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Non-domestic storage furniture — Requirements for safety, strength, durability and stability

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National foreword

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Meubles de rangement à usage collectif - Exigences pour la sécurité, la résistance, la durabilité et la stabilité

Behältnismöbel für den Nicht-Wohnbereich - Anforderungen an die Sicherheit, Festigkeit, Dauerhaltbarkeit und Standsicherheit

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CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 16121:2013) has been prepared by Technical Committee CEN/TC 207 “Furniture”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by March 2014, and conflicting national standards shall be withdrawn at the latest by March 2014.

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1 Scope

This European Standard specifies requirements for the safety, strength, durability and stability for all types of non-domestic storage furniture.

It does not apply to domestic storage, office storage, industrial storage, kitchen, catering equipment, retail storage, laboratory storage and industrial storage lockers.

Requirements for strength and durability do not apply to the structure of the building for example the strength of wall hanging cabinets includes only the cabinets and the parts used for attachment. The wall and the wall attachments are not included.

It does not include requirements for the resistance to ageing, degradation and flammability.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 71-1:2011, *Safety of toys — Part 1: Mechanical and physical properties*

EN 716-2:2008+A1:2013, *Furniture — Children's cots and folding cots for domestic use — Part 2: Test methods*

EN 12150-1:2000, *Glass in building — Thermally toughened soda lime silicate safety glass — Part 1: Definition and description*

EN 12600:2002, *Glass in building — Pendulum test — Impact test method and classification for flat glass*

EN 14072:2003, *Glass in furniture — Test methods*

EN 16122:2012, *Domestic and non-domestic storage furniture — Test methods for the determination of strength, durability and stability*

3 Terms and definitions

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

3.1
accessible parts
parts to which access can easily be gained by the user when in its intended configuration of use and for which the probability of unintentional user contact is high

Note 1 to entry: This includes, but is not limited to:

— the exposed edges and corners of storage units to which the user has access when the doors, drawers and extension elements are closed,

— the corners and edges of handles.

3.2
parts accessible during setting up and folding
parts to which access can only be gained when setting up and folding the furniture

3.3
shear and squeeze points
such points exist if the distance between two accessible parts moving relative to each other can be less than 25 mm or more than 8 mm in any position during movement

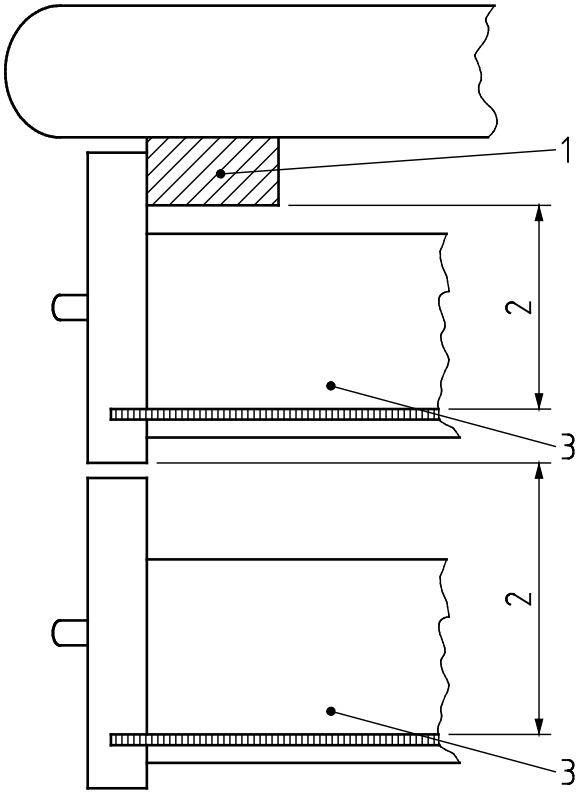
Note 1 to entry: For the definition of shear and squeeze points for furniture intended for use in schools and kindergartens, see A.2.2.

3.4
unit
complete item of furniture including the structure and all components such as drawers, doors and other storage features

3.5
total mass
mass (kg) of the unit, or component plus the load defined in Table 2

3.6
clear height
unobstructed height above the top of the bottom surface

Note 1 to entry: The top of the extension element bottom and the lower edge of the extension element above, or the structure of the unit (see Figure 1).



