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To the P- and O-members of ISO/TC 136

Circulation of Committee Draft ISO/CD 12808

Situation

Further to the approval of the new project, please find attached the committee draft ISO/CD 12808 *Hardware for furniture — Strength and durability of extension elements and their components*.

Action

The committee draft (ISO/CD) is now available for 8 weeks to review and comment. ISO/TC 136 Members are requested to vote via Committee Internal Balloting (CIB) by

2022-08-25

Yours sincerely,

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Hardware for furniture — Strength and durability of extension elements and their components

CD stage

A model manuscript of a draft International Standard (known as "The Rice Model") is available at https://www.iso.org/iso/model_document-rice_model.pdf

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC *136*, *Furniture*.

A list of all parts in the ISO 12808 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The aim of this Standard is to provide furniture manufacturers, designers and developers with comparable information regarding the performance of extension elements and drawers.

The tests consist of the application of loads, forces and velocities simulating normal functional use, as well as misuse, that might reasonably be expected to occur.

With the exception of the corrosion test in 6.4, the tests are designed to evaluate properties without regard to materials, design/construction or manufacturing processes.

The strength and durability tests only relate to the extension elements and the parts used for the attachment, e.g. screws.

The strength and durability tests are carried out in a test frame with specified properties. The test results can only be used as a guide to the performance of a piece of furniture.

The test results are only valid for the extension element tested. These results may be used to represent the performance of production models provided that the tested model is representative of the production model.

Hardware for furniture — Strength and durability of extension elements and their components

1 Scope

This document specifies test methods and requirements for the strength and durability of all types of extension elements and their components for all fields of application, except table extensions.

With the exception of corrosion, ageing and the influence of heat and humidity are not included.

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 320, *Fibreboards — Determination of resistance to axial withdrawal of screws (correct ISO standard to be determined)*

ISO 9427:2003, *Wood-based panels — Determination of density*

ISO 6270-2, *Paints and varnishes — Determination of resistance to humidity — Part 2: Procedure for exposing test specimens in condensation-water atmospheres (ISO 6270-2:2005)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
catch device
device, which keeps or pulls an extension element in place, but does not require a second action in order to release it, e.g. a magnetic catch or a self-closing or self-opening mechanism

3.2
extension element
components that can be pulled out and pushed in, e.g. drawers, suspended pocket files, keyboard trays

3.3
loading capacity, M
mass in Kg, as specified by the manufacturer, for which the extension element will fulfil the strength and durability requirements.

NOTE The loading capacity includes the extension element and the load in/on the extension element. This is also referred to as total mass.

3.4
damper
mechanism which gently brings the extension element to a stop

4 Test conditions

4.1 General

The extension element shall be assembled/mounted according to the instructions supplied with it.

If mounting or assembly instructions are not supplied, the most adverse configuration shall be used and the mounting or assembly method shall be recorded in the test report. Fittings shall be tightened before testing and shall not be re-tightened unless specifically required in the manufacturer's instructions. If the configuration must be changed to produce the worst-case conditions, this shall be recorded in the test report.

For testing a range of related extension elements, only worst case(s) need to be tested.

The tests shall be carried out in indoor ambient conditions at a temperature between 15 °C and 25 °C. If during a test the temperature is outside of the range of 15 °C to 25 °C, the maximum and/or minimum temperature shall be recorded in the test report.

Extension elements which include structural hardware parts made of hygroscopic plastic materials, e.g. polyamide shall be conditioned at (23 ± 5) °C and a relative humidity of (50 ± 5) % for at least 7 days before testing.

In the case of designs not addressed in the test procedures, the test shall be carried out as far as possible as described, and deviations from the test procedure recorded in the test report.

Before beginning the testing, visually inspect the extension element thoroughly. Record any defects so that they are not assumed to have been caused by the tests. Carry out measurements when specified.

