

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household refrigerating appliances – Characteristics and test methods

**Appareils de réfrigération à usage ménager – Caractéristiques et méthodes
d'essai**

IEC 62552:2007

<https://standards.iteh.ai/catalog/standards/iec/d5a7664f-18c1-4cc3-ad2c-2ef5ffb4312a/iec-62552-2007>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2007 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: csc@iec.ch
Tél.: +41 22 919 02 11
Fax: +41 22 919 03 00

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Household refrigerating appliances – Characteristics and test methods

Appareils de réfrigération à usage ménager – Caractéristiques et méthodes d'essai

IEC 62552:2007

<https://standards.iteh.ai/catalog/standards/iec/d5a7664f-18c1-4cc3-ad2c-2ef5ffb4312a/iec-62552-2007>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

XC

CONTENTS

FOREWORD	4
1 Scope.....	6
2 Normative references	6
3 Terms, definitions and symbols.....	6
4 Classification	12
5 Materials, design and manufacture	13
6 Storage temperatures.....	15
7 Determination of linear dimensions, volumes and areas	17
8 General test conditions.....	22
9 Testing air-tightness of doors, lids or drawer seals.....	29
10 Testing opening force of doors or lids	29
11 Testing the durability of doors, lids and drawers.....	29
12 Testing mechanical strength of shelves and similar components.....	32
13 Testing storage temperatures	33
14 Water vapour condensation test.....	37
15 Energy consumption test.....	38
16 Temperature rise test	43
17 Freezing test.....	44
18 Ice-making test	48
19 Final test report.....	51
20 Designation.....	51
21 Marking.....	52
22 Technical and commercial product information.....	54
23 Instructions for users	55
Annex A (informative) Conditions particular to certain countries	76
Annex B (informative) Percentage running time	78
Annex C (informative) Test for absence of taste and odour.....	79
Annex D (normative) Built-in refrigerating appliances.....	82
Annex E (informative) Rated characteristics and control procedure.....	83
Bibliography	85
Figure 1 – Example of operating cycle for frost-free refrigerator-freezer	16
Figure 2 – Overall space required in use (upright type)	17
Figure 3 – Partition to restrict air circulation and ambient temperatures sensor position	24
Figure 4 – Example of opening and closing external door(s).....	30
Figure 5 – Example of opening and closing of external drawer(s).....	31

Figure 6 – Test position for sliding components which have no limiting stop	32
Figure 7 – Examples of shifted package stack.....	34
Figure 8 – Example of multiple stacks with shifted package.....	35
Figure 9 – Condensation codes	38
Figure 10 – Determination by interpolation of energy consumption – Refrigerators and types I and II refrigerator-freezers.....	41
Figure 11 – Identification symbol for food freezer compartment (for further details, see Figure 20).....	53
Figure 12 – Star identification symbols for frozen-food storage compartments (for further details, see Figure 21).....	53
Figure 13 – Marking of load limit	54
Figure 14 – Temperature measurement points in fresh-food storage compartments with different arrangements of evaporator	57
Figure 15 – Temperature measurement points T_{Cj} in cellar compartments of refrigerators relative to height h_C and internal fittings.....	59
Figure 16 – Examples of storage plan (see 13.3)	61
Figure 17 – Examples of positioning of M-packages	63
Figure 18 – Examples of determination of dimensions for calculating shelf area (see 7.3).....	66
Figure 19 – Examples of determination of mean dimensions for calculating basket area (see 7.3.2.6, 7.3.2.7.2 and 7.3.2.7.3)	67
Figure 20 – Details of identification symbols for food freezer compartments	68
Figure 21 – Details of identification symbols for frozen-food storage compartments	69
Figure 22 – Examples of determination of gross volume	70
Figure 23 – Determination of volume of evaporator space	72
Figure 24 – Example of determination of storage volume of frozen-food storage or food freezer compartments/cabinets	74
Figure 25 – Determination of volumes of shelves and partitions	75
Figure A.1 – Cold zone identification symbol	76
Table 1 – Climate classes	13
Table 2 – Storage temperatures.....	15
Table 3 – Test package dimensions and mass.....	25
Table 4 – Chill compartment storage load.....	34
Table 5 – Energy-storage temperature conditions for determining energy consumption	40

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD REFRIGERATING APPLIANCES –
CHARACTERISTICS AND TEST METHODS**

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 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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62552 has been published under the responsibility of IEC technical committee 59: Performance of household and similar electrical appliances.

