BS EN 14749:2016

BSI Standards Publication

# Furniture — Domestic and kitchen storage units and kitchen-worktops — Safety requirements and test methods

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**National foreword**

This British Standard is the UK implementation of EN 14749:2016. It supersedes BS EN 14749:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee FW/0/2, Domestic and Contract Furniture.

A list of organizations represented on this committee can be obtained on request to its secretary.

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# EN 14749

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English Version

# Furniture - Domestic and kitchen storage units and kitchen-worktops - Safety requirements and test methods

Ameublement - Meubles de rangement domestiques et de cuisine et plans de travail de cuisine - Exigences de sécurité et méthodes d'essai

Möbel - Wohn- und Küchenbehältnismöbel und Küchenarbeitsplatten - Sicherheitstechnische Anforderungen und Prüfverfahren

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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## European foreword

This document (EN 14749:2016) 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of an identical text or by endorsement, at the latest by August 2016, and conflicting national standards shall be withdrawn at the latest by February 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14749:2005.

Compared to EN 14749:2005 the following modifications have been made:

a) structure revised;

b) the most test methods removed and replaced by a reference to EN 16122:2012, *Domestic and non-domestic storage furniture — Test methods for the determination of strength, durability and stability*;

c) Clause 3 “Terms and definitions” extended;

d) tests for stability of TV-furniture added;

e) Annex B (informative) “Guide to testing of units and components” amended;

f) Annex D (informative) “Relation between safety requirements, total mass and position of centre of gravity of loaded units or loaded components” deleted;

g) new Annex D (informative) containing a method for calculation of vertical and horizontal acting forces added.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

# Introduction

With this revision the included test methods have been as far as possible taken out of the standard and referenced to:

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

This standard was prepared in order to provide assurance that domestic storage furniture and kitchen-worktops comply with the given requirements and are safe.

The intention of this European Standard is the prevention of serious injury through normal use, as well as foreseeable misuse. It cannot ensure that structural failure will not eventually occur as a result of habitual misuse.

Co-ordinating sizes for kitchen furniture (including kitchen-worktops) kitchen appliances, sinks and decorative panels are covered by EN 1116, *Kitchen furniture — Co-ordinating sizes for kitchen furniture and kitchen appliances*.

# 1 Scope

This European Standard specifies safety requirements and test methods for all types of kitchen and bathroom storage units and domestic storage furniture and their components.

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

It does not apply to units covered by EN 71-1, *Safety of toys — Part 1: Mechanical and physical properties* and EN 60065, *Audio, video and similar electronic apparatus — Safety requirements (*IEC 60065*)*.

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

Safety that is dependent upon the structure of the building is not included, *e.g*. the strength of wall hanging units includes only the cabinet and its components including wall attachment devices. The wall and the wall attachments are not included.

Annex A (normative) contains additional test methods.

Annex B (informative) contains a guide to testing of units and components according to this document.

Annex C (informative) contains an example of loading of wall hanging units.

Annex D (informative) contains a method for calculation of vertical and horizontal acting forces.

# 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 71-1:2014, *Safety of toys - Part 1: Mechanical and physical properties*

EN 12150-1:2015, *Glass in building — Thermally toughened soda lime silicate safety glass — Part 1: Definition and description*

EN 12600, *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**
**unit**
piece of storage furniture

**3.2**
**free standing unit**
unit not intended to be attached to a load bearing structure

**3.3**
**floor standing unit intended to be attached to the building**
unit intended to be supported by the floor and also attached to a structure

**3.4**
**wall hanging unit**
unit intended to be entirely supported by a vertical structure

Note 1 to entry: A vertical structure can be a wall, panel or screen.

**3.5**
**wall attachment device**
device including the component that is attached to the cabinet and the component that is attached to the wall

Note 1 to entry: A component that is attached to the cabinet is e.g. a suspension bracket.

Note 2 to entry: A component that is attached to the wall is e.g. a hook, a rail.

**3.6**
**kitchen-worktop**
work surface primarily intended to be used for preparing food

**3.7**
**TV-furniture**
unit designed to support a TV-set

**3.8**
**component**
part of a unit including hardware

**3.9**
**extension element**
component that can be pulled out and pushed in

Note 1 to entry: An extension element can be a basket, a drawer or a suspended pocket file.

**3.10**
**storage area**
**storage volume**
space in furniture for storage

Note 1 to entry: A storage area/-volume can be in extension elements and on shelves, bottoms and tops.

**3.11**
**accessible part**
part 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:

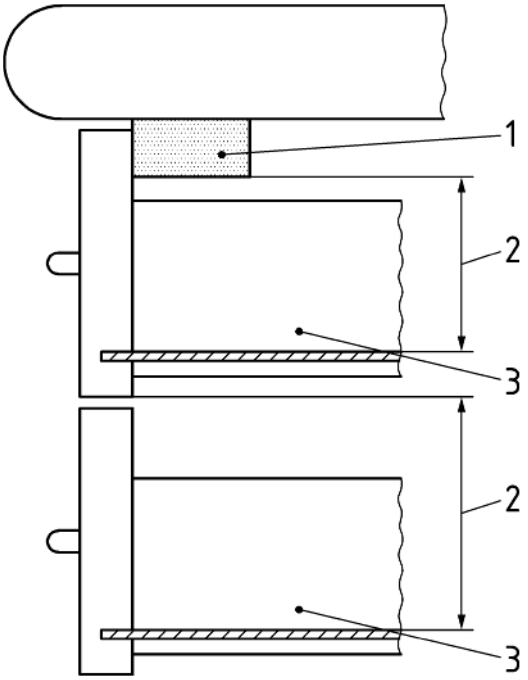
— the exposed edges and corners of storage units to which the user has access when the doors, drawers and extension elements are closed,

— the corners and edges of handles.

**3.12**
**shear and squeeze point**
distance between two accessible parts moving relative to each other which can be ≥ 25 mm or ≤ 8 mm in any position during movement

**3.13**
**clear height**
unobstructed height above the top of the bottom surface

Note 1 to entry: See Figure 1.




