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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household refrigerating appliances – Characteristics and test methods – Part 2: Performance requirements

Appareils de réfrigération à usage ménager – Caractéristiques et méthodes d'essai – Partie 2 – Exigences de performances

IEC 62552-2:2015-02(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD REFRIGERATING APPLIANCES – CHARACTERISTICS AND TEST METHODS –

Part 2: Performance requirements

FOREWORD

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International Standard IEC 62552-2 has been prepared by subcommittee 59M: Performance of electrical household and similar cooling and freezing appliances, of IEC technical committee 59: Performance of household and similar electrical appliances

IEC 62552-1, IEC 62552-2 and IEC 62552-3 cancel and replace the first edition of IEC 62552 published in 2007. IEC 62552-1, IEC 62552-2 and IEC 62552-3 together constitute a technical revision and include the following significant technical changes with respect to IEC 62552:2007:

a) All parts of the standard have been largely rewritten and updated to cope with new testing requirements, new product configurations, the advent of electronic product controls and computer based test-room data collection and processing equipment.
b) In Part 1 there are some changes to test room equipment specifications and the setup for testing to provide additional flexibility especially when testing multiple appliances in a single test room.

c) For more efficient analysis and to better characterise the key product characteristics under different operating conditions, the test data from many of the energy tests in Part 3 is now split into components (such as steady state operation and defrost and recovery). The approach to determination of energy consumption has been completely revised, with many internal checks now included to ensure that data complying with the requirements of the standard is as accurate as possible and of high quality.

d) Part 3 of the standard now provides a method to quantify each of the relevant energy components and approaches on how these can be combined to estimate energy under different conditions on the expectation that different regions will select components and weightings that are most applicable when setting both their local performance and energy efficiency criteria while using a single set of global test measurements.

e) For energy consumption measurements in Part 3, no thermal mass (test packages) is included in any compartment and compartment temperatures are based on the average of air temperature sensors (compared to the temperature in the warmest test package). There are also significant differences in the position of temperature sensors in unfrozen compartments.

f) The energy consumption test in Part 3 now has two specified ambient temperatures (16°C and 32°C).

g) While, in Part 2 (this part) test packages are still used for the storage test to confirm performance in different operating conditions, in Part 1 they have been standardised to one size (100 mm × 100 mm × 50 mm) to simply loading and reduce test variability. A clearance of at least 15 mm is now specified between test packages and the compartment liner.

h) A load processing energy efficiency test has been added in Part 3.

i) A tank-type ice making energy efficiency test has been added in Part 3.

j) A cooling capacity test has been added in Part 2 (this part).

k) A pull-down test has been added in Part 2 (this part).

l) Shelf area and storage volume measurement methods are no longer included. In Part 3 the volume measurement has been revised to be the total internal volume with only components necessary for the satisfactory operation of the refrigeration system considered as being in place.

m) Tests (both performance (Part 2 – this part) and energy (Part 3)) have been added for wine storage appliances.

The following print types are used in this international standard:

– requirements: in roman type;

– test variables: in *italic type*;

– notes: in small roman type.

– words in **bold** are defined in IEC 62552-1:2015.

The text of this standard is based on the following documents:

FDIS	Report on voting
59M/62/FDIS	59M/65/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62252 series, published under the general title *Household refrigerating appliances – characteristics and test methods*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

IEC 62552 is split into 3 parts as follows:

- Part 1: Scope, definitions, instrumentation, test room and set up of refrigerating products;
- Part 2: General performance requirements for **refrigerating appliances** and methods for testing them (this part);
- Part 3: **Energy consumption** and **volume** determination.

HOUSEHOLD REFRIGERATING APPLIANCES – CHARACTERISTICS AND TEST METHODS –

Part 2: Performance requirements

1 Scope

This part of IEC 62552 specifies the essential characteristics of household **refrigerating appliances** cooled by internal natural convection or forced air circulation, and specifies test methods for checking the characteristics.

This part of IEC 62552 describes the methods for the determination of performance requirements. Although there is some commonality in the set-ups for different tests (and so it may be an advantage to apply them all to one sample), these are separate tests to evaluate specific characteristics of the sample being tested. This part of IEC 62552 does not specify a procedure to generalise the results from sample test results to a prediction of the characteristics of the whole population from which that sample was selected.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62552-1:2015, *Household refrigerating appliances – Characteristics and test methods – Part 1: General requirements*

IEC 62552-3:2015, *Household refrigerating appliances – Characteristics and test methods – Part 3: Energy consumption and volume*

3 Terms, definitions and symbols

For the purposes of this document, the terms, definitions and symbols given in IEC 62552-1:2015 apply.

