BRITISH STANDARD

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12194:2000

Shutters, external and internal blinds — Misuse — Test methods

The European Standard EN 12194:2000 has the status of a British Standard

ICS 91.060.50

National foreword

This British Standard is the official English language version of EN 12194:2000.

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.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 33 and a back cover.

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English version

Shutters, external and internal blinds - Misuse - Test methods

Fermetures pour baies équipées de fenêtres, stores extérieurs et intérieurs - Fausses manoeuvres - Méthodes d'essais

Äußen und innere Abschlüsse und Markisen - Falschbedienungen - Prüfverfahren

This European Standard was approved by CEN on 6 October 1999.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

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of an identical text or by endorsement, at the latest by December 2000, and conflicting national standards shall be withdrawn at the latest by June 2001.

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.

This standard is a part of a series of standards dealing with blinds and shutters for buildings as defined in prEN 12216:1996.

The methods of testing are linked to the performance requirements for internal/external blinds and shutters, as specified in prEN 13120:1998, prEN 13561:1999, and prEN 13659:1999.

1 Scope

This standard specifies the tests to be carried out to determine the ability of shutters and blinds to resist abnormal use of their operating mechanisms in terms of rough, forced or reversed operation.

It applies to the following products:

- **Internal blinds:** Internal venetian blinds, roller, vertical and pleated blinds and darkening blinds.
- **External blinds:** Folding arm awnings, trellis arm awnings, vertical roller awnings, pivot arm awnings, marquisolettes, façade awnings, roof light awnings, verandah or conservatory awnings, dutch awnings, insect screen awnings and louvre arrays.
- **Shutters:** External venetian blinds, roller shutters (vertical or projected), venetian shutters (vertical or projected), flat-closing concertina shutters, concertina shutters, sliding panel shutters.

Shutters with a projection system are also covered.

2 Normative references

The present European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriated places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revision of any 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.

prEN 12216:1996, *Shutters, internal and external blinds - Terminology - Glossary and definitions*

prEN 13120:1998, *Internal blinds - Performance requirements including safety*

EN 13527:1999, *Shutters and Blinds - Measurement of operating forces - Test methods*

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 definitions of prEN 12216:1996, prEN 13120:1998, EN 13527:1999, prEN 13561:1999 and prEN 13659:1999 apply.

4 Test conditions

4.1 Specification of the samples

These are the same samples used for the operating tests (see EN 13527:1999).

4.2 Test preparation

The sample product, blind or shutter, is submitted for test in its normal usage position, fully equipped, with the necessary operating systems and mechanisms, systems for guiding the curtain and projection system where applicable.

The complete assembly is mounted on a test rig according to recommendations in the manufacturer’s technical instructions, which consists of:

- for blinds and shutters with a vertical curtain, a rigid frame simulating the opening.

The frame allows, if necessary, locking of the curtain or its projection. The support piece shall be horizontal.

- for projecting shutters with a vertical curtain, on a rigid support which simulates the wall, façade or roof, on which the test product is fixed using the positions recommended by the manufacturer and erected in compliance with the technical instructions (e.g. use of brackets) and according to the angle(s) specified in EN 13527:1999.

- for sloping or horizontal products, on a rigid support, allowing it to be tilted to the minimum and maximum angles laid down in the manufacturer's technical instructions.

After the blind or shutter has been mounted, check that it is operating normally by carrying out a complete operation: extention, retraction, locking, tilting the laths (where applicable) and all other options with which the product is equipped, with particular attention to the setting of the limit stops.

4.3 Nature of tests

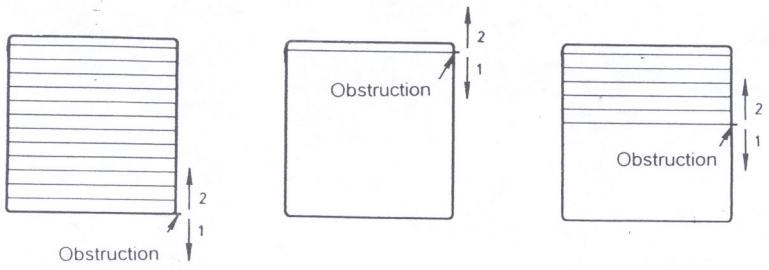
The testing of the operating mechanism to determine the possibility of misuse.

4.3.1 Reminder

4.3.1.1 Misuse relating to the curtain

- **rough operation** is only possible if the moving part has significant mass and can reach excessive speed.

- **forced operation** may occur either at the fully extended or retracted position or at an intermediate position when obstructed (see Figure 1)



Direction 1: extension.
Direction 2: retraction.

a) curtain fully retracted **b) curtain fully extended** **c) curtain in intermediate position, obstructed during extension and/or retraction**

Figure 1 - Illustration of forced operation

Important: Certain products are not designed to withstand obstructions during the extension of the curtain in situations specified in a2, b1, c1 and c2. They will not be subjected to the corresponding tests if the operating procedure[(1)] does not warn the user of the risk of damage when the curtain is obstructed in these situations.

- **reversed operation** is only possible if continued operation within the limits of the operating force of the class:

  - once the product is fully extended, leads to the retraction of the curtain;

or

  - once the product is fully retracted, leads to the extension of the curtain.

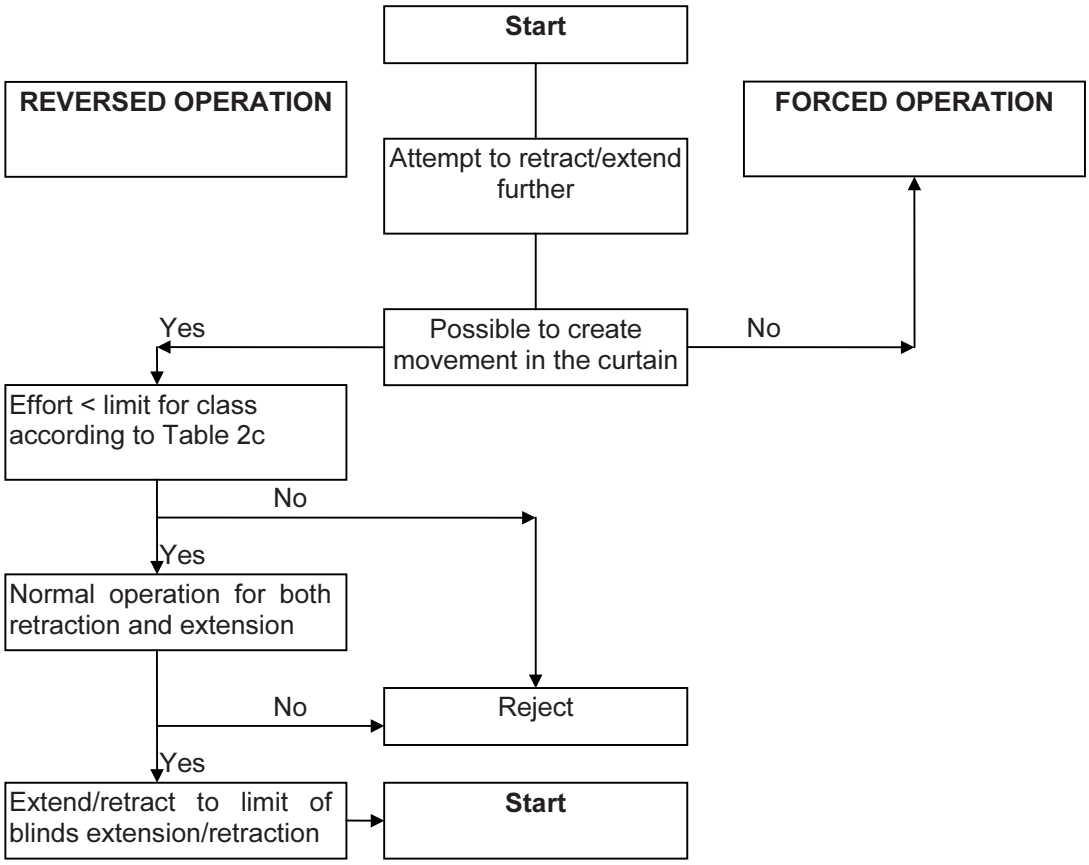
Reversed operation only refers to rolling blinds and shutters and to those products using a roll up method for extension and retraction.

