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BSI Standards Publication

# Refrigerated storage cabinets and counters for professional use — Classification, requirements and test conditions

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**National foreword**

This British Standard is the UK implementation of EN 16825:2016.

The UK participation in its preparation was entrusted to Technical Committee RHE/19, Commercial refrigerated food cabinets (cold room and display cases).

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.


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EUROPEAN STANDARD

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English Version

# Refrigerated storage cabinets and counters for professional use - Classification, requirements and test conditions

Armoires et comptoirs frigorifiques à usage professionnel - Classification, prescriptions et conditions d'essai

Servicekühltheken- und -tische für gewerbliche Küchen - Klassifikation, Anforderungen und Prüfbedingungen

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



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## European foreword

This document (EN 16825:2016) has been prepared by Technical Committee CEN/TC 44 “Commercial and Professional Refrigerating Appliances and Systems, Performance and Energy Consumption”, 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of an identical text or by endorsement, at the latest by February 2017, and conflicting national standards shall be withdrawn at the latest by February 2017.

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# 1 Scope

This European Standard specifies requirements for the construction, characteristics, performance including energy consumption of refrigerated storage cabinets and counters for professional use in commercial kitchens, hospitals, canteens, preparation areas of bars, bakeries, gelateria, institutional catering and similar professional areas.

The products covered in this European Standard are intended to store foodstuffs. It specifies test conditions and methods for checking that the requirements have been satisfied, as well as classification of the cabinets and counters, their marking and the list of their characteristics to be declared by the manufacturer.

It is not applicable to:

— refrigerated cabinets used in the direct sale of foodstuffs;

— cabinets that carry out food processing and not just storage function (e.g. bakery cabinets that chill, heat and humidity);

— cabinets with water cooled condenser;

— appliances with remote condensing unit;

— appliances with open top tables and saladettes for preparation or storage of foodstuffs;

— cabinet specifically intended for storage of specific foodstuffs (i.e. fresh meat, fresh fish, etc.) operating at a temperature different from those specified in Table 1;

— chest freezers;

— appliances intended for short time /intermittent normal operation during the full day;

— built-in cabinet;

— roll-in cabinet;

— pass-through cabinet.

# 2 Normative references

Not applicable.

# 3 Terms and definitions

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

**3.1**
**refrigerated storage cabinet**
cabinet cooled by an incorporated refrigerating system which enables chilled and frozen foodstuffs placed therein to be maintained within prescribed temperature limits

Note 1 to entry: Refrigerated storage cabinets is supplied with:

— transparent door: door where the transparent part is more than 20 % of the surface of the door

— solid door: door where the transparent part is less than 20 % of the surface of the door.

**3.1.1**
**vertical cabinet**
refrigerated storage cabinet, having overall height equal or higher than 1 050 mm with one or more front doors or drawers accessing the same compartment

**3.1.2**
**counter cabinet**
refrigerated storage cabinet, having overall height lower than 1 050 mm, with one or more front doors or drawers accessing the same compartment

**3.1.3**
**roll-in cabinet**
refrigerated cabinet intended to be loaded with trolleys with shelves and designed to be introduced as such in the compartment

**3.1.4**
**pass-through cabinet**
refrigerated cabinet accessible from both sides

**3.1.5**
**semi-professional or light duty cabinet**
refrigerated cabinet for which the measurement of energy consumption and the capability of maintaining temperature in the compartment are verified when tested at test room climate class 3

**3.1.6**
**normal duty cabinet**
refrigerated cabinet for which the measurement of energy consumption and the capability of maintaining temperature in the compartment are verified when tested at test room climate class 4

**3.1.7**
**heavy duty cabinet**
refrigerated cabinet for which the verification of the capability of maintaining the temperature in the compartment is performed when tested at test room climate class 5 and the measurement of energy consumption is verified when tested at test room climate class 4

**3.1.8**
**static air cabinet**
cooling system without fan inside the cabinet, or system in which the fan can be switched off by the user

**3.1.9**
**built-in cabinet**
refrigerated storage cabinet intended to be installed into a prepared recess in a wall or similar location and requiring furniture finishing

**3.1.10**
**refrigerator**
appliance where the chilled foodstuff is stored at temperature corresponding to that of class M1

**3.1.11**
**freezer**
appliance where the frozen foodstuff is stored at temperature corresponding to that of class L1

**3.1.12**
**combined refrigerated cabinet**
refrigerated cabinet with different temperatures for chilled and/or frozen foodstuffs in separate compartments of the same cabinet

**3.1.13**
**multi use refrigerated cabinet**
refrigerated cabinet or separate compartment of the same cabinet that may be set at different temperatures for chilled or frozen foodstuffs

**3.2**
**commercial kitchen**
area in commercial premises where foodstuffs are processed and stored

Note 1 to entry: This area also includes counter area in a bar.

**3.3**
**overall external dimensions**
dimensions of the right parallelepiped bounded by the length, depth and height of the cabinet, including its projecting accessories

**3.4**
**net volume**
volume containing foodstuffs within the load limit

**3.5**
**shelf**
surface, excluding the base deck, on which the goods are stored

Note 1 to entry: When GN is mentioned, it means a shelf with dimensions according to the EN 631 series.

**3.6**
**shelf sham**
device intended to limit the loading of a shelf surface

**3.7**
**shelf area**
area defined by the external dimensions of the shelf or internal dimensions of the base of the drawer

Note 1 to entry: The shelf area used for the calculation of volume is different from the area loaded with packages as given in 5.3.3.3.

Note 2 to entry: In case of shelves that are recessed into the cabinet walls the recess part is not considered for the calculation of the surface area.

**3.8**
**load limit**
part of the cabinet boundary surface consisting of a plane or several planes within which foodstuffs can be loaded

**3.9**
**load limit line**
permanently marked boundary line denoting the limit of the loading surface

**3.10**
**operating conditions**
conditions which exist when the cabinet, including all permanently located accessories, has been set up with the recommendations of the manufacturer and is in service

Note 1 to entry: Specific operating conditions are defined in Clause 5.

**3.11**
**defrosting**
removal of frost, snow and ice from a refrigerated cabinet

**3.11.1**
**automatic defrosting**
defrosting where no action is necessary by the user to initiate the removal of frost accumulation and to restore normal operation

Note 1 to entry: It includes automatic removal of defrost water.

**3.11.2**
**semi-automatic defrosting**
defrosting where an action is necessary by the user to initiate the removal of frost accumulation and operating condition is restored automatically

Note 1 to entry: It either includes automatic removal of defrost water or entails manual removal of defrost water.

**3.11.3**
**manual defrosting**
defrosting where an action is necessary by the user to initiate the removal of frost accumulation and restoration to normal operation requires a further action by the user

Note 1 to entry: It either includes automatic removal of defrost water or entails manual removal of defrost water.

**3.12**
**defrost water removal**
process through which defrost water is removed from a refrigerated cabinet

**3.12.1**
**automatic removal of defrost water**
removal and/or evaporation of defrost water that does not require any action by the user

**3.12.2**
**manual removal of defrost water**
removal of defrost water that requires an action by the user

**3.13**
**condensing unit**
combination of one or more compressors, condensers and liquid receivers (when required) and common accessories

**3.14**
**compression-type refrigerating system**
system in which refrigeration is effected by the vaporization at low pressure in a heat exchanger (evaporator) of a liquid refrigerant, the vapour thus formed being restored to the liquid state by mechanical compression to a higher pressure and subsequent cooling in another heat exchanger (condenser)

**3.15**
**indirect-type refrigerating system**
system in which a secondary refrigerant circulating system is installed between a central refrigerating system and a refrigerated cabinet

**3.16**
**frame heating**
system to avoid condensation on the frame surface and freezing of the gasket of the refrigerated cabinet

**3.17**
**Energy consumption (E24h)**
energy consumption of the refrigerated cabinet in kWh

**3.18**
**M-package**
test package fitted with a temperature measuring sensor at its geometric centre

**3.19**
**M-package temperature class**
classification of M-package temperature according to temperatures of M-packages during the temperature test

**3.20**
**climate class**
classification of the test room climate according to the dry bulb temperature and relative humidity

**3.21**
**drawer**
retractable device for food storage, not located behind a door and accessible directly from the front of the cabinet

**3.22**
**cabinet section**
vertical part of a cabinet compartment containing one or more doors or drawers placed above each other

# 4 Requirements

## 4.1 Condensate drainage

Where drains, drip trays or evaporation receptacles are fitted, they shall have a capacity such to avoid overflow immediately during the testing period of 5.3.3.6.1 and whenever relevant (e.g. in case of manual cleaning), specific instructions shall be given on how to access and clean them.

## 4.2 Operating characteristics

### 4.2.1 Classification according to temperature

The temperatures measured in the compartment(s) shall comply with the values specified in Table 1 and the tests shall be carried out as specified in 5.3.4.

**Table 1 — M-package temperature classes**

| **Class** | **Highest temperature, $\theta_{ah}$, of warmest M-package less than or equal to** (see Figure 11) | **Lowest temperature, $\theta_b$, of coldest M-package greater than or equal to** (see Figure 11) | **Lowest temperature, $\theta_{al}$, of warmest M-package less than or equal to** (see Figure 11) |
|---|---|---|---|
| | °C | | |
| L1 | – 15 | — | – 18 |
| M1 | + 5 | – 1 | — |

### 4.2.2 Defrosting

The proposed defrosting procedures (automatic or manual) shall not affect the temperature requirements (see 5.3.4).

### 4.2.3 Water vapour condensation

The presence of water vapour condensation shall be verified according to the conditions and test methods specified in 5.3.5.

### 4.2.4 Electrical energy consumption

The electrical energy consumption (E24h) shall be measured over 24 h period according to the conditions and the test methods specified in 5.3.6.

The energy consumption shall be expressed in kWh/24h rounded to two decimal places.

# 5 Test conditions

## 5.1 General

When the characteristics of a cabinet are to be verified, all the tests and inspections shall be applied to one and the same cabinet. These tests and inspections may also be made individually for the study of a particular characteristic.

Compartment(s) of a combined refrigerated cabinet that are not foreseen for storage of foodstuffs are not subjected to tests and verifications of this standard.

Table 2 lists the tests and verifications.