It cancels and replaces International Standard ISO 15502 and its corrigendum (2005) prepared by subcommittee 5: Testing and rating of household refrigeration appliances of ISO technical committee 86, Refrigeration and air-conditioning, which was transferred to the IEC subsequent to IEC SMB decision 127/11.

The first edition of ISO 15502 cancelled and replaced ISO 5155:1995, ISO 7371:1995, ISO 8187:1991 and ISO 8561:1995, of which it constitutes a technical revision. It also incorporates the amendments ISO 7371:1995/Amendment 1:1997, ISO 8187:1991/Amendment 1:1997 and ISO 8561:1995/Amendment 1:1997.

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

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

The contents of the corrigendum of March 2008 have been included in this copy.

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

[IEC 62552:2007](https://standards.itih.ai/catalog/standards/iec/d5a7664f-18c1-4cc3-ad2c-2ef5ffb4312a/iec-62552-2007)

<https://standards.itih.ai/catalog/standards/iec/d5a7664f-18c1-4cc3-ad2c-2ef5ffb4312a/iec-62552-2007>

HOUSEHOLD REFRIGERATING APPLIANCES – CHARACTERISTICS AND TEST METHODS

1 Scope

This International Standard specifies the essential characteristics of household refrigerating appliances, factory-assembled and cooled by internal natural convection or forced air circulation, and establishes test methods for checking the characteristics. These are type tests, and because of this, when verification of the performance of a refrigerating appliance of a given type in relation to this standard is necessary, it is preferable, wherever practicable, that all the tests specified be applied to a single unit. The tests can also be made individually for the study of a particular characteristic.

NOTE For the safety requirements applicable to household refrigerating appliances, see IEC 60335-2-24; for noise requirements applicable to household refrigerators and freezers, see ISO 8960; and for additional safety requirements applicable to the refrigerating systems of household refrigerating appliances, see ISO 5149.

2 Normative references

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

ISO 534, *Paper and board – Determination of thickness, density and specific volume*

ISO 817, *Refrigerants – Designation system*

IEC 60335-2-24:2002, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and icemakers*

3 Terms, definitions and symbols

For the purposes of this document, the following terms, definitions and symbols apply.

3.1

refrigerating appliance

factory-assembled insulated cabinet with one or more compartments and of suitable volume and equipment for household use, cooled by natural convection or a frost-free system whereby the cooling is obtained by one or more energy-consuming means

NOTE From the point of view of installation, there are various types of household refrigerating appliance (free-standing, wall-mounted, built-in, etc.).

3.1.1

compression-type refrigerating appliance

refrigerating appliance in which refrigeration is effected by means of a motor-driven compressor

3.1.2

absorption-type refrigerating appliance

refrigerating appliance in which refrigeration is effected by an absorption process using heat as energy source

3.1.3

refrigerator

refrigerating appliance intended for the preservation of food, one of whose compartments is suitable for the storage of fresh food

3.1.3.1

frost-free refrigerator

refrigerator in which all compartments are automatically defrosted with automatic disposal of the defrosted water and at least one compartment is cooled by a frost-free system and at least one is a “frozen-food storage” compartment

NOTE A single-compartment refrigerator using a frost-free system cannot be called a frost-free refrigerator.

3.1.4

refrigerator-freezer

refrigerating appliance having at least one compartment suitable for the storage of fresh food (the fresh-food storage compartment) and at least one other (the food freezer compartment) suitable for the freezing of fresh food and the storage of frozen food under three-star storage conditions

3.1.4.1

frost-free refrigerator-freezer

refrigerator-freezer in which all compartments are automatically defrosted with automatic disposal of the defrosted water and at least one compartment is cooled by a frost-free system

3.1.5

frozen-food storage cabinet

refrigerating appliance having one or more compartments suitable for the storage of frozen food

3.1.5.1

frost-free frozen-food storage cabinet

frozen-food storage cabinet in which all compartments are automatically defrosted with automatic disposal of the defrosted water and which is cooled by a frost-free system

3.1.6

food freezer

refrigerating appliance having one or more compartments suitable for freezing foodstuffs from ambient temperature down to a temperature of -18 °C and which is also suitable for the storage of frozen food under three-star storage conditions

NOTE In certain instances, two-star sections and/or compartments are permitted within the compartment or cabinet (see 7.2.8).

