

# International Standard 5155

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## Household frozen food storage cabinets and food freezers — Essential characteristics and test methods

*Conservateurs ménagers de denrées congelées et congélateurs ménagers — Caractéristiques essentielles et méthodes d'essai*

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## Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

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It has been approved by the member bodies of the following countries :

Brazil  
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Denmark  
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The member bodies of the following countries expressed disapproval of the document on technical grounds :

Canada  
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# Household frozen food storage cabinets and food freezers — Essential characteristics and test methods

## 1 Scope and field of application

This International Standard specifies the essential characteristics of household frozen food storage cabinets and household food freezers, and lays down the test methods to check these characteristics.

It applies to factory-assembled appliances whatever their operating principle but not to low-temperature compartments (one-, two- and three-star compartments<sup>1)</sup> or freezer compartments incorporated in refrigerators<sup>2)</sup>.

Whenever appropriate testing methods are not specified, the provisions contained in this International Standard should be considered as recommendations.

## 2 Safety requirements

The safety requirements applicable to the electrical equipment of household refrigerating appliances are covered by IEC Publication 335-2-24.

The safety requirements applicable to refrigerating equipment in general are covered by ISO/R 1662. The parts of ISO/R 1662 which may be applicable to household frozen food storage cabinets and household food freezers are under consideration.

The safety requirements applicable to the heating equipment (gaseous or liquid fuels) of appliances of the absorption type will be covered by a separate International Standard.

## 3 References

ISO 534, *Paper and board — Determination of the thickness of single sheets (and method of calculation of the apparent density of board)*.

ISO 817, *Organic refrigerants — Number designation*.

ISO/R 824, *Household refrigerators — Part 1 : Performance requirements*.

ISO/R 825, *Household refrigerators — Part 2 : Special low-temperature compartments for the storage of frozen foodstuffs*.

ISO/R 1662, *Refrigerating plants — Safety requirements*.

ISO 3055, *Kitchen equipment — Co-ordinating sizes*.

ISO 5731, *Kitchen equipment — Limit of size*.

ISO 5732, *Kitchen equipment — Sizes of openings for built-in appliances*.

IEC Publication 335-1 (1976), *Safety of household and similar electrical appliances — Part 1 : General requirements*.

IEC Publication 335-2-24 (1976), *Safety of household and similar electrical appliances — Part 2 : Particular requirements for refrigerators and food freezers*.

## 4 Definitions

**4.1 household frozen food storage cabinet :** A heat-insulated enclosure having adequate volume and equipment for household use, cooled by an energy-consuming means and having one or more compartments the temperature of which is such that, under the test conditions specified in 8.5, the temperature of products, equal to or below  $-18\text{ }^{\circ}\text{C}$  when they are placed in the appliance, does not rise above this value ( $-18\text{ }^{\circ}\text{C}$ ).

**4.2 household food freezer :** A heat-insulated enclosure having adequate volume and equipment for household use, cooled by an energy-consuming means, having one or more compartments for freezing a quantity of at least 4,5 kg of test-packages per 100 l of storage volume in 24 h under the test conditions for the light load specified in 8.7, and suitable for storage as defined in 4.1.

### 4.3 General definitions applicable to all appliances

**4.3.1 top-opening type of appliance :** A frozen food storage cabinet or food freezer the compartment(s) of which is (are) accessible from the top.

1) These compartments are covered by ISO/R 825.

2) Will be the subject of a future International Standard.

**4.3.2 upright type of appliance** : A frozen food storage cabinet or food freezer the compartment(s) of which is (are) accessible from the front.

**4.3.3 overall dimensions** (means of access closed) : The measurements of the rectangular parallelepiped, having a horizontal base, within which the appliance fits, including the fittings but not the handle, the protrusion of which, if the case, is to be specified separately.

**4.3.4 overall space required in use** (means of access open) : The overall dimensions, increased by the space necessary for free circulation of the cooling air when the appliance is in service and the space necessary to allow opening of the means of access to the minimum angle permitting removal of all removable parts (baskets, shelves, etc) (see figure 1).