4.2 Application of forces

The forces in the static load tests shall be applied sufficiently slowly to ensure that negligible dynamic force is applied. Unless otherwise specified, each force shall be maintained for not less than 10 and not more than 15 s.

The forces in durability tests shall be applied at a rate to ensure that excessive heating does not occur.

The forces may be replaced by masses. The relation 10 N = 1 kg may be used for this purpose.

4.3 Tolerances

Unless otherwise stated, the following tolerances are applicable:

Forces: ± 5 % of the nominal force;

Velocities: ± 5 % of the nominal velocity;

Masses: ± 1 % of the nominal mass;

Dimensions: ± 1 mm of the nominal dimension;

Angles: ± 2° of the nominal angle;

The accuracy for the positioning of loading pads shall be ± 5 mm.

4.4 Sequence of testing

The tests shall be carried out in the same sequence as the clauses are numbered in this standard. If the clause sequence is not followed, the sequence shall be recorded in the test report.

4.5 Inspection and assessment of results

Before and after completion of each test, carry out the inspection as specified, after using adjustment devices, if available.

Before any measurements are taken, the loaded extension shall be moved 10 times over the total extension length.

Record any changes that have taken place since the initial inspection. The inspection shall include at least the following:

a) the fracture of any component or joint;

b) the loosening of any joint intended to be rigid, which can be demonstrated by hand pressure;

c) the deformation or wear of any part or component such that its functioning is impaired;

d) the loosening of any means of fixing components;

e) any impaired function of a component or part.

5 Test equipment

5.1 General

Unless otherwise specified, the tests may be applied by any suitable device, because results are not dependent upon the apparatus.

The equipment shall not inhibit deformation of the extension element, i. e. it shall be able to move so that it can follow the deformation of the extension element during testing.

5.2 Masses

Masses shall be designed so that they do not reinforce the structure or re-distribute the stresses.

5.3 Glass marbles

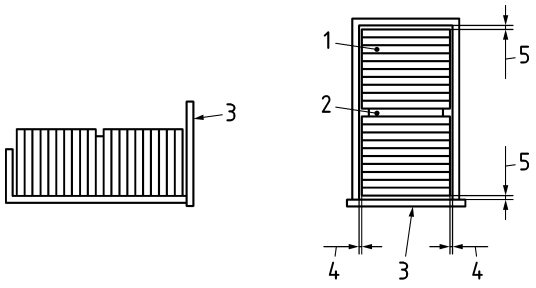
Marbles made of solid glass with 10 mm to 15 mm diameter. They shall be in a flexible bag large enough to allow them to move in the bag during the test.

In cases where the volume of the glass marbles is greater than the volume of the extension element, steel marbles shall be used. This shall be noted in the test report.

5.4 Loads for filing pockets

Suspended filing pockets shall be loaded with typing paper or an equivalent alternative as shown in Figure 1.

In cases where it is not possible to achieve the loading capacity with paper, the additional mass shall be steel and shall be positioned as the spacing material. This shall be noted in the test report.



a) b)

Key

1 Typing paper
2 Spacing material (for example polystyrene) in the middle of the extension element
3 Front of extension element
4 Air gap
(NOTE Will be determined by the size of the paper)

5 Air gap 25mm ± 6 mm
a Side view
b Top view

Figure 1 — Loading of suspended filing pockets with typing paper

5.5 Loading pad

Rigid disc 100 mm in diameter (or 50 mm to be used in limited space), with a flat face and a 12 mm front edge blend radius.

All loading pads shall be capable of pivoting in relation to the direction of the applied force. The pivot point shall be as close as practically possible to the load surface.