[(1)] The operating procedure must be provided by the installer to his client. The installation instructions provided by the manufacturer to the installer will recall this duty.

With regard to roll up products, Movements a1 or b2 (see Figure 1) are either forced or reversed operations when the operating force is within the limits for the class.

The following flowchart shows the procedure to be followed to check tests on reversed and forced operation.

Table 1 - Flowchart



Checks on tests for reversed and forced operations on rolling products in the following situations:

- an attempt to extend further a curtain already fully extended (Movement a1);
- an attempt to retract further a curtain already fully retracted (Movement b2).

4.3.1.2 Misuse relating to the tilting of the laths

Forced operations only apply. In the case of monocommand, the forced operation applies during the tests related to movement of the curtain.

4.3.1.3 Misuse relating to the projection of the curtain

Rough and forced operations only apply.

4.3.2 Types of operation

These are described as:

- linear operation;
- one direction movement of the operating mechanism:
    - operation by tape or cord with or without reel;
- endless movement of the operating mechanism:
    - operation by cord or chain;
- direct operation:
    - operation by hand or rod or lever (only for tilting laths on wing shutters);
- rotational operation:
    - gear with crank handle;
    - winch with cord, cable or tape;
    - wand, rod or knob (only for tilting the laths of internal blinds);
- power operated mechanism.

4.4 Efforts to be applied

- Force P for linear operation.

- Torque C for rotational operation.

- Efforts developped by the motor or power operated mechanisms.

The Table 2 shows the symbols used related to the type of misuse.

Table 2 - Symbols used related to the type of misuse

Efforts applied	Type of misuse operations			
	rough	forced	reversed	Edge loading
Force	P_B	P_F	P_I	P_{el}
Torque	C_B not applicable[1]	C_F	C_I	-
[1] Operation by gear cannot be rough since it does not cause excessive speed in the movement of the curtain.				

The misuse values of the forces and torques to be applied as a function of type of misuse operation are specified in the performance requirements standards, for internal blinds, external blinds, shutters.

4.5 Laboratory conditions

The tests are carried out at the ambient temperature of the laboratory, c.e. 23 °C± 5 °C.

4.6 Measuring equipment

– **measuring forces**

- linear operation: forces applied using weights.
- rotational operation: torques applied using a torque wrench with an accuracy of 3 %.

– **positioning of the curtain**

A tolerance of ±10 mm is allowed.

4.7 Requirements for conducting the tests

– The tests described in the following paragraphs are carried out a number of times equal to 0,5 % of the endurance cycles for the class of the product, number designated by *N* for the following.

– During the forced operation test, the force P_F or the torque C_F is applied for 5 s. The curtain shall be operated in the opposite direction as is necessary to achieve the start conditions before reapplying P_F or C_F.

In the case of operation by crank handle and for Situations b1 and c1 (see Figure 1), for which the value of C_F is not achieved at the end of three turns of the handle, the test is carried out in the following manner:

– carry out the three turns of the crank handle then return to the initial position;

– carry out the procedure *N* times;

– At the end of each test, record any possible damage.

5 Misuse relating to movement of the curtain

5.1 One direction of the operating mechanism (tape or cord)

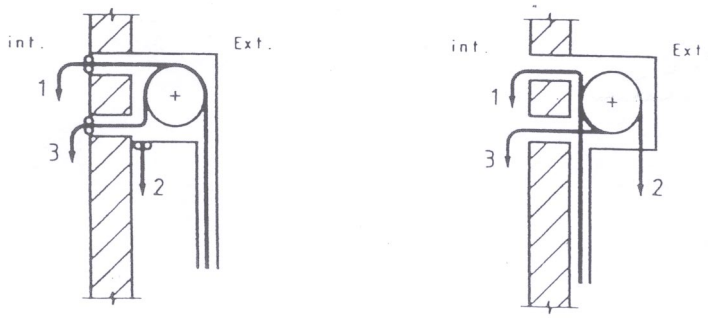
In the following it is assumed that the blinds and shutters are operated in the direction of retraction and using for extension gravity or the potential energy stored during the retraction (spring, counterweight, etc.). If the gravity or potential energy is used for retraction, the tests described remain valid in replacing extension by retraction and retraction by extension.

5.1.1 Exit positions for drive system

They are those retained for the test measurement of the operating force (exit position least favourable corresponding to the greatest resistance of the operating mechanism as specified in 5.1.2 of EN 13527:1999).

- Position 1 (see Figure 2b), when the roll up is external, or Position 3 (see Figure 2a), when the roll up is internal,
- otherwise, Position 3 (see Figure 2b), or Position 1 (see Figure 2a),
- otherwise, Position 2 (see Figure 2a or Figure 2b).

NOTE: If the manufacturer proposes the Positions 1, 2 and 3, the confirmation of the Position 1 (external roll up) and Position 3 (internal roll up) is de facto implied in the other positions.



2a internal roll up **2b external roll up**

Figure 2 - Illustration of the different box exit positions for a roller shutter for two box configurations

5.1.2 Rough operation

Three tests shall be carried out:

- on extension:

  a) sudden stopping of the operating mechanism before the curtain is fully extended (testing the operating mechanism);

  b) sudden stopping of the curtain at the end of extension (testing the curtain);

- on retraction:

  c) sudden stopping of the curtain at the end of retraction (testing the curtain and the operating mechanism).

5.1.2.1 Extension test

1st test (see Figure 3)

Position the curtain in Position 2. Immobilize tape/belt or cord roller. Pull 500 mm of tape/belt or cord which takes the curtain to Position 1. Release belt/tape or cord.

The curtain drops sharply from Position 1 to Position 2.

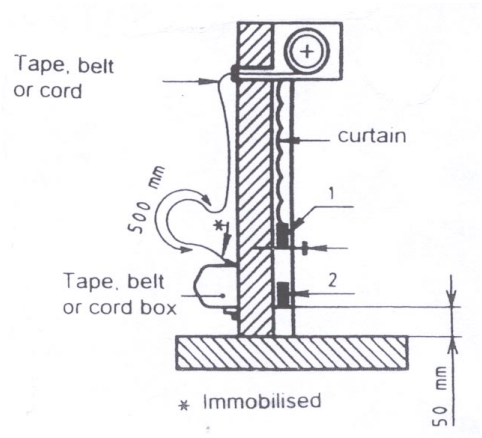


Figure 3 - Operation by single tape/belt or cord - First test of rough operation during extension - For roller shutter

2nd test (see Figure 4)

The curtain is in a fully retracted position (Position 1). Release the tape/cord box brake or untie the cord.

The curtain extends under its own weight or using the potential energy stored in the course of retraction and is stopped by an intermediate stop support piece or lower end stop (Position 3).