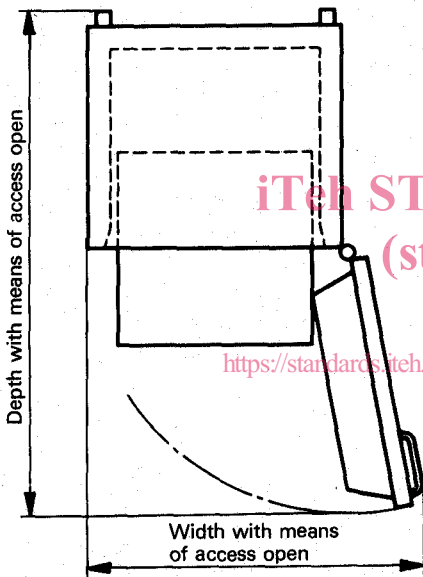


Figure 1 — Overall space required in use

**4.3.5 Volumes**

**4.3.5.1 gross volume of the food compartment(s)** : The total volume of the food compartment(s) within the inside walls of the appliance, the means of access being closed and without fittings. However, when cooling is provided by forced air, the gross volume is calculated by subtracting from the total volume, the volume blocked by cold-air ducting, evaporator, fan and other associated accessories.

**4.3.5.2 rated gross volume** : The gross volume stated by the manufacturer.

**4.3.5.3 storage volume** : That portion of the gross volume complying with the definition given in 4.3.5.1, minus the volume of components and spaces unusable for food storage (see figure 6).

**4.3.5.4 rated storage volume** : The storage volume stated by the manufacturer.

**4.3.6 Storage surfaces**

**4.3.6.1 shelf** : For the purpose of this International Standard, any horizontal surface (shelves, partitions, etc) on which food can be placed. It may be formed by one component or by components fitted side by side, which may be fixed or removable.

**4.3.6.2 storage shelf area** : The sum of the horizontal projections of each shelf within the storage volume, including door shelves, and of the bottom of the appliance.

**4.3.6.3 rated storage shelf area** : The storage shelf area stated by the manufacturer.

**4.3.7 load limit** : The surface enveloping the storage volume.

**4.3.8 load-limit line(s)** : Permanent mark(s) indicating the limits of the storage volume.

**4.3.9 Classification**

With regard to the ability of appliances to operate in extreme ambient temperatures, this International Standard distinguishes the two following classes :

**Class N** (temperate) : appliances intended for use in ambient temperatures not higher than +32 °C.

**Class T** (tropical) : appliances intended for use in ambient temperatures not higher than +43 °C.

**4.4 Definitions relating to some performance characteristics**

**4.4.1 Frozen food storage cabinets and freezers**

**4.4.1.1 energy consumption** : The consumption by an appliance over a period of 24 h when loaded with simulated frozen food storage test-packages, running under stable operating conditions at an ambient temperature of +25 °C (class N appliances) or +32 °C (class T appliances), the temperature of the stored packages being maintained at or below -18 °C, measured under the conditions specified in 8.8.

**4.4.1.2 rated energy consumption** : The energy consumption stated by the manufacturer.

**4.4.1.3 storage temperature** : The maximum temperature of the warmest "M" package of a load placed in storage (see 8.5).

**4.4.1.4 temperature rise of the load** : The temperature rise of the test-packages which is found under test conditions when the normal operation of the refrigerating system is interrupted.

#### 4.4.2 Food freezers

**4.4.2.1 freezing capacity :** The mass of test-packages the temperature (i.e. the instantaneous arithmetic mean temperature of all the "M" packages) of which can be lowered from the loading temperature to  $-18\text{ }^{\circ}\text{C}$  in 24 h under the test conditions specified in 8.7. The freezing capacity is expressed in kilograms.