5.6 Test frame and test drawer

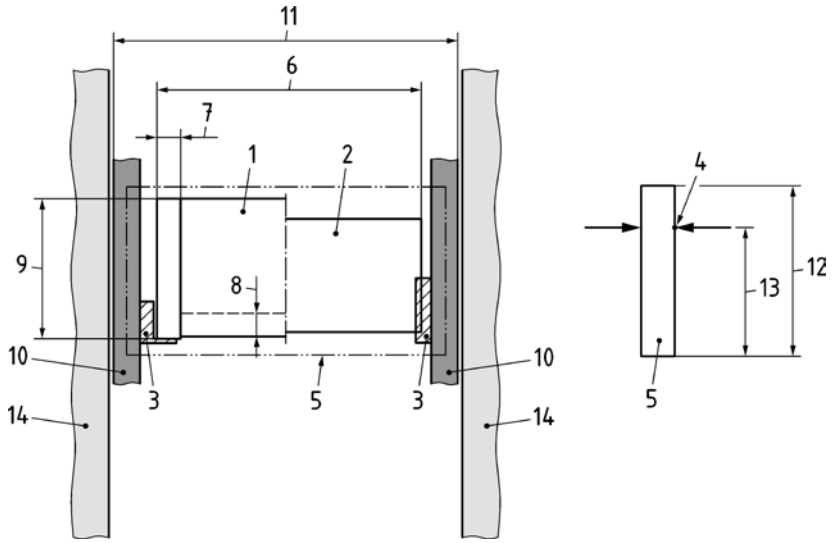
The tests specified in 6.2 and 6.3 shall be carried out in a test frame (Figure 2, which is so constructed that the deformation under the applied load is no more than 1 mm).

Unless otherwise specified by the manufacturer, the extensions shall be mounted on particle board sides, see 5.7.

The distance between the outer surfaces of the particle board shall be specified by the manufacturer. If it is not specified, the distance (Figure 2, key 11) shall be (590 ± 10) mm.

The height of the front shall be specified by the manufacturer. In cases where the height of the front is not specified, it shall be 300 mm. The force application point shall be 50 mm below the top of the front.

In cases where the extensions do not include a drawer, this shall, unless otherwise specified by the manufacturer, be made of 16 mm particle board, see 5.7.



Key

1 Test drawer of particle board
2 Extension element (alternative)
3 Extension slides
4 Force application point, opening and closing (Annex A)
5 Front, 16 mm particle board
6 "Drawer" width
7 "Drawer" sides, 16 mm particle board
8 "Drawer" bottom, 16 mm particle board
9 "Drawer" height
10 Sides, 16 mm particle board
11 Distance between the outer surfaces
12 Front height
13 Height to force application point, opening and closing (Annex A)
14 Test frame

Figure 2 — Test frame and test drawer

5.7 Particle board properties

The properties of the particle board shall be as specified in Table 1.

Table 1 — Table 1 — Particle board properties

Property	Reference standard	Requirement
Axial withdrawal of screws	EN 320	1 100 N ± 100 N
Density	ISO 9427:2003	0,65 g/cm³ ± 0,05 g/cm³

Kommentiert [KM1]: Are there any references to ISO standards?

5.8 Wood component

Component made of wood with a density > 0,55 g/cm³, 40 mm in width and 20 mm in thickness. The length depends on the inner heights of the extension element.

6 Test procedures and requirements

6.1 General

For the following tests, three sets of extensions shall be used as follows:

The first set shall be used for the first test sequence specified in 6.2.

The second set shall be used for the second test sequence specified in 6.3.

The third set shall be used for the corrosion test specified in 6.4.

6.2 Overload tests

6.2.1 General

During testing according to 6.2, the extension element shall be loaded according to the loading capacity M (3.3). The load shall be masses (5.3) unless otherwise specified.

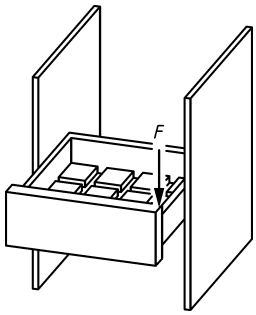
6.2.2 Vertical downwards static overload

Open the extension element to its open stops or if there are no open stops to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the test frame.