**Key**

1 structure of the unit

2 clear height

3 extension element

**Figure 1 — Clear height**

[SOURCE: EN 16122:2012, 3.2 modified - …or the structure of the unit … has been deleted; another figure has been included]

**3.14**
**levelling device**
adjustable device intended to keep the item of furniture perpendicular to the floor

Note 1 to entry: A levelling device can be an adjustable foot or similar.

**3.15**
**potential energy**
multiplication of the total mass (kg) of the unit (or the component), gravity (m/s2) and the height (m) above the floor to the centre of gravity

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

**3.16**
**overturn**
event at which a furniture unit pivots to a point beyond which the unit continues to fall

# 4 Test procedure and tolerances

## 4.1 General

For all tests referred to in this standard, EN 16122:2012, Clause 4 "General test conditions" and EN 16122:2012, Clause 5 "Test equipment and apparatus" apply.

## 4.2 Sequence of testing

The tests shall be carried out in the same sequence as the clauses are numbered in this European Standard.

## 4.3 Tolerances

Unless otherwise stated, the following tolerances are applicable:

— Forces: ± 5 % of the nominal force;

The forces may be replaced by masses. The relationship 10 *N* = 1 kg should be used.

— 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.

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

The safety requirements are based upon the knowledge that kitchen units, bathroom units and domestic storage furniture and their components are likely to cause serious injury only when they are heavy and fall through a significant distance. This is possible if floor standing units overturn, wall or screen hanging units become detached, or heavy components become detached from units.

### 5.1.2 Determination of centre of gravity

The centre of gravity above the floor (for floor standing units) shall be measured 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.

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.

All wall hanging units or top hanging units or components thereof are considered to have their centre of gravity more than 900 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 determined according to Table 1, unless the unit or component is conspicuously and durably marked by the manufacturer with a maximum load, in which case the unit or component shall be loaded with the stated maximum load multiplied by 1,2. The volume of fixed baskets 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.

**Table 1 — Loads**

| Component | Load |
|---|---|
| All horizontal storage areas, including shelves, bottoms, tops and bottom hinged flaps | 0,65 kg/dm$^2$ |
| Extension elements and fixed baskets | 0,2 kg/dm$^3$ |
| Clothes rails | 4,0 kg/dm |
| Suspended filing pockets | 2,5 kg/dm [a] |
| Storage area/-volume (3.10) for heavy appliances (e.g. refrigerator, washing machine)[b] | 0,5 kg/dm$^3$ [c] |

[a] Measured perpendicular to the plane of the filing pockets.

[b] Other heavy objects, e.g. aquariums are not covered by this value.

[c] Max. load 200 kg per unit.

## 5.2 General safety requirements

### 5.2.1 General

The following requirements apply to all units and components.

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

All movable components accessible during normal use shall have safety distances in any position during movement of ≤ 8 mm or ≥ 25 mm. This applies to any components moving relatively to each other, with the exception of doors, flaps and extension elements including their hardware. The safety distances also apply to the distance between handles/handgrips and other components.

### 5.2.2 Units moving vertically

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

### 5.2.3 Lids

In order to prevent children's heads and necks from being entrapped by hinged lids of storage units horizontal lids that are 1 000 mm or less from the floor and weigh 0,25 kg or more, 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 71-1:2014, 8.31.2. In the case of adjustable mechanisms, product information shall be given for the correct adjustment.

#### 5.2.4 Vertically moving roll fronts and vertically moving sliding doors

All roll fronts and doors sliding vertically including those constructed from hinged components shall not move by themselves from any position higher than 200 mm measured from the closed position.

#### 5.2.5 Extension elements

All extension elements whose total mass (according to 5.1.3) exceeds 10 kg but where safety tests are not required shall have effective open stops, *i.e.* they shall resist being pulled out of the unit once by a horizontal force of 200 N applied to the handle of the loaded extension element (according to Table 1), or they shall be supplied with product information to this effect.

### 5.3 Structural safety requirements

#### 5.3.1 General

The tests and requirements in 5.3.2 to 5.3.9 apply to any component only when:

— the height to the centre of gravity of the component is > 900 mm above the floor and the total mass (5.1.3) is ≥ 10 kg;

or

— the height to the centre of gravity of the component is > 350 mm and the total mass (5.1.3) is ≥ 35 kg.

Where specified in EN 16122, storage units and their components shall be loaded in accordance with Table 1.

Unless otherwise specified, all storage components, which are not subject to testing, shall be uniformly loaded with the specified load(s).

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.

Details on testing and application of safety requirements can be found in Annex B (informative).

#### 5.3.2 Shelves

##### 5.3.2.1 Shelf retention – vertical downward

Unloaded shelves shall not fall down when tested according to EN 16122:2012, 6.1.3 with a downwards vertical force of 100 N.

##### 5.3.2.2 Shelf retention – horizontal outward

Unloaded shelves shall not fall down when tested according to EN 16122:2012, 6.1.2 with a force representing 50 % of the weight of the unloaded shelf.

#### 5.3.3 Shelf supports

If the clear height is less than 200 mm the test is not carried out.

This test shall be carried out according to EN 16122:2012, 6.1.5 with impact plate No. One on all horizontal surfaces e.g. shelves, tops and bottoms that can be used as storage area. The horizontal surface shall be loaded according to Table 1.

In case of identical shelf supports and horizontal surfaces only one test shall be carried out.

After the test, the horizontal surface and the shelf supports shall show no fracture or other damage that can affect the safety.

### 5.3.4 Storage area/-volume for heavy appliances

This requirement is only applicable to units with shelves which are designed to carry heavy appliances, e.g. refrigerator, washing machine.

In derogation to EN 16122:2012, 6.2.1 the test shall be carried out on all shelves, tops or bottoms which are intended to carry heavy appliances irrespective of the height above the floor.

