



**SLOVENSKI STANDARD**  
**oSIST prEN 13659 rev:2011**  
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**Polkna in zunanje žaluzije - Zahtevane lastnosti, vključno z varnostjo**

Shutters and external venetian blinds - Performance requirements including safety

Abschlüsse Außen und Außenjalousien - Leistungs- und Sicherheitsanforderungen

Fermetures pour baies équipées de fenêtres et stores vénitiens extérieurs - Exigences de performance y compris la sécurité

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## Shutters and external venetian blinds - Performance requirements including safety

Fermetures pour baies équipées de fenêtres et stores  
véniens extérieurs - Exigences de performance y compris  
la sécurité

Abschlüsse Außen und Außenjalousien - Leistungs- und  
Sicherheitsanforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 33.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (prEN 13659:2011) 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 13659:2004 + A1:2008..

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directives, see informative Annex ZA and Annex ZB, which is an integral part of this document.

This standard specifies the requirements for shutters and external venetian blinds, the levels of performance and the associated classes where applicable.

It is completed by test standards as well as by the standards referring to specific performance requirements.

.Annexes A, B and D are informative.

Annex C is normative.

This document includes a Bibliography.

- Clause 4 “wind resistance” has been modified in integrate requirements on the shutters and external venetian blinds in the retracted position and has been aligned to the EN 1932 “test methods” under revision. Class 0 has been deleted.
- Clause 10 “Resistance of mechanisms holding the shutter in the extended position” has been clarified and modified to be applicable to any type of shutters and external venetian blinds.
- Clause 14 “Resistance against intrusion” has been added.
- Clause 17 “Additional thermal resistance” has been clarified
- Clause 18 “Total solar energy transmittance” has been added
- Clause 19.2 “Durability of rigid plastic materials” has been aligned to the new version of EN 13245-1.
- Clause 19.3 “Durability of metals” has been clarified
- Clause 20 “Dimensional tolerances” has been modified for external venetian blinds
- Clause 23 “Evaluation of conformity” has been aligned to the European template
- Annex B “Calculation of wind pressure exerted on a shutter” has been modified to consider values of Eurocode 1.
- Annex C “List of significant machine hazards” has been modified. Standard EN ISO 14121-1 has been introduced.

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- Annex D “Example of methodology for wind stress determination on fixed parts of shutters” has been added.
- Annex ZA has been modified to introduce a two mandated characteristics : the total solar energy transmittance  $g_{tot}$  and the additional thermal resistance  $\Delta R$

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## Introduction

The performances given in this European Standard which illustrate suitability for use, are required for every type of shutter and external venetian blind (intrinsic performances).

Other performances are only required as a complement (specific performances) and result in specific products. Some of them are described in European Standards (e.g. EN 1522, EN 1523, ENV 1627, ENV 1628, ENV 1629, ENV 1630, EN 13123-1, EN 13124-1, EN 13123-2 and EN 13124-2). Others are described in EN 14500 and EN 14501 which are related to important issues such as thermal comfort, i.e.:

- Solar factor;
- Shading factor;
- Direct solar transmittance;
- Secondary heat transfer factor;

and visual comfort, i.e.:

- Light control;
- Night privacy;
- Visual contact with the outside;
- Glare control;
- Use of daylight;
- Rendering of colours.

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or with the airborne sound insulation (see EN 14759).

**NOTE** Health and Safety regulations require that the workplace receives as much natural light as is reasonably practical (see EU Directive 89/654/EEC) and protection of operators working with VDV screens against glare control and reflected light (see EU Directive 87/391/EEC).

The list of these documents is given in the Bibliography.

With the aim of clarifying the intentions of the standard and avoiding doubts when reading it, following assumptions were made related to power operated products while producing it:

- Negotiations shall occur between the manufacturer and the purchaser concerning particular conditions for use and places for use such as for nursery schools or for buildings for disabled people which need specific risk analysis;
- The risk analysis carried out in this standard and the corresponding significant hazards listed in Annex C suppose a normal use or normally predictable use e.g. which excludes deliberate and conscious risks taken by the user (see Interpretative Document "Safety in use" of EU Construction Products Directive).

