



IEC 62552-3

Edition 1.2 2025-08

Corrected version
2026-02

INTERNATIONAL STANDARD

CONSOLIDATED VERSION

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

CONTENTS

FOREWORD.....	7
INTRODUCTION.....	10
1 Scope.....	11
2 Normative references	11
3 Terms, definitions and symbols	11
3.1 Terms and definitions.....	11
3.2 Symbols.....	11
4 Applicable test steps for determination of energy and volume.....	12
4.1 Setup for energy testing.....	12
4.2 Steady state power consumption.....	12
4.3 Defrost and recovery energy and temperature change	12
4.4 Defrost frequency	12
4.5 Number of test points and interpolation	12
4.6 Load processing efficiency.....	12
4.7 Specified auxiliaries.....	12
4.8 Volume determination	13
5 Target temperatures for energy determination	13
5.1 General.....	13
5.2 Temperature control settings for energy consumption test	14
6 Determination of energy consumption.....	14
6.1 General.....	14
6.2 Objective	14
6.3 Number of test runs	15
6.4 Steady state power consumption.....	16
6.5 Defrost and recovery energy and temperature change	16
6.6 Defrost interval	16
6.7 Specified auxiliaries.....	16
6.8 Calculation of energy consumption	16
6.8.1 General	16
6.8.2 Daily energy consumption.....	17
6.8.3 Interpolation	18
6.8.4 Specified auxiliaries.....	18
6.8.5 Total energy consumption.....	18
7 Circumvention devices.....	19
8 Uncertainty of measurement.....	19
9 Test report.....	20
Annex A (normative) Set up for energy testing	21
A.1 General.....	21
A.2 Additional set up requirements for energy testing.....	21
A.2.1 Ice making trays	21
A.2.2 User adjustable controls	21
A.2.3 Ambient temperature	21
A.2.4 Accessories and shelves	21
A.2.5 Anti-condensation heaters	22
A.2.6 Automatic icemakers – ice storage bins	22
Annex B (normative) Determination of steady state power and temperature.....	25

B.1	General.....	25
B.2	Setup for testing and data collection	25
B.3	Case SS1: no defrost control cycle or where stability is established for a period between defrosts	25
B.3.1	Case SS1 approach.....	25
B.3.2	Case SS1 acceptance criteria.....	28
B.3.3	Case SS1 calculation of values.....	29
B.4	Case SS2: steady state determined between defrosts.....	29
B.4.1	Case SS2 approach.....	29
B.4.2	Case SS2 acceptance criteria.....	31
B.4.3	Case SS2 calculation of values.....	32
B.5	Correction of steady state power.....	33
Annex C (normative)	Defrost and recovery energy and temperature change	35
C.1	General.....	35
C.2	Setup for testing and data collection	35
C.3	Case DF1: where steady state operation can normally be established before and after defrosts.....	36
C.3.1	Case DF1 approach.....	36
C.3.2	Case DF1 acceptance criteria.....	38
C.3.3	Case DF1 calculation of values.....	39
C.4	Number of valid defrost and recovery periods	41
C.5	Calculation of representative defrost energy and temperature.....	41
Annex D (normative)	Defrost interval	43
D.1	General.....	43
D.2	Elapsed time defrost controllers.....	43
D.3	Compressor run time defrost controllers.....	44
D.4	Variable defrost controllers	48
D.4.1	General	48
D.4.2	Variable defrost controllers – declared defrost intervals.....	48
D.4.3	Variable defrost controllers – no declared defrost intervals (demand defrost).....	50
D.4.4	Variable defrost controllers – non-compliant deviating cases	50
Annex E (normative)	Interpolation of results	51
E.1	General.....	51
E.2	Temperature adjustment prior to interpolation	52
E.3	Case 1: linear interpolation – two test points.....	52
E.3.1	General	52
E.3.2	Requirements	52
E.3.3	Calculations.....	52
E.4	Case 2: triangulation – three (or more) test points	56
E.4.1	General	56
E.4.2	Requirements for two (or more) compartment triangulation	57
E.4.3	Calculations for two compartment triangulation – manual interpolation	60
E.4.4	Calculations for two compartment triangulation – matrices.....	61
E.4.5	Checking temperature validity where there are more than two compartments for triangulation	63
E.4.6	Calculations for three compartment triangulation – matrices	64
Annex F (normative)	Energy consumption of specified auxiliaries	68
F.1	Purpose	68

