IEC 62552-3

Edition 1.0 2015-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Household refrigerating appliances – Characteristics and test methods – Part 3: Energy consumption and volume

Appareils de réfrigération à usage ménager – Caractéristiques et méthodes d'essai – Partie 3: Consommation d'énergie et volume

IEC 62552-3:2015-02(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 97.030

ISBN 978-2-8322-2229-4

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD REFRIGERATING APPLIANCES – CHARACTERISTICS AND TEST METHODS –

Part 3: Energy consumption and volume

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62552-3 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 (this part) 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 (this part) 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 (this part), 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 (this part) now has two specified ambient temperatures (16°C and 32°C).

g) While, in Part 2 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 (this part).

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

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

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

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) and energy (Part 3 – this part)) have been added for wine storage appliances.

The following print types are used in this international standard:

– requirements: in roman type;

– test specifications: in *italic type*;

– notes: in small roman type.

– Words in **bold** are defined in IEC 62552-1:2015, Clause 3 or in this part.

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

FDIS	Report on voting
59M/63/FDIS	59M/66/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,
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- amended.

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INTRODUCTION

IEC 62552 is split into 3 parts as follows:

- IEC 62552-1: Scope, definitions, instrumentation, test room and set up of refrigerating products;
- IEC 62552-2: General performance requirements for **refrigerating appliances** and methods for testing them;
- IEC 62552-3: **Energy consumption** and **volume** determination (this part).

HOUSEHOLD REFRIGERATING APPLIANCES – CHARACTERISTICS AND TEST METHODS –

Part 3: Energy consumption and volume

1 Scope

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

This part of IEC 62552 describes the methods for the determination of **energy consumption** characteristics and defines how these can be assembled to estimate **energy consumption** under different usage and climate conditions. This part of IEC 62552 also defines the determination of **volume**.

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 62552-2:2015, *Household refrigerating appliances – Characteristics and test methods – Part 2: Performance requirements*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62552-1, as well as the following apply.

3.1.1
specified auxiliaries
functions or features that affect the **energy consumption** of a **refrigerating appliance** and where their actual **energy consumption** depends on the conditions of use or operation

Note 1 to entry: This standard makes optional provision for determining the **energy consumption** impacts of these functions or features in accordance with regional requirements.

Note 2 to entry: Test requirements for specified auxiliaries, where applicable, are set out in Annex F and their application specified in 6.8.4. The only specified auxiliaries in this edition of the standard are ambient controlled anti-condensation heaters and tank type automatic icemakers.

3.1.2
defrost interval
the measured or estimated length of a **defrost control cycle**, starting from the point of initiation of one **defrost control cycle** to the point of initiation of the subsequent **defrost control cycle**, expressed in hours of elapsed (clock) time

3.2 Symbols

For the purposes of this document, the following symbols apply.

E electrical **energy consumption** over a specified period (day, year, etc.) in Wh or kWh

P average steady power consumption over a defined period in W

T **compartment** temperature average over a specified period in degrees Celsius (°C)

TMP_n temperature measurement position of a specific temperature sensor

t time at a specific moment

Δt time interval in hours between two defined times or for a defined period

ΔE_{df} additional energy associated with a **defrost and recovery period**, over and above the relevant **steady state** power consumption at the same **temperature control settings**, in Wh

$\Delta Th_{df\text{-}i}$ the accumulated temperature difference over time (relative to the **steady state** temperature) during a **defrost and recovery period** in Kh for **compartment** *i*

Rt actual compressor run time in hours for a defined period (actual compressor on period)

CRt percentage of compressor run time for a defined period (Rt/total time interval as %)

P_{Hi} average heater power associated with an ambient controlled anti-condensation heater at a specified temperature and humidity in W (Annex F)

M mass of water used for a **processing load** (Annex G) or the mass of water or ice during an ice making test (Annex F)

4 Applicable test steps for determination of energy and volume

4.1 Setup for energy testing

Prior to the measurement of **energy consumption** for a **refrigerating appliance**, it shall be set up in a test room as specified in Annex A.

4.2 Steady state power consumption

The **steady state power consumption** of the **refrigerating appliance** shall be determined in accordance with Annex B.

4.3 Defrost and recovery energy and temperature change

For products with one or more defrost systems (each with its own **defrost control cycle**), the incremental **defrost and recovery** energy for a representative number of **defrost and recovery periods** shall be determined in accordance with Annex C for each system. The temperature change associated with **defrost and recovery** shall also be determined in accordance with Annex C for each system.

4.4 Defrost frequency

For products with one or more defrost systems (each with its own **defrost control cycle**), the **defrost interval** for each system shall be determined in accordance with Annex D, depending on the control type.

4.5 Number of test points and interpolation

Where the **energy consumption** of a **refrigerating appliance** is interpolated in accordance with Clause 6, one of the methods specified in Annex E shall be used.