The test shall be carried out for one week according to EN 16122:2012, 6.2.1 with the load specified in Table 1.

After the test the shelves, tops or bottoms and the shelf supports shall show no fracture or other damage that can affect the safety.

### 5.3.5 Pivoted doors

#### 5.3.5.1 Vertical load of pivoted doors

Carry out the test according to EN 16122:2012, 7.1.2, respecting EN 16122:2012, 7.1.1 with a load of 30 kg.

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

#### 5.3.5.2 Horizontal load on pivoted doors

Carry out the test according to EN 16122:2012, 7.1.3, respecting EN 16122:2012, 7.1.1 with a horizontal static load of 60 N. This test is not applicable for doors with an opening angle > 135°.

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

### 5.3.6 Sliding doors and horizontal roll fronts

Carry out the test according to EN 16122:2012, 7.2.2, respecting EN 16122:2012, 7.2.1 with a mass $m_2$ = 4 kg.

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

### 5.3.7 Extension elements

#### 5.3.7.1 Slam open of extension elements

Carry out the slam open test according to EN 16122:2012, 7.5.4, respecting EN 16122:2012, 7.5.1 with a load according to Table 1.

A factor K of 2,5 shall be applied (see EN 16122:2012, A.3.2).

Throughout the test, the extension elements shall not fall out of the cabinet.

If a pneumatic system is used the calibration values for 5 kg drawer shall be 1,3 m/s and for 35 kg drawer 1,0 m/s.

#### 5.3.7.2 Strength test of extension elements

The extension element shall be loaded according to Table 1.

Carry out the test according to EN 16122:2012, 7.5.2, respecting EN 16122:2012, 7.5.1 with a downward force of 200 N.

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

After the test the extension element shall remain attached to the unit.

### 5.3.8 Bottom hinged flaps

Carry out the test according to EN 16122:2012, 7.3.1 with a force of 200 N.

The flap shall not be loaded according to Table 1.

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

### 5.3.9 Top hinged flaps

Carry out the test according to A.1.

After the test there shall be no fracture or other damage that can affect the safety and the flap or components of it shall not become detached.

### 5.3.10 Kitchen-worktops and other top surfaces

#### 5.3.10.1 General

Tests and requirements are applicable to all kitchen-worktops and all other top-surfaces regardless of their mass and with a height ≤ 1 000 mm and with a depth of the top surface ≥ 250 mm.

#### 5.3.10.2 Static load test for kitchen-worktops

The kitchen-worktop shall not be loaded.

Carry out the test according to EN 16122:2012, 6.2.2 with a force of 1 000 N with the derogation that bottom surfaces shall not be tested.

After the test the kitchen-worktop and/or the unit shall show no fracture or other damage that can affect the safety.

#### 5.3.10.3 Static load test for other top surfaces

The top surface shall not be loaded.

Carry out the test according to EN 16122:2012, 6.2.2 with a force of 750 N with the derogation that bottom surfaces shall not be tested.

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

### 5.3.11 Wall hanging units and top hanging units

#### 5.3.11.1 General

The tests in 5.3.11 shall be carried out on all wall hanging units and top hanging units with a total mass ≥ 10 kg.

All components shall be tested irrespective of their total mass. But the safety requirements specified in 5.3.1 to 5.3.10 do not apply to components with a total mass < 10 kg.

The unit(s)/component(s) shall be mounted and adjusted according to the manufacturer's installation instructions. If mounting or assembly instructions are not supplied, adjustable wall attachment devices shall be adjusted to the maximum depth (as far from the wall as possible) and to the mid of the height adjustment range.

The unit shall then be levelled by means of distance devices placed as low and as far apart as possible.

#### 5.3.11.2 Movable components, shelf supports and top surfaces

Load according to Table 1. As soon as possible after the loading, carry out the following tests regardless of mass and height of centre of gravity of components:

— 5.3.3: Shelf supports;

— 5.3.5: Pivoted doors;

— 5.3.6: Sliding doors and horizontal roll fronts;

— 5.3.7: Extension elements;

— 5.3.8: Bottom hinged flaps;

— 5.3.9: Top hinged flaps;

— 5.3.10.2: Kitchen work tops ≤ 1 000 mm from the floor with the derogation that the test shall be carried out at one point most likely to cause failure;

— 5.3.10.3: Top surfaces ≤ 1 000 mm from the floor with the derogation that the test shall be carried out at one point most likely to cause failure – this test is applicable for top surfaces with a depth > 250 mm.

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

After the test the unit shall remain attached to the building (wall/ceiling) and shall carry the test load.

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

#### 5.3.11.3 Overload

After carrying out the tests in 5.3.11.2, increase the load on all the storage areas according to the principle in EN 16122:2012, 10.1.3.

The specified load is 250 kg/m$^2$.

Additionally to that load:

— water basins/sinks shall be completely filled with water or an equivalent mass;

— extension elements shall be loaded with their load according to Table 1 adding 20 % or the manufacturer's instructions adding 20 %.

All doors and extension elements shall be open during the test.

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 minus 1 shall then be the number of shelves to be used during testing.

If the volume of the unit, calculated by the inner width, depth and height, is > 0,225 $m^3$, the loads shall be multiplied by the factor *R*:

$$R = \frac{1,2}{\left(0,75 + 2V\right)} \quad (1)$$

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.

An example is shown in Annex C (informative).

After the test the unit shall remain attached to the building (wall/ceiling) and shall carry the test load.

#### 5.3.11.4 Sidewards detachment test

The unit shall not be loaded.

Carry out the test according to A.3 with a horizontal force of 100 N or for a maximum distance of 100 mm.

During and after the test the unit shall not become detached.

#### 5.3.11.5 Vertical dislodgement test

The unit shall not be loaded.

Carry out the test according to EN 16122:2012, 10.1.4 with a vertical upwards force of 100 N.

During and after the test the unit shall not become detached.