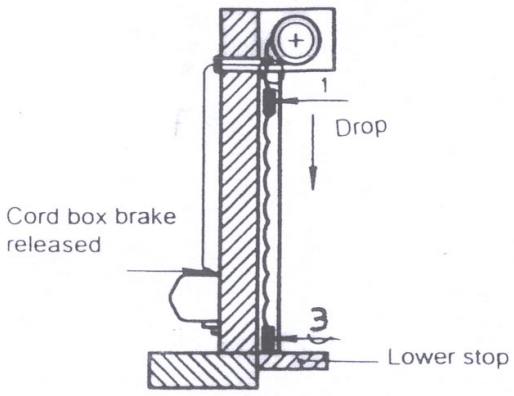


Figure 4 - single operation by tape/belt or cord - 2nd test of rough operation during extension - For roller shutter

5.1.2.2 Retraction test (see Figure 5)

Move the curtain to Position 5 (position of the fully retracted curtain minus 50 mm); pull 500 mm of strap or cord to reach Position 4 and immobilize the curtain in this position.

Apply the load P_B to the belt/tape or cord.

The curtain is then free and its movement is caused by the fall of the weight P_B, without initial speed, for a distance of 500 mm obtained by the interposition of a block.

The speed generated causes the displacement of the curtain beyond Position 5 coming to a sudden stop when fully retracted.

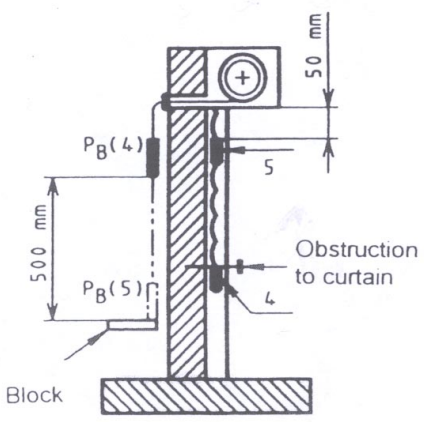


Figure 5 - Single operation by belt/tape or cord - Test of rough operation during retraction - For roller shutter

5.1.3 Forced operation

5.1.3.1 Extension test

This test is not applicable. Effort can only be exerted on the tape or belt in the direction of retraction.

5.1.3.2 Retraction test

1st test (see Figure 6a)

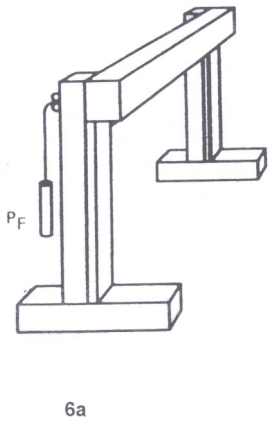
With the curtain fully retracted, apply the load P_F without initial speed to the operating mechanism in the direction of retraction.

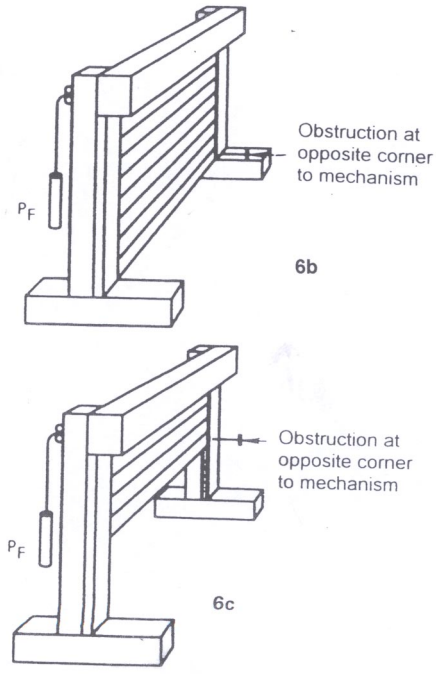
2nd test (see Figure 6b)

With the curtain fully extended and obstructed on the level with the corner of the curtain opposite to the operating mechanism, apply the load P_F to the drive mechanism in the direction of retraction.

3rd test (see Figure 6c)

With the curtain half extended and obstructed on the level with the corner of the curtain opposite to the operating mechanism, apply the load P_F to the drive mechanism in the direction of retraction.





6a - in fully retracted position
6b - in fully extended position
6c - half extended

Figure 6 - Operation by belt/tape or cord - Forced operation during retraction - For roller shutter

5.1.4 Reversed operation

This test is not applicable as the single tape/belt or cord does not allow reverse operation.

5.2 Operation by endless mechanism (cord or chain)

5.2.1 Rough operation

5.2.1.1 Extension test (see Figure 7)

The curtain is positioned to allow the cord or chain to unwind to a length of 500 mm (Position 1). The curtain is moved a distance of 50 mm from the fully extended position (Position 2) and obstructed in this position.

The load P_B is applied to the cord or chain.

The curtain is then released and its movement caused by the drop of the weight P_B, without initial speed, for the distance of 500 mm obtained by the interposition of a block. The speed gained causes the curtain to move beyond Position 2, coming to a stop when fully extended.

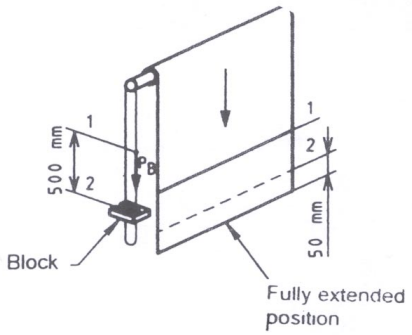


Figure 7 - Operation by endless cord or chain - Test on rough operation during extension

5.2.1.2 Retraction test (see Figure 8)

The curtain is positioned (Position 4) to allow the cord or chain to unwind to a length of 500 mm. The curtain is moved to a distance of 50 mm from the fully retracted position (Position 5).

The load P_B is applied to the cord or chain. The curtain is then released and its movement caused by dropping the weight P_B, without initial speed, for the distance of 500 mm obtained by the interposition of a stop.

The speed gained causes the curtain to move beyond Position 5, coming to a halt when fully retracted.

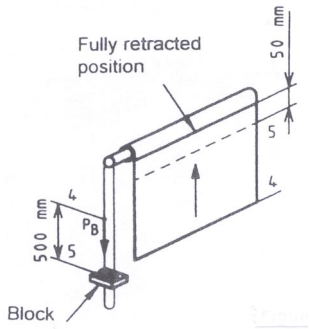


Figure 8 - Operation by continuous cord or chain - rough operation test during retraction and before coming to a halt at the top stop

5.2.2 Forced operation

5.2.2.1 Extension test

1st test (see Figure 9a)

With the curtain fully extended, apply the load P_F on the operating mechanism in the direction of extension.