**Table 2 — Test summary**

| Tests and inspections | Test method | |
|---|---|---|
| Temperature | 5.3.4 | **Inside test room** (see 5.3) |
| Defrosting | 4.2.2 | |
| Water vapour condensation | 5.3.5 | |
| Electrical energy consumption | 5.3.6 | |
| Calculation of net volume | 6.1 | **Outside test room** (see 5.2) |

## 5.2 Tests outside test room

The tests which may be carried out outside the test room deal with the inspection of construction characteristics and physical dimensions, linear dimensions, areas and volumes.

Measurements shall be made with the cabinet not in operation but situated in a place where the temperature is maintained between 16 °C and 30 °C.

If the cabinet includes permanent jacks, rollers, feet or other components for adjustment of height, they are considered in the measurement of the height of the cabinet. The height for counter shall not include the work top.

## 5.3 Tests inside test room

### 5.3.1 General

The tests which are carried out inside the test room deal with the measurement of the following characteristics:

— temperature and defrosting;

— water vapour condensation;

— electrical energy consumption.

### 5.3.2 Test conditions

#### 5.3.2.1 General

In the following, general testing conditions which are common for all tests specified in Clause 6 carried out inside the test room are defined. These conditions concern the test room, the test and M-packages, and the measuring instruments.

#### 5.3.2.2 Test room — General design, walls, floor and radiant heat

The test room shall be a parallelepiped space. The walls of the room shall be thermally insulated.

The minimum dimensions of the test room shall be such as to allow at least 0,5 m above the top of the cabinet, 1 m on the side of the climate measuring point, 0,5 m on the opposite side and 1,5 m on the front of the cabinet with doors in closed position (see Figure 4).

A minimum insulation level equivalent to 60 mm of rigid polyurethane foam ($\lambda$ = 0,03 W/m °C) should be used for the building of the test room.

The floor shall be made of concrete or of thermally equivalent material and/or shall be sufficiently insulated to ensure that external climatic conditions do not affect the floor temperature.

Lighting shall be installed to maintain (600 ± 100) lx measured at a height of 1 m above the floor level and shall be lit continuously during the test period.

The walls, ceilings and any partitions of rooms intended for the testing of refrigerated cabinets shall have an emissivity between 0,9 and 1 at 25 °C.

#### 5.3.2.3 Test room climate definition

##### 5.3.2.3.1 Test room climate classes

Tests shall be carried out in one of the climate classes according to Table 3.

During the test, the test room shall be capable of maintaining values of temperature and humidity within ± 1 °C of the temperature and ± 5 units of the relative humidity percentage figures at the specified climate measuring point(s).

**Table 3 — Climate classes**

| Test room climate class | Dry bulb temperature<br>°C | Relative humidity<br>% | Dew point<br>°C | Water vapour mass in dry air<br>g/kg |
|---|---|---|---|---|
| 3 | 25 | 60 | 16,7 | 12,0 |
| 4 | 30 | 55 | 20,0 | 14,8 |
| 5 | 40 | 40 | 23,9 | 18,8 |
| 7 | 35 | 75 | 30,0 | 27,3 |
| NOTE The water vapour mass in dry air is one of the main points influencing the performance and the energy consumption of the cabinets. | | | | |

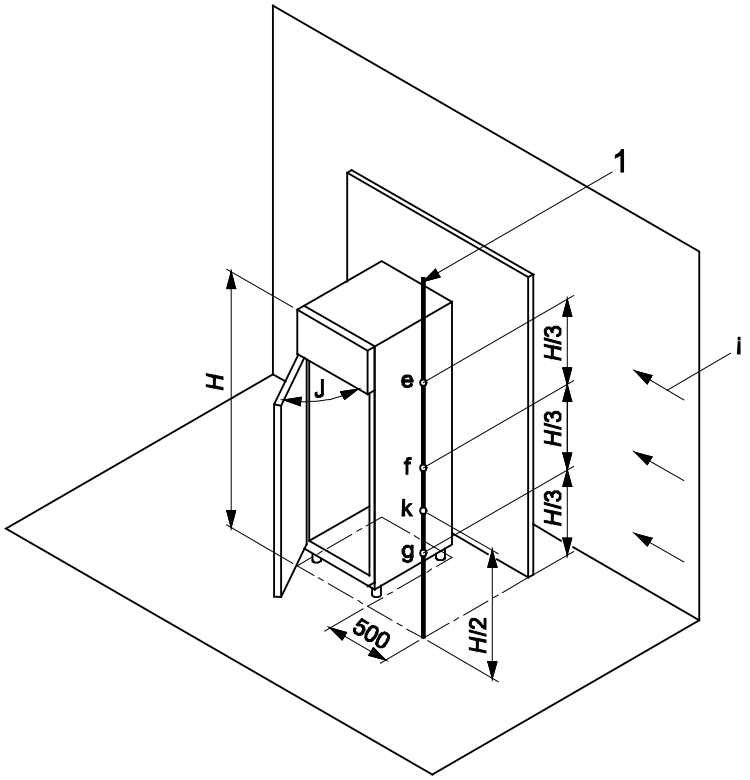
##### 5.3.2.3.2 Climate measuring point

The climate measuring point shall be located in the test room air flow, 500 mm upstream of the cabinet (i.e. on the air supply side of the cabinet), in line with the front of the cabinet at a vertical height that is half the cabinet height (including cabinet feet and fixings).

To avoid undue influence from the movement of doors or of doors operating means, for the value of the relative humidity, the mean of the relative humidity values measured during 1 min shall be considered.

The warm condenser air flow shall be prevented from influencing the temperature at the measuring point by air deflectors or other suitable means.

Positioning and type of air deflectors if any shall be indicated. This information is included in the information foreseen in Annex A.




**Key**

1 climate measuring line

H overall height of cabinet including feet or castor

J opening angle of cabinet door during test (≥60°)

e,f,g climate measuring points detecting air flow

i air currents parallel to the plane of the door opening

k climate measuring point detecting temperature and humidity

**Figure 1 — Environmental measuring points within the climate chamber**

#### 5.3.2.3.3 Temperature gradient

The temperature gradient shall be measured with the cabinet operating in the test room and with the doors and drawers closed. Temperatures shall be measured in a vertical line through the climate measuring point. The temperature gradient shall not exceed 2 °C/m and there shall not be a difference of more than 6 °C in the measurements made between the points 150 mm above the floor and 150 mm below the ceiling.

#### 5.3.2.4 Test packages characteristics

When tests are carried out, test packages in the form of rigid parallelepipeds shall be used; the size and mass of the test packages, including their packaging, shall be as specified in Table 4.

The tolerances for new test packages shall be:

— ± 2 mm for linear dimensions 25 mm to 50 mm,

— ± 4 mm for linear dimensions 100 mm to 200 mm, and

— ± 2 % for mass.

Each test package shall consist of filling material and a wrapper.

Filling material containing, per 1 000 g:

— 230,0 g of oxyethylmethylcellulose ± 1 g,

— 764,2 g of water ± 1 g,

— 5,0 g of sodium chloride ± 0,1 g,

— 0,8 g of para-chlorometa-cresol ± 0,1 g.

The freezing point of this material is −1 °C (its thermal characteristics corresponding to those of lean beef). The enthalpy value of 285 kJ/kg shall correspond to the temperature (−1 ± 0,5) °C (see Figure 2, Table 5 and Table 6).

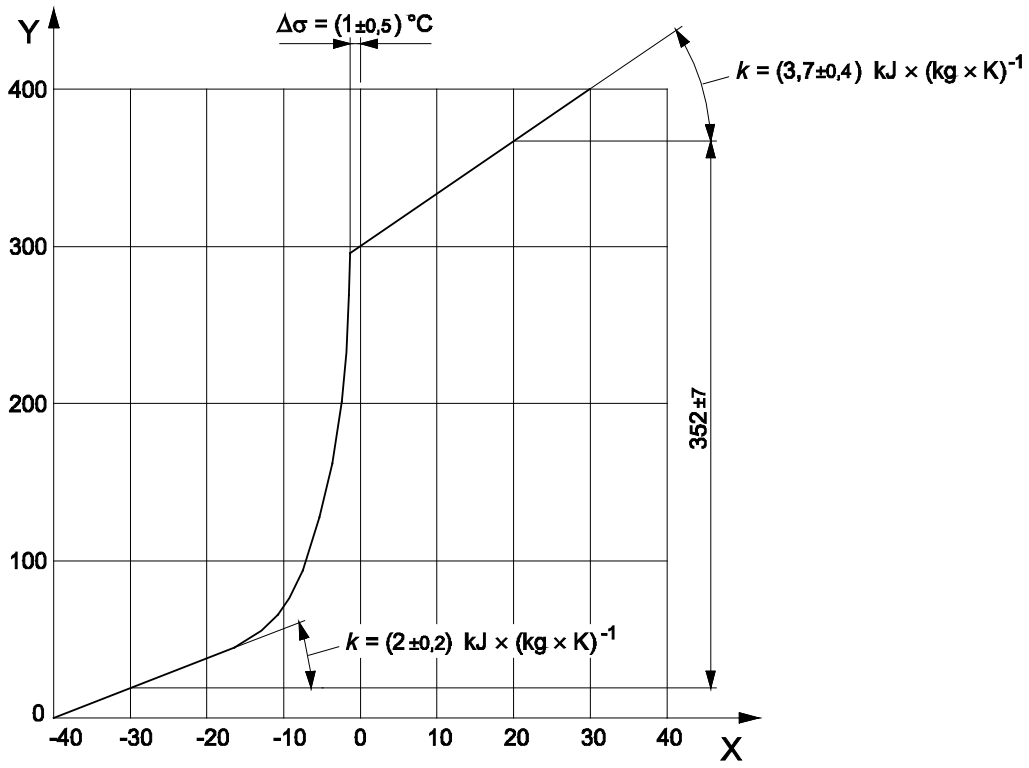
Up to 4 % of water should be added in order to compensate for evaporation during the preparation of the filling material.

**Table 4 — Dimensions and mass of test packages**

| **Dimensions**<br>(height x width x length)<br>mm | **Mass**<br>g |
|---|---|
| 50 × 100 × 100 | 500 |
| 50 × 100 × 200 | 1 000 |
| The following packages may be used as fillers to complete the cabinet loading: | |
| 25 × 100 × 200 | 500 |
| 25 × 100 × 100 | 250 |
| 25 × 50 × 100 | 125 |
| 37,5 × 100 × 100 | 375 |

Each test package shall be wrapped in sheet of light coloured plastic or any other suitable material of such nature that exchange of moisture with the ambient medium is negligible. The maximum total thickness shall be 1,0 mm. After filling this sheet shall be sealed.