Key

1 structure of the unit

2 clear height *H*

3 extension element

Figure 1 — Clear height

3.7
levelling device
adjustable device intended to keep the item of furniture perpendicular to the floor

Note 1 to entry: Adjustable feet or similar.

3.8
tray
storage element that is designed, under normal use, to be removed from the storage unit and used independently

3.9
potential energy
Nm
multiplication of the total mass (kg) of the unit (or the part), gravity (m/s^2) and the height (m) above the floor to the centre of gravity

Note 1 to entry: For the purpose of this standard gravity can be considered to be 10 m/s^2.

4 Test sequence and tolerances

4.1 Individual units

When a single unit is supplied for test all the safety tests (5) shall be carried out on the same sample and in the order in which they are listed in this standard. Tests for strength and durability (6) may be carried out on a second sample.

4.2 Range of units

For a range of units featuring similar construction and sharing hardware, or single units with features utilising identical hardware and fixings (e.g. a unit with different size drawers), selected tests shall be carried out on the worst case units/components as detailed in Annex B.

The tests shall be carried out in the order in which they are listed in this standard.

If one unit or component within a range of products does not satisfy the requirements of this standard then compliance for the full range cannot be claimed.

4.3 Tolerances

Unless otherwise stated, the following tolerances are applicable:

— Forces: ± 5 % of the nominal force;

Forces may be replaced by masses. The relationship 10 N = 1 kg may be used.

— Velocities: ± 5 % of the nominal velocity;

— Masses: ± 1 % of the nominal mass;

— Dimensions: ± 1 mm of the nominal dimension;

— Angles: ± 2^o of the nominal angle.

NOTE For the purposes of uncertainty measurement, test results are not considered to be adversely affected when the above tolerances are met.

5 Safety requirements

5.1 Principles of safety requirements

5.1.1 General

Safety requirements are based upon the knowledge that storage furniture and its parts are likely to cause injury only when they are heavy and fall through a significant distance. This is possible if floor standing units overbalance, wall or screen mounted units become detached, or heavy parts become detached from units.

Therefore, the tests contained in Table 4 are only considered to affect safety when:

— the height of the centre of gravity of the unit, or any part, is > 650 mm above the floor and the total mass is > 10 kg,

or

— when the potential energy (3.9) of the unit, or any part, is > 65 Nm and the height of the centre of gravity of the unit, or any part, is ≤ 650 mm.

5.1.2 Determination of centre of gravity

The centre of gravity of a component or unit shall be taken as the geometric centre of that unit, except in the case of extension elements, where the geometric centre of the usable volume shall be used.

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

Height adjustable components shall be placed in their highest position.

All wall or top hanging units, or components thereof, are considered to have their centre of gravity more than 650 mm above the floor.

5.1.3 Determination of total mass

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

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

The volume of fixed baskets and trays shall be taken as the volume contained below their top edge.

The volume of extension elements shall be taken as the area of its bottom multiplied by the clear height (3.6).

Table 1 — Load to determine total mass and load applied to all components other than those undergoing test, excluding stability tests

Part	Unit	Load
Horizontal surfaces, tops, shelves, door baskets, etc.	kg/dm^2	1,5
Extension elements, trays and baskets	kg/dm^3	0,2
Suspended pocket files	kg/dm [a]	4
Clothes rails	kg/dm	4
[a] Measured perpendicular to the plane of the pocket files.		

5.2 General safety requirements

The storage units shall be so designed as to minimise the risk of injury to the user.

All parts of the storage unit with which the user comes into contact, during intended use, shall be so designed that physical injury and damage are avoided. This requirement is met when:

a) the accessible parts are rounded or chamfered, and all other edges accessible during intended use are free from burrs and sharp edges;

b) feet of tubular components shall be capped or otherwise closed;

c) open ends of tubular components, accessible during intended use, shall be capped or otherwise closed.

