



BSI Standards Publication

Household and similar electrical appliances — Safety

Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers

National foreword

This British Standard is the UK implementation of EN 60335-2-24:2022+A11:2022. It is derived from IEC 60335-2-24:2020 incorporating corrigendum 1:2021. It supersedes BS EN IEC 60335-2-24:2010+A11:2020, which will be withdrawn on 9 December 2025.

The start and finish of text introduced or altered by amendment A11 is indicated in the text by tags. Tags indicating changes to text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment A11 is indicated by A11 A11.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by IEC corrigendum August 2021 is indicated in the text by AC1 AC1.

The UK participation in its preparation was entrusted to Technical Committee CPL/61, Safety of household and similar electrical appliances.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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For the Great Britain market (England, Scotland and Wales), if UK Government has designated this publication for conformity with UKCA marking (or similar) legislation, it may contain an additional National Annex. Where such a National Annex exists, it shows the correlation between this publication and the relevant UK legislation. Annex ZZA in the body of the European text will indicate the relationship to UK regulation applicable in Great Britain. References to EU legislation may need to be read in accordance with the UK designation and the applicable UK law. Further information on designated standards can be found at www.bsigroup.com/standardsandregulation.

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UK Government is responsible for legislation. For information on legislation and policies relating to that legislation, consult the relevant pages of www.gov.uk.

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Amendments/corrigenda issued since publication

Date	Text affected
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English Version

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Particular requirements for refrigerating appliances, ice-cream
appliances and ice makers
(IEC 60335-2-24:2020 + COR1:2021)

Appareils électrodomestiques et analogues - Sécurité -
Partie 2-24: Exigences particulières pour les appareils de
réfrigération, les sorbetières et les fabriques de glace
(IEC 60335-2-24:2020 + COR1:2021)

Sicherheit elektrischer Geräte für den Hausgebrauch und
ähnliche Zwecke - Teil 2-24: Besondere Anforderungen für
Kühl-/Gefriergeräte und Speiseeis- und Eisbereiter
(IEC 60335-2-24:2020 + COR1:2021)

This European Standard was approved by CENELEC on 2022-08-31. 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.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN IEC 60335-2-24:2022) consists of the text of IEC 60335-2-24:2020+COR1:2021 prepared by IEC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-06-09
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2025-12-09

This document supersedes EN IEC 60335-2-24:2010 and all of its amendments and corrigenda (if any).

This document is read in conjunction with EN IEC 60335-2-24:2022/A11:2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For the relationship with EU Directive(s)/ Regulation(s) see informative Annex ZZA, which is an integral part of EN IEC 60335-2-24:2022/A11:2022.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60335-2-24:2020+COR1:2021 was approved by CENELEC as a European Standard without any modification.

European foreword to amendment A11

This document (EN IEC 60335-2-24:2022/A11:2022) has been prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-06-09
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The numbering system for European clauses, subclauses, notes, tables, figures and annexes that are additional to those in the IEC standard are prefixed with the letter "Z".

This document is read in conjunction with EN IEC 60335-2-24:2022.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-24: Particular requirements for refrigerating appliances,
ice-cream appliances and ice-makers**

FOREWORD

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This part of IEC 60335 has been prepared by subcommittee 61C: Safety of refrigeration appliances for household and commercial use, of IEC Technical Committee 61: Safety of household and similar electrical appliances.

This eighth edition cancels and replaces the seventh edition published in 2010, Amendment 1:2012 and Amendment 2:2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- aligns the text with IEC 60335-1, Ed 5.2;
- some notes have been converted to normative text or deleted (4, 5.2, 5.7, 7.1, 7.6, 7.10, 7.12, 19.1, 19.101, 19.102, 20.101, 20.102, 20.103, 20.104, 21, 22.7, 22.33, 22.101, 22.102, 22.103, 22.107, 22.108, 22.109, 30.1);

- normative references and associated text have been updated (2, 22.108, 22.109, Table 102, Annex CC);
- definition of free space has been clarified (3.6.104);
- measurement of the input current of refrigerating appliances using inverter driven motor-compressors is included (10.2);
- compatibility tests for winding insulation of motor-compressors used with different types of refrigerants and oils have been introduced (22.9);
- requirements for inadvertent contact points between uncoated aluminium pipes and copper pipes have been updated (22.111);
- testing of accessible glass panels has been clarified (22.116);
- in refrigerating appliances, requirements for material encasing and in contact with thermal insulation have been introduced and consequential text has been deleted (22.117, 30.2, 30.2.101, Annex EE);
- requirements for motor running capacitors have been updated (24.5, 24.8);
- the locked rotor test for fan motors has been clarified (Annex AA).