The correspondence of the packages' material composition with the above mentioned characteristics should be certified by the supplier or by an independent laboratory.




**Key**

X temperature, °C

Y specific enthalpy, kJ/kg

**Figure 2 — Thermal characteristics of test packages**

**Table 5 — Temperature and specific enthalpy of test packages**

| **Temperature** °C | **Specific enthalpy** kJ/kg |
|---|---|
| −40 | 0 |
| −30 | 19 |
| −25 | 28 |
| −20 | 39 |
| −18 | 43 |
| −16 | 49 |
| −14 | 55 |
| −12 | 63 |
| −10 | 73 |
| −9 | 79 |
| −8 | 85 |
| −7 | 93 |
| −6 | 102 |
| −5 | 114 |
| −4 | 129 |
| −3 | 152 |
| −2 | 194 |
| −1 | 285 |
| 0 | 297 |
| +10 | 334 |
| +20 | 371 |

**Table 6 — Temperature and increase in specific enthalpy of test packages**

| **Temperature range** °C | **Increase in specific enthalpy** kJ/kg |
|---|---|
| − 30 to − 20 | 20 ± 2 |
| + 10 to + 20 | 37 ± 4 |
| − 30 to + 20 | 352 ± 7 |

**5.3.2.5 M-packages**

Some of the 500 g packages (50 mm × 100 mm × 100 mm) specified in 5.3.2.4 shall be equipped for temperature measurement, being fitted with temperature sensors inserted in the geometrical centre of the packages in direct contact with the filling material (see Figure 3).

Sensors inserted into a sheath are allowed, but the sensor and sheath are calibrated as a single entity.

The diameter of sensor cable shall be maximum 3 mm and the diameter of the sensor shall be maximum 5 mm.

If sensors consist of more than one wire the total section of the wires and insulation shall be calculated and shall be less than 7,1 $mm^2$.

The insulation material of the sensor lead shall be embodied within the M-package of a minimum 15 mm.

All precautions shall be taken to minimize extraneous conduction of heat and to avoid any possibility of entrance of the air from the hole in the wrapper for the passage of the temperature sensor that could create oxidation and loss of weight in the filling material.

Dimensions in millimetres

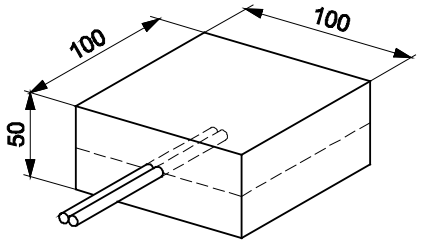



**Figure 3 — M-Package**

### 5.3.2.6 Test packages life time

Due to the frequency of use and to the loading pressure, the package could change in dimensions and weight. All test packages shall be checked annually for conformity with the following life-time tolerances:

a) Loss of mass: − 5 %.

b) On the wrapper: no visible hole.

c) Change in linear dimensions:

   1) ± 4 mm for dimensions between 25 mm and 50 mm;

   2) ± 8 mm for dimensions 100 mm and 200 mm.

When a test package is found to exceed one of the tolerances, it shall be replaced.

### 5.3.2.7 Instruments, measuring equipment and measuring accuracy

All measurements shall be carried out with instruments that have been calibrated.

The following measurement accuracies shall be met:

— Temperature measurements shall be made to an accuracy of ± 0,8 °C. Climate temperatures shall be measured by sensors, inserted in the centre of tinned solid copper or copper-zinc alloy cylinders having a mass of 25 g ± 1 g and of minimum external area (diameter = height = approximately 12,5 mm).

— Illumination flux per square metre shall be measured to an accuracy of 10 %.

— Relative humidity shall be measured to an accuracy of ± 3 units.

— Electrical energy consumption shall be measured to an accuracy of 2 % (see 5.3.6).

— Air velocity shall be measured using a laboratory-type instrument with an accuracy of 10 % or ± 0,03 m/s whichever is the greater and with a minimum sensitivity of 0,03 m/s in the range of 0 m/s to 1,5 m/s in horizontal flow at the temperature of the selected ambient class.

— time interval measurements shall be made to an accuracy of at least 1 %.

— measurement on linear dimensions shall be to an accuracy of ± 2 mm.

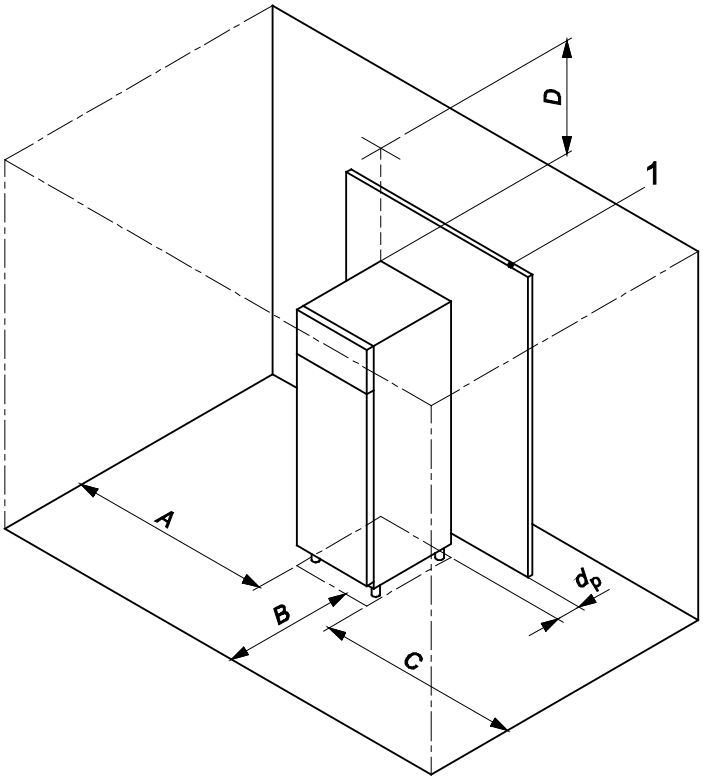
### 5.3.3 Preparation of test cabinet

#### 5.3.3.1 Cabinet selection, installation and positioning within the test room

Each refrigerated cabinet intended to be tested, unless a prototype, shall be selected from stock or routine production and shall be representative as to construction and adjustment.

The cabinet, including all components required for normal operation, shall be assembled, set up and sited as it would be installed in service as far as practicable and in accordance with the manufacturer's instructions. All permanently located accessories required for normal use shall be in their respective places.

Cabinets shall be placed against a wall of the test room or a vertical partition with an emissivity between 0,9 and 1 at 25 °C having a length of at least 1 m on the side of the climate measuring point, 0,5 m on the opposite side and an height of at least 0,5 m more than the cabinet under testing at a distance from the rear as specified in the instructions for use (see Figure 4).




**Key**

$d_p$ clearance between rear wall of test room or vertical position specified by the manufacturer (if used)

A minimum distance from side wall of test room

B minimum distance from front wall of test room

C minimum distance from side wall of test room

D minimum distance from the ceiling

1 technical partition (if used) in place of wall

**Figure 4 — Positioning of the cabinet within the climate chamber**

### 5.3.3.2 Air movement

Air movement shall be provided. The air movement, shall be, as far as practicable, parallel to the plane of the cabinet opening and to the longitudinal axis. The length of the cabinet is defined as the longest horizontal dimension of the opening.

Air velocity shall be measured in a vertical line through the climate measuring point with the cabinet in operation and with the doors or drawers closed. The air velocity at one third, two thirds three thirds of the overall height of the cabinet shall be between 0,1 m/s and 0,2 m/s.

The direction of air flow shall be such that the air enters the cabinet when the door(s) is (are) open. For refrigerated cabinets with multiple doors, 50 % or more of the doors shall open into the direction of the air.

#### 5.3.3.3 Loading the cabinet

##### 5.3.3.3.1 General

The cabinet shall be loaded with test packages (see 5.3.2.4) and M-packages (see 5.3.2.5) up to half the load limit, as illustrated in Figures 5 to 8.

Test packages with a mass of 1 000 g and 500 g shall be used.

To complete the loading, test packages of the following sizes (height x width x length) shall be used as fillers:

— 25 mm × 100 mm × 200 mm;

— 37,5 mm × 100 mm × 100 mm;

— 25 mm × 100 mm × 100 mm;

