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SLOVENSKI STANDARD
SIST EN 62552:2013

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Gospodinjski hladilni aparati - Značilnosti in preskusne metode (IEC 62552:2007, spremenjen + popravek marec 2008)

Household refrigerating appliances - Characteristics and test methods (IEC 62552:2007, modified + corrigendum Mar. 2008)

Haushalt-Kühl-/Gefriergeräte - Eigenschaften und Prüfverfahren (IEC 62552:2007, modifiziert + corrigendum Mar. 2008)

Appareils de réfrigération à usage ménager - Caractéristiques et méthodes (CEI 62552:2007, modifiée + corrigendum Mar. 2008)

Ta slovenski standard je istoveten z: EN 62552:2013

ICS:

97.040.30	Hladilni aparati za dom	Domestic refrigerating appliances

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62552

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English version

Household refrigerating appliances -
Characteristics and test methods
(IEC 62552:2007, modified + corrigendum Mar. 2008)

Appareils de réfrigération à usage
ménager -
Caractéristiques et méthodes d'essai
(CEI 62552:2007, modifiée + corrigendum
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CENELEC

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

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Foreword

This document (EN 62552:2013) consists of the text of IEC 62552:2007 + corrigendum 2008 prepared by IEC/TC 59 "Performance of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 59X "Performance of household and similar electrical appliances".

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2013-10-22
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2015-10-22

This document supersedes EN 153:2006 and EN ISO 15502:2005 + AC:2007.

EN 62552:2013 includes the following significant technical changes with respect to EN 153:2006 and EN ISO 15502:2005:

– new compartment: zero star;

– new compartment: wine storage, combined with requirements for vibration, temperature fluctuation and humidity;

– new compartment: pantry;

– new compartment: multi-use;

– new compartment: through-the-door-devices;

– requirements for circumvention.

EN ISO 15502:2005 + AC:2007, *Household refrigerating appliances – Characteristics and test methods*, is based on ISO 15502:2005 and its corrigendum Cor 1:2007; this International Standard, prepared by subcommittee 5: Testing and rating of household refrigeration appliances of ISO technical committee 86, Refrigeration and air-conditioning, was transferred to the IEC subsequent to IEC SMB decision 127/11. ISO 15502:2005 and its corrigendum are superseded by IEC 62552:2007.

EN 153:2006, *Methods of measuring the energy consumption of electric mains operated household refrigerators, frozen food storage cabinets, food freezers and their combinations, together with associated characteristics*, was prepared by CEN/TC 44, Household refrigerating appliances and commercial refrigeration equipment.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62552:2007 are prefixed "Z".

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Endorsement notice

The text of the International Standard IEC 62552:2007 + corrigendum 2008 was approved by CENELEC as a European Standard with the following common modifications.

COMMON MODIFICATIONS

2   Normative references

Delete the reference to ISO 817.

Delete the reference to IEC 60335-2-24:2002

3   Terms, definitions and symbols

Add the following definitions after 3.1.7:

3.1.Z1
wine storage appliance
refrigerating appliance having one or more and only compartments exclusively designed for storage of wine

Note 1 to entry: An appliance containing compartment(s) which does not fulfil all requirements as specified for wine storage compartments cannot be called wine storage appliance.

3.1.Z2
multi door or other appliances
refrigerating appliance having two or more compartments, each one specified according to one of specifications as to Table 2 and being not covered by definitions as to 3.1.1 till 3.1.Z1

3.1.Z3
thermoelectric refrigerating appliance
refrigerating appliance where the cooling uses the Peltier effect

3.1.Z4
Mobile refrigerating appliance
appliance that is primarily intended to be used at different locations, having a mass of less than 18 kg

Note 1 to entry: While being moved, the appliance does not necessarily need to be operating.

Add the following definitions after 3.3.3:

3.3.Z1
zero-star compartment
low-temperature compartment intended for the freezing and storage of ice and for short time storage of frozen food in which the temperature is not warmer than 0 °C

3.3.5.Z2
wine storage compartment
compartment exclusively designed either for short-term wine storage to bring wine to the ideal drinking temperature or for long-term storage of wine, with the following features:

– a storage temperature range, either pre-set or set manually according to the manufacturer's instructions, in the range from +5 °C to +20 °C, each compartment providing t_{wma} ≤ +12 °C;

Note 1 to entry: The range from +5 °C to +20 °C indicates the maximum allowed range, no target values. If there is more than one wine storage compartment in one appliance, the temperature setting range can also be subdivided covering only part of the temperature range by each wine storage compartment.