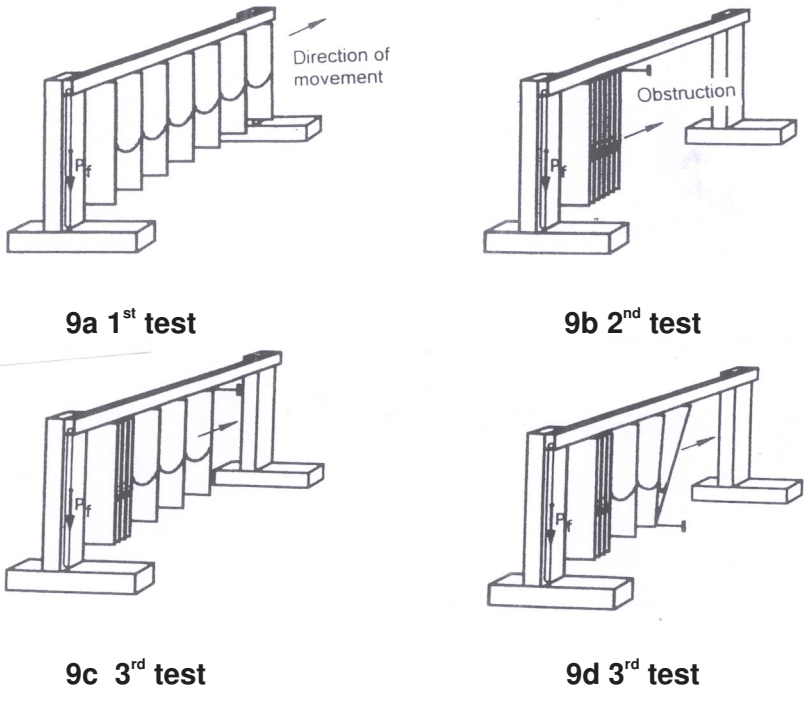
2nd test (see Figure 9b)

Same test as before, with the curtain fully retracted and obstructed on the level with the corner of the curtain opposite to the operating mechanism in the direction of retraction.

3rd test: (see Figures 9c and 9d)

Same test as before, with the curtain obstructed at half-way position. For curtains made up of independent laths such as vertical blinds, it is suitable to carry out the test obstructing both the mechanism for moving the laths (Figure 9c) and a lath itself at the same time (Figure 9d).

If a feature allows the detaching of the vanes, these shall be replaced after each return to the initial position. The result of test will prove the performance of the feature.



9a 1st test **9b 2nd test**

9c 3rd test **9d 3rd test**

Figure 9: **Operation by continuous cord or chain - Forced operation during extension - For vertical blinds**

5.2.2.2 Retraction test

1st test (see Figure 10a)

The curtain is fully extended and obstructed in the direction of extension on the level with the corner of the curtain opposite to the operating mechanism.

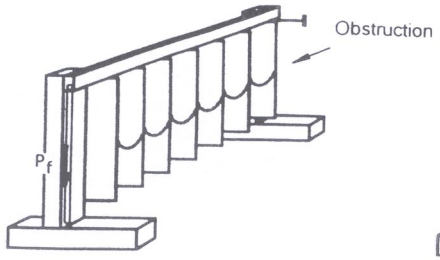
Apply vertical the load P_F on the operating mechanism in the direction of extension.

2nd test (see Figure 10b)

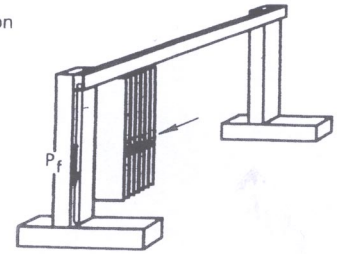
With the curtain fully retracted, apply the load P_F in the direction of retraction.

3rd test: (see Figure 10c and 10d)

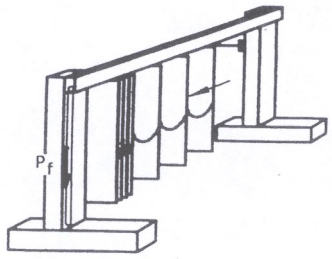
Same test as above, with the curtain obstructed at half-way position (Figure 10c) at the level of the operating mechanism and also at the level of a vane if necessary (Figure 10d) or with the details of the test given in 5.2.2.1 (3rd test) if the product allows the vanes to detach.



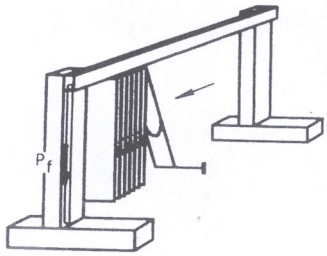
10a 1st test



10b 2nd test



10c 3rd test



10d 3rd test

Figure 10 - Operation by endless mechanism - Forced operation during retraction - For vertical blind

NOTE: The tests may be conducted in a different order, that is with the curtain in the same position carrying out the extension and then the retraction tests:

- curtain fully extended and obstructed;
- curtain fully retracted and obstructed;
- curtain in half-way position.

5.2.3 Reversed operation

5.2.3.1 Extension test

With the curtain fully extended, carry out the operation in the direction of extension according to the procedure given in the flowchart with force P_1 (see Table 1).

Note how the curtain rolls up to fully retracted position and its condition when fully retracted.

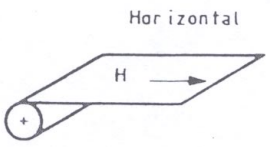
5.2.3.2 Retraction test

This test is not relevant as the endless cord or chain does not allow reverse operation during retraction (see forced operation).

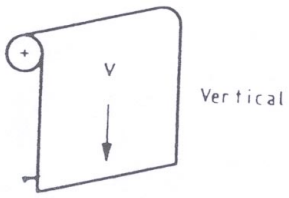
5.3 Direct operation (hand, rod, pole)

The test methods and test equipment are linked to four types of movement identified as the following (see EN 13527:1999):

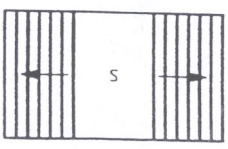
- **Product H:** horizontal product with horizontal movement (see Figure 11a);
- **Product V:** vertical product with vertical movement (see Figure 11b);
- **Product S:** vertical product with horizontal movement (see Figure 11c)
  (covers products: flat-closing concertina shutters, concertina shutters, sliding panel shutters);
- **Product P:** vertical product pivoting on a vertical axis (see Figure 11d)
  (covers products: wing shutters and venetian shutters).



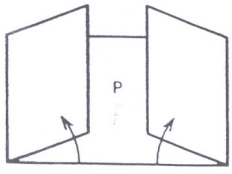
11a Horizontal product with horizontal movement



11b Vertical product with vertical movement



11c Vertical product with horizontal movement
(curtain in two parts)



11d Vertical product pivoting on a vertical axis
(a two panel curtain)

Figure 11 - Direct operation - Typing of the four movements

In the case of Products S or P where the curtain may be in two parts, the tests as described in 5.3.1 and 5.3.2 are carried out only on one.

5.3.1 Rough operation

Tests on venetian shutters are not applicable.

5.3.1.1 Extension test on Product P (see Figure 12)

The following test is to be carried out on each panel.

Obstruct the panel in a position whereby a rotation of 60° allows full extension (Position 1).

The load P_B is applied in the direction of extension half-way up the far edge of the panel, or on the handle designated by the manufacturer, using a return pulley according to the principle as shown in Figure 12.

The curtain is then released and its movement is caused by the fall of the load P_B, without initial speed, with the load P_B being stopped by the interposition of a block (Position 2) giving a distance of 50 mm from the fully extended position.

The speed acquired causes the panel to move beyond Position 2 stopping either at the stop supplied by the manufacturer or by the frame supporting the structure.