The text of this International Standard is based on the following documents:

FDIS	Report on voting
61C/861/FDIS	61C/863/RVD

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

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

A list of all parts of the IEC 60335 series, under the general title *Household and similar electrical appliances – Safety*, can be found on the IEC website.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fifth edition (2010) of that standard.

NOTE 1 When “Part 1” is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for refrigerating appliances, ice-cream appliances and ice-makers.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

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

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

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

The following differences exist in the countries indicated below.

- 22.101 : E12 and E17 lamp holders are checked as specified for E14 and B15 lamp holders. E26 lamp holder is checked as specified for E27 and B22 lamp holders (Japan).
- 22.110 : For unsealed glass tube heaters, the temperature requirements are different (Japan).
- 22.117: Only the first two dashed items in the first paragraph of the requirement are allowed (Australia and New Zealand).

The contents of the corrigendum of August 2021 have been included in this copy.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 60335, the relevant part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

When a part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal and generic standards covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.

A11 With this European amendment A11, the standard EN 60335-2-24:2010+A1:2019+A2:2019+A11:2020 is superseded.

This European amendment A11 supplements or modifies the corresponding clauses of the standards below:

- EN 60335-1:2012+A11:2014+A13:2017+A1:2019+A14:2019+A2:2019+A15:2021 (Part 1)
- EN IEC 60335-2-24:2022 (Part 2) **A11**

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of the following appliances, their **rated voltage** being not more than 250 V for single-phase appliances, 480 V for other appliances and 24 V DC for appliances when battery operated:

- **refrigerating appliances** for household and similar use;
- **ice-makers** incorporating a motor-compressor and **ice-makers** intended to be incorporated in frozen food storage compartments;
- **refrigerating appliances** and **ice-makers** for use in camping, touring caravans and boats for leisure purposes.

These appliances may be operated from the mains, from a separate battery or operated either from the mains or from a separate battery.

This standard also deals with the safety of **ice-cream appliances** intended for household use, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances.

It also deals with **compression-type appliances** for household and similar use, which use **flammable refrigerants**.

This standard does not cover features of the construction and operation of those **refrigerating appliances** which are dealt with in other IEC standards.

Refrigerating appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as

- **refrigerating appliances** used in staff kitchen areas in shops, offices and other working environments,
- **refrigerating appliances** used in farm houses and by clients in hotels, motels and other residential type environments,
- **refrigerating appliances** used in bed and breakfast type environments, and
- **refrigerating appliances** used in catering and similar non-retail applications

are within the scope of this standard.

A11 This document deals with the reasonably foreseeable hazards presented by appliances and machines that are encountered by all persons. However, in general, it does not take into account: **A11**

- A11** — **children** playing with the appliance,
- the use of the **refrigerating appliances** by **very young children**,
- the use of **ice-cream makers** and separated **ice-makers** by **young children** and by **very young children**.

It is recognized that **very vulnerable people** can have needs beyond the level addressed in this document. **A11**

NOTE 1 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements can be necessary;
- in many countries, additional requirements are specified by national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

- A11** – in some countries, specific legislation covers surfaces and materials in contact with food. **A11**

This standard does not apply to

- appliances intended to be used in the open air;
- appliances designed exclusively for industrial purposes;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);
- appliances incorporating a battery intended as a power supply for the refrigerating function;
- appliances assembled on site by the installer;
- appliances with remote motor-compressors;
- motor-compressors (IEC 60335-2-34);
- commercial dispensing appliances and vending appliances (IEC 60335-2-75);
- commercial refrigerating appliances and ice-makers with an incorporated or remote refrigerant unit or motor-compressor (IEC 60335-2-89);
- professional ice-cream makers (IEC 60335-2-118).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60068-2-11:1981, *Basic environmental testing procedures – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60079-1:2014, *Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d"*

IEC 60079-7:2015, *Explosive atmospheres – Part 7: Equipment protection by increased safety "e"*

IEC 60079-7:2015/AMD1:2017¹

IEC 60079-15:2017, *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

IEC 60252-1:2010, *AC motor capacitors – Part 1: General – Performance, testing and rating – Safety requirements – Guidance for installation and operation*

IEC 60252-1:2010/AMD1:2013

¹ There exists a consolidated edition 5.1:2017 that includes edition 5 and its Amendment 1

IEC 60335-2-34:2012, *Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for motor-compressors*
 IEC 60335-2-34:2012/AMD1:2015
 IEC 60335-2-34:2012/AMD2:2016²