– measured storage temperature(s) within a variation over time of less than 0,5 K at each declared ambient temperature specified by the climate class for household refrigerating appliances (see 8.Z1);

– active or passive control of the compartment humidity within a range from 50 % to 80 % relative humidity;

– constructed to reduce the transmission of vibration to the compartment, whether from the refrigerator compressor or from any external source

3.3.5.Z3
pantry compartment
compartment intended for the storage of particular foods or beverages at a temperature warmer than that of the cellar compartment

3.3.5.Z4
multi-use-compartment
compartment intended for use at two or more of the temperatures of the compartment types in Table 2, capable of being set by the user to remain at the operating temperature range applicable to each compartment type

Note 1 to entry: Where temperatures can shift to a different operating range for a period of limited duration only, the compartment is not a "multi-use compartment".

3.3.5.Z5
low ambient switch
device activated at the low ambient temperatures, automatically or manually, to balance the temperatures in different compartment types used in combination if applicable

3.3.5.Z6
thermal accumulator
device with thermal capacity provided by manufacturer

Replace Definitions 3.5.3, 3.5.4, 3.5.5 and 3.5.6 by:

3.5.3
overall dimensions
space – height, width and depth – with doors or lids closed

3.5.4
overall space required in use
total space – height, width and depth – with doors or lids open

3.5.5
gross volume
volume within the inside liner of the refrigerating appliance or of a compartment with an external door, in every case without internal fittings and with doors or lids closed

3.5.6
storage volume
part of the gross volume of any compartment that remains after deduction of the volume of components and spaces unusable for the storage of food

Note 1 to entry: See 7.2.

*In Definition 3.5.7, **delete** the note.*

***Add** the following definitions after 3.6.23:*

3.6.Z1
wine compartment storage temperature
t_{wma}
mean temperature of the wine storage compartment

3.6.Z2
humidity wine compartment
RH_{wim}
internal relative humidity in a wine storage compartment as integrated time average

3.6.Z3
pantry compartment storage temperature
t_{pma}
mean temperature of the pantry storage compartment

***Add** the following definitions after 3.7.4:*

3.7.Z1
humidity control device
device which automatically regulates the humidity level inside a compartment

3.7.Z2
ambient air exchange device
device which allows to exchange the air in a refrigerating compartment with ambient air, either fix as to manufacturer design, or to be controlled automatically, or to be set manually by the user as to manufacturer's instructions

Note 1 to entry: The hole for defrosting water draining is not considered as an air exchange device.

3.8 Symbols

***Replace** the content by:*

$T_i, T_{ci}, T_{wi}, T_{ai}$	temperature measurement positions
t_i	instantaneous temperature value (fresh food compartment)
$t^{(*)}, t^*, t^{**}, t^{***}$	The temperatures of each compartment, cabinet or section is the maximum temperature of any M-package in that compartment, cabinet or section.
t_{amb1}, t_{amb2}	instantaneous ambient temperature value
$t_{amb1.m} / t_{amb2.m}$	integrated time average of t_{amb1}/t_{amb2}
$t_{amb.ma}$	arithmetic average of $t_{amb1.m}$ and $t_{amb2.m}$
t_{ci}	instantaneous temperature value (cellar compartment)

t_{cc}	instantaneous temperature value (chill compartment)
t_{wi}	instantaneous temperature value (wine storage compartment)
t_{pi}	instantaneous temperature value (pantry compartment)
t_{im}	integrated time average of t_i
t_{cim}	integrated time average of t_{ci}
t_{wvim}	integrated time average of t_{wi}
t_{pvim}	integrated time average of t_{pi}
t_{va}	instantaneous arithmetic average of t_1, t_2, t_3
t_{ca}	instantaneous arithmetic average of t_{c1}, t_{c2}, t_{c3}
t_{ma}	arithmetic average of t_{1m}, t_{2m}, t_{3m}
t_{cma}	arithmetic average of t_{c1m}, t_{c2m}, t_{c3m}
t_{wma}	arithmetic average of t_{w1m}, t_{w2m}, t_{w3m}
t_{pma}	arithmetic average of t_{p1m}, t_{p2m}, t_{p3m}
RH_{wi}	instantaneous relative humidity (wine storage compartment)
RH_{wim}	integrated time average of RH_{wi}
E_{24h}	energy consumption of household refrigerating appliance in kWh/24 h (conditions as in Table 5)
i	subscript representing 1, 2 or 3

4 Classification

Add the following text after Table 1:

If the lowest declared temperature is not within standard climate classes, the lowest ambient temperature is the temperature where the appliance can be used fulfilling the storage test requirements. This temperature shall be indicated in the user manual and the test report.