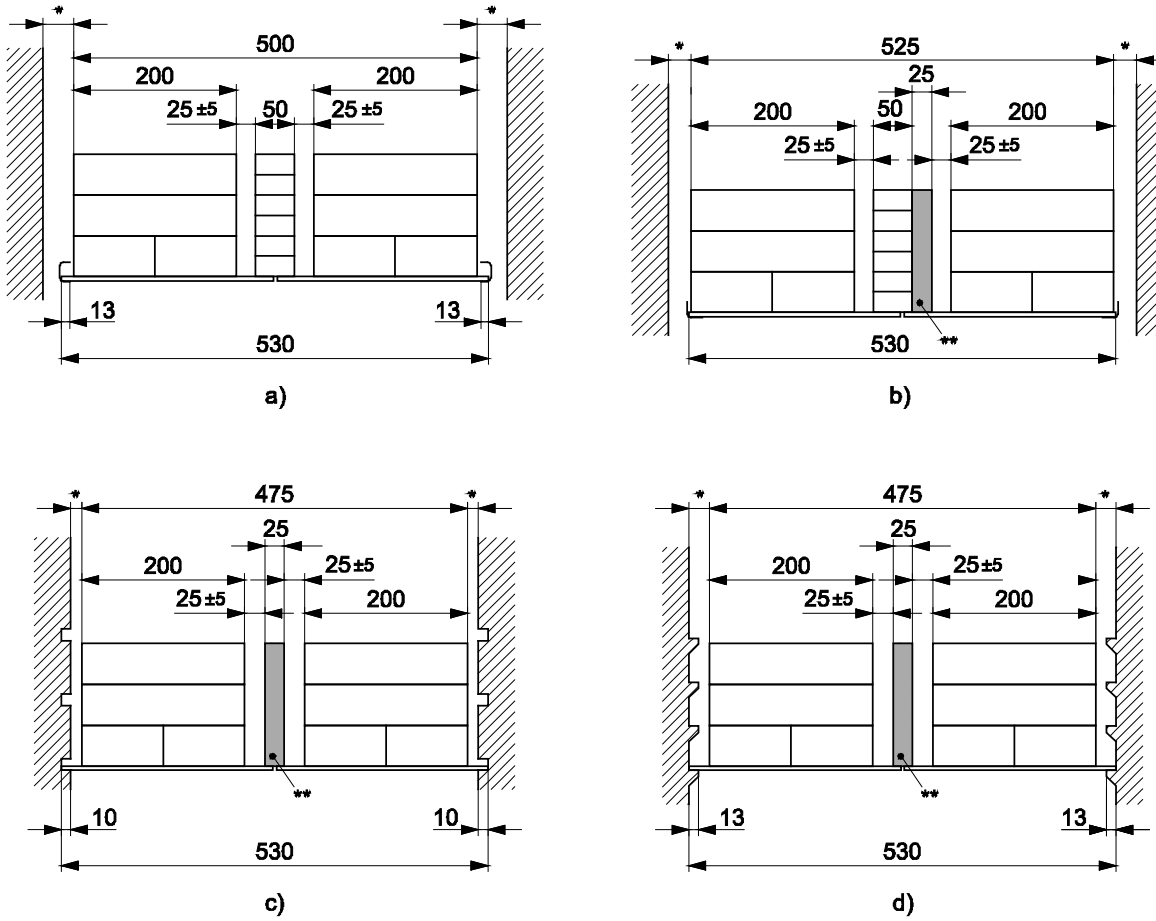
— 25 mm × 50 mm × 100 mm.

The test packages shall be arranged so as to form an even level.

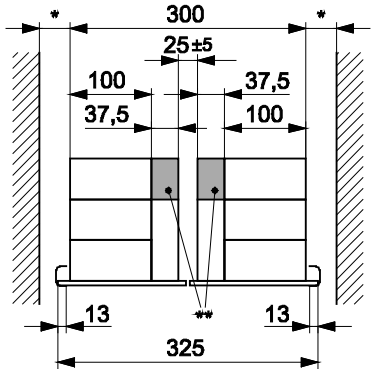
Each refrigerated shelf area shall be loaded with test packages arranged in such a way that they form rows with a length of 200 mm by the depth of the cabinet shelf or drawer base or container. In case this condition is not possible due to the size of the shelf or drawer base or container, evenly distributed rows as close as possible to 200 mm shall be used.

A clearance of 25 mm ± 5 mm shall be left between package rows. If the clearance is limited by construction, the packages adjacent to the side walls shall be loaded to the shelf extremity (see Figures 5, 6 and 7).

Otherwise the clearance of the extreme package close to the walls shall be as close as possible to 25 mm.




**a) Loading of shelves GN 2/1 front view**




**b) Loading of shelves GN 1/1 front view**

Packages should be loaded to the rear extremity and front extremity of the cabinet shelf or drawer unless this is limited by construction or by a specific load limit line.

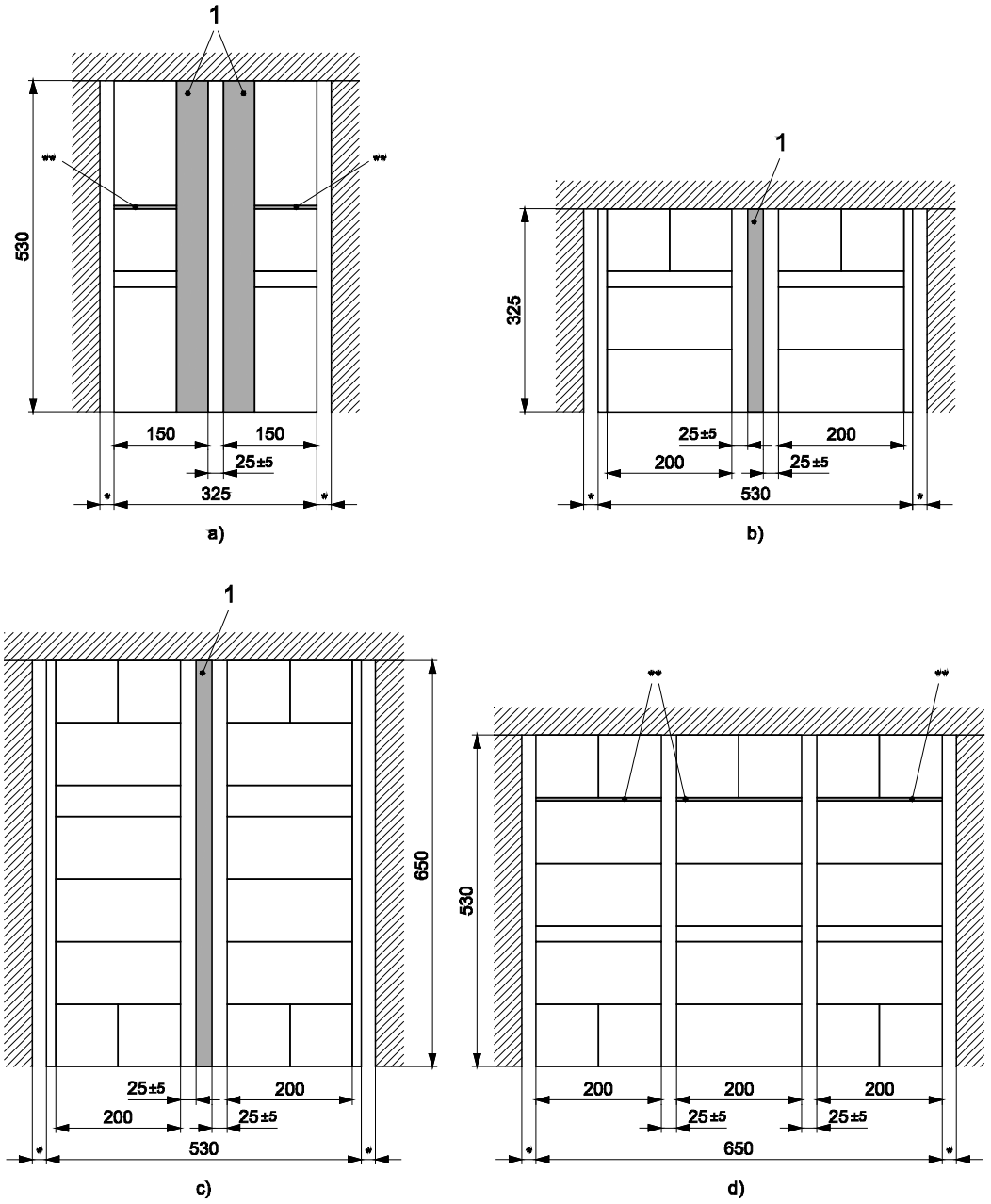
**Key**

* as close as possible to 25 mm

** wooden dividers

**Figure 5 — Loading of shelves, front view**

In the case of drawers the clearance of the extreme package close to the side of the container or of the drawer shall be as close as possible to 25 mm (see Figure 7).




**Key**

1 fill packages and wooden divider

* as close as possible to 25 mm

** wooden dividers

a) GN 1 / 1 in depth

b) GN 1 / 1 in width

c) GN 2 / 1 in depth

d) GN 2 / 1 in width

**Figure 6 — Loading of shelves, top view**

It is permitted to use partitions with a thickness of approximately 25 mm to position the packages on condition that they have minimal effect on normal airflow and minimal thermal conduction.

Lengthways, any remaining spaces shall be filled with test packages depth-wise and width-wise, any remaining spaces of less than 25 mm wide shall be filled with wooden vertical dividers, placed approximately midway along the space between two M-packages. A support system not influencing the temperature distribution inside the cabinet may be used to support the test packages or the fillers.

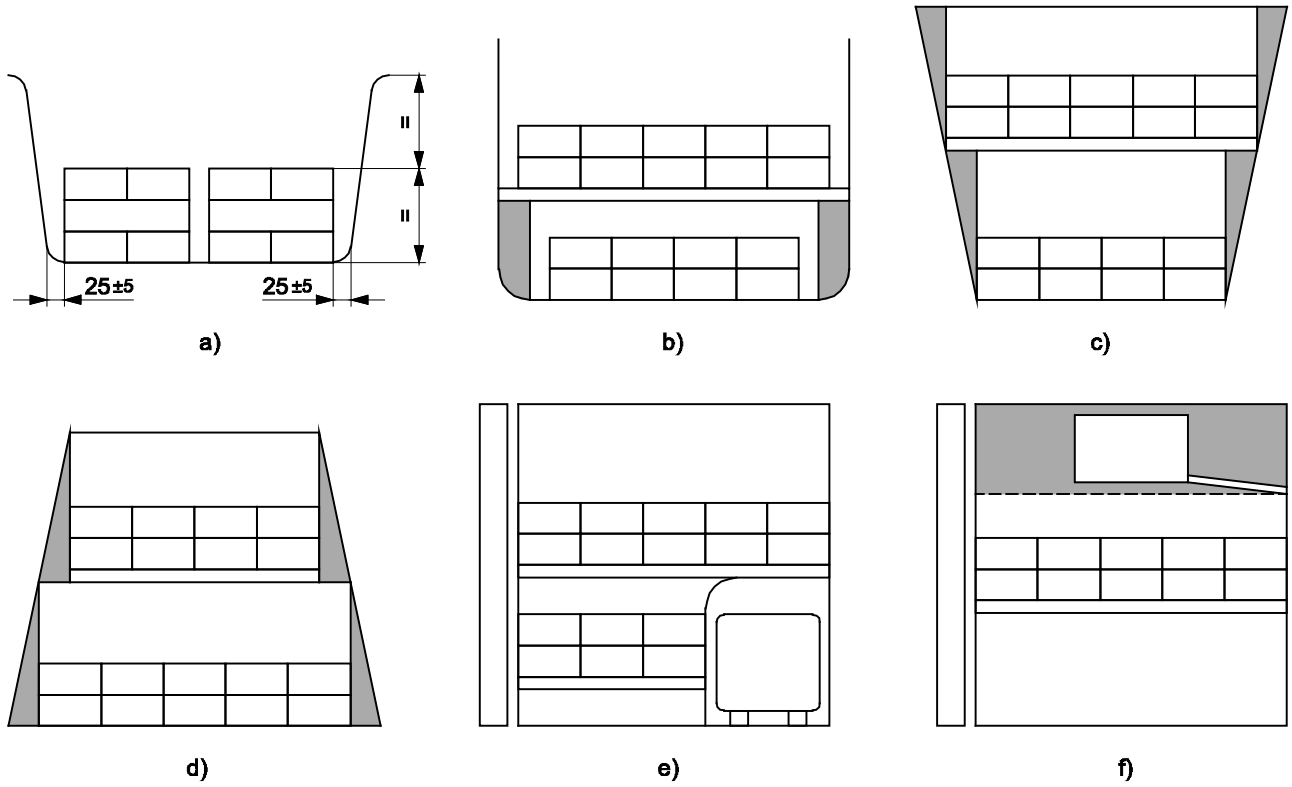
In case the required clearance of 25 mm ± 5 mm between package rows cannot be maintained, special shelves and support systems, not influencing the loading pattern and the temperature distribution inside the cabinet may be used for this test purpose only. The special shelves shall not be considered for the calculation of the net volume as in 6.1.

