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Responsible committee: CPL/61 Safety of household and similar electrical appliances

Interested committees:

Title: Draft BS EN 60335-2-89 Ed.4.0 Household and similar electrical appliances - Safety

Part 2-89: Particular requirements for commercial refrigerating appliances and ice-makers with an incorporated or remote refrigerant unit or motor-compressor

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

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- ii) affects other national standard(s)
- iii) requires additional national guidance or information

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



61C/885/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 60335-2-89 ED4

DATE OF CIRCULATION:

2022-05-13

CLOSING DATE FOR COMMENTS:

2022-08-05

SUPERSEDES DOCUMENTS:

61C/884/RR

IEC SC 61C : SAFETY OF REFRIGERATION APPLIANCES FOR HOUSEHOLD AND COMMERCIAL USE

SECRETARIAT:

Germany

SECRETARY:

Mr Dario Perroni

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 61, SC 61D

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☒ SAFETY

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Household and similar electrical appliances - Safety - Part 2-89: Particular requirements for commercial refrigerating appliances and ice-makers with an incorporated or remote refrigerant unit or motor-compressor

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-89: Particular requirements for commercial refrigerating
appliances and ice-makers with an incorporated or
remote refrigerant unit or motor-compressor**

FOREWORD

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- 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.

This part of International Standard IEC 60335 has been prepared by subcommittee 61C: Household appliances for refrigeration, of IEC technical committee 61: Safety of household and similar electrical appliances.

This fourth edition cancels and replaces the third edition published in 2019, and its corrigendum 1 (2019-09) and corrigendum 2 (2021-08). This edition constitutes a technical revision.

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

- the text has been aligned with Ed 6 of Part 1;
- some notes have been deleted or converted to normative text (4, 5.7, 7.12, 19.1, 19.102, 21.1, 22.7, 22.102, 22.109, 22.111, 22.112, 22.113, 30.1);
- definition of Maximum allowable pressure (PS) has been introduced (3.1.103);

- requirements for cold room, prefabricated cold room and packaged refrigerating system has been introduced (3.5.103, 3.5.104, 3.6.106, 7.1, 7.12, 22.116.1, 22.116.2, 22.116.3, 22.121, Annex DD);
- definition of free space has been clarified (3.6.102);
- requirement for appliances intended to be installed in areas open to the public has been introduced (1, 3.8.103, 7.12, Table 102);
- test room climatic class 7 (38 °C ± 2 °C) has been introduced (5.7, 24.7);
- 1.2 kg threshold of maximum charge for flammable refrigerants has been removed (22.110);
- normative references and associated text have been updated (2, 22.112, 22.113, Annex BB);
- requirement for protection of parts containing flammable refrigerants has been introduced (22.122);
- requirement for routine test for each refrigerating system, having a refrigerant charge exceeding 150 g of flammable refrigerants has been introduced (22.123);
- requirement (Measurements, Compliance, formula for mass flux calculation, Figure CC.1) in Annex CC has been updated;
- requirement for releasable charge has been introduced (3.1.104, 3.6.110, 3.8.104, 3.8.105, 3.8.106, 3.8.107, 7.1, 22.110, 22.124, 22.125, 22.126, 22.127, Annex EE)

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

FDIS	Report on voting
61C/XXX/FDIS	61C/XXX/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.

The language used for the development of this International Standard is English

This document has been drafted in accordance with the ISO/IEC Directives, Part 2 and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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 unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) 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 commercial refrigerating appliances with an incorporated or remote refrigerant unit or compressor.

Where a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. Where 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.

The National Committees are requested to note that for this publication the stability date is 202X.

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

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).
- 22.114 : For unsealed glass tube heaters, the temperature requirements are different (Japan).

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.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website

<https://www.iec.ch/tc61/supportingdocuments>

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard

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 publications, basic safety publications and group safety publications 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.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

- IEC standards published by TC 59 concerning methods of measuring performance;
- CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters.

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 which 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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-89: Particular requirements for commercial refrigerating appliances and ice-makers with an incorporated or remote refrigerant unit or motor-compressor

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electrically operated commercial refrigerating appliances and **ice-makers** that have an incorporated motor-compressor or that are supplied in two or more units for assembly as a single appliance in accordance with the instructions (split system), their rated voltage being not more than 250 V for single-phase appliances and 480 V for other appliances.

These appliances are not intended for household use. They are used by experts or instructed persons for commercial preparation or delivery of food, drinks and consumer products, for example in kitchens of restaurants, canteens, hospitals and for appliances which are intended to be used by non-experts or non-instructed persons in **area open to the public**, for example in commercial enterprises such as supermarkets, bakeries and butcheries.

As far as is practicable, this standard deals with the common hazards presented by this type of appliances.

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 for appliances incorporating pressure vessels are specified;

- in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

- for appliances intended to be used outdoors, additional requirements can be necessary.