3.1.6.1

frost-free food freezer

food freezer in which all compartments are automatically defrosted with automatic disposal of the defrosted water and at least one compartment is cooled by a frost-free system

3.1.7

built-in appliance

fixed refrigerating appliance intended to be installed in a cabinet, in a prepared recess in a wall or similar location

3.2

frost-free system

system automatically operated to prevent the permanent formation of frost, in which cooling is provided by forced air circulation, the evaporator or evaporators are defrosted by an automatic defrost system and the water from defrosting is disposed of automatically

3.3 Compartments and sections

3.3.1

fresh-food storage compartment

compartment intended for the storage of unfrozen food, which may itself be divided into sub-compartments

NOTE The storage temperatures can be maintained according to Clause 6.

3.3.2

cellar compartment

compartment intended for the storage of particular foods or beverages at a temperature warmer than that of the fresh-food storage compartment

NOTE The storage temperatures can be maintained according to Clause 6.

3.3.3

chill compartment

compartment intended specifically for the storage of highly perishable foodstuffs whose volume is capable of containing at least 2 M packages

NOTE The storage temperatures can be maintained according to Clause 6.

3.3.4

ice-making compartment

low-temperature compartment intended specifically for the freezing and storage of ice

3.3.5

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.

3.3.5.1

one-star compartment

frozen-food storage compartment in which the temperature is not warmer than -6 °C

3.3.5.2

two-star compartment

frozen-food storage compartment in which the temperature is not warmer than -12 °C

3.3.5.3

three-star compartment

frozen-food storage compartment in which the temperature is not warmer than -18 °C

3.3.5.4

food freezer compartment

four-star compartment

compartment suitable for freezing foodstuffs from ambient temperature down to -18 °C, and which is also suitable for the storage of frozen food under three-star storage conditions

NOTE Two-star sections and/or compartments are permitted within the compartment or cabinet (see 7.2.8).

3.3.5.5

two-star section

part of a food freezer compartment or cabinet, or three-star compartment or cabinet, which is not self-contained (i.e., does not have its own individual access door or lid) and in which the temperature is not warmer than -12 °C

3.4

rated

stated as a value (for example, a volume) by the manufacturer

3.5 Physical aspects and dimensions

3.5.1

top-opening type

refrigerating appliance in which the compartment(s) are accessible from the top

3.5.2**upright type**

refrigerating appliance in which the compartment(s) are accessible from the front

3.5.3**overall dimensions**

space – height, width and depth – with doors or lids closed taken up by the refrigerating appliance

3.5.4**overall space required in use**

total space – height, width and depth – with doors or lids open necessary for the refrigerating appliance for normal use

3.5.5**gross volume**

volume within the inside liner of the refrigerating appliance, or of a compartment with an external door, without internal fittings and with the 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 recognized as unusable for the storage of food

NOTE See 7.2.

3.5.7**shelf**

horizontal surface (shelves, partitions, etc.) on which food can be placed

NOTE It can be formed by one component or by components fitted side by side, which can be fixed or removable.

3.5.8**storage shelf area**

sum of the horizontal projections of the storage surfaces within the storage volume, including door shelves and the bottom of each compartment

NOTE See 7.3.

3.5.9**load limit**

surface enveloping a frozen-food storage volume

3.5.10**load-limit line**

permanent mark indicating limit of three-star frozen-food storage volume

3.5.11**storage plan**

arrangement of test packages within a refrigerating appliance

3.6 Definitions relating to performance characteristics**3.6.1****energy consumption**

energy consumed by a refrigerating appliance calculated over a period of 24 h when tested according to this standard

3.6.2**fresh-food storage temperature**

t_{ma}

mean temperature of the fresh-food storage compartment

**3.6.3
frozen-food storage temperature**

t^* , t^{**} , t^{***}

maximum temperature of any M package during the test period

NOTE 1 The superscript attached to the symbol t corresponds to the one-star, two-star or three-star temperature.

NOTE 2 See 8.8.3.