**5.3.3.3.2 Loading heights**

The loading height of the refrigerated shelves shall be as follows:

a) For refrigerated storage cabinets with drawers, the loading height shall be equal to half of the height defined by the load limit line of the drawer, with a tolerance of mm (see Figure 7). In the case of a drawer that does not have a base where the load can be placed, the container with maximum dimensions and material declared by the manufacturer shall be used.

   Examples of loading in case of drawers with special configurations are given in Figure 7.




**Key**

a) front view

b) front view

c) front or side view

d) front or side view

e) side view

f) side view

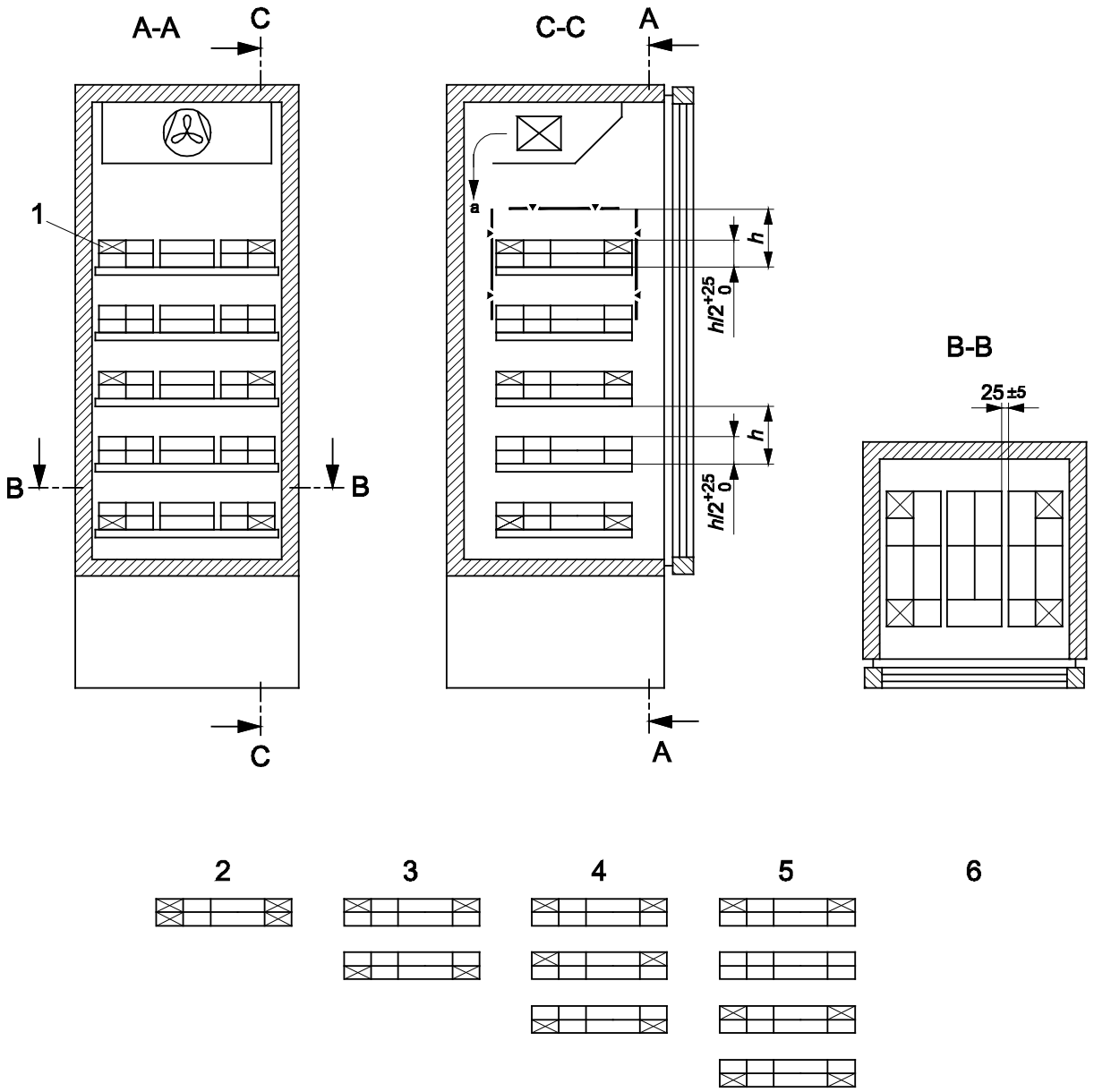
Area excluded from loading with test packages

**Figure 7 — Examples of loading configurations**

b) For refrigerated storage cabinets that allow shelves to be put in different positions by the user the minimum number of shelves to be used is calculated by dividing by 300 mm the vertical distance from the surface of the lowest shelf or loadable surface to the load limit line. The number of shelves resulting shall be rounded to the nearest lowest integer, with a minimum of one shelf to be used.

The lowest shelf shall be located at the lowest available fitting. The remaining shelves shall be placed at as much as possible equal distance apart. The loading height shall be equal to half of the distance between shelves or where there is a load limit line, half of the distance to the load limit line, with a tolerance of $^{+25}_{0}$ mm (see Figure 8).

c) For refrigerated storage cabinets with fixed shelves, the loading height shall be equal to half of the distance between shelves, or where there is a load limit line, half of the distance to the load limit line with a tolerance of $^{+25}_{0}$ mm (see Figure 8).




**Key**

1 M-package
2 1 level
3 2 levels
4 3 levels
5 4 levels
6 5 levels (see main illustration)
*h* Distance between shelves or between top shelf and load limit

**Figure 8 — Loading scheme for vertical cabinets**

The base of the cabinet may be considered as shelf if it is indicated in the instructions for use as suitable for storing of goods.

#### 5.3.3.3.3 M-package locations

M-packages shall be located as indicated in 5.3.3.3.2 as follows:

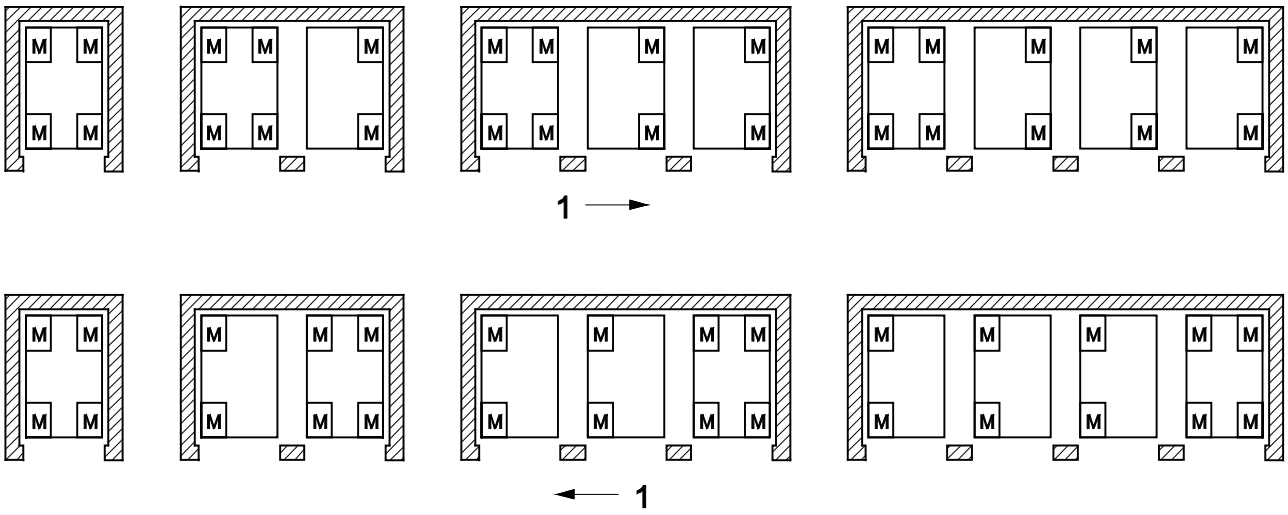
One M-package shall be placed on the shelf corresponding to each corner of the cabinet.

When a cabinet has more than one section:

a) In case the test room air flows from left to right, 2 additional M- packages shall be placed on the right corners of each additional shelf to the right, if not already present.

b) In case the test room air flows from right to left, 2 additional M- packages shall be placed on the left corners of each additional shelf to the left, if not already present.

Figure 9 shows examples of configurations a) and b):




**Key**

1 → Configuration a) Direction of the air flow →

← 1 Configuration b) ← Direction of the air flow

**Figure 9 — Position of M packages with reference to air flow**

For one or two shelves/drawers an M-package layer shall be located on the bottom layer of the bottom shelf and on the top layer of the upper shelf.

For 3 shelves/drawers, each shelf/drawer shall have one M-package layer located as follows:

— one M-package layer on the lower layer of the bottom shelf/drawer,

— one M-package layer on the upper layer of the middle shelf/drawer,

— one M-package layer on the upper layer of the top shelf/drawer.

