70 % of the stroke. Subsequently, the moving component shall be brought slowly to a halt via the operating equipment in a jerk-free and jolt-free manner by the time it has reached its designated final position. Once the predetermined opening is reached, the rest time specified in 5.4 shall be applied.

7.3.4.2 Opening system with restrictor

On completion of the rest time, the moving component is set in motion accelerating in a jerk-free and jolt-free manner.

The reference velocity in accordance with Table 1 shall be reached 5 ± 0 mm before the stopping/restricting position. After this, the moving component shall move freely into the stopping/restricting hardware at the open position.

The rest time specified in 5.4 shall then be applied.