Apply a vertical static force equal to the loading capacity (3.3), but not higher than the maximum force specified in Annex C on one top corner of the extension element front (Figure 3).

Carry out 10 times.

The extension element or parts of it shall not become detached.



Key

F force

Figure 3 — Vertical downwards static overload

6.2.3 Horizontal sideways static overload

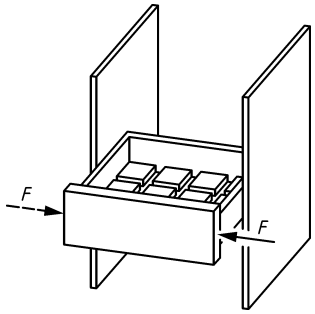
Open the extension element to its open stops or if there are no open stops to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the test frame.

Apply a horizontal force equal to 50 % of the loading capacity (3.3), but not higher than the maximum force specified in Annex C to the centre of the side of the front (Figure 4).

Carry out 5 times.

Repeat the test 5 times in the opposite direction of the front (Figure 4).

The extension element or parts of it shall not become detached.



Key

F force

Figure 4 — Horizontal sideways static overload

6.2.4 Outwards static overload

This test is only applicable to extensions with stops in the open position.

Apply the horizontal force (Figure 5) specified in Annex C to the force application point of the extension element.

The extension element or parts of it shall not become detached.

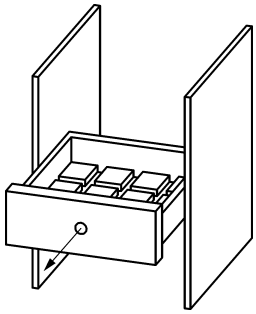


Figure 5 — Outwards static overload

6.2.5 Slam-shut/open

Place the extension element on its runners and load it according to the loading capacity (M) (3.3). The load shall be marbles (5.4) or, when configured for pocket files, paper (5.5) as shown in Figure 1.

Open the extension element 300 mm, or fully open it if it cannot be opened 300 mm. Extension elements without stops in the open position shall be opened until 100 mm remains inside the test frame.

Slam the extension element shut 10 times (Figure B.1) using the velocities specified in Annex C.

NOTE Two suitable slam test apparatus are specified in Annex B.

The slamming force shall act until 10 mm before the extension element reaches its end travel.

Apply the force to the force application point (Figure 2).

Carry out the slam open test (Figure B.2) according to the same principle as above, if the extension element is fitted with stops in the open position.

The extension element or parts of it shall not become detached.

6.3 Functional tests

6.3.1 General

During testing according to 6.3, the extension element shall be loaded according to the loading capacity M (3.3). The load shall be masses (5.3) unless otherwise specified.

6.3.2 Deflection of extension element bottoms

This test is only applicable to extensions which include a bottom.

Determine the lowest point of the unloaded bottom.

Load the bottom according to 6.3 (Figure 6).

After 15 min determine the lowest point of the loaded bottom and record the deflection.

The deflection shall not exceed 1/75 of the shortest inner dimension (width or depth).

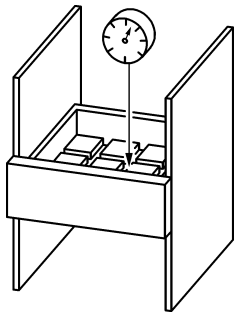


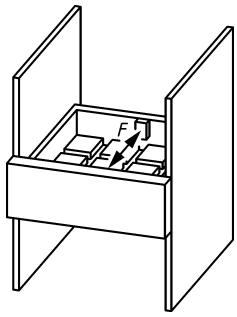
Figure 6 — Load on bottom surface

6.3.3 Deformation of front and back

This test is only applicable to extension element systems which include front and back.

Apply a static force 2/3 of the loading capacity (3.3) but not more than the force specified in Annex C. The force shall be applied 2/3 down from the top of the lowest element [front or back] and at the middle of the width of the front and back (Figure 7) through the wood component (5.8).