NOTE 101 Examples of appliances that are within the scope of this standard are

- **refrigerated display** and **storage cabinets**;

- refrigerated trolley cabinets;

- service counters and self-service counters;

- blast chillers and blast freezers;

- **commercial ice-makers**.

- prefabricated cold rooms

- packaged refrigerating systems intended for use in **cold rooms**

As far as is practicable, this standard deals with the common hazards presented by these types of appliances including those that use **flammable refrigerants** and appliances employing R-744 refrigerant.

This International Standard is not applicable to appliances with a mass of **flammable refrigerant** exceeding the limits specified in 22.110 or to appliances with that use refrigerants with a toxicity classification of B according to ISO 817.

It does not cover those features of construction and operation of refrigerating appliances that are dealt with in ISO standards.

NOTE 102 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or aboard 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.

This standard does not apply to

- appliances using **flammable refrigerant** in **transcritical refrigeration systems**;
- domestic refrigerating appliances (IEC 60335-2-24);
- split systems having a **refrigerant charge of flammable refrigerant** exceeding 150 g in any **refrigerating circuit**;
- industrial refrigerating systems;
- motor-compressors (IEC 60335-2-34);
- commercial dispensing appliances and vending machines (IEC 60335-2-75);
- professional ice-cream makers (IEC 60335-2-118);
- multiple refrigerated chambers with a remote motor-compressor unless intended as single appliance.
- equipment for measurement, control, and laboratory use (IEC 61010-2-011)

NOTE 103 Standards listed above can invoke requirements and clauses of this standard

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

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

IEC 60079-7:2015/AMD1:2017 ¹,

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

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

IEC 60079-29-1, *Explosive atmospheres – Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases*

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

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

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

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

¹ There exists a consolidated edition 5.1 (2017) that includes Edition 5 and its Amendment 1.

ISO 14903, *Refrigerating systems and heat pumps – Qualification of tightness of components and joints*

IEC 60335-2-40:2022, *Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers*

IEC 61508-4:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations*

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:

Appliances are operated at an ambient temperature in accordance with 5.7, empty, with doors or lids closed, or blinds closed or open, whichever is the more unfavourable. User adjustable temperature control devices are short-circuited or otherwise rendered inoperative. Devices that are switched, by dew-point controls or clocks, are switched on or off, whichever is the more unfavourable.

For appliances connected to a water supply, the water other than cooling water, is at a temperature of $15\text{ °C} \pm 2\text{ °C}$. The cooling water is at the maximum temperature specified in the instructions.

3.1.101

design pressure

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

Note 1 to entry: The **design pressure** assigned should take into account pressures that could be expected during transportation of the **transcritical refrigeration system**.

3.1.102

refrigerant charge

mass of refrigerant within a **refrigerating circuit**

3.1.103

Maximum allowable pressure (PS)

maximum pressure which system or component is designed, as specified by the manufacturer

3.1.104

releasable charge

M_{rl}

Maximum mass of refrigerant that can be released into the indoor space from a **refrigerating circuit** in the event of a leak

Note 1 to entry: Any part of the **refrigerant charge** that leaks to the outdoor is excluded from the **releasable charge**.

3.1.105

Hot surface ignition temperature (HSIT)

highest temperature at which refrigerant does not ignite when tested in accordance with Annex KK of IEC 60335-2-40 7th edition.

3.5 Definitions relating to types of appliances

3.5.101

refrigerated display and storage cabinet

cabinet which displays or stores beverages or chilled or frozen foodstuff placed therein and which is cooled by a **refrigerant unit**

3.5.102

ice-maker

appliance in which ice is made by freezing water by a device consuming electrical energy

Note 1 to entry: The appliance may be provided with a compartment for storing the ice.

3.5.103

cold room

thermally insulated enclosed refrigerated storage space, that can be walked into.

3.5.104

prefabricated cold room

Cold room delivered charged in kit form to installation site ready for assembly without any further modification

3.6 Definitions relating to parts of an appliance

3.6.101

ancillary heating element

heating device which performs an auxiliary function, such as a defrost heater, door heater or anti-condensation heater

3.6.102

free space

space with a volume exceeding 60 l in which 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 ± 0,5 mm diameter sphere or a square with 200 +/- 0,5 mm side without appreciable force. The volume can be ignored if the sphere or square cannot fit inside."

3.6.103

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**.

3.6.104

refrigerating circuit

combination of interconnected refrigerant-containing parts constituting one closed circuit in which the refrigerant is circulated for the purpose of extracting and delivering heat

3.6.105

refrigerant unit

factory assembled unit for performing part of the refrigeration cycle (compressing gas, condensation or gas cooling) comprising of one or more refrigerant compressors with motors, condensers or **gas coolers**, liquid receivers, interconnection pipe work and ancillary equipment, all mounted on a common base

3.6.106**packaged refrigerating system**

a factory assembled and **hermetically sealed system** for performing the complete refrigeration cycle (compressing gas, condensation or gas cooling, and evaporation) comprising power-driven refrigerant compressor(s) with motors, condensers or gas coolers, liquid receivers, interconnection pipe work, and ancillary equipment, all mounted on a common base. A **packaged refrigerating system** is mounted on the enclosure to be cooled, for example, a **cold room, refrigerated display or storage cabinets using** a cassette

Note: commonly referred to as a “monoblock unit”.