For cabinets with more than three shelves/drawers the M-package layers shall be located as follows:

— one M-package layer on the lower layer of the bottom shelf/drawer,

— one M-package layer on the upper layer of the middle shelf/drawer. if there is an even number of shelves/drawers the lower middle shelf/drawer shall be selected as the shelf/drawer for location of M-packages,

— one M-package layer on the upper layer of the top shelf/drawer (see Figure 8).

#### 5.3.3.4 Running in

The cabinet shall be operated at normal operating conditions with parameters preset by the manufacturer, recommended routine of defrosting shall be followed. The cabinet shall be filled with test packages and M-packages according to 5.3.3.3 for the tests.

After loading, the cabinet shall be operated until stable conditions as defined in 5.3.3.5 have been reached. During stabilization the test room shall be maintained at the desired climate class as specified in Table 3, while the temperatures of the M-packages are recorded.

#### 5.3.3.5 Stable conditions

A cabinet is considered to operate under stable conditions if, during a period of 24 h, the temperature of each M package agrees within ± 0,5 °C at the corresponding points on the temperature curve.

#### 5.3.3.6 Test conditions

##### 5.3.3.6.1 Test period

The test shall begin after the stabilization cycle at a point half way between the start of two defrost cycles, based on the previous two defrost cycles.

The test period shall then have the following duration:

— Two sequential 24 h periods as described in 5.3.3.6.2 (doors/drawers opening scheme).

— During the first 24 h period the temperature and energy data shall be measured but shall not be included in the calculation of the cabinet energy consumption.

— During the second 24 h period the temperature and energy data shall be measured and shall be included in the calculation of the cabinet energy consumption.

For combined refrigerated cabinets the operating conditions are performed simultaneously on all compartments.

Multi use refrigerated cabinets shall be operated as either a refrigerator or a freezer.

##### 5.3.3.6.2 Doors/drawers opening scheme

###### 5.3.3.6.2.1 General

Depending on the type of product opening/closing cycles per 24 h testing period shall be as follows:

###### 5.3.3.6.2.2 For vertical and counter cabinet refrigerators

For each vertical section, initial opening time of doors or drawers is performed according to the pattern described in 5.3.3.6.3 and shall be 0,30 s per litre net volume of the vertical section with a minimum of 60 s and the maximum of 180 s. The doors/drawers opening and closing rate is 1,5 s.

In case the initial opening time is not the same for all vertical sections, it is allowed to apply to each vertical section the sum of the initial opening times of all vertical sections divided for the number of the sections.

Then for each vertical section the total opening time for doors/drawers shall be 7 s (1,5 s for opening, 4 s remains, 1,5 s for closing), six times per hour, for a total of 12 h; doors/drawers are closed for the remaining period within the 24 h test period.

#### 5.3.3.6.2.3 For vertical and counter cabinet freezers

For each vertical section, initial opening time of doors or drawers is performed according to the pattern described in 5.3.3.6.3 and shall be 0,15 s per litre net volume of the vertical section with a minimum of 30 s and the maximum of 90 s. The doors/drawers opening and closing rate is 1,5 s.

In case the initial opening time is not the same for all vertical sections, it is allowed to apply to each vertical section the sum of the initial opening times of all vertical sections divided for the number of the sections.

Then for each vertical section:

— Step 1: the total opening time for doors/drawers shall be 7 s (1,5 s for opening, 4 s remains, 1,5 s for closing), six times per hour, for a total of 4 h;

— Step 2: doors/drawers are kept closed for 4 h;

— Step 3: step 1 is repeated;

— Step 4: doors/drawers are kept closed for the remaining time over the 24 h period.

### 5.3.3.6.3 General test conditions for all types of products

Opening and closing speed shall be as smooth as possible.

Each vertical section shall be opened in sequence according to the plan shown in Figure 10.

For multiple vertical sections, during the initial door opening, it is allowed to open the next vertical section a maximum of 3 s before closing the previous vertical section.

Care shall be taken that the path of wires of temperature sensors does not cause abnormal moisture in the cabinet.

Following the initial door opening period the cabinet doors/drawers shall remain closed for 10 min before the following sequence of door openings shall be initiated. An example of the doors/drawers opening scheme is provided as follows:

— For a 2 vertical sections cabinet:

| | Door/drawer opening time: | | | |
|---|---|---|---|---|
| vertical section 1 | 0 min | 10 min | 20 min | etc. |
| vertical section 2 | 5 min | 15 min | 25 min | etc. |

— For a 3 vertical sections cabinet:

| | Door/drawer opening time: | | | |
|---|---|---|---|---|
| vertical section 1 | 0 min | 10 min | 20 min | etc. |
| vertical section 2 | 3 min 20 s | 13 min 20 s | 23 min 20 s | etc. |
| vertical section 3 | 6 min 40 s | 16 min 40 s | 26 min 40 s | etc. |

— For a 4 vertical sections cabinet:

| | Door/drawer opening time: | | | |
|---|---|---|---|---|
| vertical section 1 | 0 min | 10 min | 20 min | etc. |
| vertical section 2 | 2 min 30 s | 12 min 30 s | 22 min 30 s | etc. |
| vertical section 3 | 5 min | 15 min | 25 min | etc. |
| vertical section 4 | 7 min 30 s | 17 min 30 s | 27 min 30 s | etc. |

— For a 5 vertical sections cabinet:

| | Door/drawer opening time: | | | |
|---|---|---|---|---|
| vertical section 1 | 0 min | 10 min | 20 min | etc. |
| vertical section 2 | 2 min | 12 min | 22 min | etc. |
| vertical section 3 | 4 min | 14 min | 24 min | etc. |
| vertical section 4 | 6 min | 16 min | 26 min | etc. |
| vertical section 5 | 8 min | 18 min | 28 min | etc. |

— For a 6 vertical sections cabinet:

| | Door/drawer opening time: | | | |
|---|---|---|---|---|
| vertical section 1 | 0 min | 10 min | 20 min | etc. |
| vertical section 2 | 1 min 40 s | 11 min 40 s | 21 min 40 s | etc. |
| vertical section 3 | 3 min 20s | 13 min 20s | 23 min 20s | etc. |
| vertical section 4 | 5 min | 15 min | 25 min | etc. |
| vertical section 5 | 6 min 40 s | 16 min 40 s | 26 min 40 s | etc. |
| vertical section 6 | 8 min 20 s | 18 min 20 s | 28 min 20 s | etc. |

Drawers shall be opened at 70 % +5 % – 0 % of the depth of the drawer or at maximum opening allowed by construction if smaller than 70 %.

Doors shall be opened to 60°+ 30°– 0° (from their closed position).

The sequence described above shall be followed taking into account the following:

— In each vertical section with 2 drawers, the top drawer shall be opened.

— In each vertical section with more than 2 drawers, the top drawer (to be considered as number 1) plus other odd drawers shall be simultaneously opened.

— In each vertical section with more than one door, all doors shall be simultaneously opened.

For cabinets with doors, doors in each section shall be opened simultaneously, i.e.:

— If 1 door per section – open door (as shown in Figure 10a, section 1) according to prescribed door opening regime.

— If 2 doors per section – open doors 1 and 2 together (as shown in Figure 10a, section 2) according to proscribed door opening regime.

For cabinets with drawers, drawers in each section shall be opened simultaneously, i.e.:

— If 1 drawer per section – open drawer 1 (as shown in Figure 10b, section 1) according to prescribed drawer opening regime.

— If 2 drawers per section – open drawer 1 (as shown in Figure 10b, section 2) according to prescribed drawer opening regime.

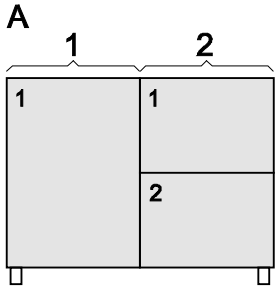
— If 3 drawers per section – open drawers 1 and 3 (as shown in Figure 10b, section 3) according to prescribed drawer opening regime.

— If 4 drawers per section – open drawers 1 and 3 (as shown in Figure 10b, section 4) according to prescribed drawer opening regime.

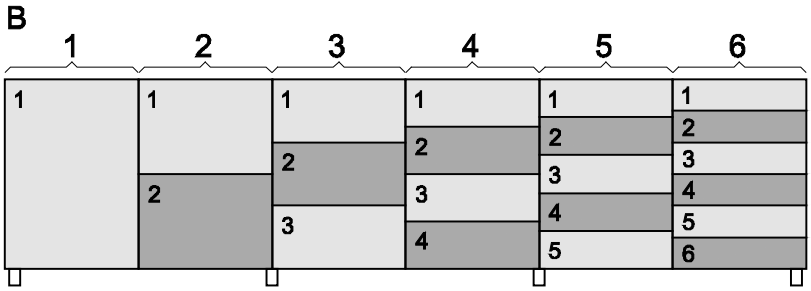
— If 5 drawers per section – open drawers 1, 3 and 5 (as shown in Figure 10b, section 5) according to prescribed drawer opening regime.

— If 6 drawers per section – open drawers 1, 3 and 5 (as shown in Figure 10b, section 6) according to prescribed drawer opening regime.

NOTE This testing pattern is proportionally replicated in case of products with more than 6 sections.




**a) Section at front plane of cabinet with varied number of doors per section**




**b) Section at front plane of cabinet with varied number of drawers per section**

**Key**

A cabinets with doors

B cabinets with drawers

1 section 1

2 section 2

3 section 3

4 section 4

5 section 5

6 section 6

door/drawer opened simultaneously

door/drawer remaining closed

**Figure 10 — Door/drawers opening scheme**

### 5.3.3.7 Lighting

If the tested cabinet is fitted with lighting, carry out the tests as follows:

— automatic lighting: works automatically,

— manual lighting (on/off possible by the user): Lighting is switched on only during the door opening cycling period including initial door opening.

### 5.3.3.8 Power supply

The cabinet shall be supplied at the voltage and frequency marked on the rating plate. In case a range of voltage is indicated, the cabinet is supplied at 230 V or 400 V and 50 Hz. The tolerance on power supply shall be ± 2 % for voltage and ± 1 % for frequency, in relation to the nominal values given on the marking plate or otherwise stated.