## 5.4 Stability

### 5.4.1 General

The following requirements apply to free standing storage units with a height to the top of the unit ≥ 600 mm above the floor level and when the potential energy (3.15) exceeds 60 Nm.

Free standing units which fall under the principles in 5.1 shall be tested for stability according to Table 3, following the order listed in Table 3.The stability requirements are fulfilled when, during testing in accordance with Table 3, the storage unit does not overturn.

If during testing the overturning movement is prevented by the opening of an extension element, door or flap the component shall be prevented from opening and the test repeated.

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 and baskets with internal height, $H$, ≤ 1 dm | 0,2 kg/dm$^3$ |
| Extension elements and baskets with internal height, $H$, between 1 dm and 2,5 dm | (0,2667 – 0,0667$H$) kg/dm$^3$ ($H$ in dm) |
| Extension elements and baskets with internal height, $H$, ≥ 2,5 dm clear height | 0,1 kg/dm$^3$ |
| Hanging rails | 2 kg/dm |
| Suspended filing pockets | 1,25 kg/dm |

**Table 3 — Stability requirements**

| Test No. | Test | Reference in EN 16122:2012 | Loading | Test parameter |
|---|---|---|---|---|
| 5.4.1.1 | Doors, extension elements and flaps closed, all storage units unloaded – Units that are, or can be, adjusted to a height of 1 000 mm or less | 11.2.1 | Vertical force, N | 750 |
| 5.4.1.2 | 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 | 11.2.2 | Vertical force, N<br>Outward horizontal force resulting in an overturning moment, Nm | 350<br>50 |
| 5.4.1.3 | All storage areas unloaded and all doors, extension elements and flaps open | 11.4.1 | – | – |
| 5.4.1.4 | All storage areas unloaded, with overturning load | 11.4.2 | Vertical force, N | 75 |
| 5.4.1.5 | All storage areas loaded, with overturning load | 11.4.3 | Vertical force, N | 20 % of mass of the unit loaded according to Table 2 but not greater than 300 N |
| 5.4.1.6 | Doors, extension elements and flaps closed and locked | 11.5 | Outward horizontal force, N | 100 |

### 5.4.2 Kitchen floor units with kitchen-worktops

In addition to the tests in 5.4.1 carry out the test according to EN 16122:2012, 11.2 with a horizontal outwards overturning moment of 200 Nm. During testing, all doors, flaps and extension elements shall be closed.

### 5.4.3 Stability of TV-furniture

#### 5.4.3.1 General

The requirements for TV-furniture specified in 5.4.3.2 and 5.4.3.3 are additional to the requirements in 5.4.1.

#### 5.4.3.2 One door, extension element or flap opened – storage areas unloaded

In addition to the tests in 5.4.1 carry out the test according to A.2.1 with a force of 150 N.

#### 5.4.3.3 Doors, extension elements and flaps closed – storage areas unloaded

Carry out the test according to A.2.2 with a mass of 27 kg.

Place stops in front of the feet or castors of the unit and apply an outwards overturning moment of 60 Nm in the direction most likely to cause it to overturn.

### 5.5 Floor standing units intended to be attached to the building

The requirements only apply to storage units where the height to the top of the unit is 600 mm or more above the floor level, and when the potential energy (3.15) exceeds 60 Nm.

Carry out the test according to EN 16122:2012, 10.2 with a horizontal outwards force of 200 N.

The force shall be maintained for not less than 10 s and not more than 15 s.

After the test, the unit shall remain attached to the structure.

### 5.6 Vertical glass components

Any external, vertical glass component ≥ 0,1 $m^2$ in area, where the smallest dimension is ≥ 200 mm and any component of which is < 900 mm above the floor, shall not break when tested according to EN 14072:2003, or shall break as specified in EN 14072:2003, Clause 7, c) 2) or c) 3).

This test shall not be carried out if the glass fulfils the requirements in EN 12150-1:2015, Clause 8, "Fragmentation test", or where the mode of breakage ($\beta$) according to EN 12600 is Type B or Type C.

This test shall not be carried out for vertical glass components which are fully supported by a carrier material (e.g. particle board).

Load storage areas according to Table 1.

The test shall be carried out according to EN 14072:2003 with a drop height of 70 mm.

The impact point shall be on the most adverse corner 100 mm from each visible edge of the glass. The glass shall be impacted once

## 6 Product information

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

a) installation shall be carried out exactly according to the manufacturer's instructions – otherwise a safety risk can occur if incorrectly installed; a warning shall be given to the consumer to notify them of related risks:

EXAMPLE 1 For floor standing units intended to be attached to the building: WARNING In order to prevent overturning this product must be used with the wall attachment device provided.

EXAMPLE 2 For wall hanging units: WARNING In order to prevent falling down this product must be used with the wall attachment device provided.

EXAMPLE 3 For wall hanging units and top hanging units: WARNING Assess the suitability of the wall/ceiling to ensure that the fastening devices will withstand the forces generated.

b) where there are no open stops for the extension element information shall be provided about the potential risk of extension element can be pulled out of the unit.

For self-assembly furniture the following additional information is required:

c) list of parts supplied;

d) list of tools required;

e) diagram of the bolts and other fastenings required.

## 7 Test report

The test report shall include at least the following information:

a) reference to this European Standard;

b) details of the item tested (relevant data);

c) details of defects observed before testing;

d) manner of mounting, if appropriate;

e) test results;

f) name and address of the test facility;

g) date of test.