F.2	Ambient controlled anti-condensation heaters	68
F.2.1	Outline of the method	68
F.2.2	Measurement procedure	69
F.2.3	Data requirements	69
F.2.4	Regional weather data	69
F.2.5	Calculation of power consumption	69
F.2.6	Where anti-condensation heater(s) cannot be disabled but their power consumption can be measured directly	70
F.2.7	Where anti-condensation heater(s) cannot be disabled and their power consumption cannot be measured directly	71
F.2.8	Where anti-condensation heater(s) has a user-adjustable setting	71
F.3	Automatic icemakers – energy to make ice	71
F.3.1	General	71
F.3.2	Tank type automatic icemakers.....	71
Annex G (normative)	Determination of load processing efficiency	78
G.1	Purpose	78
G.2	General description.....	78
G.3	Setup, equipment and preparation	79
G.3.1	General	79
G.3.2	Equipment	80
G.3.3	Quantity of water to be processed	80
G.3.4	Position of the water load in compartments.....	81
G.3.5	Temperature of the water to be processed.....	84
G.4	Load processing efficiency test method.....	85
G.4.1	Commencement of the load processing efficiency test	85
G.4.2	Placement of the load	85
G.4.3	Measurements to be taken.....	86
G.4.4	Conclusion of load processing efficiency test.....	86
G.5	Determination of load processing efficiency	87
G.5.1	General	87
G.5.2	Quantification of input energy	88
G.5.3	Quantification of additional energy used to process the load.....	89
G.5.4	Load processing efficiency	91
G.5.5	Load processing multiplier	91
G.5.6	Addition of user related loads into daily energy	93
Annex H (normative)	Determination of volume	95
H.1	Scope	95
H.2	Total volume	95
H.2.1	Volume measurements	95
H.2.2	Determination of volume	95
H.2.3	Volume of evaporator space	96
H.2.4	Two-star sections and/or compartments.....	96
H.3	Key for Figures H.1 through H.5.....	96
H.4	Calculation of the volume of the section or sub-compartment in the compartment whose target temperatures are different from each other	99
Annex I (informative)	Worked examples of energy consumption calculations	102
I.1	Example calculation of daily energy consumption.....	102
I.2	Variable defrost – calculation of defrost intervals	103
I.3	Examples of Interpolation	104

1.3.1	General	104
1.3.2	Linear interpolation	104
1.3.3	Two compartments – manual triangulation	113
1.3.4	Two compartments – triangulation using matrices	117
1.3.5	Three compartments – triangulation using matrices	119
1.4	Calculating the energy impact of internal temperature changes	121
1.4.1	General	121
1.4.2	One compartment	121
1.4.3	Triangulation	122
1.5	Automatically controlled anti-condensation heater(s)	123
1.6	Calculation of load processing efficiency	125
1.7	Determination of annual energy consumption	127
1.8	Examples of determination of power and temperature from raw data	128
1.8.1	Manual review of data	128
1.8.2	Review of data and selection of minimum spread using bespoke software	148
Annex J (informative) Development of the IEC global test method for refrigerating appliances		150
J.1	Purpose	150
J.2	Overview	150
J.3	Test method objective	150
J.4	Description of key components of energy consumption	151
J.5	Regional factors to consider in energy regulations	152
Annex K (normative) Analysis of a refrigerating appliance without steady state between defrosts		154
K.1	Purpose	154
K.2	Products with regular characteristics but without steady state operation	154
K.2.1	General	154
K.2.2	Special case DF2 approach	154
K.2.3	Case DF2 acceptance criteria	155
K.2.4	Case DF2 calculation of values	155
Annex L (informative) Derivation of ambient temperature correction formula		157
L.1	Purpose	157
L.2	Background	157
L.3	Approach	158
Annex M (informative) Volume measurement with a 3D scanner		161
M.1	Volume measurement with a 3D scanner	161
M.2	Requirements to 3D scanner	161
M.3	Scanning method	161
M.3.1	General	161
M.3.2	Preparation	161
M.3.3	Example of a scanning process	161
M.3.4	Example of data processing	163
M.3.5	Example of result	164
Figure B.1 – Illustration of a test period made of blocks of 5 temperature control cycles – temperatures for Case SS1		26
Figure B.2 – Illustration of a test period made of blocks of 5 temperature control cycles – power for Case SS1		27

