

External blinds and shutters — Resistance to wind loads — Method of testing

The European Standard EN 1932:2001 has the status of a
British Standard

ICS 91.060.50

National foreword

This British Standard is the official English language version of EN 1932:2001.

The UK participation in its preparation was entrusted by Technical Committee B/538, Doors, windows, shutters, hardware and curtain walling, to Subcommittee B/538/3, Domestic shutters and blinds, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee 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.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 25 and a back cover.

The BSI copyright date displayed in this document indicates when the document was last issued.

This British Standard, 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 May 2001

Amendments issued since publication

Amd. No.	Date	Comments

© BSI 05-2001

ISBN 0 580 34979 9

English version

External blinds and shutters - Resistance to wind loads - Method of testing

Fermetures pour baies équipées de fenêtres et stores
extérieurs - Résistance aux charges de vent - Méthodes
d'essai

Abschlüsse und Markisen - Widerstand gegen Windlast -
Prüfverfahren

This European Standard was approved by CEN on 1 March 2000.

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 Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

CONTENTS

Page

Foreword.....	3
1 Scope	3
2 Normative references.....	3
3 Terms and definitions.....	4
3.1 test pressure p	4
3.2 nominal test load F_N	4
3.3 safety load F_S	4
3.4 dimensions.....	4
4 Test conditions.....	5
4.1 Dimensions of test samples.....	5
4.2 Laboratory conditions.....	5
5 Folding arm and treillis arm awnings.....	5
5.1 Test preparation.....	5
5.2 Test methods.....	6
6 Pivot arm awning and marquiselette	8
6.1 Test preparation.....	8
6.2 Test methods.....	9
7 Awning with lateral guiderail without tension system	11
7.1 Test preparation.....	11
7.2 Test methods.....	12
8 Awning with lateral guiderail with tension system	13
8.1 Test preparation.....	14
8.2 Test methods.....	14
9 Roller shutter, wing shutter, venetian shutter, flat closing concertina shutter, concertina shutter, sliding panel shutter	16
9.1 Test preparation.....	16
9.2 Test methods.....	17
10 External venetian blind.....	18
10.1 Test preparation.....	18
10.2 Test methods.....	19
11 Resistance of projection systems.....	20
11.1 Test preparation.....	21
11.2 Test methods.....	21
12 Test report	22
Annex A (Informative) Description of a test apparatus for the measurement of the wind resistance of shutters.....	24

Foreword

This European Standard 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 September 2001, and conflicting national standards shall be withdrawn at the latest by September 2001.

It is part of a package of standards dealing with blinds and shutters for buildings as defined in prEN 12216:1995.

The effect of wind on external blinds and shutters takes the form of pressure pushing and pulling which are reproduced conventionally by the following tests.

These tests enable verification, under these conditions, that the blind or shutter as a whole satisfies the specifications in prEN 13561:1999 and prEN 13659:1999 namely :

- presents no unacceptable visual defects;
- retains its characteristics of suitability for use;
- does not endanger the safety of users.

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

1 Scope

The current standard specifies the test methods to be applied to evaluate the wind resistance of blinds and shutters designed to be used in front windows/doors or façades and delivered as a complete unit.

This standard applies to:

- **Shutters** : roller shutter, external venetians blind, wing shutter, venetian shutter, concertina shutter, flat closing concertina shutter and sliding panel shutters (Including those with projection systems).
- **Blinds** : folding arm awning and trellis arm awning, pivot arm awning, marquisolette, vertical awning, façade awning, conservatory awning and roof light awning.
- whatever of the nature of the constituent materials;
- under normal operating conditions;
- and installed in compliance with the manufacturer's installations instructions.

Dutch awnings (adjustable or fixed) and solar screen are not included.

2 Normative references

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

EN 13527 *Blinds and shutters – Measurement of operating force – Test methods*.

prEN 12216:1995, *Shutters, external blinds, internal blinds – Terminology, glossary and definitions*.

prEN 13561:1999, *External blinds – Performance requirements including safety.*

prEN 13659:1999, *Shutters – Performance requirements including safety.*

3 Terms and definitions

For the purposes of this standard the terms and definitions given in prEN 12216:1995, prEN 13561:1999 and prEN 13659:1999 apply together with the following :

3.1

test pressure p

Pressure exerted on the external or internal face of the test sample which represents the differential pressure (difference in pressure between the two faces) exerted by the wind on the exterior blind or shutter

p is chosen within the wind resistance classes specified in prEN 13561:1999 and prEN 13659:1999

3.2

nominal test load F_N

Sum of selective forces applied to the blind or shutter allowing the reproduction of effects caused by uniform pressure exerted on the test sample

It is a function of :

- the test pressure p ;
- a coefficient β which expresses the relationship between the static wind load and the test load;
- the surface submitted to loading.

3.2.1

direct nominal test load F_N

Nominal load corresponding to a pressure exerted on the external face (positive differential pressure)

3.2.2

inverse nominal test load $-F_N$

Nominal load corresponding to pressure exerted on the internal face (negative differential pressure)

3.3

safety load F_S

Direct or inverse load under which there shall be no rupture of the product

The safety load F_S is linked to the nominal load F_N by a coefficient γ which value depends on the product involved : $F_S = \gamma \times F_N$

3.4

dimensions

3.4.1

height H

In the case of awnings, H is the distance between the axis of the roller tube and the extremity of the front or bottom profile

In the case of roller shutters, H is the measurement of the visible part of the curtain including the bottom lath

In the case of external venetian blinds, H is distance between the top edge of the headbox and the extremity of the bottom lath

In the case of others shutters, H is the height of the curtain

3.4.2

width L

In the case of awnings, L is the width of the fabric

In the case of shutters, L is the visible width of the curtain

4 Test conditions

4.1 Dimensions of test samples

The dimensional technical limits of a product are the maximum dimensions for the width and height (L_{max} and H_{max}) associated with the maximum surface area (S_{max}) specified by the manufacturer.

