BRITISH STANDARD

BS EN
1727:1998

Domestic furniture — Storage furniture — Safety requirements and test methods

The European Standard EN 1727:1998 has the status of a British Standard

ICS 97.140

National foreword

This British Standard is the English language version of EN 1727:1998. It partially supersedes BS 4875-7:1985 and BS 4875-8:1985.

The UK participation in its preparation was entrusted to Technical Committee FW/2, Domestic and contract furniture, 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 committee 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.

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Summary of pages

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Wohnmöbel — Schränke und Regale — Sicherheitstechnische Anforderungen und Prüfverfahren

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 207, Furniture, the secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by September 1998, and conflicting national standards shall be withdrawn at the latest by September 1998.

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.

Contents

Introduction

This European Standard has been prepared in order to provide assurance that domestic storage furniture complying with the requirements are reasonably safe.

1 Scope

This European Standard specifies safety requirements and test methods for all types of domestic storage furniture excluding kitchen furniture (see EN 1153) and special function storage furniture, e.g. for use as a changing unit.

Safety depending on the structure of the building is not included, e.g. the strength of wall hanging cabinets includes only the cabinet and its parts. The wall and the wall attachment are not included.

It is intended to prevent serious injury through normal functional use, as well as misuse that might reasonably be expected to occur.

It should be understood that the test results fulfilling the requirements do not ensure that structural failure will not eventually occur as a result of habitual misuse or after an excessively long period of service.

NOTE A European Standard, *Glass in furniture — Test methods* is under preparation.

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

ISO 48, *Rubbers, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD).*

EN 1153, *Kitchen furniture — Safety requirements and test methods for built-in and free standing kitchen cabinets and work tops.*

3 Definitions

For the purpose of this standard the following definitions apply.

3.1

free standing unit

a unit not attached or not intended to be attached to the structure of the building

3.2

wall mounted unit

a unit supported entirely by one or more walls of the building

3.3

top mounted unit

a unit supported by the ceiling

3.4

storage area/volume

spaces in furniture for storage, e.g. in drawers and on shelves, bottoms and tops

4 General test conditions

4.1 Preliminary preparation

Before any of the tests are commenced, the item shall be old enough to ensure that it has developed its full strength. At least four weeks in normal indoor conditions shall have elapsed between manufacturing (or assembly) and testing in the case of glued joints in timber and the like.

The furniture shall be tested as delivered. If of knock-down type, it shall be assembled according to instructions supplied with the furniture. If the furniture can be assembled or combined in different ways, the most adverse combination shall be used for each test. The same is valid for units that can be combined with other units or components.

The test shall be carried out in indoor conditions, but if during a test the atmosphere temperture is outside the range of 15 °C to 25 °C, the maximum and/or minimum temperature shall be recorded in the test report.

Tighten any assembly fittings before testing. Further retightening shall not take place unless it is specifically required by the manufacturer.

The tests refer to furniture parts with conventional function. Combination of tests may be necessary to cover the properties of multi-function components, e.g. a shelf that can be pulled out on runners shall be tested for strength of shelf supports as well as for strength as a drawer.

4.2 Test equipment

The forces in the static load tests shall be applied sufficiently slowly to ensure that negligible dynamic force is applied.

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

4.3 Tolerances

Unless otherwise stated the following tolerances are applicable:

forces:	±5 %
velocities:	±5 %
masses:	±0,5 %
dimensions:	±1,0 mm
angles:	±2°

4.3.1 ***Positioning***

The accuracy for the position of loading pads (**5.4**) shall be ±5 mm.

4.4 Sequence of testing

The tests shall be carried out in the sequence laid down in this standard.

4.5 Prevention of movement during test

If the unit tends to overbalance during the tests **6.5** to **6.12** load the unit until this tendency stops.

If the unit tends to slide during the tests **6.5** to **6.12** and **6.14** the unit shall be restrained by stops (**5.3**).

4.6 Loading

During all tests all components intended for storage purposes shall be uniformly loaded according to Table 1, except where otherwise specified.