# Annex A
(normative)

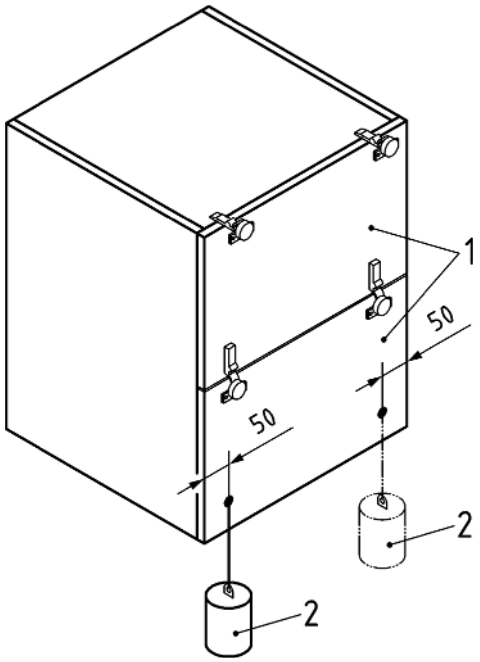
# Additional test methods

## A.1 Vertical downwards static load of top hinged flaps

Close the flap and apply a vertical static load of 150 N. The load application points shall be at the surface 50 mm from the left, right and bottom edges (see Figure A.1).

Carry out five times at each side.

Dimensions in millimetres




**Key**

1 flap

2 test load

**Figure A.1 — Vertical downwards static load of top hinged flaps**

## A.2 Stability of TV-furniture

### A.2.1 One door, extension element or flap opened – storage areas unloaded

The unit shall be unloaded.

One door shall be opened to 90° and extension elements shall be fully opened, except where there are no open stops, in which case they shall be opened to two thirds of the internal length. Flaps shall be fully opened.

Apply the specified vertical force at the centre of the front of each extension element and 75 mm from the outermost edge of the door or flap.

Extension elements and flaps shall be opened across the full width of the unit. Only one extension element in each vertical line of extension elements shall be opened so as to produce the configuration most likely to cause overturning.

Apply the specified vertical force to any point likely to cause overturning, on the centreline of the front of an extension element or 50 mm from the outer edge of a door or flap.

Record if the unit overturns or is supported by an open extension element, opened door or opened flap.

### A.2.2 Doors, extension elements and flaps closed – storage areas unloaded

Load the TV-furniture top surface with the specified mass acting 15 cm from the front edge of the unit and sideways on a length of 50 cm where it is likely to have the worst stability consequence. The mass shall not overhang the edge of the unit.

## A.3 Sidewards detachment test

Close all extension elements, flaps, roll fronts and doors.

Apply, by means of the loading pad (EN 16122:2012, 5.4), the specified force one time at points A and B on the centreline of the side of the unit 50 mm from the top and at points C and D 50 mm above the bottom (see Figure A.2). If no structural member exists at this position, apply the force by means of a rigid bar.

Dimensions in millimetres

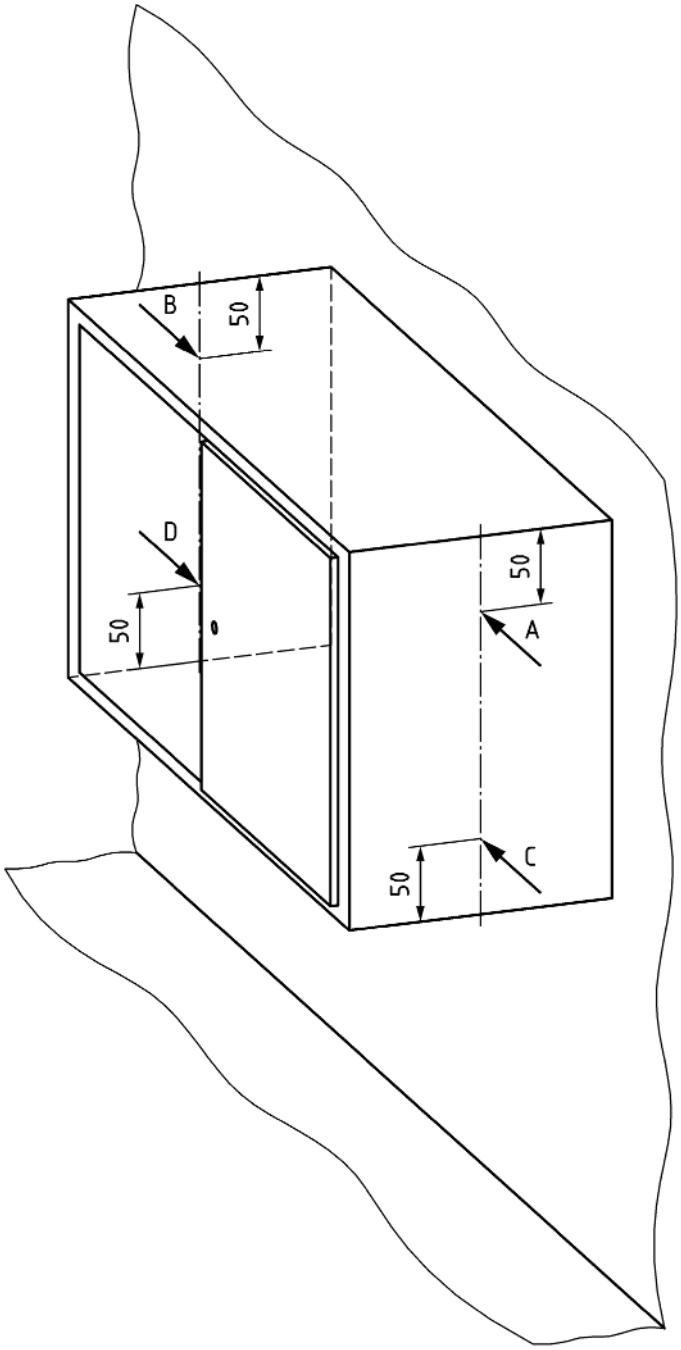



**Figure A.2 — Sidewards detachment test**

# Annex B
(informative)

# Guide to testing of units and components

This guide with Table B.1, B.2 and B.3 is intended to ease the use of this standard.