 IEC 60335-2-34:2021, *Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for motor-compressors* 

IEC 60598-1:2014, *Luminaires – Part 1: General requirements and tests*
 IEC 60598-1:2014/AMD1:2017³

IEC 60695-11-3:2012, *Fire hazard testing – Part 11-3: Test flames – 500 W flames – Apparatus and confirmational test methods*

IEC 60695-11-20:2015, *Fire hazard testing – Part 11-20: Test flames – 500 W flame test method*

IEC 60730-2-6:2015, *Automatic electrical controls – Particular requirements for automatic electrical pressure sensing controls including mechanical requirements*
 IEC 60730-2-6:2015/AMD1:2019⁴

IEC 60851-4:2016, *Winding wires – Test methods – Part 4: Chemical properties*

ISO 209:2007, *Aluminium and aluminium alloys – Chemical composition*

ISO 817:2014, *Refrigerants – Designation and safety classification*
 ISO 817:2014/AMD1:2017

ISO 4126-2:2018, *Safety devices for protection against excessive pressure – Part 2: Bursting disc safety devices*

ISO 5149-1:2014, *Refrigerating systems and heat pumps – Safety and environmental requirements – Part 1: Definitions, classification and selection criteria*
 ISO 5149-1:2014/AMD1:2015

ISO 7010:2019, *Graphical symbols – Safety colours and safety signs – Registered safety signs*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.9 Replacement: normal operation

operation of the appliance under the following conditions from 3.1.9.101 to 3.1.9.104.

² There exists a consolidated edition 5.2:2016 that includes edition 5 and its Amendment 1 and Amendment 2.

³ There exists a consolidated edition 8.1:2017 that includes edition 8 and its Amendment 1

⁴ There exists a consolidated edition 3.1:2019 that includes edition 3 and its Amendment 1

3.1.9.101**normal operation of a refrigerating appliance**

operation at an ambient temperature in accordance with 5.7, empty, with the doors and lids closed. User-adjustable temperature control devices which control the operation of the motor-compressor in **compression-type appliances** are short-circuited or otherwise rendered inoperative

3.1.9.102**normal operation of an ice-maker**

operation at an ambient temperature in accordance with 5.7, with the supply water at a temperature of $15\text{ °C} \pm 2\text{ °C}$

3.1.9.103**normal operation of an incorporated ice-maker**

operation at the normal temperature of the frozen food storage compartment, with the supply water at a temperature of $15\text{ °C} \pm 2\text{ °C}$

3.1.9.104**normal operation of an ice-cream appliance**

operation of the appliance using the maximum quantity of the mixture of ingredients indicated in the instructions; the mixture used being that which gives the most unfavourable results, the mixture being at an initial temperature of $23\text{ °C} \pm 2\text{ °C}$

3.5 Definitions relating to types of appliances**3.5.101****refrigerating appliance**

enclosed thermally insulated appliance of suitable volume for household use, cooled by an incorporated device and having one or more compartments intended for the preservation of foodstuffs including cooling of beverages

A11 NOTE Z1 In general, the definitions relating to areas of a refrigerating appliance follow those in EN 62552-1:2020; however, the following definitions used in this document are listed.

3.2101**refrigerator**

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

[SOURCE: EN 62552-1:2020]

3.2102**one-star compartment**

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

[SOURCE: EN 62552-1:2020]

3.2103**two-star compartment**

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

[SOURCE: EN 62552-1:2020]

3.2104**three-star compartment**

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

[SOURCE: EN 62552-1:2020] **A11**

3.5.102**compression-type appliance**

appliance in which refrigeration is effected by the vaporization at low pressure in a heat exchanger (**evaporator**) of a liquid refrigerant, the vapour thus formed being restored to the original state by mechanical compression at a higher pressure and subsequent cooling in another heat exchanger (**condenser**)

3.5.103**ice-maker**

appliance in which ice is made by freezing water by a device consuming electrical energy and having a compartment for storing the ice

3.5.104**incorporated ice-maker**

ice-maker specially designed to be incorporated into a frozen food storage compartment and without independent means for freezing water

3.5.105

absorption-type appliance

appliance in which refrigeration is effected by the evaporation in a heat exchanger (**evaporator**) of a liquid refrigerant, in the liquid state, the resulting vapour being then absorbed by an absorbent medium from which it is subsequently expelled at a higher partial vapour pressure by heating and liquefied by cooling in another heat exchanger (**condenser**)