5 Test apparatus

5.1 *Floor surface*, a rigid, horizontal and flat surface.

5.2 *Wall surface*, a rigid, vertical and flat surface.

5.3 *Stops*

Devices to prevent the unit from sliding but not tilting not higher than 12 mm except in cases where the design of the unit necessitates the use of higher stops, in which case the lowest that will prevent the item from sliding shall be used.

5.4 *Loading pad*

A rigid cylindrical object, 100 mm in diameter (or 50 mm to be used in limited space), having a flat face with 12 mm radius on the edge.

5.5 *Apparatus for slam open of drawers*

An example for a suitable apparatus as well as calibration instructions are shown in annex A.

5.6 *Dead loads*

Masses which do not reinforce the structure or redistribute the stresses.

If bags with lead shots, etc. are used, the bags shall be divided into small compartments to prevent the contents from moving during the test.

5.7 *Glass marbles*

The marbles shall be between 10 mm and 15 mm in diameter. The marbles shall be used during the test described in **6.15**. They shall be in a flexible bag large enough to allow them to move during the test.

5.8 *Impact plate*

A 1,7 kg impact plate, with a steel plate of 200 mm × 109 mm × 10 mm faced with a 3 mm thick layer of rubber with a hardness of (85 ± 10) IRHD according to ISO 48.

6 Safety requirements and test methods

6.1 Principles of safety requirements

The following safety requirements are based upon the knowledge that domestic storage furniture and its components are likely to cause serious injury only when they are heavy and fall through a significant distance.

Therefore, with the exception of stability of free standing units (**6.14**), the test methods specified are only applicable to units and components whose centre of gravity is:

at or above 900 mm from the floor and whose total mass (according to **6.3**) equals or exceeds 10 kg; or

at or above 350 mm and whose total mass (according to **6.3**) equals or exceeds 35 kg.

The requirements and test methods for stability (**6.14**) apply only to storage units where the multiplication of the height of the centre of gravity (**6.2**) and the total mass (**6.3**) exceeds 60 N·m.

6.2 Determination of the centre of gravity

The centre of gravity of a component or unit shall be taken as the geometric centre of the usable volume of drawers and unit and as the geometric centre of doors, flaps and shelves.

The height of the centre of gravity above the floor shall be measured for cupboards or their components when installed according to the manufacturer's instructions. Adjustable feet shall be set at their middle position.

Height adjustable components of cupboards shall be placed in their highest position.

All wall or top-mounted units or components there of are considered to have their centre of gravity more than 900 mm above the floor, unless specific restrictions are specified by the manufacturer.

6.3 Determination of total mass

The total mass shall be the mass of the component or unit plus the mass supported by it.

Unless conspicuously and durably marked by the manufacturer with a maximum allowable contents load, the mass of the contents shall be determined according to Table 1, which specifies load per unit area for shelves and the load per unit volume for drawers and baskets.

The volume of baskets shall be taken as the volume contained below its top edge.

The volume of drawers shall be taken as the area of the drawer bottom multiplied by the clear height.

The clear height is the distance between the top of the drawer bottom and the lower edge of the drawer front of the drawer above, or the structure of the unit.

Table 1 — Loads

All horizontal storage areas including shelves, bottoms, tops and flaps	0,65 kg/dm^2
Baskets with internal height ≤ 100 mm	0,5 kg/dm^3
All other baskets	0,2 kg/dm^3
Drawers with ≤ 110 mm clear height	0,35 kg/dm^3
All other drawers	0,2 kg/dm^3
Hanging rails	4 kg/100 mm
Suspended filing pockets	2,5 kg/100 mm

6.4 Constructional safety requirements

Components or parts of the furniture with which the user may come into contact during normal use shall have no burrs and/or sharp edges, nor shall there be any open-ended tubes.

All movable parts accessible during normal use shall have safety distances in any position during movement of ≤ 8 mm or ≥ 25 mm. This applies to any two elements moving relatively to each other, with the exception of doors (incl. hinges), flaps (incl. hinges) and extension elements, (incl. runners) but including handles.