**Table B.1 — Floor standing unit and free standing unit: Structural safety requirements in relation with the tested components characteristics – relevant for 5.3 except 5.3.10 and 5.3.11**

| EN 14749 | **Test Method** | EN 16122: 2012 | **Components characteristics** | | | |
|---|---|---|---|---|---|---|
| | | | Height of the centre of gravity of the component (see 5.3.1) | > 350 mm | > 900 mm | < 900 mm |
| | | | Total mass of the component (see 5.1.3 and 5.3.1) | ≥ 35 kg | ≥ 10 kg | < 35 kg |
| | | | **Test parameters** | **Requirements** | | |
| 5.3.2.1 | Shelf retention – vertical downward | 6.1.3 | $F_V$ [a] = 100 N<br>1 cycle | The unloaded shelf shall not fall. | | N.A |
| 5.3.2.2 | Shelf retention – horizontal outward | 6.1.2 | 50 % of the weight of the unloaded shelf<br>1 cycle | The unloaded shelf shall not fall. | | N.A |
| 5.3.3 | Shelf supports | 6.1.5 | Load: Table 1<br>Impact plate no. 1, EN 16122:2012<br>10 cycles | The shelf and the shelf supports shall show no fracture or other damage that can affect the safety. | | N.A |
| 5.3.4 | Storage area/-volume for heavy appliances | 6.2.1 | Load: Table 1<br>1 week loading | The shelves, tops or bottoms and the shelf supports shall show no fracture or other damage that can affect the safety. | | N.A |
| 5.3.5.1 | Vertical load of pivoted doors | 7.1.1<br>7.1.2 | Load: Table 1 and consider EN 16122:2012, 4.5<br>Test load: 30 kg<br>10 cycles | The door shall remain attached to the unit. | | N.A |
| 5.3.5.2 | Horizontal load on pivoted doors | 7.1.1<br>7.1.3 | Load: Table 1 and consider EN 16122:2012, 4.5<br>$F_H$ [b] = 60 N<br>For doors ≤ 135° only<br>10 cycles | The door shall remain attached to the unit. | | N.A |

| EN 14749 | **Test Method** | EN 16122: 2012 | **Components characteristics** | | | |
|---|---|---|---|---|---|---|
| | | | Height of the centre of gravity of the component (see 5.3.1) | > 350 mm | > 900 mm | < 900 mm |
| | | | Total mass of the component (see 5.1.3 and 5.3.1) | ≥ 35 kg | ≥ 10 kg | < 35 kg |
| | | | **Test parameters** | **Requirements** | | |
| 5.3.6 | Sliding doors and horizontal roll fronts | 7.2.1<br>7.2.2 | Load: Table 1 and consider EN 16122:2012, 4.5<br>$m_2$ = 4 kg<br>10 cycles | No fracture or other damage that can affect the safety. | | N.A |
| 5.3.7.1 | Slam open of extension elements | 7.5.1<br>7.5.4 | Load: Table 1<br>K = 2,5<br>10 cycles | The extension elements shall not fall out of the unit. | | N.A |
| 5.3.7.2 | Strength test of extension elements | 7.5.1<br>7.5.2 | Load: Table 1<br>$F_H$ = 200 N<br>10 cycles | The extension element shall remain attached to the unit; no fracture or other damage that can affect the safety. | | N.A |
| 5.3.8 | Bottom hinged flaps | 7.3.1 | Load: Table 1<br>$F_V$ = 200 N<br>10 cycles | The flap and/or the unit shall show no fracture or other damage that can affect the safety. | | N.A |
| 5.3.9 | Top hinged flaps | A.1 | $F_V$ = 150 N<br>2 × 5 cycles | The flap or components of it shall not become detached. There shall be no fracture or other damage that can affect the safety. | | N.A |

N.A. Not applicable.

a $F_V$ is the total vertical force transferred to the wall.

b $F_H$ is the total horizontal force transferred to the wall.

**Table B.2 — Floor standing unit and free standing unit: Structural safety requirements in relation with unit characteristics – relevant for 5.3.10**

| EN 14749 | **Test method** | EN 16122:2012 | **Unit characteristics** | | | |
|---|---|---|---|---|---|---|
| | | | Height of the centre of gravity of the unit (see 5.3.1) | > 350 mm | > 900 mm | < 900 mm |
| | | | Total mass of the unit (see 5.1.3 and 5.3.1) | ≥ 35 kg | ≥ 10 kg | < 35 kg |
| | | | **Tests parameters** | **Requirements** | | |
| 5.3.10.2 | Static load test for kitchen-worktops | 6.2.2 | $F_V$ = 1 000 N<br><br>10 cycles per loading point, max. 3 loading points | The kitchen-worktop and/or unit shall show no fracture or other damage that can affect the safety. | The test is only applicable on top ≤ 1 000 mm.<br>The kitchen-worktop and/or unit shall show no fracture or other damage that can affect the safety. | N.A |
| 5.3.10.3 | Static load test for all other top surfaces | 6.2.2 | $F_V$ = 750 N<br><br>10 cycles per loading point, max. 3 loading points | The top surface and/or unit shall show no fracture or other damage that can affect the safety. | The test is only applicable on top ≤ 1 000 mm and with depth of the top surface ≥ 250 mm.<br>The top surface and/or unit shall show no fracture or other damage that can affect the safety. | N.A |
| N. A. Not applicable. | | | | | | |