4 Performance requirements and tests covered in this standard

4.1 General

This standard sets out tests to assess the performance of household and similar **refrigerating appliances**. While this standard does not require these tests to be performed, when they are performed, they shall be carried out as specified.

4.2 Storage test

The storage test is used to establish whether the **refrigerating appliance** is capable of maintaining suitable internal **storage temperatures** in a range of ambient conditions defined under the climate classes for which it is **rated**. See Clause 6.

4.3 Cooling capacity test

The **cooling capacity** test is used to measure the load processing capability of **fresh food compartment**s by determining the time to pull down a specified test load from ambient to a specified temperature. See Clause 7.

4.4 Freezing capacity test

The **freezing capacity** test is used to measure the load processing capability of **frozen compartment**s by determining the time to pull down a specified test load from ambient to a specified temperature. This test is required to establish whether a **frozen compartment** also qualifies for a **four-star** performance rating. See Clause 8.

4.5 Automatic ice-making capacity test

The **ice-making capacity** test is used to determine the quantity of new ice cubes that can be produced over a specified period of time. See Clause 9.

4.6 Other tests

Other tests that may not be required to be performed are found in the annexes.

These tests are

a) Pull-down test (Annex A): This test is used to measure the reserve refrigerating capacity of a **refrigerating appliance**.

b) Wine storage test (Annex B): This test is used to check compliance with the requirements of Part 2 at appropriate **ambient temperatures** for the various climate classes.

c) Temperature rise test (Annex C): This test is used to determine the time taken for the temperature to rise in the warmest test package from –18°C to –9°C after the power is disconnected. It is applicable to **refrigerating appliances** with one or more **three-star** or **four-star compartments**.

d) Water vapour condensation test (Annex D): This test is used to determine the extent of water condensation on the external surface of the **refrigerating appliance** under specified ambient conditions.

4.7 Test summary

Table 1 provides a summary of the tests to be performed.

Table 1 – Test summary

Clause / Annex and Test	Ambient		Pantry and cellar	Fresh food	Chill	zero star	1 and 2 star	3 and 4 star	Temperature requirements after test has started
Clause 6 Storage	Various	Packages	No		Yes	No	Yes		To hold initial values
		Initial temp	Mean		Instant	Mean	Max		
Clause 7 **Cooling capacity**	25 °C	Packages	No						For test load final only
		Initial temp	Table 2	+4 °C ± 0,5 K	Table 2	Maximum/ minimum	Average/ minimum		
Clause 8 **Freezing capacity**	25 °C	Packages	M-packages only		Yes	No	Yes		Yes excursion and final
		Initial temp	Table 2		Not measured	Maximum/minimum			
Clause 9 Auto ice-making	25 °C	Packages	No						No
		Initial temp	As for Table 2			Maximum/minimum			
Annex A Pull-down	43 °C	Packages	No						Final only
		Initial temp	43 °C						
Annex C Temp rise	25 °C	Packages	As for the storage test						For –18 °C **compartments** only
		Initial temp	Not specified					–18 °C	
Annex D Condensation	25 °C for SN and N 32 °C for ST and T	Packages	No						To hold initial values
		Initial temp	≤ energy test temperatures as in Table 1 in IEC 62552-3:2015						

NOTE 1 For definitions of symbols, see 3.7 in IEC 62552-1:2015.

NOTE 2 In the event of any discrepancy between data in this Table and the individual test procedures, the test procedures take precedence.

NOTE 3 Wine storage test parameters are specified in Annex B.

Table 2 – Compartment temperatures

°C								
Compartment type								
Fresh food		**Three-star and four-star**	**Two-star**	**One-star**	**Zero-star**	**Chill**	**Cellar**	**Pantry**
T_{1m}, T_{2m}, T_{3m}	T_{ma}	T^{***} [a]	T^{**} [a]	T^{*} [a]	T_{zma}	T_{cci}	T_{cma}	T_{pma}
$0 \leq T_{1m}$, T_{2m}, $T_{3m} \leq +8$	$\leq +4$	≤ -18 [b]	≤ -12 [b]	≤ -6	≤ 0	$-3 \leq T_{cci} \leq +3$	$+2 \leq T_{cma} \leq +14$	$+14 \leq T_{pma} \leq +20$
average	average	maximum	maximum	maximum	average	instantaneous	average	average

[a] The superscripts attached to the symbol T correspond to the **three-star** and **four-star**, **two-star** or **one-star compartment** temperature.

