



**SLOVENSKI STANDARD**  
**oSIST prEN 1191:2011**  
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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

**Ta slovenski standard je istoveten z: prEN 1191**

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**ICS:**

91.060.50      Vrata in okna

Doors and windows

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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 - Dauerfunktionssprüfung - Prüfverfahren

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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COMITÉ EUROPÉEN DE NORMALISATION  
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## Foreword

This document (prEN 1191:2011) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 1991:2000.

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## Introduction

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

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 mechanical durability of windows and doorsets when subjected to repeated opening and closing.

It applies to all construction materials and operating systems for any window or doorset, including gaskets and 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 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 devices 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 The Annexes provide more details on the testing procedures:

- 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 manually operated side-hung single swing doorsets.

## 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 1154, *Building hardware — Controlled door closing devices — Requirements and test methods (includes amendment 1:2002)*

EN 1634-1, *Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware — Part 1: Fire resistance tests for doors, shutters and openable windows*

EN 1634-3, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware — Part 3: Smoke control test for door and shutter assemblies*

EN 1363-1, *Fire resistance tests — Part 1: General requirements*

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

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



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

EN 12519, *Windows and pedestrian doors — Terminology*

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

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

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

EN 15269, *Extended application of test results for fire resistance and/or smoke control for door, shutter and openable window assemblies, including their elements of building hardware*

prEN 15887, *Building hardware — Uncontrolled Door Closing Devices for single action doors — Requirements and test methods*

### 3 Terms and definitions

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

#### 3.1

##### **moving component**

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

##### **type (or mode) of operation**

motion of the moving component as either translatory or rotary

NOTE Some hardware systems allow for a combination of several types of operation, for example, Tilt and Turn windows or folding windows which combine rotary and translatory operations.

#### 3.5

##### **main type of operation**

intended principal type (or mode) of operation and distance or angular travel as specified by the manufacturer. Windows or doorsets might feature multiple main types of operation, such as tilting and sliding

#### 3.6

##### **minor type of operation**

secondary type (or mode) of operation intended for occasional use

NOTE Operating the moving component for cleaning or maintenance purposes is not considered a main or minor type of operation.

#### 3.7

##### **cleaning or maintenance type of operation**

additional type (or mode) of operation not in every day use

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**3.8  
cycle**

series of operations involving opening a moving component, including releasing any fastening devices, moving open to the open position, returning to the closed position and re-engaging any fastening devices the cycle might consist of several types of operation, that might be tested separately or combined

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

**3.8.1  
part cycle**

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

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

NOTE 2 All part cycles shall be carried out on the same test specimen.

**3.8.2  
number of cycles**

shall comply with the classification in accordance with EN 12400 or EN 14600 as appropriate, and applied to the cycle or part cycle accordingly

**3.9  
operating device**

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

**3.10  
fastening device**

hardware component or set that keeps the moving component locked or latched, for example, door lock or Tilt and Turn hardware.

**3.11  
closing edge**

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

**3.12  
reference velocity**

for translatory operation this is the actual velocity of the moving components for rotary operation this is the angular velocity of the closing edge

**3.13  
rest time**

time in seconds of a stationary period for the following:

- between two changes of direction of operation;
- between the completion of a moving component's operation and the subsequent fastening device's operation;
- between the completion of a fastening device's operation and the subsequent moving component's operation;
- between two cycles.

## 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.

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 measurement equipment accurate to  $\pm 5\%$ ;
- force and mass measuring equipment accurate to  $2\%$ ;
- dynamometer and torque-meter accurate to  $3\%$ ;
- measuring tape, EC-precision class I;
- dial gauges and callipers accurate to  $\pm 0,1\text{ mm}$ .

### 4.4 Velocity measurement

The measurement of the reference velocity shall be carried out over a measuring track with a maximum of 70 mm for turning and sliding and a max of 30 mm for tilting. The end of the measuring track shall be at a maximum distance of  $5 \pm 0$  mm from the moving component's final position. 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 prescribed in this European Standard shall be adhered to, unless stated otherwise in the Annexes.

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## 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 type 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  $\pm 10\%$ .

**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
$65 < M \leq 100$	0,2	0,35	0,50
$100 < M \leq 150$	0,17	0,30	0,50
$150 < M \leq 200$	0,14	0,25	0,43
$200 < M \leq 300$	0,12	0,20	0,35
$M > 300$	0,10	0,18	0,31

NOTE 1 A consistent energy of 1,6 J (rotary and translatory) and 9,4 J (tilt mode) is the basis for calculating for the respective mass and velocity.

NOTE 2 For doorsets and openable windows with fire resisting and/or smoke control characteristics, the velocities shall be in accordance with EN 14600.

### 5.3.2 Mechanical operation

If the moving component is mechanically operated, for example, via self-weight, springs or any other mechanism, during either a cycle or part cycle, and if the velocity is adjustable, the reference velocity shall be set as defined in Table 1. If not adjustable, the reference velocity shall be the actual velocity.

## 5.4 Rest time

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

## 5.5 Operation of the fastening devices

### 5.5.1 Force level

For manually operated fastening devices 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 devices.

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

NOTE 1 The operating forces shall be measured with moderate velocity, in a jerk-free and jolt-free manner.

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.

If deemed necessary during the test, subsequent adjustments of the operating equipment may be carried out in order to enable the test to proceed.

NOTE 2 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.

NOTE 3 Ensure that the moving component is in the closed position before the operation equipment applies a force on the operating device. EN 13115 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  $100 \text{ N} \times 1,5 = (150 \pm 10) \text{ N}$  should be applied as the (gasket) compression force.

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

## 6 Preparation for testing

Specimens shall be tested in their 'as received' condition, unless otherwise specified.

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.

NOTE 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 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.

NOTE Windows or doors 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 %.