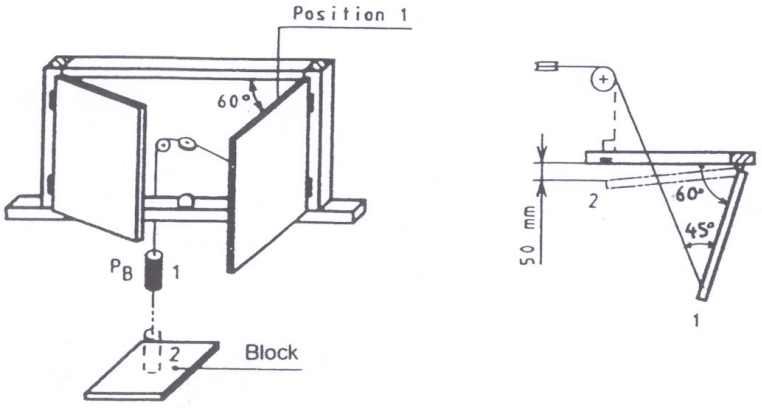


Figure 12 - **Rough operation - Extension test on wing shutter**

5.3.1.2 Retraction test on Product P (see Figure 13)

Same test as for extension with the panel in a position whereby a 60° rotation allows full retraction.

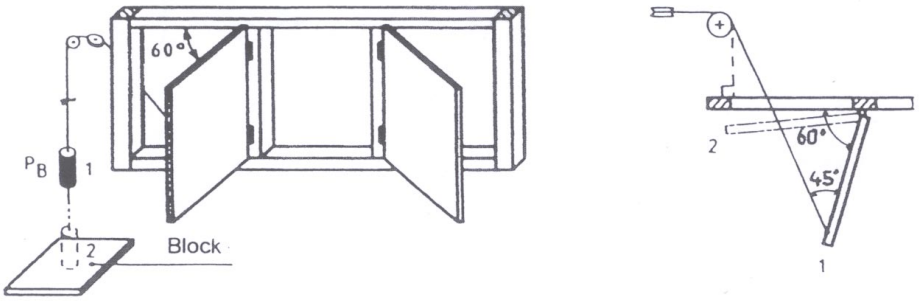


Figure 13 - Rough operation - Retraction test for wing shutter

5.3.1.3 Extension test for Products S and H

– **Product S**

Tests shall be carried out according the principle of tests for Products H described as follows:

– **Product H** (see Figure 14)

Move the curtain to Position 2 (50 mm from the fully extended position).

Place a block at the position of the load P_B when the curtain is in Position 2. Lift up the load P_B so it is 500 mm higher than its Position 2 giving Position 1 of the load and curtain.

Release the load P_B from Position 1 to Position 2.

The speed gained by the curtain causes it to move beyond Position 2.

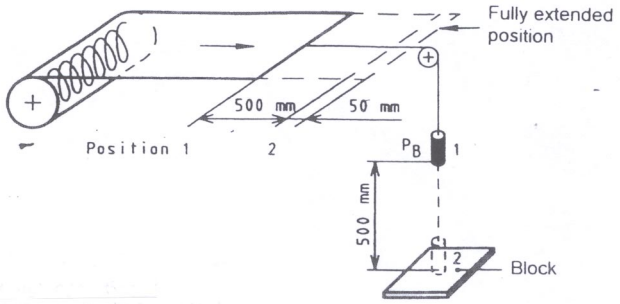


Figure 14 - Rough operation - Extension test for Products S and H - For roller blind

5.3.1.4 Retraction test for Products S and H

– **Product S** (see Figure 15)

Tests shall be carried out according to the principle as shown in Figure 15.

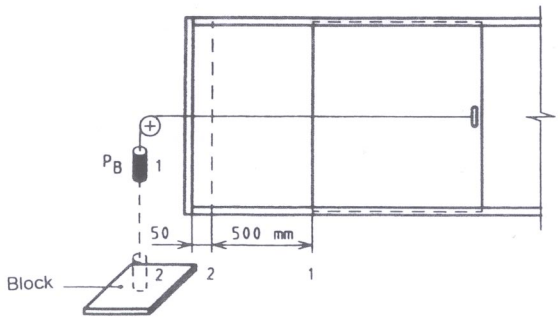


Figure 15 - Rough operation - Retraction test for sliding shutters

– **Product H** (see Figure 16)

The curtain retracts itself using the potential energy stored during extension. The test involves extending the curtain to Position 1 and then releasing it. The curtain moves roughly from Position 1 to Position 2 (curtain fully retracted).

Position 1 is that specified in by the manufacturer's technical instructions as the position beyond which the product cannot withstand being released. This shall be ≥ 25 % of the length L of the fully extended curtain.

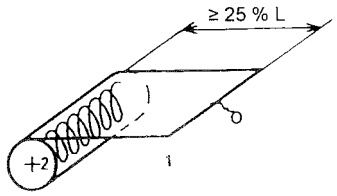


Figure 16 - Rough operation - Retraction test on Product H - For roller blind

5.3.1.5 Extension test for Product V (see Figure 17)

The test is carried out following the principle specified in 5.3.1.3 and as shown in Figure 17.

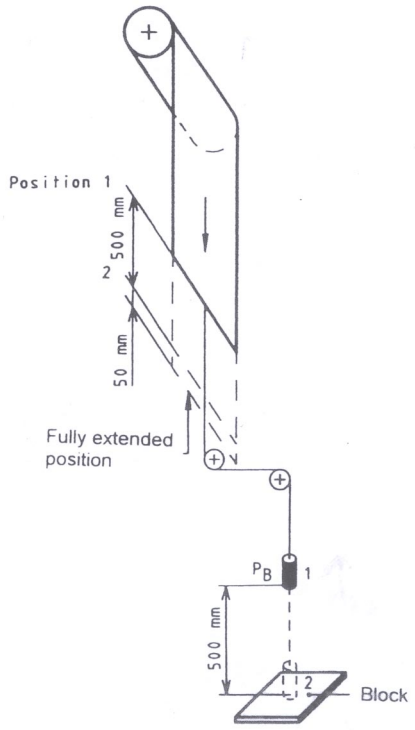


Figure 17 - Rough operation - Extension test on Product V - For roller blind or roller shutter

5.3.1.6 Retraction test for Product V

– Where the curtain retracts itself using the potential energy stored during extension, the test is carried out following the principle in 5.3.1.4 (Product H) as shown in Figure 16 with the curtain in a vertical position.

  The manufacturer's technical instructions shall state that this product cannot withstand being released beyond the length indicated in the instructions (≥ 25 % H).

– Where the curtain has a balanced position in the course of its movement, the test is carried out following the principle as shown in Figure 18.

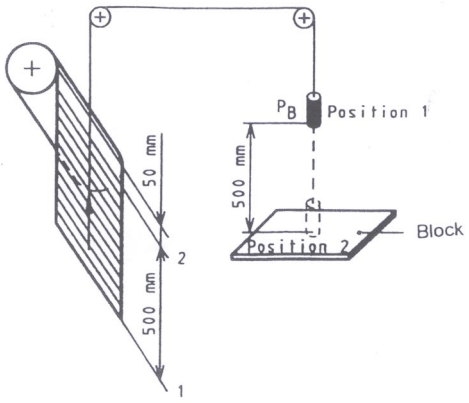


Figure 18 - Rough operation - Retraction test on Product V - For balanced roller shutter

5.3.2 Forced operation

Non guided Products H and V are not concerned.

5.3.2.1 Extension test

Test in fully extended position (see Figure 19)

Only for Products P.

The aim is to test the fixings of the retaining brackets as well as those of the locking profile.

With the curtain fully extended, apply load P_F on the shutter latch in a perpendicular direction to the panel.