Movable and adjustable parts shall be designed so that injuries and inadvertent operation are avoided.

It shall not be possible for any load bearing part of the storage unit to come loose unintentionally.

All parts which are lubricated to assist sliding shall be designed to protect users from lubricant stains when in normal use.

If it can cause injury, all roll fronts and doors sliding vertically including those constructed from hinged elements shall not move by themselves from any position higher than 200 mm measured from the closed position.

In order to avoid pinching points for feet, the safe height for vertically moving units shall be at least 100 mm from the floor.

Subject to the conditions contained within the general safety principles (5.1.1), all extension elements and trays shall not become detached from the unit when subjected to one horizontal pull force of 200 N applied to the handle of the loaded extension element/tray. The extension element/tray shall be loaded in accordance with Table 1, unless the component is conspicuously and durably marked by the manufacturer with a maximum load. In this case the component shall be loaded with the stated maximum load.

5.3 Sheer and squeeze points

5.3.1 Shear and squeeze points when setting up and folding

Unless 5.3.2 or 5.3.3 are applicable, shear and squeeze points that are created only during setting up and folding are acceptable, because the user can be assumed to be in control of his/her movements and to be able to cease applying the force immediately upon experiencing pain.

5.3.2 Shear and squeeze points under influence of powered mechanism

With the exception of the operation of doors, flaps and extension elements, including their hardware, there shall be no shear and squeeze points created by parts of the storage unit operated by powered mechanisms, i.e. springs, gas lifts and motorised systems.

5.3.3 Shear and squeeze points during use

With the exception of operation of doors, flaps and extension elements, including their hardware, there shall be no shear and squeeze points created by forces applied during normal use (see Table 2 and Table 3).

5.4 Hinged horizontal lids

Horizontal lids that are 1 000 mm or less from the floor and weigh 0,25 kg or more, that are hinged, shall be provided with lid-support mechanisms to prevent sudden collapse or dropping of the lid. The lid-support

mechanism shall support the lid so that at no position in the arc of travel of the lid from within 50 mm of the fully closed position through an arc not to exceed 60° from the fully closed position shall it drop more than 12 mm under the influence of its own mass, except in the last 50 mm of travel. The test shall be carried out in accordance with EN 71-1:2011, 8.31.2.

The lid-support mechanism shall confirm to this requirement before and after being tested to the durability of flaps test, as described in Table 5.

5.5 Vertical glass components

This requirement is not applicable if the glass fulfils the fragmentation test requirements of EN 12150-1:2000, Clause 8, or has a mode of breakage (β) according to EN 12600:2002, Type B or Type C.

Any external, vertical glass component ≥ 0,1 m^2 in area, where the smallest dimension is greater than or equal to 200 mm and any part of which is less than 900 mm above the floor, shall not break or become detached, when impacted once in accordance with EN 14072:2003, Clause 5, with a drop height of 70 mm. The impact point shall be on the most adverse corner 100 mm from the edge of the glass.

5.6 Stability

The requirements for stability only apply to units where the height to the top of the unit is 650 mm or more above the floor level, and when the potential energy (3.9), exceeds the value 65.

Where specified the unit shall be loaded in accordance with the loads specified in Table 2. When the unit or component is conspicuously and durably marked by the manufacturer with a maximum load, the unit or component shall be loaded with the stated maximum load multiplied by 0,5, but the load shall not exceed the value calculated using Table 2.

Table 2 — Loads for stability testing

Component	**Load**
All horizontal storage areas, including shelves, bottoms, tops and flaps	0,325 kg/dm^2
Extension elements, trays and baskets with clear height (3.6), *H*,≤ 1 dm:	0,2 kg/dm^3
Extension elements, trays and baskets with clear height (3.6), *H*, between 1 dm and 2,5 dm:	(0,266 7 – 0,066 7*H*) kg/dm^3 (*H* in dm)
Extension elements, trays and baskets with clear height (3.6), *H*,≥ 2,5 dm:	0,1 kg/dm^3
Hanging rails	2 kg/dm
Suspended filing pockets	1,25 kg/dm

Storage units shall be tested for stability according to Table 3, and following the order listed in Table 3.