All drawers whose total mass (according to **6.3**) exceeds 10 kg but where safety tests are not required (see **6.1**) shall have effective open stops, i.e. they shall resist being pulled out of the carcase once by a horizontal force of 200 N applied to the handle of the loaded drawer, or they shall be supplied with product informaton to this effect.

6.5 Shelves

Shelves more than 900 mm above the floor shall be secured against falling out.

If the shelf is not restrained by a physical stop this requirement is fulfilled when a horizontal force applied to the middle of the front edge required to initiate movement of the unloaded shelf is more than 50 % of the weight of the unloaded shelf.

No unloaded shelf shall tip when a downwards vertical force of 100 N is applied to any point 25 mm in from the front edge.

6.6 Shelf supports

All supports of the shelf shall be tested.

For units with an indeterminate number of shelves, unless otherwise specified, divide the internal height of the article in millimetres by 300 and take the nearer integer. This number minus 1 shall then be the number of shelves to be tested.

For the shelf being tested, distribute the load uniformly, except at approximately 220 mm from one support, where the impact plate (**5.8**) shall be tipped over 10 times at a point as close to the support as possible (see Figure 1). The striking surface shall be that faced with rubber.

After the test the shelf supports and/or the shelf/carcase shall show no fracture or other damage that can affect the safety.

6.7 Pivoted doors

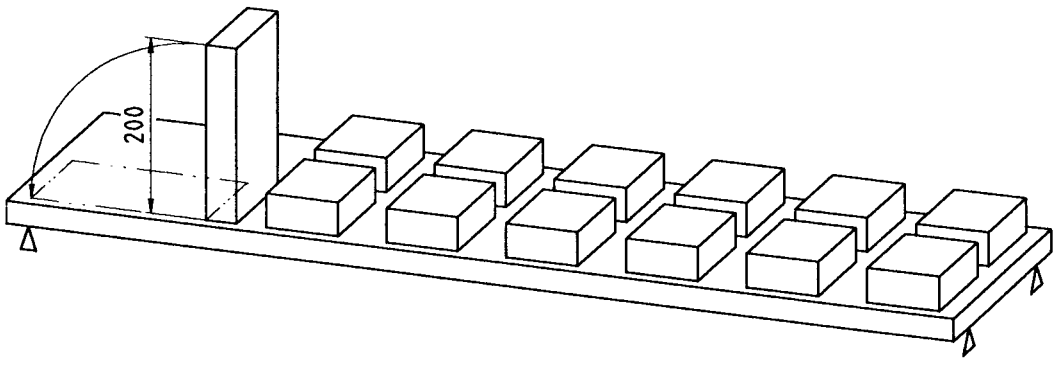
This test applies to all doors hinged to the carcase on one vertical side (incl. folding doors).

Load the door as shown in Figure 2 with a load of 30 kg.

Swing the door 10 full cycles (back and forth) from a position 45° from fully closed to a position 10° from fully opened, up to a maximum of 135°.

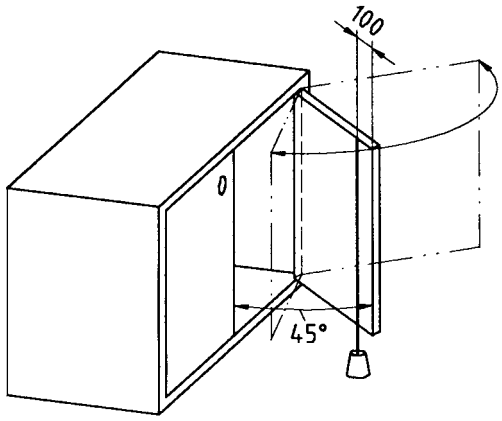
Opening and closing can be done by hand using 3 s to 5 s for opening and 3 s to 5 s for closing.

After the test the door shall remain attached to the unit.