**prEN 13659:2011 (E)****1 Scope**

This European Standard specifies the performance requirements which shutters and external venetian blinds shall fulfil when fitted to a building. It deals also with the significant hazards for construction, transport, installation, operation and maintenance (see list of significant machine hazards in Annex C).

It applies to all shutters and external venetian blinds as well as similar products whatever their use and nature of the materials used, as follows and defined in EN 12216:

— external venetian blind, roller shutter, wing shutter, Venetian shutter, flat-closing concertina shutter, concertina shutter or sliding panel shutter, with or without a system of projection.

These products can be operated manually with or without compensating spring, or by means of electric motors (power operated products).

NOTE This standard covers shutters and external venetian blinds mounted externally. In case such products are installed internally, they should fulfil all relevant safety requirements defined in EN 13120.

This document is not applicable to shutters and external venetian blinds which are manufactured before the date of application of this document by CEN.

The noise emission of power operated shutters and external venetian blinds is not considered to be a relevant hazard. Therefore this standard does not contain any specific requirements on noise in relation to the Machinery Directive.

If not specified otherwise, the term "shutter" used in this document refers to any type of shutter or external venetian blind included in the scope of this European Standard.

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**2 Normative references**

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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 ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*.

EN ISO 14121-1, *Safety of machinery - Risk assessment - Part 1: Principles*

EN 1070:1998, *Safety of machinery - Terminology*.

EN 1670, *Building hardware - Corrosion resistance - Requirement and test methods*.

prEN 1932:2011, *External blinds and shutters - Resistance to wind loads - Method of testing*.

EN 12045, *Shutters and blinds power operated - Safety in use - Measurement of the transmitted force*.

EN 12194, *Shutters, external and internal blinds - Misuse - Test methods*.

EN 12216, *Shutters, external blinds, internal blinds — Terminology, glossary and definitions*.

EN 12833, *Skylight and conservatory roller shutters - Resistance to snow load - Test method*.

EN 12835, *Airtight shutters - Air permeability test*.

EN 13125, *Shutters and blinds - Additional thermal resistance - Allocation of a class of air permeability to a product*.

EN 13245-1:2004, *Plastics - Unplasticized poly(vinyl chloride) (PVC-U) profiles for building applications – Part 1: Designation of light coloured profiles.*

prEN 13330:2011, *Shutters - Hard body impact — Test method.*

EN 13527, *Shutters and blinds – Measurement of operating force — Test methods.*

EN 14201, *Blinds and shutters - Resistance to repeated operations (mechanical endurance) - Methods of testing.*

EN 60335-1, *Household and similar electrical appliances - Safety - Part 1: General requirements (IEC 60335-1:2001, modified)*

EN 60335-2-97, *Safety of household and similar electrical appliances - Part 2-97: Particular requirements for drives for rolling shutters, awnings, blinds and similar equipment (IEC 60335-2-97:1998, modified).*

EN 61310-1, *Safety of machinery – Indication, marking and actuation – Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:1995).*

EN ISO 10077-1, *Thermal performance of windows, doors and shutters -Calculation of thermal transmittance - Part 1: Simplified method (ISO 10077-1:2000).*

ISO 9227, *Corrosion tests in artificial atmospheres – Salt spray tests.*

### 3 Terms and definitions

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For the purposes of this European Standard, the terms and definitions given in EN 1070:1998 and EN 12216:2002 and the following apply.

#### 3.1

##### **intrinsic performance**

overall performances of the shutter regardless of its application as opposed to specific performance

#### 3.2

##### **specific performance**

performance which may be additional and complementary to the intrinsic performances and refers to a specific product (for example, acoustic, thermal, burglary resistance, etc.)

#### 3.3

##### **curtain**

that part of the product which is set in motion by the operating mechanism, and ensures its function

#### 3.4

##### **extension/retraction**

movement of the curtain resulting in an increase/decrease the surface area covered

#### 3.5

##### **opening/closing**

terms used to describe the increase in light (opening) or reduction of light (closing) in an extended position for products with slats or slats which can be tilted or adjusted

NOTE The common parlance uses "open" for retraction and "closed" for extension.