The stability requirements are fulfilled when, tested in accordance with Table 3, the storage unit does not overturn. If the storage unit is prevented from overturning by an open extension element, open door or open flap the stability requirements are not fulfilled.

Table 3 — Stability tests

Test No	Test	Reference	Loading	Force
5.6.1	Doors, extension elements and flaps closed, all storage units unloaded - Units that are, or can be, adjusted to a height of 1000 mm or less	EN 16122:2012, 11.2.1	Vertical force, N	750
5.6.2	Doors, extension elements and flaps closed, all storage units unloaded - Units that are, or can be, adjusted to a height of more than 1 000 mm	EN 16122:2012, 11.2.2	Vertical force, N Outward force, N	350 50
5.6.3	All storage areas unloaded and all doors, extension elements and flaps open	EN 16122:2012, 11.4.1	-	-
5.6.4	All storage areas unloaded with overturning load	EN 16122:2012, 11.4.2	Vertical force, N	100
5.6.5	All storage areas loaded with overturning load	EN 16122:2012, 11.4.3	Vertical force, N	20 % of total mass (3.5) of the unit but not greater than 300 N
5.6.6	Doors, extension elements and flaps closed and locked	EN 16122:2012, 11.5	Outward force, N	100
5.6.7	Dynamic stability test for units with castors [a]	EN 16122:2012, 11.6	-	-

[a] The test shall be carried out in accordance with EN 16122:2012, 11.6, except that the stops shall be 12 mm high with square edges

5.7 Structural safety

5.7.1 Structural safety tests

The tests contained in Table 4 shall only be carried out when the principles of safety requirements (5.1.1) are met.

Storage units shall be tested according to Table 4 and following the order listed in Table 4.

Where specified in EN 16122:2012 storage units and their components shall be loaded in accordance with Table 1. When the unit or component is conspicuously and durably marked by the manufacturer with a maximum load, the unit or component shall be loaded with the stated maximum load multiplied by 1,2.

Table 4 — Safety tests

Test No	Test	Reference	Loading	Requirement
5.7.1.1	Static load test for tops and bottoms	EN 16122:2012, 6.2.2	Force, N Cycles	750 10
5.7.1.2	Shelf retention test – horizontal outward	EN 16122:2012, 6.1.2	Force, N	50 % of unloaded shelf weight
5.7.1.3	Shelf retention test – vertical downward	EN 16122:2012, 6.1.3	Force, N	100
5.7.1.4	Strength of shelf supports	EN 16122:2012, 6.1.5	Cycles Mass per unit area, kg/dm^2 steel impact plate, EN 16122:2012, Table 1	10 0,65 1
5.7.1.5	Vertical load on pivoted doors	EN 16122:2012, 7.1.2	Mass, kg 10 cycles	30
5.7.1.6	Horizontal load on pivoted doors [a]	EN 16122:2012, 7.1.3	Force, N 10 cycles	60
5.7.1.7	Strength of bottom-hinged flaps	EN 16122:2012, 7.3.1	Force, N Cycles	200 10
5.7.1.8	Strength of extension elements [b]	EN 16122:2012, 7.5.2	Force, N Cycles	200 10
5.7.1.9	Slam shut and open of extension elements [c]	EN 16122:2012, 7.5.4	Velocity, m/s, at calibration points Slam open 5 kg Slam shut 35 kg Factor K Mass in drawer (marbles)	1,30 1,00 2,5 See Table 1.
5.7.1.10	Interlock test	EN 16122:2012, 7.5.6	Force, N Cycles	200 10
5.7.1.11	Test for structure and underframes	EN 16122:2012, 6.4.1	Force, N Cycles	350 10
5.7.1.12	Test for unit with castors or wheels [d]	EN 16122:2012, 6.4.3	Cycles	2 000
5.7.1.13	Overload test	EN 16122:2012, 10.1.3	Mass per unit area, kg/dm^2	2,5
5.7.1.14	Dislodgement test	EN 16122:2012, 10.1.4	Force, N	100
5.7.1.15	Units supported by the floor	EN 16122:2012, 10.2	Force, N	200

[a] This test shall only be applied to doors with an opening angle less than or equal to 135°.