5 Materials, design and manufacture

Add the following after 5.7.6:

5.7.Z1 Wine storage appliances and wine storage compartments shall be constructed by using suitable means to reduce transmission of vibration to the compartment(s), whether from the refrigerating system or from any external source.

6 Storage temperatures

Replace *Table 2 by the following table:*

Table 2 – Storage temperatures

°C									
Fresh-food storage compartment		**Food freezer and three-star compartment/ cabinet**	**Two-star compartment/ section**	**One-star compartment**	**Cellar compartment**	**Chill compartment**	**Wine compartment**	**Zero-star compartment**	**Pantry compartment**
t_{1m}, t_{2m}, t_{3m}	t_{ma}	t^{***}	t^{**}	t^{*}	t_{cm}	t_{cc}	t_{wma} [a, b]	$t^{(*)}$	t_{pma}
$0 \le t_{1m}, t_{2m}, t_{3m} \le 8$	$\le +4$	≤ -18 [a]	≤ -12 [a]	≤ -6	$+8 \le t_{cm} \le +14$	$-2 \le t_{cc} \le +3$	$+5 \le t_{wma} \le +20$ $t_{wma} \le +12$	$t^{(*)} \le 0$	$+14 < t_{pma} < +20$

[a] As a result of a defrost cycle, the storage temperatures of frost free and/or adaptive defrost refrigerating appliances are permitted to rise by no more than 3 K during a period not greater than 4 h or 20 % of the duration of the operating cycle, whichever is the shorter. An example of an operating cycle for a frost-free refrigerator-freezer is given in Figure 1. For wine storage compartments applies that the maximum temperature t_{wi} shall not be more than 1,5 K above integrated time average temperature t_{wim} for each measuring point.

[b] The range +5 °C to +20 °C indicates the maximum allowed range, no target values. If there are more than one wine storage compartment in one appliance the temperature setting range can also be subdivided covering only part of the temperature range by each wine storage compartment. Each compartment shall provide $t_{wma} \le +12$ °C.
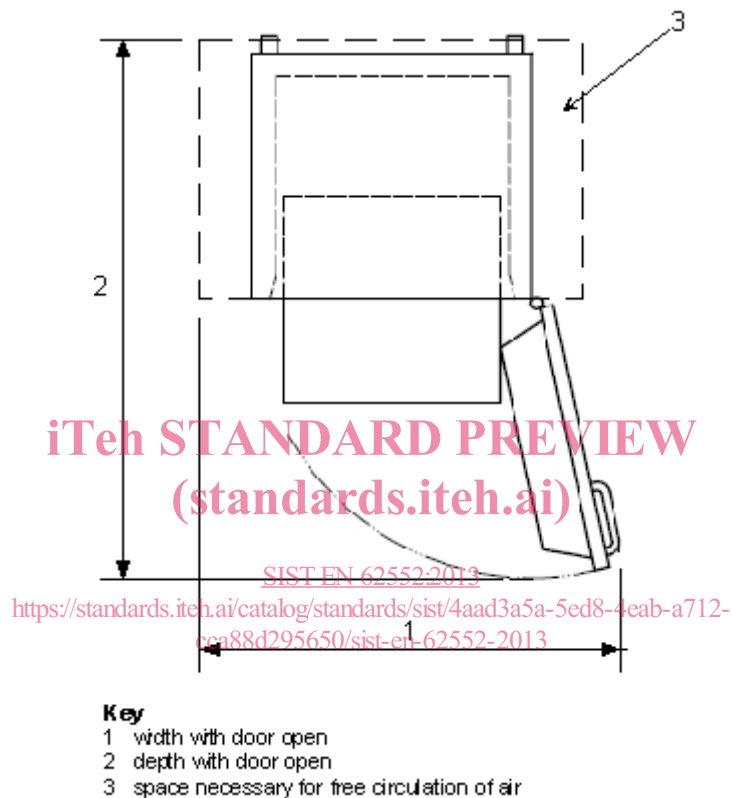
7 Determination of linear dimensions, volumes and areas

7.1 Determination of linear dimensions

Change 1st sentence of 2nd paragraph to: The measurement shall be carried out on the refrigerating appliance in its final condition for use (i.e. all external fittings supplied with the appliance for installation by the user).