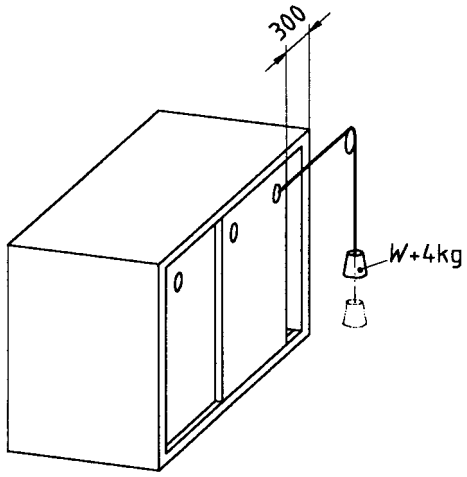
Dimensions in millimetres

Figure 1 — Strength test of shelf supports



Dimensions in millimetres

Figure 2 — Load test of pivoted doors



Dimensions in millimetres

Figure 3 — Slam open/shut of sliding doors

6.8 Sliding doors (including horizontal roll fronts)

This test applies to all doors sliding horizontally including those constructed from hinged elements.

The door shall be opened/closed by means of a string or cord attached to the centre of the handle. If the handle has a length greater than 200 mm, the string shall be attached 100 mm below the top of the handle up to a maximum height from the floor of 1 200 mm (see Figure 3).

If the door has no handle, the string shall be attached at the middle of the door height.

Determine the mass *W*, required to just move the door. The test mass shall be 4 kg plus the mass *W*.

Close/open the door/roll front 10 times towards the fully closed/opened positions using the test mass ($W + 4$ kg).

Start the movement 300 mm from the closed/opened positions respectively. The test mass shall be removed 10 mm before the door/roll front is fully closed/opened.

The test shall be carried out as shown in Figure 3.

After the test there shall be no fracture or other damage that can affect the safety.

6.9 Roll fronts

This test applies to all roll fronts and doors sliding vertically including those constructed from hinged elements.

All roll front doors sliding vertically shall not move by themselves from any position higher than 200 mm measured from the closed position if this can cause any injury.

6.10 Drawers

This test applies to all extension elements with stops in the open position.

Place the drawer on its runners and load with glass marbles (**5.7**) according to Table 1. Close the drawer to a position 300 mm from the fully open position (or fully close the drawer if the travel is less than 300 mm).

The apparatus shall be calibrated so that the slam velocities of the calibration drawers are (see annex A):

1,3 m/s for a 5 kg drawer; and

1,0 m/s for a 35 kg drawer.

NOTE A linear relationship is assumed from 5 kg to 35 kg mass drawers.

Apply the force on the centreline of the drawer front or back at the same level as the handle.

The slamming force shall be applied until 10 mm before the drawer reaches its end travel.

Slam the drawer open 10 times using the apparatus shown in annex A or using an apparatus with similar function.

Throughout the test, the drawer shall not fall out of the cabinet.

6.11 Flaps

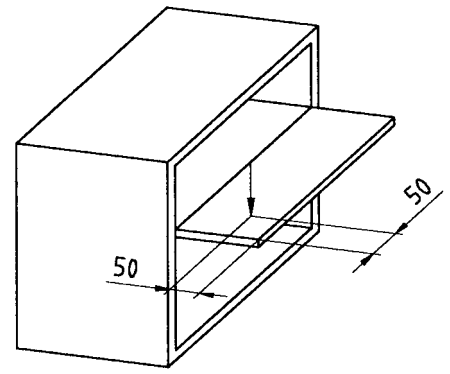
This test only applies to flaps intended to be loaded when used in the open position, e.g. as a work surface.

The flap shall not be loaded according to Table 1.

Apply a vertical force 10 times with 200 N as shown in Figure 4 using the loading pad (**5.4**).

During each application maintain the load for 10 sec.

After the test the flap and/or the carcase shall show no fracture or other damage that can affect the safety.



Dimensions in millimetres

Figure 4 — Strength test of flaps

6.12 Top surfaces

This test applies to all top surfaces which are less than or equal to 1 000 mm above the floor surface.