**3.6.4
cellar compartment storage temperature**

t_{cma}

mean temperature of the cellar compartment

**3.6.5
chill compartment storage temperature**

t_{cc}

instantaneous storage temperature of the chill compartment

**3.6.6
freezing capacity**

amount of food expressed in kilograms that can be frozen to a temperature of $-18\text{ }^{\circ}\text{C}$ in 24 h when tested in accordance with Clause 17 of this standard

**3.6.7
ice-making capacity**

quantity of ice the refrigerating appliance is capable of producing within 24 h in an automatic icemaker, and/or the time necessary for the freezing of the water in the ice tray(s) supplied with the refrigerating appliance

**3.6.8
automatic defrost**

defrosting where no action is necessary by the user to initiate the removal of frost accumulation or to restore normal operation, and the disposal of the defrost water is automatic

**3.6.9
semi-automatic defrost**

defrosting where an action is necessary by the user to initiate the removal of frost accumulation and normal operation is restored automatically, the defrost water being removed manually or removed and disposed of automatically

**3.6.10
semi-automatic defrost**

defrosting where no action is necessary by the user to initiate the removal of frost accumulation nor to restore normal operation, but the removal of the defrost water is manual

**3.6.11
manual defrost**

defrosting where an action is necessary by the user to initiate the removal of frost accumulation and where restoration to normal operation requires a further action by the user, the defrost water being removed manually or removed and disposed of automatically

**3.6.12
automatic disposal of defrost water**

removal and evaporation of the defrost water which does not require any action by the user

**3.6.13
manual removal of defrost water**

collection and removal of defrost water that requires actions by the user

3.6.14**adaptive defrost**

form of automatic defrosting system where energy consumed in defrosting is reduced by an automatic process whereby the time intervals between successive defrosts are determined by an operating condition variable (or variables) other than, or in addition to, elapsed time or compressor run time.

3.6.15**test package**

food simulant used as load when testing frozen food compartments and chill compartments and during freezing capacity testing in all compartments of refrigerator-freezers

3.6.16**M-package**

test package fitted with a temperature sensor at its geometric centre

3.6.17**operating cycle**

(frost-free systems) period commencing at the initiation of an automatic defrosting cycle and terminating at the moment of initiation of the next automatic defrosting cycle

3.6.18**operating cycle**

(systems designed to operate continuously) period of 24 h under stable operating conditions

3.6.19**operating cycle**

(other refrigerating appliances) period between two successive stops of the refrigerating system, or part of the system, under stable operating conditions

3.6.20**automatic defrosting cycle**

period between the moment when the means of defrosting the evaporator(s) is switched on and the moment when the refrigeration process is re-established

3.6.21**stable operating conditions**

conditions in which a refrigerating appliance's mean temperatures and energy consumption are stable

3.6.22**ambient temperature**

measured temperature in the space surrounding the refrigerating appliance under test

3.6.23**temperature rise time**

time period needed to raise the temperature of food in the frozen food compartment from -18 °C to -9 °C after the operation of the refrigerated system has been interrupted

3.7 Definitions relating to refrigerating system**3.7.1****refrigerant**

fluid used for heat transfer in a refrigerating system, which absorbs heat at a low temperature and at a low pressure of the fluid and rejects heat at a higher temperature and at a higher pressure of the fluid, usually involving changes of state of the fluid

3.7.2**condenser**

heat exchanger in which vaporized refrigerant is liquefied by rejecting heat to an external cooling medium

3.7.3

evaporator

heat exchanger in which the liquid refrigerant is vaporized by absorbing heat from the medium to be refrigerated

3.7.4

temperature control device

device which automatically regulates the operation of a refrigerating system according to the temperature of an evaporator or of a compartment or cabinet

3.8 Symbols

T_i, T_{ci} temperature measurement points

t_i instantaneous temperature value (fresh food compartment)

t_{ci} instantaneous temperature value (cellar compartment)

t_{cc} instantaneous temperature value (chill compartment)

t_{im} integrated time average of t_i

t_{cim} integrated time average of t_{ci}

t_a 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 $t_{c1m}, t_{c2m}, t_{c3m}$

i subscript representing 1, 2 or 3

4 Classification

4.1 Refrigerating appliances conforming to this standard are classified into four climate classes or into a range of classes, see Table 1. The range of ambient temperatures in which the appliances are intended to be used, and for which the required storage temperatures are to be met (see Clause 6), shall be as specified in Table 1.