[b] The extension element shall be loaded in accordance with Table 1.

[c] For safety tests only the slam open test shall be performed. Table 5 contains requirements for the slam shut test.

[d] This test shall be performed on a horizontal, smooth steel surface.

5.7.2 Structural safety requirements

The structural safety requirements are fulfilled when after testing in accordance with Table 4:

a) there are no fractures of any member, joint or component;

b) units attached to the structure of the building shall remain attached and carry the test load;

c) the storage unit fulfils the stability requirements (5.6).

6 Strength and durability

6.1 General

When choosing the loads and cycles for each test, this shall be done with due respect to the end use of the product, see Annex C - Guidance of test severity in relation to application.

It shall be noted that some end uses may be covered by more than one requirement depending on the severity of the expected use, e.g. kindergarten, barracks, schools, hotels.

Storage units shall be tested according to Table 5 and following the order listed in Table 5.

Where specified in EN 16122, storage units and their components shall be loaded in accordance with Table 1. When the unit or component is conspicuously and durably marked by the manufacturer with a maximum load, the unit or component shall be loaded with the stated maximum load multiplied by 1,2.

Table 5 — Strength & durability tests

Test No	Test	Reference	Loading	Test Severity	
				1	2
6.1.1	Strength of clothes rail supports	EN 16122:2012, 6.3.1	Mass per unit length, kg/dm Time	4.0 1 h	4.0 1 h
6.1.2	Strength of coat hooks	EN 16122:2012, 9.1	Force per hook, N Cycles	40 10	150 10
6.1.3	Durability of pivoted doors	EN 16122:2012, 7.1.5	Cycles	40 000	80 000
6.1.4	Slam shut test of pivoted doors	EN 16122:2012, 7.1.4	Mass, m_2, kg Cycles	3 10	4 10
6.1.5	Slam shut/open of sliding doors and horizontal roll fronts	EN 16122:2012, 7.2.2	Mass, m_2, kg Cycles	4 10	6 10
6.1.6	Durability of sliding doors and horizontal roll fronts	EN 16122:2012, 7.2.3	Cycles – sliding doors Cycles-roll fronts	20 000 10 000	40 000 20 000
6.1.7	Durability of flaps	EN 16122:2012, 7.3.2	Cycles	10 000	20 000
6.1.8	Durability of vertical roll fronts	EN 16122:2012, 7.4.2	Cycles	10 000	20 000

Table 5 *(continued)*

Test No	Test	Reference	Loading	Test Severity	
				1	2
6.1.9	Durability of extension elements	EN 16122:2012, 7.5.3	Cycles – extension elements Cycles – trays	40 000 20 000	80 000 40 000
6.1.10	Slam shut and open of extension elements [a]	EN 16122:2012, 7.5.4	Velocity, m/s, at calibration points Slam open 5 kg Slam shut 35 kg Factor K	1,30 1,00 2,5	1,30 1,00 2,5
6.1.11	Displacement of extension element bottoms	EN 16122:2012, 7.5.5	Force, N Cycles	60 10	70 10
6.1.12	Strength test for locking and latching mechanisms for extension elements	EN 16122:2012, 7.6.2	Force, N Cycles	200 10	200 10
6.1.13	Strength test for locking and latching mechanisms for doors, flaps and roll fronts	EN 16122:2012, 7.6.3	Force, N Cycles	200 10	200 10
6.1.14	Drop test	EN 16122:2012, 6.4.2	Drop height, mm	-	50
6.1.15	Deflection of shelves	EN 16122:2012, 6.1.4	Mass per unit area, kg/dm^2	1,5	2,0
6.1.16	Dislodgement of clothes rails	EN 16122:2012, 6.3.2	Mass per unit length, kg/dm	5	5
6.1.17	Drop test for trays	EN 16122:2012, 8,3	Drop height, mm Cycles	350 10	700 10
6.1.18	Sustained load test for trays	EN 16122:2012, 8.2	Kg/dm^3	0,65	1,0

[a] For strength and durability tests, only the slam shut test shall be performed. Table 4 contains requirements for the slam open test.