#### 5.3.3.9 Testing several cabinets in the same room

If more than one cabinet is being tested in the same room, appropriate arrangements, such as the use of partitions, shall be made in order to ensure that the conditions surrounding each cabinet are in accordance with the test requirements specified in 5.3.2.3.

### 5.3.4 Temperature test

#### 5.3.4.1 Test conditions

The cabinet shall be located and loaded in accordance with 5.3.2 and 5.3.3, operated in accordance with the manufacturer's instructions at the conditions appropriate to the test room climate class for which it is intended (see Table 3) operated to stable conditions defined in 5.3.3.5 and then operated for the test period during which measurements shall be recorded. Lighting, if any, shall be manipulated according to 5.3.3.7.

All temperatures are recorded at a maximum interval of 60 s. Measured temperature values shall be rounded to one decimal place.

#### 5.3.4.2 Temperature curves of M-packages

From the recorded temperatures of all M-packages, the following curves shall be plotted as a function of time:

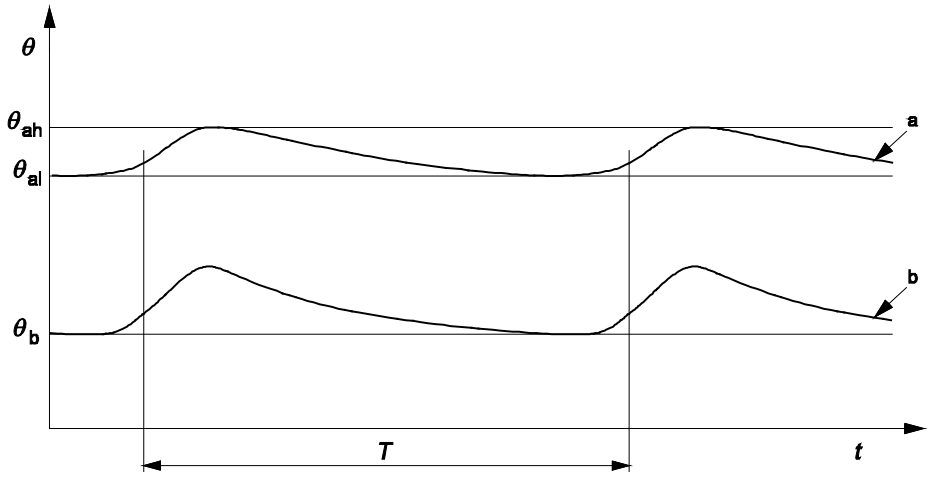
a) the temperature of the warmest M-package (i.e. the one with the highest peak temperature) (see Figure 11);

b) the temperature of the coldest M-package (i.e. the one with the lowest minimum temperature) (see Figure 11);

c) the arithmetic mean temperature of all M-packages (see Figure 12).

All other M-package temperatures shall be available for reference if required.

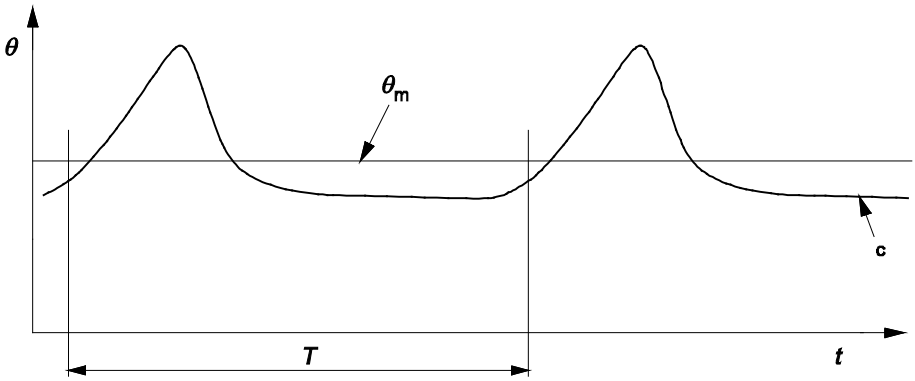
In the case of cabinets with multiple temperature classes, curves a), b), and c), shall be prepared separately for each temperature class.




**Key**

| | |
|---|---|
| $\theta$ | temperature |
| $\theta_{ah}$ | highest temperature of warmest M-package |
| $\theta_b$ | lowest temperature of coldest M-package |
| $\theta_{al}$ | lowest temperature of warmest M-package |
| $t$ | time |
| $T$ | test period |
| a | temperature curve a of warmest M-package |
| b | temperature curve b of coldest M-package |

**Figure 11 — Warmest and coldest M-package temperatures (curves a and b)**




**Key**

| | |
|---|---|
| $\theta$ | temperature |
| $\theta_m$ | average mean temperature |
| $t$ | time |
| $T$ | test period |
| c | arithmetic mean temperature of all M-packages |

**Figure 12 — Arithmetic mean temperature of M-packages (curve c)**

#### 5.3.4.3 Calculation of average mean temperature

The average instant temperature at measuring sample $n$ of all M-packages, $\theta_{cn}$ is expressed by the following formula:

$$\theta_{cn} = \frac{1}{K_{\max c}} \times \sum_{k=1}^{K_{\max c}} \left(\theta_k\right)_n \quad (1)$$

where

$n$ is the time index for the instant measuring sample

$k$ is the index for the individual M-package

$K_{\max c}$ is the number of all M-packages

$\left(\theta_k\right)_n$ is the instant measured temperature of M-package $k$ at measuring sample $n$

From these average instant temperatures the arithmetic mean temperatures of all M-packages $\theta_{\mathrm{mc}}$ for the test period shall be calculated as follows:

$$\theta_{mc} = \frac{1}{N_{\max}} \times \sum_{n=1}^{N_{\max}} \theta_{cn} \quad (2)$$

where

$N_{\max}$ is the number of measuring samples taken during the test period.

The formula is valid only for constant time intervals during the test period.

### 5.3.5 Water vapour condensation test

#### 5.3.5.1 Test conditions

The test can be carried out with the cabinet loaded or empty, after a running period of minimum 24 h. Test is carried out at test room climate class 7 (see Table 3).

If anti-condensation heaters are provided which can be switched on and off by the user they shall not be switched on. If, however, running water appears externally when the cabinet is subjected to the water vapour condensation test, the test shall be repeated with the anti-condensation heaters switched on.

Before starting the test period, all external surfaces of the cabinet shall be carefully wiped dry with a clean cloth. If the cabinet is fitted with automatic defrosting equipment this test period shall be selected during the period when condensation is most likely to occur.

#### 5.3.5.2 Test results

The test shall be considered satisfactory if there is no evidence of condensed water vapour on the external cabinet surfaces.

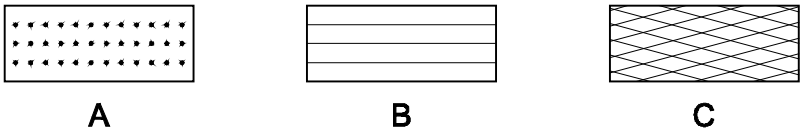
#### 5.3.5.3 Observations

During the test period, external surface areas exhibiting fog, droplets or running water shall be outlined and coded by the letters “A”, “B” and “C”, respectively (see Figure 13).

#### 5.3.5.4 Expression of results and test report

A coded sketch shall be made showing the running water area appearing during the test on all external surfaces; code C as shown in Figure 13 shall be used to indicate this. Codes A and B may also be included.

The test report shall also indicate the selected test period and the duration of the period of observation and shall state whether any manual switch provided for anti-condensation heaters was switched on or off.




**Key**

A fog

B droplets

C running water

**Figure 13 — Condensation code**

### 5.3.6 Electrical energy consumption test

#### 5.3.6.1 Test conditions

The cabinet shall be located and loaded in accordance with 5.3.2 and 5.3.3 operated in accordance with the manufacturer's instructions at the conditions appropriate to the test room climate class for which it is intended (see Table 3), operated to stable conditions defined in 5.3.3.5 and then operated for the test period according to 5.3.3.6.1 during which measurements shall be recorded. Lighting, if any, shall be manipulated according to 5.3.3.7.

The test shall be carried out during the temperature test.

#### 5.3.6.2 Energy measurement

Measure the total energy consumption in the 24 h period as defined in 5.3.3.6.1 with all fitted electrical power using components switched on.

Measurement shall be made at least every 10 s and the relevant average or integrated values shall be recorded every 1 min period.

## 6 Test procedures

### 6.1 Calculation of net volume

The net volume (Vn) shall be calculated as the sum of the individual volumes obtained as follows:

— for shelves: by multiplying each shelf area by the distance from the top of the shelf up to 10 mm from the next shelf top surface. For the top shelf the volume shall be obtained multiplying the shelf area by the distance up to the load limit.

— for drawers: by multiplying each shelf area by the distance from the lower loading area to the load limit of each drawer.

Each individual volume is the vertical projection of the shelf area.

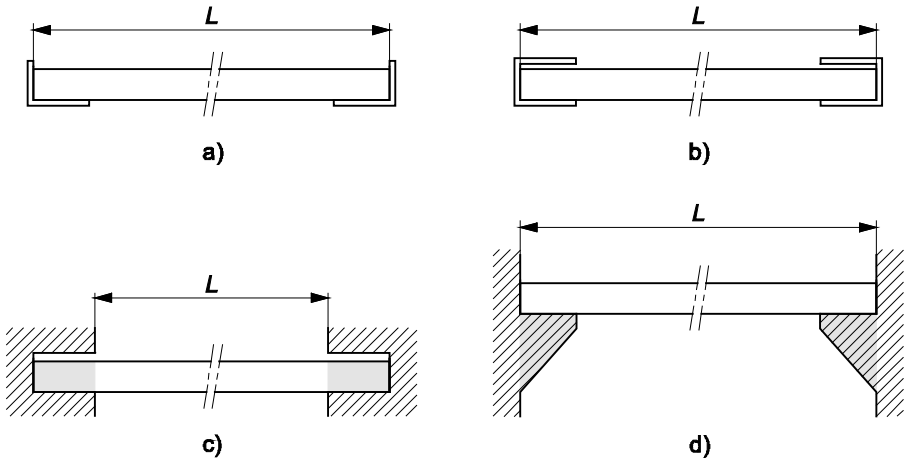
When drawer can only be used with containers (no shelf area where to put foodstuff), the bigger container possible is filled with water up load limit. The weight of water in kg is equal the individual volume in litre.