The top surface shall not be loaded according to Table 1.

Apply a vertical force 10 times with 750 N at the position most likely to cause failure using the loading pad (**5.4**).

During each application maintain the load for 10 s.

After the test the work top and/or carcase shall show no fracture or other damage that can affect the safety.

6.13 Wall and top mounted units

6.13.1 *General*

The unit shall be mounted according to the manufacturer's installation instructions. Where the manner of mounting is not unambiguously defined, the manner of mounting shall be recorded.

Adjustable wall attachment devices shall be set in the position most likely to cause failure.

NOTE This position will normally be when adjusted to the maximum depth (as far from the wall as possible) and to the mid of the height adjustment range. Distance devices used for levelling adjustments shall be placed as low and as far apart as possible.

After the testing in accordance with **6.13.2** and **6.13.3** the unit shall remain attached by its mountings and shall support the test load in accordance with **6.13.3**.

It is acceptable that components with a total mass less than 10 kg can become detached.

6.13.2 *Movable parts and shelf supports*

As soon as possible after the loading according to Table 1, carry out the following tests:

— **6.6**: Shelf supports;

— **6.7**: Pivoted doors;

— **6.8**: Sliding doors (including horizontal roll fronts);

— **6.9**: Roll fronts;

— **6.10**: Drawers;

— **6.11**: Flaps.

These tests shall be carried out on those parts most likely to cause failure to the wall attachment.

6.13.3 *Overload*

After carrying out the tests on the movable parts, increase the load on all the storage areas according to the following principle.

If the number of shelves is not determined by the structure of the unit, divide the internal height of the unit in millimetres by 200 and take the lower integer. This number shall then be the number of shelves to be used during testing.

Bottom:	250 kg/m^2;
First shelf:	150 kg/m^2;
Second shelf:	100 kg/m^2; and
Third and following shelves:	65 kg/m^2.

If the volume of the unit, calculated by the inner width, depth and height, is greater than 0,225 m^3, the loads shall be multiplied by the factor $\frac{1,2}{(0,645 + 2 \cdot V)^2}$ where V is the volume of the unit in m^3.

When reduction of the load is necessary, it shall be removed from the bottom.

The loading time shall be one week.

6.14 Stability of free standing units

With storage areas unloaded or loaded according to Table 1 use any possible configuration of movable parts so as to produce the worst case of stability.

NOTE This implies that some parts can be loaded and others unloaded.

Drawers and extension elements shall be fully opened except when there are no stops in the open position. In this case the drawer shall be pulled out two thirds of its internal length.

If there are drawers positioned in a vertical line only one of these drawers shall be opened.

The unit shall not overturn when any one force from Table 2 is applied.

Table 2 — External tilting force

Components	External force	Direction of force	Position
Door	20 % of the mass of the unloaded unit, min. 50 N	vertical downward	50 mm from the outer edge
Drawers/extension elements	20 % of the total mass of the component load; min. 25 N	vertical downward	centre of front
Flaps	20 % of the total mass of the component load; min. 25 N max. 200 N	vertical downward	centre, 50 mm from outer edge
Top surfaces	20 % of the mass of unloaded unit, min. 25 N, $h \times F$ = max. 200 N·m[1)]	horizontal foreward	centre of front of the component
Door	20 % of the mass of unloaded unit, min. 25 N max. 200 N	horizontal foreward	at handle/knob

[1)] The max. overturning moment shall be calculated by the formula $h \times F$, where h is the height in m to the force application point, and F is the horizontal force in N.
In cases where the calculated overturning moment exceeds 200 Nm, the horizontal force shall be reduced so that the overturning moment is 200 Nm.

6.15 Floor standing unit attached to the building

The unit shall be mounted according to the manufacturer's installation instructions.

Where the manner of mounting is not unambiguously defined, the manner of mounting shall be recorded.

Apply a horizontal force of 200 N forward to the center of the top of the unit. After the test the unit shall remain attached to the structure of the building.