#### 3.6

##### **rough operation**

sharp action on the operating mechanism or directly on the curtain, resulting in excessive speed at the beginning and a sudden stop at the end

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NOTE Rough operation is only possible if the moving part has significant inertia (mass and speed).

**3.7****forced operation**

excessive force exerted on the operating mechanism or directly on the curtain with the aim of causing movement in spite of resistance to the travel of the curtain

**3.8****reversed operation**

extension or retraction of the curtain occurring in the opposite direction to that intended without use of abnormal force

**3.9****winch handle**

operating mechanism consisting of a reel rotated by an operation handle which allows accumulation of a cord, cable, or chain

**3.10****gear with crank handle**

operating mechanism consisting of a gear attached to an axle, a drive shaft, a universal joint, a rotated rod and a crank handle

**3.11****one direction movement of the operating mechanism**

operating mechanism operated by a single cord, belt, etc., extension / retraction being effected by relying on gravity or the potential energy stored up during retraction / extension, respectively

**3.12****endless movement of the operating mechanism**

operating mechanism operated by a loop, movement in one direction extends the curtain (or tilts the laths), and in the reverse retracts the curtain (or tilts the laths) in the opposite direction

**3.13****monocommand**

same mechanism which achieves both opening/closing and extension/retraction

**3.14****vertical loading/racking**

downward force applied to the panel edge of a wing shutter

**3.15****determination of performance**

means of verification of the performance relating to the corresponding requirement

**4 Wind resistance****4.1 In the extended position****4.1.1 General**

The wind resistance of a shutter is characterised by its ability to withstand specified loads simulating the action of wind in positive or negative pressure.

Wind resistance is specified through classes defined by threshold values of nominal pressure  $p_N$  and safety pressure  $p_S = \gamma \times p_N$  with  $\gamma = 1,5$ :

- Nominal wind pressure  $p_N$ : it represents the wind pressure under which the shutter shall not sustain deformation or deterioration detrimental to its correct operation.
- Safety wind pressure  $p_S$ : it represents the wind pressure under which no deterioration which may be dangerous for the persons shall be observed (breakage, coming out from the fixing or locking devices).

#### 4.1.2 Determination

The determination shall be in accordance with the test methods specified in FprEN 1932:2011.

NOTE The FprEN 1932:2011 specifies that the test samples shall be of the following dimensions: the maximum width associated with the greatest height achievable with this width and the maximum height associated with the greatest width achievable with this height. Therefore, two tests are necessary for a same range of shutters.

#### 4.1.3 Performance requirement

##### 4.1.3.1 General

Depending on the type of shutter considered, the performance criteria applicable to the curtain and specified in:

- clause 8.1.5 of prEN 1932:2011 for roller shutter, wing shutter, venetian shutter, flat closing concertina shutter, concertina shutter, sliding panel shutter,

or

- clause 8.2.8 prEN 1932:2011 for external venetian blind

shall be fulfilled.

In addition, for projecting shutters, the performance criteria of the projection mechanism specified in clause 8.3.6 of prEN 1932:2011 shall be fulfilled.

The classification of the shutters shall be given according to 4.1.3.2.

##### 4.1.3.2 Classes of wind resistance

The classes of wind resistance are given by the threshold test pressures specified in Table 1. For projecting shutters, the class declared shall be the class obtained when the shutter is in the non-projected position.

**Table 1 — Classes of resistance to static pressure**

	Classes					
	1	2	3	4	5	6
Nominal pressure $p_N$ (N/m <sup>2</sup> )	50	70	100	170	270	400
Safety pressure $p_S = 1,5 p_N$ (N/m <sup>2</sup> )	75	100	150	250	400	600

NOTE 1 The application of a static pressure over the shutter gives the classification shown in Table 1. It provides an accurate measurement of the intrinsic resistance of a shutter but does not consider the dynamic behaviour of such a shutter in real wind conditions. Annex B gives the rule allowing the calculation of the wind speed from the static pressure for which the shutter has been classified. This calculation rule considers the coefficient  $C_p$  of the shutter, i.e. the algebraic difference between the external pressure coefficient  $C_{pe}$  and the internal pressure coefficient  $C_{pi}$ . The coefficient  $C_p$  is mainly depending on the air permeability of the shutter.