Figure B.3 – Case SS2 – typical operation of a refrigerating appliance with a defrost control cycle	30
Figure C.1 – Conceptual illustration of the additional energy associated with a defrost and recovery period	36
Figure C.2 – Case DF1 with steady state operation before and after a defrost	37
Figure E.1 – Interpolation where temperatures change in multiple compartments (compartment D critical).....	55
Figure E.2 – Interpolation with valid results in both Compartment A and B	55
Figure E.3 – Interpolation with no valid results	56
Figure E.4 – Schematic representation of interpolation by triangulation	58
Figure G.1 – Conceptual illustration of the load processing efficiency test	79
Figure G.2 – Shelf locations and loading sequence (example showing 10 PET bottles).....	82
Figure G.3 – Ice cube tray locations and clearances	84
Figure G.4 – Representation of the additional energy to process the added load	88
Figure G.5 – Case where a defrost and recovery period occurs during load processing	90
Figure H.1 – Basic view of top mounted freezer appliance	97
Figure H.2 – Automatic ice-maker dispenser and chute.....	98
Figure H.3 – Automatic ice-making compartment	98
Figure H.4 – Rail of drawer type shelves or baskets.....	99
Figure H.5 – Rotary divider of fresh food compartment for French Doors	99
Figure H.6 – Part with partition in the freezer is a two-star compartment (or a chill compartment next to a fresh food compartment)	100
Figure H.7 – Part without partition next to the freezer or fresh food compartment is a two-star compartment or a chill compartment, respectively	100
Figure H.8 – Freezer door shelves are a two-star section	100
Figure H.9 – Drawer in the freezer is a two-star section (or a chill sub-compartment in a fresh food compartment)	101
Figure H.10 – Space between a door shelf and drawer-type two-star section	101
Figure I.1 – Example linear interpolation two compartments (Compartment B critical)	106
Figure I.2 – Example linear interpolation two compartments (Compartment B critical)	107
Figure I.3 – Example Interpolation where both test points have both compartments below target (two valid results)	108
Figure I.4 – Example Interpolation where both test points have both compartments below target (two valid results)	109
Figure I.5 – Example Interpolation where neither test point has both compartments below target (no valid results).....	110
Figure I.6 – Example Interpolation where neither test point has both compartments below target (no valid results).....	111
Figure I.7 – Example Interpolation for 4 compartments	113
Figure I.8 – Example of triangulation (temperatures).....	115
Figure I.9 – Example of triangulation (temperature and energy)	116
Figure I.10 – An example of power and temperature data	129
Figure I.11 – Example of finding a test period with minimum spread in power	149
Figure K.1 – Special Case SS2 – where steady state operation is never reached between defrost and recovery periods and Annex C stability may not be established	154
Figure M.1 – Volume with unnecessary parts removed.....	161

Figure M.2 – Scanning of the benchmark shapes for the assembly	162
Figure M.3 – Scanning of the internal surfaces of the cabinet	162
Figure M.4 – Scanning of the door only	163
Figure M.5 – Assembly of 3D data	163
Figure M.6 – Joined closed cavity data	164
Figure M.7 – Calculated volume value	164
Table 1 – Target temperatures for energy determination by compartment type.....	13
Table B.1 – Assumed ΔCOP adjustment.....	34
Table F.1 – Format for temperature and humidity data – ambient controlled anti- condensation heaters.....	70
Table I.1 – Example of linear interpolation, single compartment.....	104
Table I.2 – Example 1 of linear interpolation, two compartments	105
Table I.3 – Example 2 of linear interpolation, two compartments	107
Table I.4 – Example 3 of linear interpolation, two compartments	109
Table I.5 – Example of linear interpolation, test data for four compartments.....	111
Table I.6 – Example of linear interpolation, results for four compartments.....	113
Table I.7 – Example of triangulation, two compartments	114
Table I.8 – Example of triangulation, three compartments.....	119
Table I.9 – Example of population-weighted humidity probabilities and heater wattages at 16 °C, 22 °C and 32 °C.....	124
Table I.10 – An example of calculation of energy, power and temperature for each temperature control cycle (TCC)	130
Table I.11 – An example of calculation of energy, power and temperature for all possible blocks (size = 3 TCC).....	132
Table I.12 – An example of calculation of energy, power and temperature for all possible test periods (3 blocks each of 3 TCC)	134
Table I.13 – An example of calculation of energy, power and temperature for all possible blocks (size = 5 TCC).....	137
Table I.14 – An example of calculation of energy, power and temperature for all possible blocks (size = 9 TCC).....	139
Table I.15 – An example of calculation of energy, power and temperature for all possible test periods (3 blocks each of 5 TCC)	141
Table I.16 – An example of calculation of energy, power and temperature for all possible test periods (3 blocks each of 9 TCC)	143
Table I.17 – Determination of defrost validity DF1.....	145
Table I.18 – Determination of steady state values using SS2	147
Table J.1 – Regional parameters	153
Table L.1 – Assumed relative insulation value for multi-compartment products	160

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

This consolidated version of the official IEC Standard and its amendments has been prepared for user convenience.

IEC 62552-3 edition 1.2 contains the first edition (2015-02) [documents 59M/63/FDIS and 59M/66/RVD], its amendment 1 (2020-11) [documents 59M/128/FDIS and 59M/134/RVD] and its amendment 2 [documents 59M/188/FDIS and 59M/192/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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 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.

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 document and its amendment will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

This corrected version of IEC 62552-3:2015+AMD1:2020+AMD2:2025 CSV incorporates the following correction:

- Addition of normative reference IEC 62552-1:2015/AMD1:2020

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).

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 62552-1:2015/AMD1:2020

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