Each of the individual volumes shall be expressed in litres, to two decimal places. The net volume shall be rounded to the nearest decimal place.

NOTE The number of shelves to be considered and their positioning is obtained as indicated in 5.3.3.3.2.

The net volume shall be calculated by summing-up all individual volumes.

The volume of constructional shelf support protuberances shall be excluded from the volume calculation (see Figure 14).




**Key**

area excluded from net volume calculation

**Figure 14 — Examples of recessed areas**

All dimensions shall be expressed in millimetres.

Compartment(s) of a combined refrigerated cabinet that are not foreseen for storage foodstuff are not subjected to calculation of net volume.

## 6.2 Load line and cabinet label marking durability

Compliance is checked by inspection and by rubbing the marking by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirit. The petroleum spirit to be used for the test is aliphatic solvent hexane. After all the tests of this standard, the marking shall be clearly legible. It shall not be easily possible to remove marking plates nor shall they show curling.

NOTE In considering the durability of the marking, the effect of normal use is taken into account. For example, marking by means of paint or enamel, other than vitreous enamel, on containers that are likely to be cleaned frequently, is not considered to be durable.

## 6.3 Tests outside test room - Linear dimensions, areas and volumes

According to 5.2.

See Table 7.

**Table 7 — Linear dimensions, areas and volumes**

| Description | Symbol | Unit | Number of decimal places |
|---|---|---|---|
| Overall external dimensions at installation | L, H, W | mm | 0 |
| Net volume for each declared temperature class | | l | 1 |

## 6.4 Tests inside test room

### 6.4.1 Test conditions

According to 5.3.2.

See Table 8.

**Table 8 — Conditions for tests inside test room**

| Subclause no. | Description |
|---|---|
| 5.3.2 | Statement that the test room, test packages, filling material (wood loading), M-packages and the instrumentation used are in accordance with 5.3.2 |

### 6.4.2 Cabinet preparation

See Table 9.

**Table 9 — Cabinet preparation for tests inside test room**

| Subclause no. | Description | Symbol | Unit |
|---|---|---|---|
| 5.3.3.1 | The cabinet location within the test room using the Figure 4 presentation | *A B*, *C*, *D* | mm |
| 5.3.3.1 | For cabinets intended to be placed against a wall, the location of the vertical partition at the rear of the cabinet | $d_p$ | mm |
| 5.3.3.3 | Number of the figure according to which the cabinet was loaded | - | - |
| 5.3.3.4 | The method of temperature control, defrost process, defrost termination, setting parameters and sensor locations | - | - |

### 6.4.3 Temperature test

According to 5.3.4

See Table 10.

**Table 10 — Temperature test for tests inside test room**

| Subclause no. | Description | Symbol | Unit |
|---|---|---|---|
| 5.3.4.2 | The time/temperature curves of the warmest and the coldest M-packages and the extreme values $\theta_{ah}$, $\theta_b$ and if necessary $\theta_{al}$ and the resulting cabinet classification | $\theta_{ah}$<br>$\theta_b$<br>$\theta_{al}$ | °C |
| 5.3.4.3 | The average mean temperatures of all M-packages | $\theta_{cn}$ | °C |

### 6.4.4 Water vapour condensation test

According to 5.3.5.

See Table 11.

**Table 11 — Water vapour condensation test**

| Subclause no. | Description | Symbol | Unit |
|---|---|---|---|
| 5.3.5.1 | Whether any manual switch provided for anti-condensation heaters was switched off | - | - |
| 5.3.5.3 | The duration of the period of observation | - | h |
| | Coded sketches as defined in 5.3.5.4 | - | - |

### 6.4.5 Electrical energy consumption test

According to 5.3.6.

See Table 12.

**Table 12 — Electrical energy consumption test**

| Subclause no. | Description | Symbol | Unit |
|---|---|---|---|
| 5.3.6.2 | Electrical energy consumption | - | kWh/24 h |
| | Relative running time of the compressor unit | - | % |

# 7 Template for information to be declared

For each cabinet tested, general information on specific test results shall be given using the following Table 13.

**Table 13 — Template for Information to be declared**

| | | | | |
|---|---|---|---|---|
| Model(s): [information identifying the model(s) to which the information relates] | | | | |
| Operating temperature(s) | | chilled / frozen / multi-use | | |
| Category | | Vertical / counter | | |
| (where applicable)<br>Heavy-duty / light-duty | | | | |
| Refrigerant fluid(s):[information to identify the refrigerant fluid(s), including GWP] | | | | |
| Item | | Symbol | Value | Unit |
| Energy Consumption | | *E24h* | x.xx | kWh |
| Net volume<br>(where applicable) | | $V_N$ | x.x | litre |
| Chilled volume | | $V_{NRef}$ | x.x | litre |
| Frozen volume | | $V_{NFrz}$ | x.x | litre |
| Refrigerant charge | | | x.xx | kg |
| Contact details | Name and address of the manufacturer or its authorized representative. | | | |

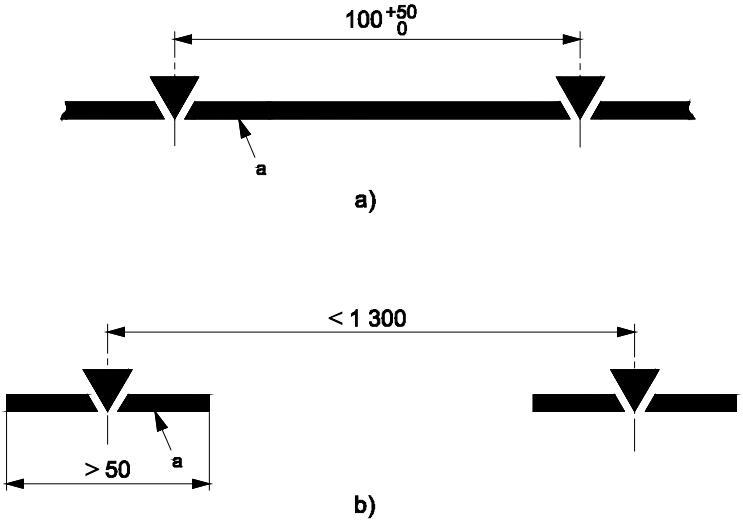
# 8 Load limit marking

Every storage cabinet shall be marked with one or several visible and durable maximum load limit line(s) on the inside face. In case of drawers where it is not possible to exceed the load limit, no marking is required.

The load limit line shall be continuous (see Figure 15 a), or repeated at intervals (see Figure 15 b), to ensure that it cannot be overlooked. Individual markings shall be at least 50 mm long and shall contain at least one equilateral triangle with side dimension, $d_l$, included within 5,5 mm and 15 mm (see Figure 16).

Where a load limit line cannot be marked because of cabinet design (e.g. drawers without walls) the load limit shall be indicated in the instructions for use.

Dimensions in millimetres




**Key**

a) continuous load limit line

b) load limit line repeated at intervals

a this denotes the load limit

**Figure 15 — Load limit markings**

Dimensions in millimetres

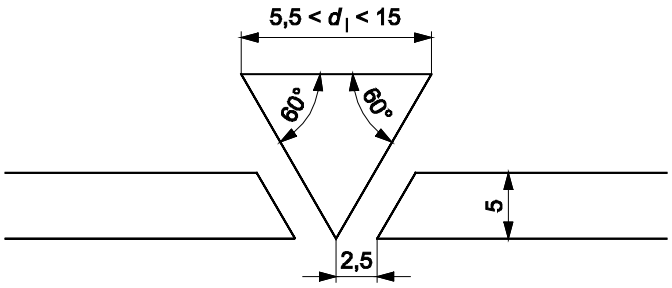



**Figure 16 — Load limit individual markings dimensions**

# Annex A
(informative)

# Information and accessories to be provided by the manufacturer for the correct performance and reproducibility of tests

The following shall be provided:

— loading plan,

— reinforced shelves if needed,

— positioning and type of air deflectors used for the measurement of the climate measuring point in 5.3.2.3.2.

NOTE Further information is needed.

# Annex ZA
(informative)

# Relationship between this European Standard and the Ecodesign requirements of Commission Regulation (EU) No 2015/1095 aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/495 EN and its Amendment No. 1 Technical Update (ANNEX B OF M/495), Standardization mandate to CEN, CENELEC and ETSI under Directive 2009/125/EC relating to harmonized standards in the field of Ecodesign to provide one voluntary means of conforming to the energy labelling requirements of Commission Delegated Regulation (EU) No 2015/1095 of 5 May 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to Ecodesign requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers.

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding energy labelling requirements of that Regulation and associated EFTA regulations.

**Table ZA.1 — Correspondence between this European Standard and Commission Regulation (EU) No 2015/1095 of 5 May 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to Ecodesign requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers and Commission's standardization request M/495 EN and its Amendment No. 1 Technical Update (ANNEX B OF M/495)**

| **Ecodesign Requirements of Regulation (EU) No 2015/1095 of 5 May 2015** | **Clause(s)/subclause(s) of this EN** | **Remarks/Notes** |
|---|---|---|
| All | All | None |

**WARNING 1 —** Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2 —** Other Union legislation may be applicable to the products falling within the scope of this standard.

# Annex ZB
(informative)

# Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 2015/1094 aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/495 EN and its Amendment No. 1 Technical Update (ANNEX B OF M/495), Standardization mandate to CEN, CENELEC and ETSI under Directive 2009/125/EC relating to harmonized standards in the field of Ecodesign to provide one voluntary means of conforming to the energy labelling requirements of Commission Delegated Regulation (EU) No 2015/1094 of 5 May 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of professional refrigerated storage cabinets.

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZB.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding energy labelling requirements of that Regulation and associated EFTA regulations.

**Table ZB.1 — Correspondence between this European Standard and Commission Delegated Regulation (EU) No 2015/1094 of 5 May 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of energy labelling of professional refrigerated storage cabinets**

| **Energy labelling requirements of Regulation (EU) No 2015/1094 of 5 May 2015** | **Clause(s)/subclause(s) of this EN** | **Remarks/Notes** |
|---|---|---|
| All | All | None |

**WARNING 1 —** Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

**WARNING 2 —** Other Union legislation may be applicable to the products falling within the scope of this standard.

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[7] ISO 817, *Refrigerants — Designation and safety classification*

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