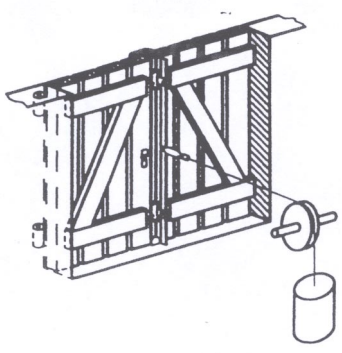
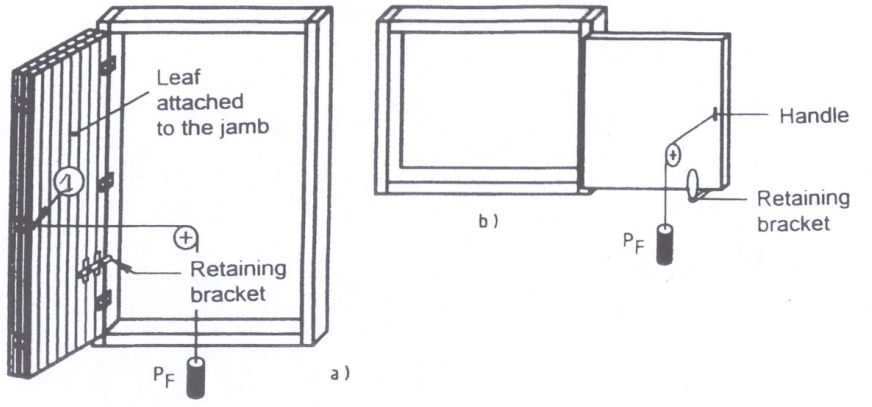


Figure 19 - Forced operation - Extension test - Curtain in fully extended position

Test in fully retracted position (see Figure 20)

The curtain being fully retracted and locked with the use of wind stops (Product S or P) or obstructed at one end (Product H or V) apply the load P_F on the pull handle in the opening direction (see Figure 20).



① Attachment on a level with the pull handle.

a) For venetian shutter b) For wing shutter with one panel

Figure 20 - Forced operation - Extension test - Curtain fully retracted

Test in half-way position

Products P are not concerned.

With the curtain at a half-way position, the panel carrying the handle obstructed at the end furthest from the handle (Product S) or the curtain obstructed on one end (Product H or V), apply load P_F on the handle in the direction of extension.

5.3.2.2 Retraction test

The test in the fully retracted position is not applicable.

Test in fully extended position (see Figure 21)

Only for Products P.

The aim is to test the fixings of retaining brackets.

With the curtain in the extended position and obstructed in this position by the retaining brackets designated by the manufacturer, apply the load P_F half-way up the far edge perpendicular to the closing panel.

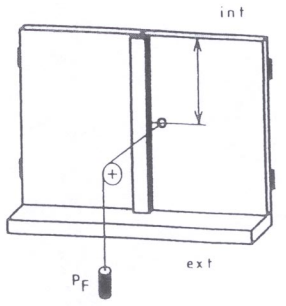


Figure 21 - **Forced operation on retraction - Test on a wing shutter with two panels**

Test in half-way position (see Figure 22)

Only Products S and Products V having a totally stable position during their travel are concerned.

With the curtain in the half-way position (Products S) or in a stable position (Product V) and the panel carrying the handle obstructed at the end furthest from the handle (Product S) or the bottom rail/front profile obstructed at one end (Product V), apply the load P_F to the handle, in the plane of the curtain, in the direction of retraction.

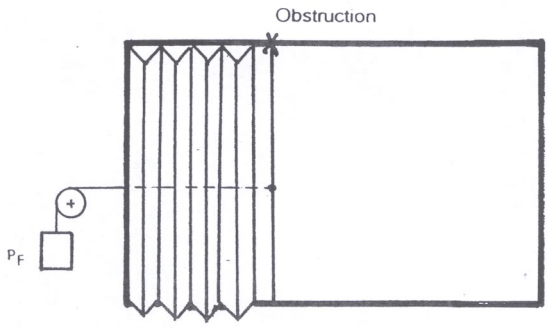


Figure 22 - Forced operation on retraction in half-way position - For venetian shutter

5.3.3 Reverse operation

Not applicable

5.4 Operation by gear with crank handle (T.O.)

5.4.1 Equipment

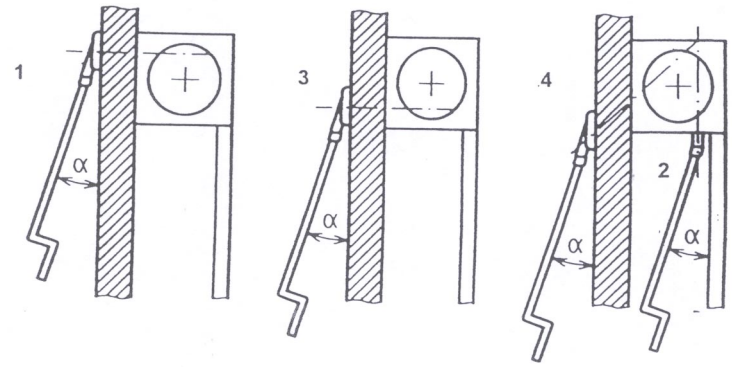
A torque wrench is placed on the rod replacing the handle allowing the torque C_F to be applied.

5.4.2 Exit positions for drive system (see Figure 23)

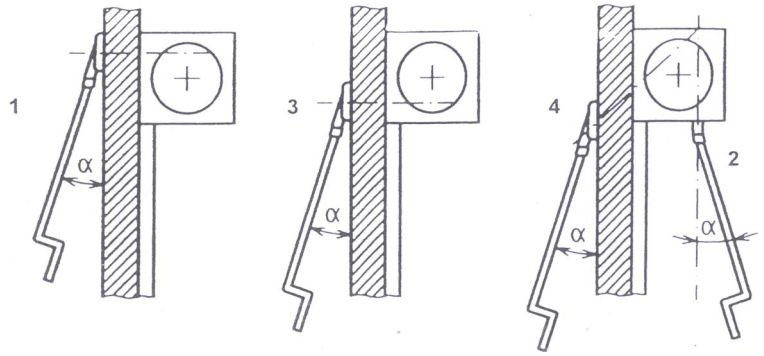
They are those retained for the test measurement of the operating force (exit position least favourable corresponding to the greatest resistance of the operating mechanism (see 5.2.2 in EN 13527:1999):

- Position 1 or Position 3;
- otherwise Position 4;
- otherwise Position 2.

Internal roll-up



External roll-up



α **= 30° ± 2°**

Figure 23 - Misuse test - Gear with crank handle - Positions 1 to 4 for roller shutters

The crank rod is rotated in the vertical plane at an angle α of 30° ± 2° from the vertical.

For exit position of the gear in the end check of the box, the test is conducted, still with an angle of 30° ± 2°, but the crank rod in a vertical plane having an angle of $45° \, {}^{+4°}_{0°}$ with the plane of the curtain.

5.4.3 Rough operation

The tests are not applicable for extension or retraction. As gear operation is not reversible it does not lead to excessive speed of the curtain.

5.4.4 Forced operation

5.4.4.1 Extension test

1st test (see Figure 24a)

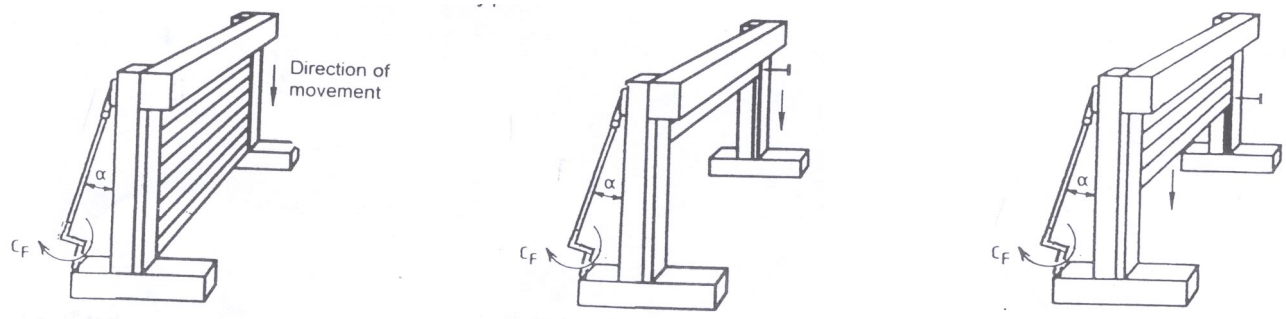
The curtain is fully extended. Apply torque C_F to the operating mechanism in the direction of extension (see 5.4.2).