During the test, the bottom shall not fall out or become detached and after testing, the extension element shall fulfil its function.



Key

F force

Figure 7 — Load on front and back

6.3.4 Operating forces

The maximum forces for opening and closing, including the forces of catches, dampers, self opening and self closing mechanisms, shall be measured before the 1st vertical downwards static load test (6.3.5) and after the 2nd horizontal sideways static test (6.3.11).

The force application point shall be as shown in Figure 2.

The measuring direction shall be perpendicular to the front and parallel to the extension direction.

The measurements shall be carried out so slowly that the influence of dynamic and damping forces is negligible.

In the case of extension elements with stops in the open position, the determination of the max. opening force shall be carried out from the fully closed to 10 mm before the fully open position. When there are no stops in the open position, the determination shall be carried out to the point at which 2/3 of the inside length [depth] of the extension element or at least 100 mm remains inside the test frame.

In the case of extension elements with stops in the open position, the determination of the max. closing force shall cover the range from the point where the extension is 50 mm from fully open to fully closed position. When there are no stops in the open position, the determination shall be carried out from the point at which 2/3 of the inside length [depth] of the extension element or at least 100 mm remains inside the test frame.

When the loading capacity is less than 40 kg, the opening and closing forces determined shall not exceed 50 N.

When the loading capacity is ≥ 40 kg, the opening and closing forces determined shall not exceed 12,5 % of the loading capacity.

6.3.5 1st vertical downwards static load test

Open the extension element to its open stops or if there are no open stops to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the test frame.

Apply a vertical static force equal to 50 % the loading capacity (3.3) but not higher than the maximum force specified in Annex C on one top corner of the extension element front (Figure 3).

Carry out 5 times.

The extension element shall fulfil its function.

6.3.6 1st horizontal sideways static load

Open the extension element to its open stops or if there are no open stops to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the test frame.

Apply a horizontal force equal to 25 % of the loading capacity (3.3) but not higher than the maximum force specified in Annex C to the centre of the side of the front (Figure 4).

Carry out 5 times.

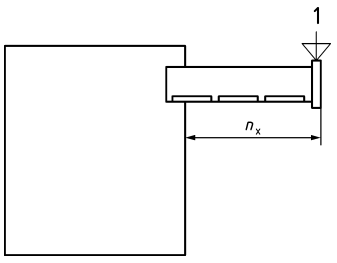
Repeat the test 5 times in the opposite direction of the front (Figure 4).

The extension element shall fulfil its function.

6.3.7 Determination of reference point for the deflection of front

Before the durability test, fully open the unloaded extension. If there are no open stops open it to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the test frame.

The vertical position at the middle of the top of the front shall be recorded as the reference point for the measurement of the deflection in 6.3.9. (Figure 8) with an accuracy of 0,1 mm.



Key

1 Deflection measuring point

n_x Extension length

Figure 8 — Deflection of front

6.3.8 Durability

If the extension element is configured for pocket files, the load shall be paper (5.5) as shown in Figure 1.

Open and close the extension element (see Figure 9) gently and without supporting the front for the number of cycles specified in Annex C.

Open from the fully closed position to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the test frame (Figure 9). For extension elements, which are equipped with any sort of built-in stop in the open position, fully open the extension element without forcing the stop.

If the extension element has a damper and/or a catch device, including a self opening or a self closing mechanism, this shall be allowed to operate at each cycle.

NOTE 1 If the extension element has a damper and/or a catch device, the speed v at the beginning of the self-closing or catch operation should be

$$v = \frac{35}{95 + M}$$

M is the loading capacity

Open and close the extension element via the force application point at a rate of 4 to 15 cycles per minute.

NOTE 2 The recommended average speed is (0,25 ± 0,1) m/s.

The extension element shall fulfil its function.