Add sentence to 3rd paragraph: If there is a difference between the delivery status and the final condition for use this information shall be made available to the user at the point of sale.

Figure 2: Change drawing to include space for air circulation mentioned in paragraph 4

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Key
1 width with door open
2 depth with door open
3 space necessary for free circulation of air

Replace title and text of 7.2.4 by:

7.2.4 Storage volume of fresh-food storage, chill, cellar, pantry and wine storage compartments

The storage volume of the fresh-food storage, chill, cellar, pantry and wine storage compartment shall be the gross volume of the compartment minus

– the volume of the evaporator space,

– the volume of any housings (such as those for interior lights, temperature-control devices and other devices e.g. non removable telescopic guides),

– the volume of shelves, partitions, retainers and other accessories whose wall thickness is greater than 13 mm according to 7.2.9.1,

– the space between the inner door protrusion and the inner liner of the fresh-food storage compartment, chill, cellar pantry and wine storage compartment, unless it is intended for the storage of food.

Where the volumes of the cellar compartment, pantry and wine storage compartment and fresh-food storage compartment are adjustable relative to one another by the user, the storage volumes of these

compartments shall be determined with the cellar compartment, pantry or/and wine storage compartment adjusted to its minimum and maximum volumes.

Add *the following sentence at the end of 7.2.5.2:*

Where the evaporator is covered by fix means, the depth of the evaporator space shall be taken as the mean horizontal distance to the foremost part of the protection cover.

Replace *the text of 7.2.5.3 by:*

The width of the evaporator space shall be the overall horizontal width of the evaporator itself or the protection or cover where applicable (neglecting suction headers near the top of the evaporator) or, if side ribs are used, the overall width including the ribs.

If there is less than 70 mm horizontal distance between the evaporator or the ribs or the protection or cover where applicable and an inside wall of the enclosed space of the cabinet, such space shall be considered as part of the evaporator space.

Replace *the text of 7.2.5.4 by:*

The height of the evaporator space shall be the mean vertical distance between the lower limit of the evaporator or the protection or cover where applicable and the upper partition of the food storage compartment.

If the free space between the upper surface or top of the evaporator or the protection or cover where applicable and the upper partition of the food storage compartment exceeds 40 mm, it shall be added to the storage volume of the fresh-food storage compartment.

The evaporator height shall include any internal drip tray and/or drip collector, except in the case when the storage height of the drip tray is greater than 40 mm and a definite manual operation is also needed to initiate defrosting.

Replace *title and text of 7.3.2.7.2 by:*

7.3.2.7.2   Fresh-food storage compartment, chill, cellar pantry and wine storage compartments

Any part of a full shelf, basket or the bottom of a compartment having less than 100 mm vertical clearance above, when all the shelves and baskets 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 19 b)).

For specific shelves as bottles shelves used in e.g. wine storage compartments, no vertical clearance requirement applies.

Replace *title and text of 7.3.4.1 by:*

7.3.4.1   Fresh-food storage compartment, chill, cellar and wine storage compartments

The area of the interior surface of the bottom of a suspended container and the area of the shelf immediately below shall not both be counted, unless the vertical clearance between this shelf and the exterior surface of the bottom of the container is at least 100 mm. For specific shelves as bottles shelves used in e.g. wine storage compartments, no vertical clearance requirement applies.

Nevertheless, in the case of one container – and one only – this minimum clearance may be reduced to 80 mm to the extent where this possibility has not been applied for the shelves.

If the minimum vertical clearance within a suspended container, as measured between the interior surface of the bottom and the cover, or to the shelf immediately above, is less than 40 mm, the bottom area of the container shall not be added.

Add *the following new subclause after 7.3.4.2:*

7.3.4.Z1   Evaluation of bottle capacity for wine storage compartments

For the evaluation of the rated capacity of bottles 0,75 l bottles or equivalent substitution with dimension as specified in Figure Z1 shall be used.

Bottles to be filled with water to provide a total weight of each bottle of 1 200 g ± 50 g to consider the deformation of shelves.

Removable parts which are stated by the manufacturer as necessary for the proper thermal and mechanical functioning of the wine storage compartment have to be placed in its intended position as to manufacturer's instructions.