3.5.106

ice-cream appliance

compression-type appliance which is used to make ice-cream

3.6 Definitions relating to parts of an appliance

3.6.101

heating system

heating element with associated components such as timers, switches, **thermostats** and other controls

3.6.102

condenser

heat exchanger in which, after compression, vaporized refrigerant is liquefied by losing heat to an external cooling medium

3.6.103

evaporator

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

3.6.104

free space

space with a volume exceeding 60 l where a child can be entrapped and which is accessible after opening any door, lid or drawer and removing any **detachable internal part**, including shelves, containers or removable drawers which are themselves only accessible after opening any door or lid

In calculating the volume, a space with any single dimension not exceeding 150 mm or any two orthogonal dimensions, each of which do not exceed 200 mm, is ignored.

Note 1 to entry: Evaluation of the ignored volume can be checked by applying a 150 mm $\pm$ 0,5 mm diameter sphere or a square with 200 $\pm$ 0,5 mm side without appreciable force. The volume can be ignored if the sphere or square cannot fit inside.

3.6.105

transcritical refrigeration system

refrigeration system where the pressure in the high pressure side is above the pressure where the vapour and liquid states of the refrigerant can coexist in thermodynamic equilibrium

3.6.106

gas cooler

heat exchanger in which, after compression, the refrigerant is cooled down, by transferring heat to an external cooling medium, without changing state

Note 1 to entry: A **gas cooler** is normally used in **transcritical refrigeration systems**.

3.7 Definitions relating to safety components

3.7.101

bursting disc

disc or foil which bursts at a predetermined pressure to reduce a pressure in a refrigeration system

3.7.102

pressure relief device

pressure sensing device, intended to reduce pressure automatically when pressures within the refrigeration system exceed the setting pressure of the device

3.8 Definitions relating to miscellaneous matters

3.8.101

design pressure

DP

gauge pressure that has been assigned to the high-pressure side of a **transcritical refrigeration system**

3.8.102

flammable refrigerant

refrigerant with a flammability classification of A2L, A2 or A3 in accordance with ISO 817

Note 1 to entry: For refrigerant blends which have more than one flammability classification, the most unfavourable classification is taken for the purposes of this definition.

4 General requirement

This clause of Part 1 is applicable except as follows.

Addition:

The use of **flammable refrigerants** involves additional hazards which are not associated with appliances using non-**flammable refrigerants**.

This standard addresses the hazards due to ignition of leaked **flammable refrigerant** by potential ignition sources associated with the appliance.

The hazard due to ignition of leaked **flammable refrigerant** by an external potential ignition source associated with the environment in which the appliance is installed is compensated by the low probability of ignition.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.2 *Addition:*

At least one additional specially prepared sample is required for the tests of 22.107.

Unless the motor-compressor conforms to IEC 60335-2-34, at least one additional specially prepared sample is required for the test of 19.1.

At least one additional sample of the fan motor, thermal motor protector combination may be required for the test of 19.1.

The test of 22.7 may be performed on separate samples.

Due to the potentially hazardous nature of the tests of 22.107, 22.108 and 22.109, special precautions may need to be taken when performing the tests.

5.3 *Addition:*

Before starting the tests,

- **ice-cream appliances** are operated empty at **rated voltage** for 1 h, or for the maximum setting of an incorporated timer, whichever is shorter;

- other **compression-type appliances** shall be operated at **rated voltage** for at least 24 h, then switched off and left to stand for at least 12 h.

The test of 11.102 is carried out immediately after the tests of Clause 13.

The test of 15.105 is carried out immediately after the test of 11.102.

The tests of 15.101.1, 15.101.2, 15.103 and 15.104 are carried out immediately after the test of 15.2.

5.4 Replacement:

Tests are carried out using each source of energy (electricity, gas or other fuel) in turn. Gas appliances are supplied at the appropriate rated pressure.

Tests are additionally carried out with all combinations of energy sources supplied simultaneously unless this is prevented by interlocking devices.

5.7 Addition:

For **ice-cream appliances**, tests specified in Clauses 10, 11 and 13 are carried out at an ambient temperature of $23\text{ °C} \pm 2\text{ °C}$.

For other appliances, tests specified in Clauses 10, 11, 13 and Subclause 19.103 are carried out at an ambient temperature of

- $32\text{ °C} \pm 1\text{ °C}$ on appliances of extended temperate (SN) and temperate (N) classes;
- $38\text{ °C} \pm 1\text{ °C}$ on appliances of subtropical (ST) class;
- $43\text{ °C} \pm 1\text{ °C}$ on appliances of tropical (T) class.