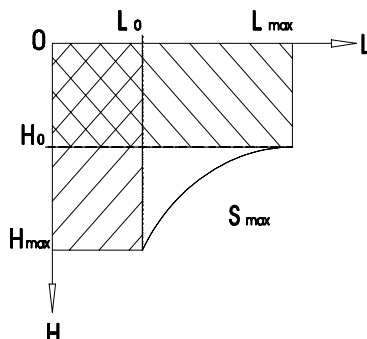


Figure 1 – Dimensions of test samples

To be representative of a range, the samples submitted for test shall be of the following dimensions (see figure 1):

- the maximum width associated with the greatest height achievable with this width,
 - and maximum height associated with the greatest width achievable with this height,
- the two tests being necessary for a same range.

Products of a smaller width and a lesser height than the test samples will be deemed to satisfy the test for the class.

In the case of the conservatory blind, the height to be considered is the maximum free height between the roller tube and the front profile, or between these and the relieving rollers.

In the case of the marquisolette, the height to be considered is the total height, the sum of the length of the relieving rail and the height of the vertical part.

In the case of folding and trellis arm awnings, the maximum width for one pair of arms is the basis of the test.

4.2 Laboratory conditions

The tests are carried out at room temperature of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

5 Folding arm and treillis arm awnings

5.1 Test preparation

5.1.1 Test loads

For the maximum height H and the maximum width L specified by the manufacturer, for pressure p of the particular wind resistance class, the direct nominal load, the inverse nominal load and the direct safety load the following using the relations obtained by the equations (see table 1):

$$F_N = \beta \times p \times L \times H \quad \text{with } \beta = 0,5$$

$$F_S = \gamma \times F_N \quad \text{with the value } \gamma \text{ given in prEN 13561:1999.}$$

Table 1 – Folding arm and trellis arm awnings - Test loads

Direct nominal load	$F_N = \beta \times p \times L \times H$	$\beta = 0,5$
Inverse nominal load	$F_N = -\beta \times p \times L \times H$	$\beta = 0,5$
Direct safety load	$F_S = \gamma \times F_N$	

5.1.2 Positioning of sample

The awning is fixed on a rigid frame by brackets according to the manufacturer's installation instructions.

For folding arm awning, the fixing is such that the blind extends horizontally (tolerance $\pm 5^\circ$).

5.1.3 Method of loading

The loads are produced by using suspended weights (direct loading), for the inverse loading, the weights are obtained by using pulleys or another system rendering the friction, relative to the applied loads, negligible. The application points and the loading forces depending on the loading sequence are defined in table 2.

5.1.4 Measurement of vertical displacements

The front bar is located according to a vertical reference, displacements are measured at each front arm connection, note Zl (left hand) and Zr (right hand).

The measurements are taken using a metre rule, with an accuracy of ± 5 mm.

5.2 Test methods

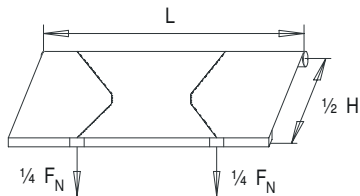
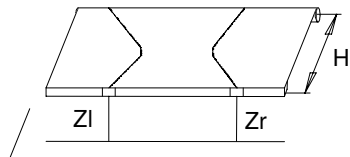
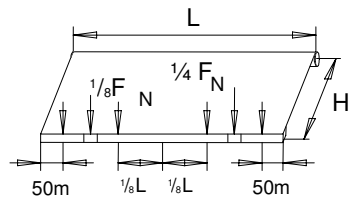
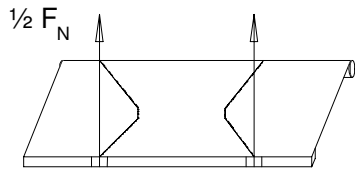
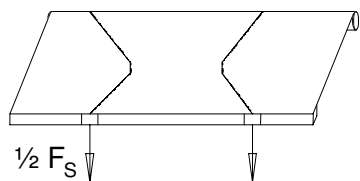
5.2.1 Test sequences

Table 2 describes the loading and unloading sequences as well as the measure sequences. The loads are applied for 2 min. Measurements are taken 2 min after the load is released.

5.2.2 Measurement of operating force

The operating force is measured according to the methods specified in EN 13527, before carrying out the test sequences and at the end of sequence 4, after a complete cycle of extension/retraction.

Table 2 – Folding arm awnings and trellis arm awnings – Test methods

Sequences	Load applied	Measurement of displacement at each arm		Expression of results
		l	r	
Sequence 1 $H_{1/2}$	$F_{N/4}$ on each arm  then release load			Horizontal positioning Measurement of operating force before loading
Sequence 2 H	 reference plane	Zl_0	Zr_0	Reference measurement Zl_0, Zr_0
Sequence 3 Direct nominal load F_N	$2 \times F_{N/4} + 4 \times F_{N/8}$  Then release load	Zl_1	Zr_1	Vertical displacement after loads is released $ Zl_1 - Zl_0 $ $ Zr_1 - Zr_0 $ $ (Zl_1 - Zl_0) - (Zr_1 - Zr_0) $
Sequence 4 Inverse nominal load $-F_N$	$-F_{N/2}$ on each arm  then release load	Zl_2	Zr_2	Vertical displacement after loads is released $ Zl_2 - Zl_0 $ $ Zr_2 - Zr_0 $ $ (Zl_2 - Zl_0) - (Zr_2 - Zr_0) $ Measurement of operating force
Sequence 5 Direct safety load F_S	$F_{S/2}$ on each arm 			Rupture : yes or no