**Table B.3 — Wall hanging unit: Structural safety requirements in relation with the mass of the unit and the tested component – relevant for 5.3.11.1 and 5.3.11.2**

| EN 14749 | **Test Method** | EN 16122:2012 | **Unit and components characteristics** | | |
|---|---|---|---|---|---|
| | | | Total mass of the unit (see 5.3.1) | ≥ 10 kg | ≥ 10 kg |
| | | | Total mass of the component (see 5.1.3 and 5.3.1) | < 10 kg | ≥ 10 kg |
| | | | **Test parameters** | **Requirements** | **Complementary requirements** |
| General | | | Follow 5.3.11.4, § 2 and § 3<br>Load: Table 1 (see 5.3.11.2) | | |
| **5.3.3** | Shelf supports | 6.1.5 | Impact plate no. 1, EN 16122<br>10 cycles | The unit shall remain attached to the building (wall/ceiling) and shall carry the test load.<br>It's acceptable that for each test components with a total mass less than 10 kg can become detached. | The shelf and the shelf supports shall show no fracture or other damage that can affect the safety. |
| **5.3.5.1** | Vertical load of pivoted doors | 7.1.1<br>7.1.2 | Test load: 30 kg<br>10 cycles | | The door shall remain attached to the unit. |
| **5.3.5.2** | Horizontal load on pivoted doors | 7.1.1<br>7.1.3 | $F_H$ = 60 N<br>For doors ≤ 135° only<br>10 cycles | | The door shall remain attached to the unit. |
| **5.3.6** | Sliding doors and horizontal roll fronts | 7.2.1<br>7.2.2 | $m_2$ = 4 kg<br>10 cycles | | No fracture or other damage that can affect the safety. |
| **5.3.7.1** | Slam open of extension elements | 7.5.4 | K = 2,5<br>10 cycles | | The extension elements shall not fall out of the unit. |
| **5.3.7.2** | Strength test of extension elements | 7.5.2 | $F_H$ = 200 N<br>10 cycles | | The extension element shall remain attached to the unit. |
| **5.3.8** | Bottom hinged flaps | 7.3.1 | $F_V$ = 200 N<br>10 cycles | | The flap and/or the unit shall show no fracture or other damage that can affect the safety. |
| **5.3.9** | Top hinged flaps | EN 14749:2016, A.1 | $F_V$ = 150 N<br>2 x 5 cycles | | The flap or components of it shall not become detached.<br>There shall be no fracture or other damage that can affect the safety. |

| EN 14749 | **Test Method** | EN 16122:2012 | **Unit and components characteristics** | | |
|---|---|---|---|---|---|
| | | | Total mass of the unit (see 5.3.1) | ≥ 10 kg | ≥ 10 kg |
| | | | Total mass of the component (see 5.1.3 and 5.3.1) | < 10 kg | ≥ 10 kg |
| | | | **Test parameters** | **Requirements** | **Complementary requirements** |
| **5.3.10.2** | Static load test for kitchen-worktops | 6.2.2 | Applicable only on kitchen-worktops which are ≤ 1 000 mm from the floor<br>Load: no load on the kitchen-worktop<br>$F_V$ = 1 000 N<br>10 cycles per loading point, max. 3 loading points | The unit shall remain attached to the building (wall/ceiling) and shall carry the test load.<br>The kitchen-worktop and/or unit shall show no fracture or other damage that can affect the safety.<br>It's acceptable that for each test components with a total mass less than 10 kg can become detached. | |
| **5.3.10.3** | Static load test for all other top surfaces | 6.2.2 | Applicable only on top surfaces which are ≤ 1 000 mm from the floor and for top surfaces with a depth > 250 mm<br>Load: No load on the top surface<br>$F_V$ = 750 N<br>10 cycles per loading point, max. 3 loading points | The unit shall remain attached to the building (wall/ceiling) and shall carry the test load.<br>The top surface and/or unit shall show no fracture or other damage that can affect the safety.<br>It's acceptable that for each test components with a total mass less than 10 kg can become detached. | |
| **5.3.11.4** | Sidewards detachment test | EN 14749:2016, A.3 | $F_H$ = 100 N or max. distance 100 mm | During and after the test the unit shall not become detached. | |

# Annex C
(informative)

# Example of loading of wall hanging units and top hanging units (see 5.3.11.3 overload)

Wall hanging unit with internal dimensions:

width: 1,000 m

depth: 0,350 m

height: 0,850 m

———————————————

= 0,298 $m^3$ volume

Number of shelves = internal height/200 = 4,25. This means 3 shelves with an area of 0,350 $m^2$ each.

According to this the following loads apply:

| | | |
|---|---|---|
| Bottom | = 0,350 $m^2$ × 250 kg/$m^2$ × 1 | = 87,500 kg |
| First shelf: | = 0,350 $m^2$ × 250 kg/$m^2$ × 0,6 | = 52,500 kg |
| Second shelf: | = 0,350 $m^2$ × 250 kg/$m^2$ × 0,4 | = 35,000 kg |
| Third shelf | = 0,350 $m^2$ × 250 kg/$m^2$ × 0,25 | = 21,875 kg |
| Top surface | = 0,350 $m^2$ × 250 kg/$m^2$ × 0,2 | = 17,500 kg |

———————————————————————————————

Test load without load reduction: 214,375 kg

Because of the inner volume of 0,298 $m^3$ a reduction of the load is required:

Reduction factor

$$R = \frac{1,2}{\left(0,75 + 2V\right)} = \frac{1,2}{\left(0,75 + 2 \times 0,298\right)} = 0,892 \qquad \text{(C.1)}$$

Reduction test load: 214,375 kg × 0,892 = 191,223 kg

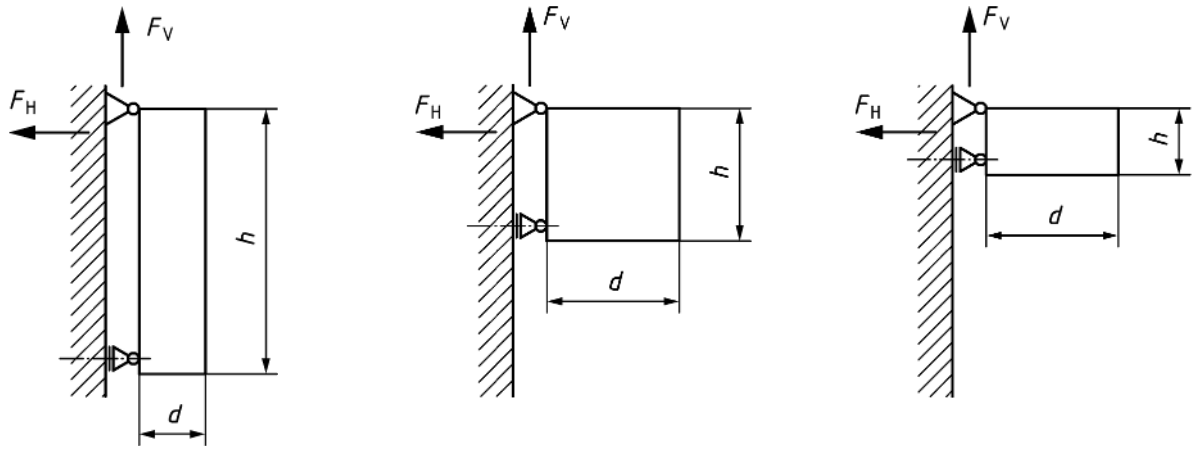
Reduction of bottom load: 214,375 kg – 191,223 kg = 23,152 kg