Before starting these tests, the appliance with the doors or lids open is brought to within 2 K of the ambient temperature specified.

Appliances classified for several climatic classes are tested at the ambient temperature relevant to the highest climatic class.

Other tests are carried out at an ambient temperature of $20\text{ °C} \pm 5\text{ °C}$.

Steady conditions are considered to be established when three successive readings of the temperature, taken at approximately 60 min intervals, at the same point of any operating cycle, do not differ by more than 1 K.

5.8.1 Addition:

Appliances which can be battery operated are tested at the more unfavourable polarity when the supply terminals or terminations for the connection of the battery have no indication for polarity.

5.9 Addition:

Appliances incorporating an **ice-maker** are tested with the **ice-maker** operating to give the most unfavourable results.

5.10 Addition:

For the tests of 22.107, 22.108 and 22.109, the appliance is empty and installed as outlined below:

Built-in appliances are installed in accordance with the instructions for installation.

Other appliances are placed in a test enclosure, the walls enclosing the appliance as near to all its sides and the top of the appliance as possible, unless the manufacturer indicates in the instructions for installation that a free distance shall be observed from the walls or the ceiling, in which case this distance is observed during the test.

NOTE 101 Commonly available fixing hardware, such as screws and bolts, need not be delivered with a fixed appliance.

5.101 *Appliances which are constructed so that an **ice-maker** may be incorporated are tested with the intended **ice-maker**.*

5.102 ***Compression-type appliances with heating systems and Peltier-type appliances are tested as combined appliances.***

5.103 ***Compression-type appliances which use flammable refrigerants and which, according to the instructions, may be used with other electrical appliances inside a food storage compartment are tested with such recommended appliances incorporated and being operated as in normal use.***

NOTE Examples of such electrical appliances are ice-cream makers and deodorizers.

6 Classification

This clause of Part 1 is applicable except as follows.

6.101 Appliances, other than **ice-cream appliances**, shall be of one or more of the following climatic classes:

- appliances of extended temperate class (SN);
- appliances of temperate class (N);
- appliances of subtropical class (ST);
- appliances of tropical class (T).

Compliance is checked by inspection.

NOTE The climatic classes are specified in IEC 62552-1:2015.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

Appliances shall also be marked with

- the power input, in watts, of **heating systems**, if greater than 100 W;
- the defrosting input, in watts, if greater than the input corresponding to the **rated power input**;

- **rated power input** in watts or **rated current** in amperes, except that **compression-type appliances**, other than **ice-cream appliances**, shall be marked with the **rated current** in amperes;
- the letters SN, N, ST or T indicating the climatic class of the appliance;
- the maximum rated wattage of lamps, in watts (not applicable if the lamps can only be replaced by the manufacturer or its service agent, together with a part of the appliance);
- the total mass of the refrigerant;
- for a single component refrigerant, at least one of the following:
 - the chemical name;
 - the chemical formula;
 - the refrigerant number;
- for a blended refrigerant, at least one of the following:
 - the chemical name and nominal proportion of each of the components;
 - the chemical formula and nominal proportion of each of the components;
 - the refrigerant number and nominal proportion of each of the components;
 - the refrigerant number of the refrigerant blend;
- the chemical name or refrigerant number of the principal component of the insulation blowing gas.

Refrigerant numbers are given in ISO 817.

For **compression-type appliances**, the defrosting power input in watts shall be marked separately if the current corresponding to the defrosting power input is greater than the **rated current** of the appliance.

Appliances which can be mains and battery operated shall be marked with the battery voltage.

Appliances which can be battery operated shall be marked with the type of battery, distinguishing between rechargeable and non-rechargeable batteries, if necessary, unless the type is irrelevant for the operation of the appliance.

The means provided for connection of any additional electrical supply shall be marked with the voltage and nature of the supply.

Appliances having provision for an **incorporated ice-maker** shall be marked with the maximum power input for an **incorporated ice-maker**, if greater than 100 W.

Ice-makers without automatic water level control shall be marked with the maximum permissible water level.

Appliances shall be marked with details of the source of supply other than electrical, if any.

For **compression-type refrigerating systems**, the appliance shall also be marked with the mass of the refrigerant for each separate refrigerant circuit.

Compression-type appliances which use **flammable refrigerants** shall be marked with the symbol ISO 7010 W021 (2019-07).

Appliances employing R-744 in a **transcritical refrigeration system** shall be marked with the substance of the following:

WARNING: System contains refrigerant under high pressure. Do not tamper with the system. It must be serviced by qualified persons only.