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NOTE 2 The prEN 1932:2011 states that “the tests shall be carried out with the maximum dimensions defined by the manufacturer in the most unfavourable configuration for each product type. The test results obtained can then be applied to all more favourable configurations and to all smaller dimensions in the particular product design”. For External Venetian Blinds, the dimensions of the test specimens have been fixed (see 8.2.3 of prEN 1932:2011 and Annex B)..

**4.2 In the retracted position****4.2.1 General**

Since some parts of shutters – for example head boxes, guiderails – cannot be retracted, they have to withstand in some cases very high wind speed. The resulting pressure on the product depends on:

- The installation condition,
- The height of the building,
- The location of the building.

This clause applies to the shutter itself. It does not cover the fixing of the shutter to its support for which the manufacturer shall give guidance in the instructions for installation (see 22.3.2.1).

NOTE As the criteria determining the resulting pressure applied to the fixed parts of shutters are depending on installation conditions (location, height, ...), it is recommended to refer to National rules – if available – which give such information on the basis of National wind speed map.

**4.2.2 Determination**

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The determination shall be done by calculation when designing the shutter.

NOTE Since the shutters covered by this standard have a huge variety it is not possible to describe a test method for each product.

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**4.2.3 Performance requirement**

All fixed parts of the shutters, i.e. the parts that are not retracted when the shutter is in the complete retracted position, shall be designed to withstand a minimum pressure of 800 Pa.

NOTE An example of determination of wind stress applied is given in Annex D.

**5 Resistance to snow load (roller shutters only)****5.1 General**

This clause is only applicable to roller shutters for skylight and conservatory for which the inclination angle from the horizontal is less than 60°.

Under the weight of snow, the shutter fitted to the window shall not:

- a) sustain deformation or deterioration which is detrimental to its correct operation;
- b) exit from its guide rails.

Two ways of resistance are considered:

- 1) the shutter itself resists the snow pressure;

- 2) the shutter resists the snow pressure together with the mechanical association of the glazing, fitted at a distance defined by the manufacturer.

This second way of resistance is allowed only if the following requirements are fulfilled:

- the shutter accepts a level of deformation resulting in contact with the glazing under the snow loading;
- and
- the distance between the shutter and the glazing is not modified by the opening of the window.

NOTE An attempt to open the window, when the shutter is loaded with snow, should not endanger the user.

## 5.2 Determination

The determination shall be in accordance with the test method specified in EN 12833.

## 5.3 Performance requirement

The shutter resists to the snow pressure  $p_N$ , maximum snow pressure specified by the manufacturer, if the following requirements are fulfilled:

- after having applied the nominal pressure  $p_N$ , the operating effort shall be maintained within the limit of the initial class;
- under the safety pressure  $p_S = \gamma \times p_N$  with  $\gamma = 1,5$ , the shutter shall not break or exit from the guide rails.

## 5.4 Expression of the results

The results shall be expressed as follows:

- 1) if the shutter resists itself the snow pressure:
  - the manufacturer shall declare:
    - the maximum nominal snow pressure  $p_N$  expressed in  $N/m^2$ ;
    - the following form of resistance : shutter alone;
  - shutters of the same range which are narrower and for which the curtain surface is lower than the product tested shall be deemed to resist at least the same snow pressure  $p_N$  than the product tested.
- 2) if the shutter resists the snow pressure with the mechanical association of the glazing:
  - the manufacturer shall declare:
    - the maximum nominal snow pressure  $p_N$  expressed in  $N/m^2$ ;
    - the following form of resistance: shutter in association with a glazing which withstands pressure  $p_N$  and located at the maximum distance  $d$  from the shutter;
  - shutters of the same range with a width and a height higher than those of the product tested shall be deemed to resist at least the same snow pressure  $p_N$  at the condition that the distance from the glazing remains the same.