6.2 Strength and durability requirements

The strength and durability requirements are fulfilled when after testing in accordance with Table 5:

a) there are no fractures of any member, joint or component;

b) there are no loosening of joints intended to be rigid;

c) the storage unit fulfils the stability requirements (5.6);

d) the storage unit fulfils its functions after removal of the test loads;

e) there shall be no deflection of shelves that exceeds 0,5 % of the span of the shelf when tested in accordance with test no. 6.1.15 (see Table 5).

7 Information for use

Information for use shall be available in the language of the country in which it will be delivered to the end user. It shall contain at least the following details:

a) information regarding the intended use, with reference to the test severity where appropriate;

b) assembly instructions, where applicable;

c) instructions for the care and maintenance of the storage furniture, where applicable.

8 Test report

The test report shall include at least the following information:

a) a reference to this European Standard;

b) the piece of furniture tested;

c) details of defects observed before testing;

d) any variation from the specified temperature range;

e) the test results;

f) the name and address of the test facility;

g) the date of the test.

Annex A
(normative)

Modified requirements for schools, kindergartens and similar applications

A.1 General

The requirements in the main body of this standard are generally suitable for the majority of end uses and users. For furniture intended for use by children in primary schools, kindergartens and similar applications, the requirements need to be modified to suit the different risks.

NOTE These requirements are generally accepted to cover use by children up to the age of 10 years to 12 years.

A.2 Requirements

A.2.1 General

Storage furniture specifically designed for use in schools and kindergartens shall fully comply with this European Standard with the exception of the following modifications:

A.2.2 Definition – shear and squeeze points.

A shear and squeeze point exist if the distance between two accessible parts moving relative to each other can be less than 25 mm or more than 7 mm in any position during movement.

A.2.3 Principles of safety requirements.

The requirements of 5.1.1 shall be modified such that the tests contained in Table 4 are only considered to affect safety when the height of the centre of gravity of the unit, or any part is > 350 mm above the floor and the total mass is > 5 kg.

A.2.4 General safety requirements.

In addition to the requirements contained within 5.2, all accessible parts where the probability of contact by the user is high shall be rounded with a minimum 2 mm radius or chamfer.

A.2.5 Shear and squeeze points under the influence of powered mechanisms.

In addition to the requirements contained within 5.3.2, it is recommended that there should be no gap greater than 7 mm between the hinged edge of a door or flap and the main body of the product, or any hinge component, when assembled/adjusted for normal use.

A.2.6 Shear and squeeze points during use.

In addition to the requirements contained within 5.3.3, it is recommended that there should be no gap greater than 7 mm between the hinged edge of a door or flap and the main body of the product, or any hinge component, when assembled/adjusted for normal use.

A.2.7 Glass.

Glass shall fulfil the fragmentation test requirements of EN 12150-1:2000, Clause 8, or has a mode of breakage (β) according to EN 12600:2002, Type B or Type C.

A.2.8 Stability.

The requirements for stability contained in 5.6 shall apply to units where the height to the top of the unit is 450 mm or more above the floor level.

A.2.9 Strength and durability – drop test for trays.

The test shall be carried out in accordance with the drop test for trays (test no. 6.17, Table 5), with the exception that the drop height for test severity 1 shall be 600 mm and drop height for test severity 2 shall be 900 mm.

A.3 Additional requirements for furniture for kindergartens

Finger entrapment

There shall be no accessible holes greater than 7 mm or less than 12 mm with a depth greater than 10 mm, when assessed in accordance with 5.3.1 of EN 716-2:2008+A1:2013.

Annex B
(normative)

Selecting product from a range of furniture

B.1 Range of units

For a range of units featuring similar construction and sharing hardware, or single units with features utilising identical hardware and fixings (e.g. a unit with different size drawers), selected tests shall be carried out on the **worst case units/components/configurations**.