2nd test (see Figure 24b)

Same test as above with the curtain fully retracted and obstructed on the level with the corner of the curtain opposite to the operating mechanism in the direction of extension.

3rd test (see Figure 24c)

Same test as above with the curtain obstructed at half-way position.



a) 1st test **b) 2nd test** **c) 3rd test**

Figure 24 - Operation by gear with crank handle - Forced operation during extension - For roller shutter

5.4.4.2 Retraction test

1st test (see Figure 25a)

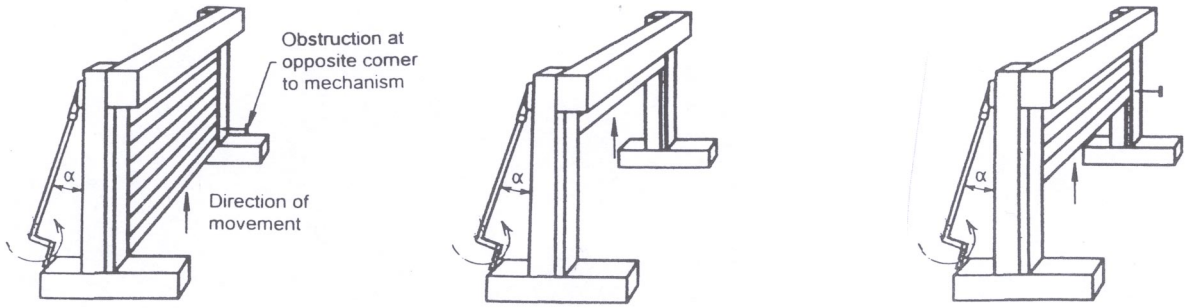
With the curtain fully extended and obstructed in the direction of retraction on the level with the corner of the curtain opposite to the operating mechanism, apply torque C_F in the direction of retraction.

2nd test (see Figure 25b)

With the curtain fully retracted apply torque C_F to the operating mechanism in the direction of retraction.

3rd test (see Figure 25c)

Same test as above with the curtain obstructed in half-way position.



a) 1st test **b) 2nd test** **c) 3rd test**

Figure 25 - Operation by gear with crank handle - Forced operation during retraction – For roller shutter

NOTE: The tests may be carried out in a different order, i.e. with the curtain in the same position, carrying out the extension and then the retraction tests:

- curtain fully extended and obstructed;
- curtain fully retracted and obstructed;
- curtain in half-way position.

5.4.5 Reversed operation

5.4.5.1 Extension test

With the curtain fully extended, carry out the operation in the direction of extension according to the procedure in the flowchart with torque C_I (see Table 1).

Note how the curtain rolls up to fully retracted position and its conditions when fully retracted.

5.4.5.2 Retraction test

This test is not applicable.

5.5 Operation by winch with cable, tape or belt

For convenience, the operation is known as operation by cable winch in the following tests.

5.5.1 Equipment

The torque C_F is achieved using the crank handle.

5.5.2 Exit position for drive system

They are those retained for the test measurement of the operating force (exit position least favourable corresponding to the greatest resistance of the operating mechanism see 5.2.2 of EN 13527:1999).

5.5.3 Rough operation

The tests are not relevant for extension or retraction, as operation by cable winch it does not allow excessive speed of the curtain.

5.5.4 Forced operation

5.5.4.1 Extension test

1st test

The objective of this test is to check the resistance of the end stop mechanism.

With the curtain fully extended, apply torque C_F in the direction of extension.

2nd test

Same test as above with the curtain fully retracted and obstructed in the direction of extension, on the level with the opposite corner to the operating mechanism.

3rd test

Same test as above with the curtain blocked at half-way position.

5.5.4.2 Retraction test

1st test (see Figure 26a)

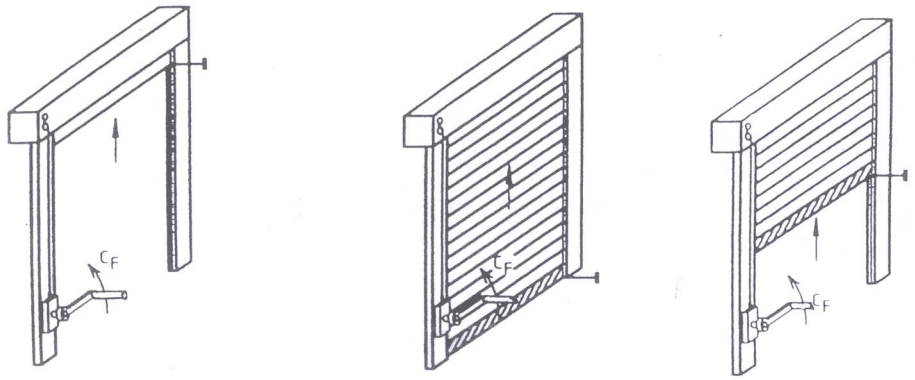
The curtain is fully retracted. Apply torque C_F to the operating mechanism in the direction of retraction.

2nd test (see Figure 26b)

Same test as above, with the curtain fully extended and obstructed on the level with the corner of the curtain opposite to the operating mechanism in the direction of retraction.

3rd test (see Figure 26c)

Same test as above, with the curtain obstructed at half-way position.



a) 1st test **b) 2nd test** **c) 3rd test**

Figure 26 - Operation by cable winch - Forced operation during retraction - For roller shutter

5.5.5 Reversed operation

5.5.5.1 Extension test

The curtain in the fully extended position, continue the operation in the direction of extension until the pre-set stop is reached in the cable winch gear. No retraction of the curtain shall be recorded.

5.5.5.2 Retraction test

This test is not applicable.

5.6 Power operated operation

The motor is provided with its pre-set stops.

5.6.1 Rough operation

Not applicable.

5.6.2 Forced operation

These tests are only to be carried out if the operating procedure does not warn the user of the risk of damage when the curtain is obstructed in these situations.

5.6.2.1 Extension test

- Curtain fully extended:

  Not applicable (pre-set stop exists).

- Curtain obstructed in fully retracted and at half-way positions:

  Apply the developped effort of the motor according to the conditions required (see 4.7).

5.6.2.2 Retraction test

– Curtain fully retracted:

  Not applicable (pre-set stop exists).

– Curtain obstructed in fully retracted and at half-way positions:

  Same test (see 5.6.2.1).

5.6.3 Reversed operation

Not applicable (presence of pre-set stops).