[b] During a **defrost and recovery period**, these **storage temperatures** of **frost-free refrigerating appliances** are permitted to rise by no more than 3 K.

NOTE For definitions of symbols, see 3.7 in IEC 62552-1:2015

5 General test conditions

Unless otherwise noted, test room set-up and instrumentation shall be as specified in Annex A of IEC 62552-1:2015.

Unless otherwise noted, installation and set-up of **shelves**, drawers, bins, flaps and controls etc. shall be as specified in Annex B of IEC 62552-1:2015.

6 Storage test

6.1 Objective

The purpose of this test is to check that the **refrigerating appliance** is capable of maintaining specified internal temperatures at different **ambient temperatures**.

Under the conditions specified in this clause (Clause 6) and at the **ambient temperatures** for the appropriate climate classes as specified in A.3.2.3 of IEC 62552-1:2015, the **refrigerating appliance** shall be capable of maintaining, simultaneously, the required **compartment temperatures** (within the permitted temperature deviations during the **defrost and recovery period**) as given in Table 2.

To meet these test requirements, there shall be, for each **ambient temperature**, at least one control setting at which all **compartments** meet the specified internal temperatures. The control(s) however, may be adjusted for testing at different ambients.

NOTE Because the **frozen compartment** loading is largely the same as that for the **freezing capacity** test, there may be an advantage in doing these tests consecutively.

6.2 Preparation of refrigerating appliance

The test room ambient shall be as specified in A.3.2.3 of IEC 62552-1:2015.

The **refrigerating appliance** shall be installed in the test room in accordance with Annex B of IEC 62552-1:2015.

Refrigerating appliances with anti-condensation heater(s) which are permanently on during **normal use** shall be tested with the heater(s) operating.

Anti-condensation heaters which can be manually controlled by the user shall be switched on and, if adjustable, they shall be set at their maximum heating rate.

Anti-condensation heaters which are automatically controlled shall be allowed to operate normally.

The empty **refrigerating appliance** should be set up and operated until it has reached equilibrium at or close to the temperatures specified in Table 2.

Any automatic icemaker shall be configured so that no new ice is made during the test, but shall otherwise remain operational. However, connection to a water supply may be omitted if it can be demonstrated that the absence or presence of a connection to a water supply would make no difference to the results of this test.

6.3 Air temperature sensor location and test and M-package loading

6.3.1 Unfrozen compartments (except chill compartment and wine storage compartment)

For determining the **storage temperatures** of these **compartment**s, air temperature sensors shall be located in accordance with D.2.2 of IEC 62552-1:2015.

NOTE See Annex B, Wine storage appliances and compartments; storage test.

6.3.2 Chill compartments

6.3.2.1 General

All test packages and M-packages shall be as specified in Clause C.2 b) of IEC 62552-1:2015.

For determining the **storage temperature** of any **chill compartment**, the storage load shall be in accordance with 6.3.2.2.

The temperature T_{cci} (see Table 2) shall be measured in M-packages positioned or suspended so that their largest surface is horizontal. They may be positioned directly on the floor of the **compartment**/drawer but shall always be at least 15 mm away from all walls and ceilings and from the other packages of the test load.

In these **compartments**, M-packages shall be placed in diagonally opposite corners.

In the case of a **compartment** with special subdivisions (**shelves**, etc.) which are part of the design, if the dimensions are too small to allow the horizontal positioning of the M-packages, it is permissible to position them vertically.

If the dimensions are too small to accommodate an M-package (for example in door **shelves**), a special support shall be used to position the M-package next to the **shelf** and as close as possible to the door liner.

The temperature of the **chill compartment** is the instantaneous temperature of any M-package in that **compartment**. The temperatures and conditions specified in Table 2 shall apply.

6.3.2.2 Chill compartment storage load

The **compartment** shall be loaded with the number of packages specified in Table 3.

There shall always be at least two M-packages and test packages may be replaced by M-packages.

Table 3 – Chill compartment storage load

Volume, V, of chill compartment (l)	Number of packages
$V < 10$	2
$10 \leq V < 20$	3
$20 \leq V < 30$	4
$30 \leq V < 40$	5
$40 \leq V < 50$	6
$50 \leq V < 60$	7
$60 \leq V < 70$	8
$70 \leq V < 80$	9