The list below shows examples of worst case units/components/configurations:

— the unit(s) that present the worst case configuration for stability;

— the largest unit that is, or can be set to, a height of 950 mm or less;

— the largest unit that is, or can be set to, a height of more than 950 mm;

— the unit with castors that has the largest load capacity;

— the largest wall unit;

— the shelf with the longest span (this may be the bottom of the unit);

— the clothes rail with the longest span;

— the door that produces the greatest load on its hinge(s) (if different types of hinge are used, the door producing the greatest load on each type of hinge shall be submitted for test);

— the largest horizontal sliding door/roll front;

— the largest bottom-hinged flap;

— the largest top-hinged door/flap;

— the largest vertical roll front;

— the largest sliding door;

— the largest extension element (if different types of runner are used, the largest extension element with each type of runner shall be submitted for test);

— one type of each tray used (If different types of trays are used, each type of tray shall be submitted for test);

— one type of each coat hook used.

Other components that form part of the range and that could be tested by the methods given in this standard may also be submitted for testing.

Annex C
(informative)

Guidance of test severity in relation to application

The use of the product is an important factor in selecting the test severity.

Severity of use is dependent upon frequency of use, length of use and the loads applied during use.

The table below shows the typical application that might be expected from furniture in relation to the two test severities contained in Table C.1.

Table C.1 — Examples of test severity in relation to application

Test severity	Severity of use	Application
1	general	hotels, homes for the elderly, kindergarten, reception areas, libraries, restaurants
2	severe	barracks, schools, universities

Annex D
(informative)

Suggested loads for tests not specified in this standard

D.1 Suggested loads for tests not specified in this standard

D.1.1 General

A number of test methods contained within EN 16122 do not have a requirement associated with them in the main body of this standard.

To offer guidance to persons wishing to use these additional test methods the following loads are suggested.

D.1.2 Stability

D.1.2.1 General

The requirements for stability only apply to units where the height to the top of the unit is 650 mm or more above the floor level, and when the potential energy (3.9), exceeds the value 65.

Table D.1 — Optional stability test requirements

Test No	Test	Reference	Loading	Force
D.1.2.1.1	Doors, extension elements and flaps closed, all storage units unloaded - Opening doors, extension elements and flaps	EN 16122:2012, 11.3	Horizontal force, N	See test method

D.1.2.2 Suggested stability requirements

The stability requirements are fulfilled when, tested in accordance with Table D.1, the storage unit does not overturn. If the storage unit is prevented from overturning by an open extension element, open door or open flap the stability requirements are not fulfilled.

D.1.3 Strength and durability

D.1.3.1 General

When choosing the loads and cycles for each test, this shall be done with due respect to the end use of the product (see Annex C).

It shall be noted that some end uses may be covered by more than one requirement depending on the severity of the expected use, e.g. kindergarten, barracks, schools, hotels.

Where specified in EN 16122, storage units and their components shall be loaded in accordance with Table 1. When the unit or component is conspicuously and durably marked by the manufacturer with a maximum load, the unit or component should be loaded with the stated maximum load multiplied by 1,2.

Storage units should be tested according to Table D.2 and following the order listed in Table D.2.

Table D.2 — Optional strength and durability test requirements

Test No	Test	Reference	Loading	Test Severity	
				1	**2**
D.2.1	Drop test for top-hinged flaps	EN 16122:2012, 7.3.3	Cycles	150	200
D.2.2	Slam shut/open of vertical roll fronts	EN 16122:2012, 7.4.1	Mass, m_2, kg Cycles	3 10	10
D.2.3	Sustained load test for tops and bottoms	EN 16122:2012, 6.2.1	Mass per unit area, kg/dm^2	1,5	2,0

D.1.3.2 Suggested strength and durability requirements

The strength and durability requirements should be fulfilled when during and after testing in accordance with Table D.2:

a) there are no fractures of any member, joint or component;

b) there are no loosening of joints intended to be rigid;

c) the storage unit fulfils its functions after removal of the test loads;

d) there shall be no deflection of top and bottom surfaces that exceeds 0,5 % of the span of the surface.

Bibliography

[1] EN 12221-2, *Changing units for domestic use — Part 2: Test methods*

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