Bottles will be stacked on each area intended to carry bottles in normal usage as to following rules:

– clearance to wall/back/door as to manufacturer's instructions;

– in the absence of instructions the rear end of shelves and 5 mm clearance to door are considered as limit, proper cooling function has to be ensured;

– bottles placed in door shelves may touch door liner;

– if evaporator is covered by fix means for protection bottles can stack till the protection, proper cooling function has to be ensured;

– bottles can be placed reverse and interleave;

– bottles can be in touch with side walls if nothing else stated by manufacturer;

– bottles can be placed horizontal or vertical, inclined if fixed means provide incline position;

– movable parts like telescopic shelves have to be kept movable and accessible under loading conditions.

A sketch of the bottle loading plan showing the location of bottles for evaluation of the bottle capacity for wine storage compartments shall be included in test report.

8   General test conditions

8.2   Ambient temperatures

Replace *the text by:*

Local ambient temperatures t_{amb1} and t_{amb2} are measured at two points T_{a1} and T_{a2}, located at the vertical and horizontal centreline of the sides of the refrigerating appliance and at a distance of 350 mm from the refrigerating appliance (see Figure 3).

The overall ambient temperature $t_{amb.ma}$ for a single appliance is the arithmetical average of the time-integrated temperatures $t_{amb1.m}$ and $t_{amb2.m}$. It is the value used for the tests.

Ambient temperatures are measured using copper or brass cylinders (see 8.7) at each of the two measurement points.

Ambient temperature sensors shall be shielded from any sources or sinks of radiant and or convective heat in the test room, including conditioning equipment, external windows, the appliance itself or other appliances under test.

During all tests the integrated time average temperatures $t_{amb1.m}$ and $t_{amb2.m}$ shall be within ± 0,5 K from the arithmetic average ambient temperature $t_{amb.ma}$.

The vertical ambient temperature gradient from the platform specified in 8.4 to a height of 2 m shall not exceed 1 K/m measured at the same vertical axis as for the ambient temperature measurement.

Tests shall be carried out under the following conditions of measured ambient temperature.

a)   For checking the storage temperatures:

+ 10 °C and + 32 °C   for class SN refrigerating appliances;

+ 16 °C and + 32 °C   for class N refrigerating appliances;

+ 16 °C and + 38 °C   for class ST refrigerating appliances;

+ 16 °C and + 43 °C   for class T refrigerating appliances.

For a rated range of climate classes, tests shall be performed at the extreme ambient temperatures of the range of rated classes.

EXAMPLE   For refrigerating appliances rated from SN to T, tests are performed at + 10 °C and at + 43 °C.

b)   For checking the energy consumption, temperature rise time, freezing capacity and ice-making capacity of all refrigerating appliances, as applicable:

+ 25 °C   for class SN, class N, class ST and class T refrigerating appliances.

c)   For all other tests: at the temperature stated in the test specifications.

8.3   Humidity

Replace the text by:

Unless otherwise specified, relative humidity shall not exceed 75 %.

For the test measuring of humidity in wine storage compartments, the relative ambient humidity shall be 50 % ≤ RH ≤ 75 % (see 8.Z2).

8.4   Installation of refrigerating appliances

Replace a) by:

a)   One of the partitions shall be placed parallel to the rear of the refrigerating appliance:

1)   for free-standing appliances, against the spacers defined as physically existing devices which fix the distance between the rear of the appliance and the wall behind the appliance. They can either be permanently attached to the appliance or provided as separate parts, which have to be installed by the user. If no spacers are provided then the manufacturer specification for the rear clearance shall be observed:

— The rear clearance is defined as the distance between the rear side of the appliance (rearmost projection) and the vertical partition. The rear side of the appliance is defined as the back wall of the foam housing itself, so excluding any condenser or other protruding elements.

— Where the rear clearance is specified, the appliance shall be positioned such that this clearance is respected with a maximum of 50 mm.

— Where the rear clearance is not specified, the appliance is to be positioned with its rearmost projection in contact with the vertical surface behind it.

— For free-standing absorber appliances the manufacturer specification for the rear clearance shall be observed (without spacer maximum 20 mm between rearmost projection and wall).

2) for built-in appliances, at the distance specified by the manufacturer in connection with the required overall space.

3) for mobile appliances, at the distance specified by the manufacturer

The consumer shall be informed about the influence of this condition on the measure of the energy consumption of the appliance.

Add the following note after a):

NOTE   Stops are physically existing devices which fix the distance between the rear of the appliance and the wall behind the appliance. They can either be permanently attached to the appliance or provided as separate parts, which are installed by the user.

8.5   Test packages

In 8.5.2, replace the last sentence of b) by:

For the measurement of chill compartments and zero-star compartment, only test package b), with a freezing point of -5 °C, shall be used.