Reduced test load of bottom: 87,500 kg – 23,152 kg = 64,348 kg

# Annex D
(informative)

# Method for calculation of vertical and horizontal acting forces

Horizontal and vertical forces can change extremely at different high/depth relation (see examples Figure D.1).




**a)** $h$ **>** $d$ **(example:** $d$ **= 300 mm,** $h$ **= 900 mm)**

**b)** $h$ **=** $d$ **(example:** $d$ **= 600 mm,** $h$ **= 600 mm)**

$h$ **<** $d$ **(example:** $d$ **= 600 mm,** $h$ **= 300 mm)**

**Key**

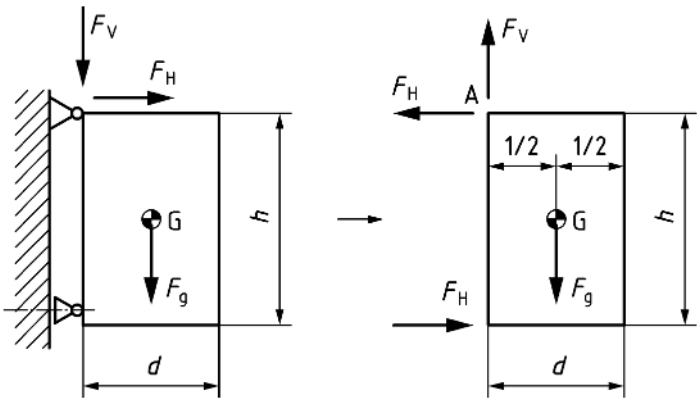
$d$ depth

$h$ height

$F_H$ total horizontal force transferred to the wall

$F_V$ total vertical force transferred to the wall

**Figure D.1 — Examples - Horizontal and vertical forces depending on the furniture dimensions**




**Key**

A wall attachment point

*d* depth

*h* height

$F_H$ total horizontal force transferred to the wall

$F_V$ total vertical force transferred to the wall

$F_g$ gravity force

G centre of gravity

**Figure D.2 — Calculation of horizontal and vertical forces – acting at the wall attachment points (A)**

The vertical and horizontal forces are calculated as following:

— $F_g = m \times g$

— $F_V = m \times g = F_g$

$$\sum M_A = 0$$

— $F_g \times d/2 = F_H \times h$

— $m \times g \times d/2 = F_H \times h$

— $F_H = (m \times g \times d/2) \; / \; h$

where

g is the gravity ($m/s^2$) (see 3.15);

$F_H$ is the total horizontal force (N);

$F_V$ is the total vertical force (N);

$F_g$ is the gravity force (N);

*h* is the height (m);

*m* is the total mass (kg);

$M_A$ is the moment at A (Nm);

*d* is the depth (m).

EXAMPLE 1 Case a):

Data:

$h$ = 0,600 m

$d$ = 0,300 m

$m$ = 140 kg

Calculation:

— $F_g = m \times g \rightarrow F_g$ = 140 kg × 9,81 m/s² = 1373,4 N

— $F_V = m \times g = F_g \rightarrow F_V$ **= 1373,4 N**

$$\sum M_A = 0$$

— $F_g \times d/2 = F_H \times h$

— $m \times g \times d/2 = F_H \times h$

— $F_H = (m \times g \times d/2) / h \rightarrow F_H$ = [140 kg × 9,81 m/s² × (0,300 m / 2)] / 0,600 m = 343,35 N → $F_H$ **= 343,35 N**

EXAMPLE 2 Case b):

Data:

$h$ = 0,600 m

$d$ = 0,600 m

$m$ = 140 kg

Calculation:

— $F_g = m \times g \rightarrow F_g$ = 140 kg × 9,81 m/s² = 1373,4 N

— $F_V = m \times g = F_g \rightarrow F_V$ **= 1373,4 N**

$$\sum M_A = 0$$

— $F_g \times d/2 = F_H \times h$

— $m \times g \times d/2 = F_H \times h$

— $F_H = (m \times g \times d/2) / h \rightarrow F_H$ = [140 kg × 9,81 m/s² × (0,600 m / 2)] / 0,600 m = 686,7 N → $F_H$ **= 686,7 N**

EXAMPLE 3 Case c):

Data:

$h$ = 0,300 mm

$d$ = 0,600 mm

$m$ = 140 kg

Calculation:

— $F_g = m \times g \rightarrow F_g$ = 140 kg × 9,81 m/s² = 1373,4 N

— $F_V = m \times g = F_g \rightarrow F_V$ **= 1373,4 N**

$$\sum M_A = 0$$

— $F_g \times d/2 = F_H \times h$

— $m \times g \times d/2 = F_H \times h$

— $F_H = (m \times g \times d/2) / h \rightarrow F_H$ = [140 kg × 9,81 m/s² × (0,600 m / 2)] / 0,300 m = 1373,4 N → $F_H$ **= 1373,4 N**

# Bibliography

[1] EN 1116, *Kitchen furniture - Co-ordinating sizes for kitchen furniture and kitchen appliances*

[2] EN 60065, *Audio, video and similar electronic apparatus — Safety requirements (IEC 60065)*

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