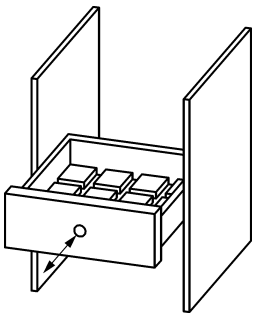


Figure 9 — Durability test

6.3.9 Deflection of front

The deflection of the loaded extension element shall be measured according to 6.3.7.

The deflection shall not exceed 4 % of the extension length, n_x (Figure 8). If there are no open stops, the extension length is to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the test frame.

6.3.10 2nd vertical downwards static load

Open the extension element to its open stops or if there are no open stops to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the test frame.

Apply a vertical static force equal to 50 % of the loading capacity (3.3) but not higher than the maximum force specified in Annex C on one top corner of the extension element front (Figure 3).

Carry out 5 times.

The extension element shall fulfil its function.

The deflection under load shall be recorded as specified in 6.3.7.

6.3.11 2nd horizontal sideways static load

Open the extension element to its open stops or if there are no open stops to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains inside the test frame (Figure 4).

Apply a horizontal force equal to 25 % of the loading capacity (3.3) but not higher than the maximum force specified in Annex C to the centre of the side of the front (Figure 4).

Carry out 5 times.

Repeat the test 5 times in the opposite direction of the front (Figure 4).

The extension element shall fulfil its function.

6.3.12 Operating forces

The maximum forces for opening and closing shall be determined as specified in 6.3.4.

When the loading capacity is less than 40 kg, the opening and closing forces determined shall not exceed 50 N.

When the loading capacity is ≥ 40 kg, the opening and closing forces determined shall not exceed 12,5 % of the loading capacity.

6.3.13 Slam-shut/open

Slam shut/open tests shall be carried out as specified in 6.2.5.

The extension element shall fulfil its function.

6.4 Corrosion resistance

The corrosion test shall be carried out when required on the third set of extensions according to ISO 6270-2.

Requirement: 3 cycles AHT

With the exception of cutting edges, screw slots, rivet heads, aluminium and moulded parts of zinc, all parts, which are visible when the extension is mounted shall show no corrosion. The function shall be maintained.

If the corrosion test has not been carried out, information on this shall be included in the product information
(Annex A).

6.5 Test report

The test report shall include at least the following information:

a) reference to this European Standard and the applied requirement document;

b) detailed description of the extension tested, incl. the weight of the extensions;

c) any defects observed before testing;

d) test results according to 6.2.2 to 6.4;

e) details to be included in the product information (Annex A);

f) load and test rate used for the durability test;

g) details of any deviations from this European Standard;

h) name and address of the test facility;

i) date(s) of test.

Annex A
(normative)

Product information system

A.1 General

The aim of the product information is to assist furniture manufacturers/developers in choosing the correct extension elements for a given purpose. Therefore, information shall be given by the manufacturer of the extension elements on at least the properties specified in this annex.

A.2 Field of application

The product information shall include information regarding the material(s) for which the extension elements are suitable, e.g. solid wood, particle board.

The product information shall include information regarding the test results (Annex C, column 1, 2 or 3).

A.3 Loading capacity

The product information shall include the mass M in kg for which the extension element will fulfil the requirements of this standard.

A.4 Open stops

The product information shall include information regarding the provision of end stops in the open position.

A.5 The maximum height of the front

The product information shall include information on the max. height of the front.

A.6 Corrosion test

The product information shall include information on whether the corrosion test has been carried out and whether the requirement has been fulfilled.

A.7 Other information

Other information regarding the test results, e.g. the deflection of front and the deflection of bottom shall be available on request.

Annex B
(normative)

Test method: Slam-shut/open of extension elements

B.1 Test method

The extension element shall be shut/opened by a hanging weight (m) that is attached to the extension element by means of a string or cord and pulley with low friction bearing (see Figure B.2).