8.6   Operating requirements for refrigerating appliances

At the end of 8.6.3.1, add the following sentence:

Where the refrigerating appliance has a rated voltage within the range between 220 V and 240 V, it shall be tested at 230 V ± 1 % with a frequency of 50 Hz ± 1 %.

At the end of 8.6.4, add the following sentences:

If position of shelves is adjustable, those shall be spread equally in the cabinet.

For wine storage compartments shelves, baskets and container shall be in position as defined in 7.3.4.Z1.

Replace the text of 8.6.5 by:

Accessories that are not necessary for the normal operation of the refrigerating appliance shall remain non-operational during testing, as long as nothing specific is specified in any other paragraph.

Add the following new subclause after 8.6.5:

8.6.Z1   Through-the-door devices

If the refrigerating appliance is fitted with a through the door device this shall be closed. Every energy consuming additional device (e.g. display, lightening etc.) is to be switched on when starting the test. Operation like ice or water dispensing will not be performed.

8.7 Measuring instruments

*In 8.7.1, **replace** the 5th paragraph by:*

In 8.7.1, **replace** the 5th paragraph by:

Temperature-measuring instruments shall have an overall accuracy of measurement of not greater than $\pm$ 0,3 K. This accuracy shall be maintained throughout the temperature measuring circuit. Regular calibration of temperature equipment is required at the temperature range of interest.

Replace the text of 8.7.2 by:

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 the dew point, shall have an overall accuracy of measurement of not greater than $\pm$ 0,3 K.

Replace the text of 8.7.3 by:

Watt-hour meters shall be readable to 0,001 kW h and be accurate to within $\pm$ 1 % of the total energy consumption measured during the test period (i.e. 1 % of reading). Calibration of Watt-hour meters shall be performed at the range used in the measurements.

The measuring accuracy shall be stated in the test report.

8.8 Measurement of storage temperature

Replace the title and text of 8.8.1 by:

8.8.1 Fresh-food storage compartment, cellar compartment and pantry compartment

The temperatures t_{1m}, t_{2m} and t_{3m} (see 3.6.2 and 3.8), t_{c1m}, t_{c2m}, t_{c3m} (see 3.6.4 and 3.8) and t_{p1m}, t_{p2m}, t_{p3m} (see 3.6.Z3 and 3.8) shall be measured using copper or brass cylinders, except for the freezing test of refrigerator-freezers, when they shall be measured in M-packages suspended and located at the temperature-sensing points.

For determining the storage temperature, the temperature-sensing points shall be located at T_1, T_2, T_3, T_{c1}, T_{c2}, T_{c3}, and T_{p1}, T_{p2}, T_{p3} as shown in Figures 14 and 15, halfway between the rear internal wall of the appliance and the internal wall of the closed door.

The temperatures t_{1m}, t_{2m} and t_{3m}, and t_{c1m}, t_{c2m} and t_{c3m} and t_{p1m}, t_{p2m} and t_{p3m} at the temperature-sensing points shall be the integrated time averages of t_1, t_2 and t_3, and t_{c1}, t_{c2} and t_{c3}, and t_{p1}, t_{p2} and t_{p3} respectively, during an test period with an integral step of 60 s or less.

The storage temperatures t_{ma} (see 3.6.2), t_{cma} (see 3.6.4) and t_{pma} (see 3.6.Z3) are the arithmetical average of the mean temperatures t_{1m}, t_{2m} and t_{3m} and t_{c1m}, t_{c2m} and t_{c3m} and t_{p1m}, t_{p2m} and t_{p3m} respectively.

If internal components do not allow the temperatures t_1, t_2 and t_3, t_{c1}, t_{c2} and t_{c3}, and t_{p1m}, t_{p2m} and t_{p3m} to be read at the points specified, readings may be taken in positions such that the geometrical centre of the cylinder or the M-package is no more than 25 mm from the point specified. If the interior arrangement of the fresh-food storage and cellar compartments does not conform to those shown in Figures 14 and 15, the temperatures t_1, t_2 and t_3, and t_{c1}, t_{c2} and t_{c3}, shall be read in positions determined by analogy with the positions indicated.

For the freezing test for refrigerator-freezer, the M-packages shall be supported or suspended in order to have their geometrical centre at the temperature-sensing points and so that their largest surface is horizontal. The instantaneous temperatures of the M-packages t_1, t_2 and t_3, t_{c1}, t_{c2} and t_{c3} ,and t_{p1}, t_{p2} and t_{p3} shall be recorded.

The temperatures shall be recorded.