5.7 Summary

Table 3 - Extension and retraction operation - Summary up of misuse tests

Type of operating mechanism		Type of misuse		
		Rough	Forced	Reversed
One directional	Extension	5.1.2.1 (two tests)	Not applicable	Not applicable
	Retraction	5.1.2.2 (one test)	5.1.3.2 (three tests)	
Endless	Extension	5.2.1.1 (one test)	5.2.2.1 (three tests)	5.2.3.1 (one test)
	Retraction	5.2.1.2 (one test)	5.2.2.2 (three tests)	Not applicable
Direct operation	Extension	Product P 5.3.1.1 (one test) Product S and H 5.3.1.3 (one test) Product V 5.3.1.5 (one test)	Products P 5.3.2.1 (two tests) Products S, H & V guided 5.3.2.1 (two tests)	Not applicable
	Retraction	Product P 5.3.1.2 (one test) Product S and H 5.3.1.4 (one test) Product V 5.3.1.6 (one test)	Product P 5.3.2.2 (one test) Products S & V balanced 5.3.2.2 (one test)	
T.O.	Extension	Not applicable	5.4.4.1 (three tests)	5.4.5.1 (one test)
	Retraction		5.4.4.2 (three tests)	Not applicable
Gear with cable	Extension	Not applicable	5.5.4.1 (three tests)	5.5.5.1 (one test)
	Retraction		5.5.4.2 (three tests)	Not applicable
Power operated	Extension	Not applicable	5.6.2.1 (two tests)	Not applicable
	Retraction		5.6.2.2 (two tests)	

6 Misuse relating to the tilting of the laths

6.1 Rough operation

Not applicable.

6.2 Forced operation

Obstruction of laths in the half-way position is not considered.

With the laths having been moved from open to closed position, curtain fully extended, apply load P_F or torque C_F to the operating mechanism according to the conditions required in 4.7.

The test is carried out in the two directions of tilting the laths according to the principle as shown in Figure 27.

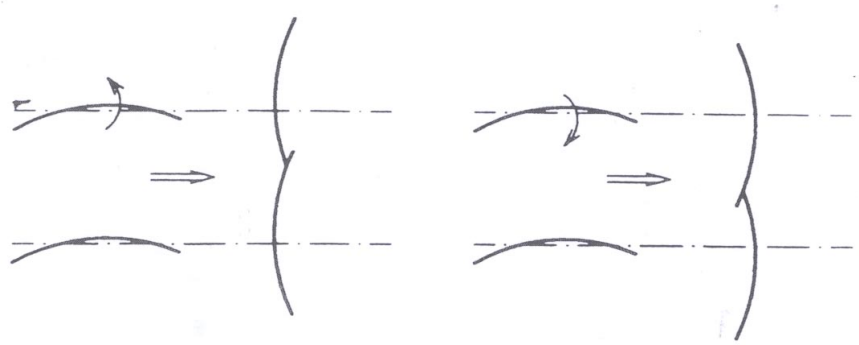


Figure 27 - Tilting of laths - Rough operation - Two tests on venetian shutters

NOTE: For monocommand, tilting of the laths being included in the cycle of extension/retraction, the forced operation test is achieved with the tests relating to movement of the curtain.

6.3 Reversed operations

Not applicable.

7 Misuse relating to the projection of the curtain

Tests are carried out according to the requirements specified in 4.7.

7.1 Rough operation

On projection (extending the arm) (see Figure 28)

With the curtain in vertical unlocked position (Position 1), apply a load F_B to the middle of the lower part of the curtain, the fall of the load F_B being stopped when the curtain reaches the position 50 mm from its fully projected position (Position 2).

The reverse pulley is positioned so that the suspension cord of load F_B is perpendicular to the curtain in fully projected position.

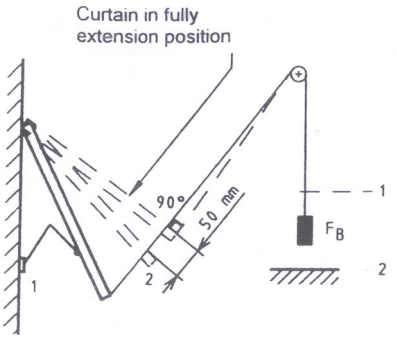


Figure 28 - Projection of curtain - Rough operation

7.2 Forced operation (see Figure 29)

With the curtain in projected position and the arms locked, apply the load P_F to the curtain perpendicular to the curtain's plane in the direction of retraction (test 1) and extension (test 2).

The arms shall remain in locked position.

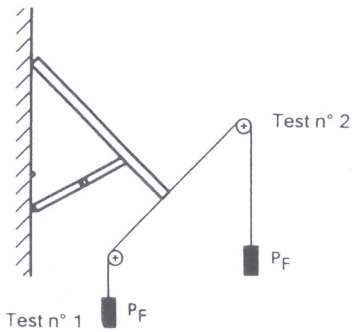


Figure 29 - Curtain in projected position - Forced operation

8 Specific tests

8.1 Edge loading

This test only applies to wing shutters.

The test consists of submitting each panel of the wing shutter to vertical load P_{el} applied for 2 min, as shown in Figure 30. After unloading, measure the remanent displacement of the extremity of each panel.

The test is only carried out once.

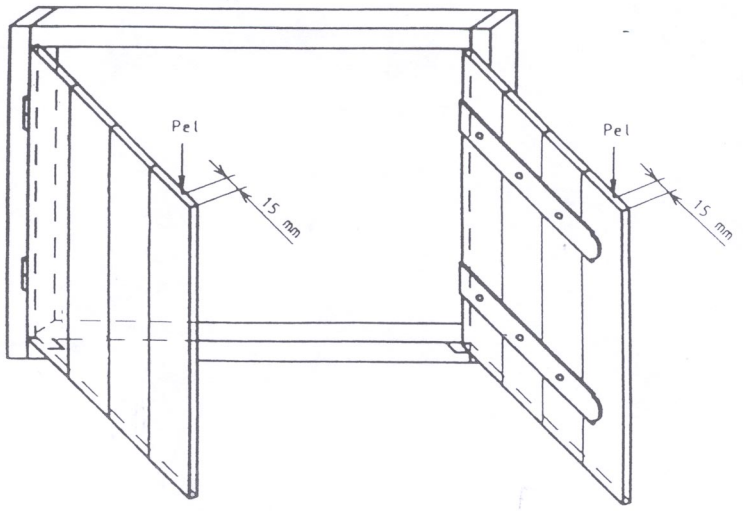


Figure 30 - Edge loading test -
For panel of a wing shutter and panel of a venetian shutter

8.2 Flexibility of the laths

This test refers to internal venetian blinds.

Apply a vertical load of 10 N vertically for 5 s on one of the blind slats between two string braids by means of a metal rod 30 mm diameter then unload.

Carry out the procedure *N* times.

After the test, the slats shall return to their original position and shape.

9 Operation test

Before and after the various misuse tests, measure the operating force according to EN 13527:1999.

10 Test report

The test report shall contain the following information:

a) details necessary to identify the product;

b) details relating to the type, dimensions, constituent materials, form and assembly of the product, correspondence to plans supplied by the manufacturer;

c) full details of accessories and fixtures;

d) dimensional limits of the product (width, height, area, slopes, etc.), positions of possible operating mechanisms;

e) dimensions of the product tested;

f) types of operation tested, the positions tested as well as the number N of cycles carried out;

g) values of the operating effort recorded before and after the misuse tests and the performance variation:

$$V\% = 100\ [\frac{P_e}{P_i} - 1]\ [\%]$$

where P_e and P_i are respectively the operating force before and after the misuse tests;

h) damage occured;

i) correspondence of directions for use of installation instructions with the configurations at hand;

j) report of compliance of warning markings;

k) specific tests carried out;

l) name of the test laboratory and those responsible for the tests;

m) date of the tests;

n) reference to this standard.

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