7 Installation instructions

Any unit intended to be attached to the building shall be supplied with installation instructions. The instructions shall contain at least the following information in the language of the country, where the furniture is sold:

a) warning of danger if incorrectly installed;

b) installation only to be carried out by a competent person;

c) the need to check the suitability of the wall/ceiling and to check that the fastening devices will withstand the forces generated.

For self assembly furniture the following additional information is required:

d) list of parts supplied;

e) list of tools required; and

f) a diagram of the bolts and other fastenings required.

8 Test report

The test report shall include the following items:

a) reference to this European Standard;

b) details of the piece of furniture tested;

c) manner of mounting if appropriate;

d) any defects observed before testing;

e) the test results according to the applicable clauses;

f) details of any deviations from this European Standard;

g) the name and address of the test facility;

h) the date of test.

Annex A (informative)
Apparatus for slam open test of drawers

A.1 Principle

Lightweight (empty) drawers are slammed at consistently higher speeds than heavy (full) drawers but friction does not significantly affect the slamming speed.

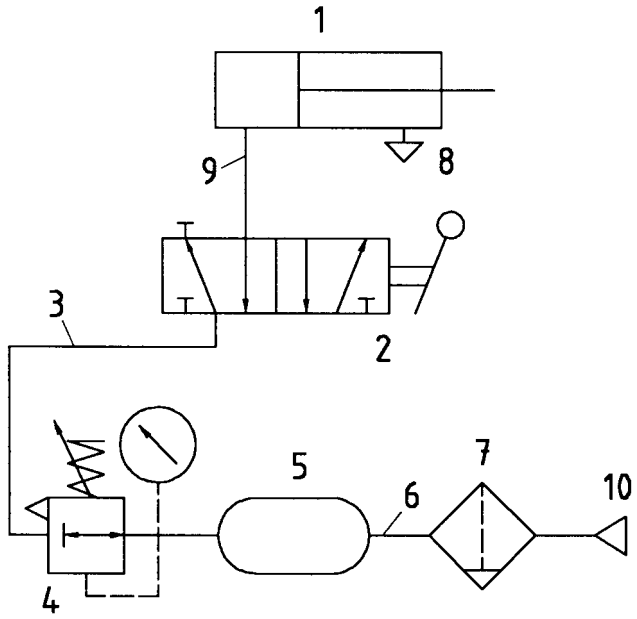
Standard "empty" (5 kg) and "full" (35 kg) drawers with minimal friction are used to simulate these conditions. Using these drawers the speed of the drawer slamming apparatus is adjusted to the slamming velocities specified.

A.2 Apparatus

A suitable apparatus for slam shut tests of drawers consists of a pneumatically actuated low-friction piston/cylinder with a means of regulating the pressure of air supplied from a reservoir. The air-flow between the piston/cylinder and the reservoir is controlled by an air-operated valve which allows the air stored in the reservoir to be connected to the piston/cylinder rapidly, when the control valve is operated. This rate of flow is controlled by the incorporation of connecting tubing of specified bores and lengths. (See Figure A.1.)

A.3 Calibration

Using two standard drawers, having masses of 5 kg and 35 kg respectively and exhibiting a total frictional force in the runners of not greater than 10 N, calibrate the apparatus to produce the closing and opening velocities specified in **6.10**.



1 Cylinder (∅ 40 mm, s = 300 mm)
2 Valve 1/4″ (nominal air flow > 900 l/min)
3 Tube (bore 6 mm, length 720 mm)
4 Pressure regulator (nominal air flow > 900 l/min)
5 Air reservoir (radius 37,5 mm; length 350 mm; volume 1 545,6 cm^3)
6 Tube (bore 3 mm, length 1 040 mm)
7 Air cleaner (nominal air flow > 900 l/min)
8 Free outlet
9 Valve to be mounted directly on cylinder
10 Primary pressure 6 bar

Figure A.1 — Circuit diagram for pneumatic drawer slamming apparatus

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