**4.4.2.2 rated freezing capacity :** The freezing capacity stated by the manufacturer.

NOTE — Normally it is impossible to attain the rated freezing capacity day after day. If, therefore, freezing is required day after day, then the quantity to be frozen may have to be reduced. Furthermore, if freezing is carried out without the prior adjustment of the thermostat or operation of the fast-freeze switch (as required in the test specified in 8.7.1), this quantity may have to be similarly reduced.

The user instructions shall draw attention to these points.

**4.4.3 automatic defrosting :** Defrosting in which the frequency and the duration of the defrost operation and the removal and disposal of the defrost water from the refrigerated space require no intervention by the user.

**4.4.4 "M" package :** A test-package in accordance with 8.1.2, of dimensions 50 mm  $\times$  100 mm  $\times$  100 mm, fitted with a temperature-measuring probe.

### 5 Materials, design and manufacture

#### 5.1 General

Household frozen food storage cabinets and food freezers shall be constructed so as to ensure adequate service. Their performance in use is checked by applying the series of tests specified in clause 8.

This present clause defines some characteristics which are not tested but to which the attention of manufacturers is drawn.

#### 5.2 Materials and finishes

All wall finishes shall be highly resistant to impact, sufficiently hard, colour-fast, smooth, easily washable, and resistant to damage by moisture and to acids present in food.

No materials used inside appliances, in particular for the fittings, shall cause odours. They shall neither contaminate food placed in contact with them nor transmit poisonous substances to food. They shall be resistant to the action of moisture and of acids present in food.

#### 5.3 Thermal insulation and air-tightness

The efficiency of the thermal insulation is tested by applying the water vapour condensation test (see 8.6) and the series of performance tests specified in clause 8.

When the door is closed, there shall be no abnormal ingress of air into the interior. This air-tight condition is checked by apply-

ing the test specified in 8.2; during this test it shall be verified that the strip of paper does not slide freely.

No running water shall appear externally when the appliance is subjected to the water vapour condensation test specified in 8.6.

#### 5.4 Doors and lids

Hinges and handles shall be strong and resistant to corrosion.

#### 5.5 Shelves and baskets

All shelves and baskets, including those which can be removed, shall be sufficiently strong.

When subjected to the test specified in 8.4, the components shall not show such distortion that they could no longer fulfil their intended function (in particular, sliding components shall be capable of their full movement when loaded).

### 6 Required characteristics

#### 6.1 Dimensional characteristics

##### 6.1.1 Rated gross volume

The measured gross volume shall not be less than the rated gross volume by more than 3 % of the latter.

##### 6.1.2 Rated storage volume

The measured storage volume shall not be less than the rated storage volume by more than 3 % of the latter.

##### 6.1.3 Rated storage shelf area

The measured storage shelf area shall not be less than the rated storage area by more than 3 % of the latter.

#### 6.2 Performance characteristics

##### 6.2.1 Storage temperature (for all appliances)

The appliance shall be capable of maintaining the required storage conditions within the storage volume, i.e. under the conditions specified in 8.5 the maximum temperature of the warmest "M" package shall be maintained at or below  $-18\text{ }^{\circ}\text{C}$  during the test.

In addition, during the test specified in 8.6, no running water shall appear.

##### 6.2.2 Rate of temperature rise

Frozen food storage cabinets and freezers shall be designed to limit the rate of temperature rise of the packages if the power supply is interrupted or if the refrigerating system fails. Under

the conditions specified in 8.9, the period between the moment when the temperature of  $-18\text{ }^{\circ}\text{C}$  is reached for the first time by any "M" package and that when the temperature of  $-9\text{ }^{\circ}\text{C}$  is reached for the first time by any "M" package (the two "M" packages may be different) shall not be shorter than the period stated by the manufacturer.

### 6.2.3 Freezing capability (for freezers only)

This performance is evaluated by the following series of determinations carried out under the test conditions specified in 8.7.

**6.2.3.1** The time necessary to reduce the instantaneous arithmetic mean of the temperatures of the "M" packages in a test load corresponding to 25 kg per 100 l of storage volume from the loading temperature to  $-18\text{ }^{\circ}\text{C}$  shall be stated.

