SLOVENSKI STANDARD
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Gospodinjski hladilni in zamrzovalni aparati - Značilnosti in preskusne metode

Household refrigerating appliances - Characteristics and test methods

Haushalt-Kühl-/Gefriergeräte - Eigenschaften und Prüfverfahren

Appareils de réfrigération à usage ménager - Caractéristiques et méthodes

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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
(CEI 62552:2007, modifiée
+ corrigendum Mar. 2008)

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

This draft European Standard is submitted to CENELEC members for CENELEC enquiry.
Deadline for CENELEC: 2011-11-25.

The text of this draft consists of the text of IEC 62552:2007 + corrigendum Mar. 2008 with common modifications prepared by CLC/TC 59X.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
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Foreword

The text of the International Standard IEC 62552:2007 and its corrigendum March 2008, prepared by SC 59M, Performance of electrical household and similar cooling and freezing appliances, of IEC TC 59, Performance of household electrical appliances, together with the common modifications prepared by WG 08, Performance of electrical household and similar cooling and freezing appliances of the Technical Committee CENELEC TC 59X, Performance of household and similar electrical appliances, is submitted to the CENELEC enquiry.

This document will supersede EN ISO 15502:2005 and its corrigendum AC:2007 as well as EN 153:2006.

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.

The significant changes compared to the document to be replaced are the following:

– 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.

This draft European Standard has been prepared under Mandate M/459 given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EU Directive 2010/30/EU.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62252:2007 are prefixed “Z”.

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Text of FprEN 62552

The text of this draft European Standard consists of the text of the International Standard IEC 62552:2007 and its corrigendum March 2008 with the following common modifications.

COMMON MODIFICATIONS

1 Scope

Replace *the Note by:*

NOTE For the safety requirements applicable to household refrigerating appliances, see EN 60335-2-24; for noise requirements applicable to household refrigerators and freezers, see IEC 60704-2-14; and for additional safety requirements applicable to the refrigerating systems of household refrigerating appliances, see ISO 5149.

Add *the following after the note:*

This draft European Standard also specifies, as far as necessary, the test methods which shall be applied in accordance with

- the Commission Delegated Regulation (EU) No 1060/2010 of 28 September 2010 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household refrigerating appliances, and
- the Commission Regulation (EC) No 643/2009 of 22 July 2009, implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for household refrigerating appliances.

2 Normative references

Delete *the reference to ISO 817.*

Replace *the reference to IEC 60335-2-24:2002 as follows:*

IEC 60335-2-24:2002 + A1:2005 + A2:2007, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers*

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 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

***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

***Add** the following definitions after 3.3.5.5:*

3.3.5.Z1
frozen-food storage compartment
low-temperature compartment intended specifically for the storage of frozen food

NOTE Frozen-food storage compartments are classified according to temperature, see 3.3.5.1 to 3.3.5.5.

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 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.

– 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 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 which will be 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 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 The hole for defrosting water draining will not be 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_{amim}	integrated time average of t_{ami} (ambient temperature)
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

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 does no vertical clearance requirement apply.

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 does no vertical clearance requirement apply.

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 heat in the test room, including conditioning equipment, external windows 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

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 have to be 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.