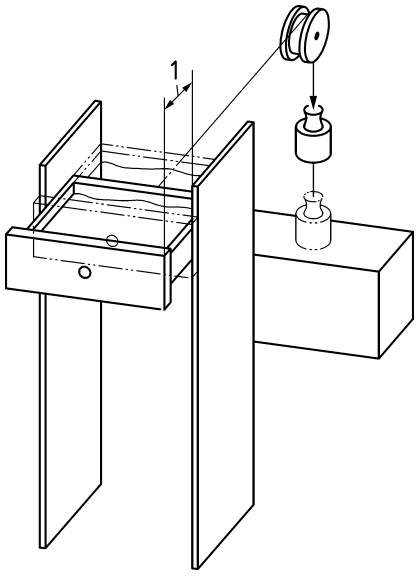
The mass (m) is calculated by the following formula: $m = K \cdot \sqrt[3]{M}$ where M is the loading capacity.

Using the values for K in Table C.1 and C.2, the slam velocities after a travel distance of 300 mm will be equal to the slam velocities exerted by the pneumatic apparatus.

For other travel distances or other calibration conditions than those specified in Table C, the factor K has to be determined by experiment in order to be comparable with the pneumatic apparatus.

Open the extension element a maximum of 300 mm or to the point at which one-third of the inside length (depth) of the extension element, or at least 100 mm, remains in the test frame (see Figure B.1).

Slam-shut the extension from that position.



Key
1 Slam travel ≤ 300 mm

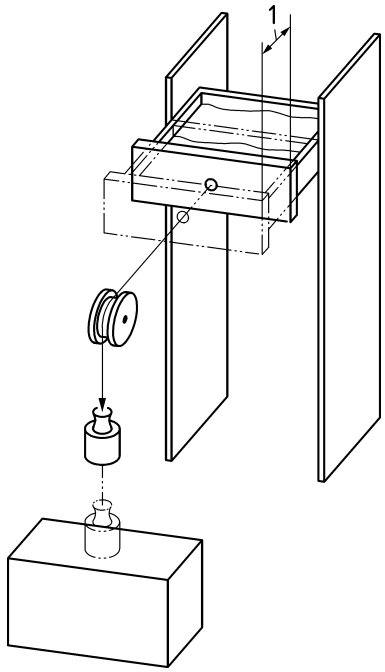
Figure B.1 — Slam-shut test of extension element (example: Hanging weight)

B.2 Slam-open

Slam-open only applies to extension elements with stops in the open position.

Close the extension element to 300 mm from fully open or fully close the extension element if the length of travel is less than 300 mm.

Slam-open the extension element from that position.



Key

1 Slam travel ≤ 300 mm

Figure B.2 — Slam-open test of extension element (Example: Hanging weight)

Annex C
(normative)

Test parameters

The test parameters shown in columns 1, 2 and 3 are considered to be suitable for extension elements for most fields of application from domestic to contract use.

Table 2 — Table C.1 — Overload tests

Clause/Test	Unit	Loads and velocities		
		1	2	3
6.2.2 Vertical static overload (max.)	N	200	250	300
6.2.3 Horizontal static overload (max.)	N	100	125	150
6.2.4 Outwards static overload (max.)	N	200		
6.2.5 Slam shut/open Factor (using falling mass)	*K*	2,5		

Table 3 — Table C.2 — Functional tests

Clause/Test	Unit	Loads, cycles and velocities		
		1	2	3
6.3.3 Load on front and back (max.)	N	100	200	200
6.3.5 + 6.3.10 Vertical downwards static load (max.)	N	100	150	200
6.3.6 + 6.3.11 Horizontal sideways static load (max.)	N	50	75	100
6.3.7 Durability	cycles	20.000	50.000	80.000[a]
6.3.12 Slam shut/open Factor (using falling mass)	*K*	1,25		

[a] if the loading capacity is > 15 kg: 60.000 cycles