**6.2.3.2** The value of the freezing capacity measured during the light-load test (mass, in kilograms, of the test load in which the instantaneous arithmetic mean of the temperatures of all the "M" packages can be lowered from the loading temperature to  $-18\text{ }^{\circ}\text{C}$  in 24 h under the test conditions specified in 8.7) shall be not less than 4,5 kg per 100 l of storage volume and also shall be not less than 90 % of the rated freezing capacity (to allow for variations in testing).

**6.2.3.3** During the determination of the freezing capacity, the maximum temperature reached by any of the previously frozen "M" packages shall be equal to or lower than  $-15\text{ }^{\circ}\text{C}$ .

### 6.2.4 Energy consumption

If the energy consumption is stated by the manufacturer, the value measured in accordance with 8.8 shall not exceed the rated energy consumption by more than 10 % of the latter.

### 6.3 Opening of the door

The doors and lids of frozen food storage cabinets and food freezers shall not be fitted with automatic latching devices which prevent the door or lid from being pushed open from inside.

The fastening system shall be such as to enable the door to be easily closed and opened. It shall be efficient and capable of maintaining its proper function.

For appliances fitted with lock and key, the instructions for use shall draw the attention of users to the fact that the key for locking the appliance door should be kept out of reach of children and not in the vicinity of the appliance, to prevent children from being locked inside.

For appliances having a volume equal to or greater than 60 l, the door or lid, if it is not locked, shall be capable of being opened from the inside. The force required to open the door or lid, applied from inside the appliance at the mid-point of the edge farthest from the hinge axis in a direction perpendicular to the plane of the door or lid, shall not exceed 70 N.

This requirement is checked by applying the test specified in 8.3.

## 7 Determination of linear dimensions, volumes and areas

The measurements are carried out on the appliance as delivered and not operating.

### 7.1 Determination of linear dimensions

Linear dimensions shall be measured to the nearest millimetre.

### 7.2 Determination of volumes

Volumes shall be expressed in cubic decimetres or litres.

#### 7.2.1 Determination of gross volume

The gross volume shall be calculated by dividing the total volume into convenient units of volume of geometric shape which can easily be measured.

When the gross volume is determined, internal fittings are considered as not being in place. However, the gross volume takes into account the exact shapes of the walls if they contain depressions or projections.

If cooling is effected by forced air, any volume which is inaccessible because of air ducts, fans, evaporator and other associated accessories shall also be deducted.

#### 7.2.2 Determination of storage volume (see figure 6)

For the determination of storage volume, the total volume of devices and of spaces considered unusable for frozen food storage shall be deducted from the gross volume calculated in accordance with 7.2.1.

The total volume to be deducted comprises

- a) the volume of spaces situated outside the load limits marked by the manufacturer;
- b) the volume of all fixed components included within the load limits;
- c) the volume of spaces which are to be kept free for correct performance of the refrigerating system;
- d) the volume of all included removable parts which are stated by the manufacturer to be necessary for the proper functioning of the appliance except shelves and partitions whose thickness is not greater than 13 mm;
- e) the volume rendered unusable by the use of removable parts (baskets, shelves, etc.) necessary for obtaining satisfactory thermal and mechanical characteristics;
- f) any volume where it is impossible to place an "M" package.

NOTE — There is no equivalence between the value of the storage volume determined in accordance with the principles above and the volume of the packages loaded into the appliance for the storage and freezing tests. The free spaces specified in the test methods could be utilized in normal use and their volume should not be deducted from the gross volume when calculating the storage volume.



### 7.3 Determination of storage area

The area shall be expressed in square decimetres.

#### 7.3.1 Determination of the area of a shelf

##### 7.3.1.1 Shelf composed of a single part

In the case of a shelf composed of a single part, the area is the product of the width by the depth. These two dimensions are determined as follows :

**width** : mean distance measured parallel to the surface of the shelf between the inner surfaces of the side walls of the enclosed space of the cabinet, where this dimension does not exceed the real width of the shelf by more than 20 mm [see figure 7a)];

**depth** : mean distance measured parallel to the surface of the shelf between the inner surfaces of the front and rear walls of the enclosed space of the cabinet, where this dimension does not exceed the actual depth of the shelf by more than 20 mm [see figure 7b)]. When the door of an upright-type appliance is provided with shelves, this distance is measured between the rear inner surface of the enclosed space of the cabinet and the vertical plane tangential to the front of the cabinet shelf, provided that any gap between the rear edge of the shelf and the rear wall does not exceed 20 mm [see figure 7c)]. When considering the bottom of an upright-type appliance, the front reference plane is the edge of the enclosed space of the cabinet [see figure 7c)].

##### 7.3.1.2 Shelf with juxtaposed parts

In the case of a shelf with juxtaposed parts, when the distance between two parts does not exceed 20 mm, the dimensions are measured as for a shelf composed of a single part. When the distance is more than 20 mm, the area is measured for each of the parts [see figure 7d)].

##### 7.3.1.3 Specific cases

The bottom of the enclosed space is considered as a shelf.

When an inner wall is not vertical, the dimension of the shelf is measured with reference to the vertical plane cutting this surface as the mid-height between the shelf under consideration and the shelf or horizontal surface immediately above.

Any part of full shelves, baskets or of the bottom of the appliance having less than 100 mm vertical clearance above, when all the shelves are in position, shall be excluded when calculating the storage area. However, it is admissible that for one full shelf or basket the vertical clearance may be reduced to not less than 80 mm (see figure 8).

#### 7.3.2 Determination of the area of door shelves

The shelf area is the product of the width by the depth. These two dimensions are determined by analogy with the specifications in 7.3.1 :

**width** : mean distance between the inner surfaces of the side walls of the door compartment or between the side edges of the retainer bar;

**depth** : mean distance between the surface of the door wall and the vertical plane tangential to the front of the shelf or retainer bar [see figure 7c)].

#### 7.3.3 Determination of the area of baskets

The basket area is the product of the two mean horizontal dimensions [see figure 8a)].

The vertical clearance above the inner surface of the bottom of the basket shall not be less than 80 mm [see figure 8b)].

## 8 Test methods

With a few exceptions, the order of carrying out the tests need not necessarily follow the sequence of the sub-clauses in this International Standard.

The results of the tests shall appear in a test report. When necessary, particular information to be noted in this report is mentioned as a special item of the sub-clause concerning the test.

It is recommended that the test authority should ask the manufacturer for the storage plans and take account of them provided that they are in accordance with this International Standard.

### 8.1 General test conditions

#### 8.1.1 Test-room

The appliances are set up in a test-room as specified in 8.1.1.1 to 8.1.1.3.

##### 8.1.1.1 Ambient temperature

Tests are carried out under the following conditions of ambient temperature, which is the temperature in the space surrounding the appliance under test, arithmetical mean of the average value of temperatures  $t_{a1}$ ,  $t_{a2}$ ,  $t_{a3}$  measured at three points located 35 cm from the side walls and front wall of the appliance, on the normals passing through the geometrical centres of the surfaces of these walls.

- a) For checking the storage temperature :
  - + 32 °C for class N appliances;
  - + 43 °C for class T appliances.
- b) For the freezing test and checking the energy consumption and the temperature rise of the load :
  - + 25 °C for class N appliances;
  - + 32 °C for class T appliances.
- c) For all other tests :
  - at the temperature stated in the test specifications.

The temperature at each measurement point shall be kept constant within  $\pm 0,5$  K both during the periods required for obtaining stable operating conditions and during the tests.

The vertical ambient temperature gradient from the platform specified in 8.1.1.3 to a height of 2 m shall not exceed 2 K/m.

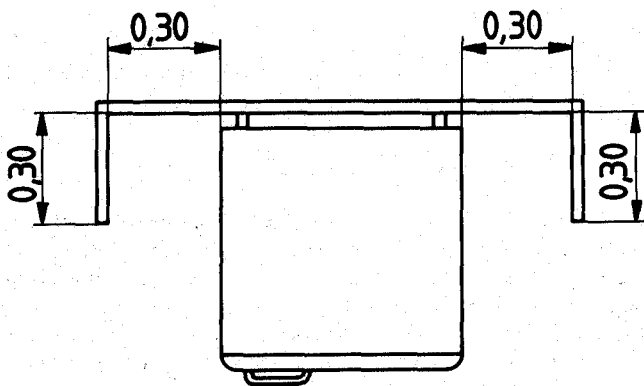
**8.1.1.2 Humidity**

Unless otherwise specified, relative humidity shall be kept between 45 % and 75 %.

**8.1.1.3 Installation of appliances**

Each appliance shall be placed on a matt black painted wooden solid-top platform, open for free air circulation under the platform. The top of the platform shall be 0,30 m above the test-room floor and shall extend at least 0,30 m, but not more than 0,60 m, beyond each side of the appliance, except at the rear.

Circulation of air about the appliance shall be restricted by surrounding the appliance by three matt black painted wooden vertical partitions arranged as follows : one of the partitions is placed parallel to the rear of the appliance, against the stops or at the distance specified by the manufacturer in connection with the required overall space; the two other partitions are parallel to the sides of the cabinet, and are fixed on the platform 0,30 m from the sides of the cabinet : they are 0,30 m wide. The whole partition structure has the form and dimensions shown in figure 2.



**Figure 2 — Partitions to restrict air circulation (plan view)**

The vertical partitions shall present no discontinuity. They shall be of such a height that they extend at least 0,30 m above the top of the appliance.

The appliance shall be placed far enough away from all other objects in the test-room to eliminate any possibility of any point

in the space in which it is situated being at a temperature other than ambient.

The appliance shall be placed to avoid, or shielded against, direct radiation to or from the test room cooling or heating equipment.

Air circulation in the test-room shall be such that the specified ambient temperatures are obtained within the limits of the specified tolerances. The appliance under test shall be shielded from any air currents of velocity above 0,25 m/s.

The air circulation in the test-room shall not interfere with the normal air circulation created by the appliance.

Appliances intended to be built-in shall be installed according to the manufacturer's instructions.

Built-in appliances intended to be combined with appliances other than refrigerators shall be tested in combination, but with the other appliance inoperative.

Before the stabilization period preceding the tests, the evaporator shall be defrosted and the interior of the appliance dried, except in the case of appliances fitted with automatic defrosting equipment. The means of access (lids or doors) shall be kept closed during the tests.

**8.1.2 Test-packages**

When tests are carried out with a loaded appliance, test-packages of rectangular parallelepiped shape shall be used.

**8.1.2.1 Sizes and tolerances**

The size prior to freezing, and the mass, packaging included, of test-packages shall be as follows :

Size <sup>1)</sup> mm	Mass <sup>2)</sup> g
25 × 50 × 100	125
50 × 100 × 100	500
50 × 100 × 200	1 000

- 1) Tolerances on linear dimensions :  
 $\pm 1,5$  mm for 25 mm and 50 mm dimensions;  
 $\pm 3,0$  mm for 100 mm and 200 mm dimensions
- 2) Tolerance on mass :  $\pm 2$  %.

**8.1.2.2 Composition**

The packages shall consist of

- a) a suitable filling material containing, per 1 000 g :  
 230 g of oxy-ethyl-methyl cellulose  
 764,2 g of water<sup>1)</sup>  
 5 g of sodium chloride  
 0,8 g of parachlorometacresol

1) The addition of about 4 % of water is recommended in order to compensate for evaporation during the preparation of the filling material.

The freezing point of this material is  $-1\text{ }^{\circ}\text{C}$  (its thermal characteristics correspond to those of lean beef).

b) a wrapper, consisting of a sheet of plastic<sup>1)</sup> or any other suitable material of such a nature that moisture exchange with the ambient medium is negligible.

After filling, the wrapping sheet shall be sealed.

### 8.1.2.3 "M" packages

Some 500 g packages (50 mm  $\times$  100 mm  $\times$  100 mm) are equipped for temperature measurement, being fitted with thermocouples<sup>2)</sup> which are inserted in the geometrical centres of the packages. All precautions shall be taken to minimize extraneous conducting of heat. These packages are called "M" packages.

## 8.1.3 Operating requirements for the appliances

### 8.1.3.1 Thermostat setting

The thermostat setting requirements are specified for each test.

When the appliance is fitted with a thermostat which is not designed for adjustment by the user, the appliance is tested in the condition in which it is delivered to the user.

### 8.1.3.2 Anti-condensation heaters

If an appliance is fitted with an anti-condensation heater, this shall be switched on; if adjustable, it shall be set at maximum heating, except for the energy consumption test, when it shall be switched on only if it is needed to withstand the water vapour condensation test.

### 8.1.3.3 Stable operating conditions

In the case of cyclic operation of the refrigerating system, including any automatic defrost periods, stable operating conditions are deemed to be reached when, for each of the "M" packages, the temperatures at all corresponding points during successive operating cycles agree within  $\pm 0,5\text{ K}$  and there is no marked trend away from the mean temperature during a period of about 24 h.

In the case of continuous operation of the refrigerating system, stable operating conditions are deemed to be reached when, although there may be a certain variation in temperature, the increase or decrease in the temperature of all the "M" packages does not exceed 0,5 K during a period of 18 h.

Stable operating conditions are considered to have been maintained during the tests if the temperature fluctuations do not exceed 0,5 K.

1) It is advisable to use a sheet of easily sealed, 120  $\mu\text{m}$  thick high-pressure polyethylene, covered externally with a sheet of approximately 12,5  $\mu\text{m}$  thick polyterephthalate, the two layers being bonded together.

2) Any other temperature-measuring device of equivalent precision may be used.

3) The verification of the thickness of the paper used is made as prescribed in ISO 534.

## 8.1.3.4 Power supply

### 8.1.3.4.1 Electric power supply

The appliance shall be tested at the rated voltage and frequency, or at the mean of the rated working range  $\pm 1\%$ .

### 8.1.3.4.2 Power supply other than electric

Appliances others than those with electric power supply shall be tested under supply conditions corresponding to the information of the rating plate.

## 8.1.3.5 General conditions for use of baskets, shelves and trays

Of all the baskets, shelves and trays supplied with the appliance, only those which have been indicated by the manufacturer as being necessary for obtaining satisfactory mechanical and thermal characteristics and for the correct storage of food shall be used during the tests. If the manufacturer gives no indication on this subject, all baskets, shelves and trays shall be in position.

## 8.1.4 Measuring instruments

The temperatures shall be measured with temperature probes, the sensors of which are inserted either in the test-packages or, for measuring the ambient temperature, in the centre of a tinned solid copper cylinder, having a mass of 25 g and of minimum external area (diameter = height = about 15,2 mm). The temperatures shall be recorded. Temperature-measuring instruments shall be accurate to  $\pm 0,3\text{ K}$ .

The relative humidity shall be measured and recorded at a point which is representative. The accuracy of the measuring instruments shall be such that the result, expressed as dew point, is accurate within  $\pm 0,3\text{ K}$ . Watt-hour meters shall be readable to 0,01 kWh and be accurate to within  $\pm 1\%$ . The measuring accuracy shall be stated in the test report.

## 8.2 Testing the air-tightness of door or lead seal

The purpose of this test is to ensure that the gasket of the door or lid of the appliance adequately prevents any abnormal ingress of the surrounding air.

### 8.2.1 Procedure

The ambient temperature shall be between  $16\text{ }^{\circ}\text{C}$  and  $32\text{ }^{\circ}\text{C}$ . The appliance shall be operated for at least 24 h under the same condition as specified for the energy consumption test (see 8.8), before carrying out this test.

A strip of paper 50 mm wide, 0,08 mm thick<sup>3)</sup> and of suitable length shall be inserted at any point of the seal, and the door or lid closed normally on it.