3.6.107**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

3.6.108**hermetically sealed system**

system in which all refrigerant containing parts are sealed by welding, brazing or a similar permanent connection

3.6.109**critical point**

point in a **refrigerating circuit** where **flammable refrigerant** may leak

Note 1 to entry: The following are considered to be **critical points**:

- interconnecting joints between parts of the **refrigerating circuit**;
- pipes with a bended radius, measured along the centre line, of less than 2,5 times the external pipe diameter;

Note 2 to entry: The following are not considered to be **critical points**:

- pipes with a bend radius, measured along the centre line, equal to or greater than 2,5 times the external pipe diameter;
- welded telescopic joints of the motor-compressor;
- welding of the pipes through the motor-compressor housing;
- welding of hermetic glass to metal seals (fusite).

3.6.110**releasable charge limited circuit**

refrigerating circuit in which the **releasable charge** is limited by design measures

Note 1 to entry: Systems relying on closing safety shut-off valves when the compressor is off are examples of releasable charge limited circuit not relying on leak detection systems.

Note 2 to entry: Systems relying on measuring temperature, pressure, ultrasonic sensing, or other working parameters to detect a leak are examples of releasable charge limited circuits not relying on refrigerant (gas) detection 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 during abnormal operation

3.8 Definitions relating to miscellaneous matters

3.8.101

flammable refrigerant

refrigerant with a flammability classification of Class 2L, Class 2 or Class 3 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.

3.8.102

qualified person

person having the appropriate technical training and experience necessary to be aware of hazards to which he or she is exposed in performing a task and of measures necessary to minimize the danger to themselves or other persons.

3.8.103

area open to the public

area in which the general public, including children, can have access

Note 1 to entry: Examples are supermarkets, canteens and self-service restaurants.

3.8.104

safety shut-off valve

valve for the purpose of limiting the amount of **releasable charge**

3.8.105

refrigerant sensor

assembly in which the sensing element is housed and that may also contain associated circuit components

[SOURCE: IEC 60079-29-1:2016, 3.3.2 modified, sensor replaced by refrigerant sensor]

3.8.106

refrigerant detection system

a sensing system which responds to a pre-set concentration of refrigerant in the environment

Note 1 to entry: A refrigerant detection system requires a refrigerant sensing element and can have multiple sensing elements

3.8.107

leak detection system

a sensing system which responds to refrigerant leaking from a **refrigerating circuit**

Note 1 to entry: example a **refrigerant detection system** is an example of a **leak detection system**.

Note 2 to entry: A **leak detection system** can include gas sensing or alternative indirect methods, such as ultrasonic or system parameters, demonstrated to be sufficiently effective at detecting a leak.

4 General requirement

This clause of Part 1 is applicable except as follows.

Addition:

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

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

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 22.112.

Unless the motor-compressor complies with IEC 60335-2-34, at least one additional specially prepared sample is required for the tests of 22.109.

Unless the motor-compressor complies with 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 tests of 22.7 and 22.108 may be performed on separate samples.

Due to the potentially hazardous nature of the tests of 22.111, 22.112, 22.113, 22.114 and 22.116, special precautions may need to be taken when performing the tests.

5.3 Addition:

*Before starting the tests, the appliance shall be operated at **rated voltage** for at least 24 h, then switched off and left to stand for at least 12 h.*

5.7 Addition:

*For **ice-makers**, the tests in accordance with Clauses 10, 11 and 13 are performed at an ambient temperature of $32\text{ °C} \pm 2\text{ °C}$*

For other appliances, tests in accordance with Clauses 10, 11 and 13 are performed at an ambient temperature of

– $32\text{ °C} \pm 2\text{ °C}$ on appliances of test room climatic class 0, 1, 2, 3, 4, 6 or 8;

– $38\text{ °C} \pm 2\text{ °C}$ on appliances of test room climatic class 7;

– $43\text{ °C} \pm 2\text{ °C}$ on appliances of test room climatic class 5.

Before starting the tests specified in 10, 11 and 13, the appliance, with the doors or lids open, is brought to the ambient specified temperature $\pm 2\text{ K}$.

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

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

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.

5.10 Addition:

*For appliances with a remote **refrigerant unit**, the **refrigerant unit** is connected to the cabinet in accordance with the instructions provided with the appliance before testing.*

For the tests of 22.111, 22.112 and 22.113, the appliance is empty with doors or lids closed, or blinds closed or open, whichever is the more unfavourable, and is installed as follows.

*Appliances, other than **built-in appliances**, are placed in a test enclosure, the walls of which enclose the appliance as closely as possible to all its sides and top surface, unless the manufacturer indicates in the instructions that a free distance shall be observed from the walls or the ceiling, in which case this distance is observed during the test. If the appliance has a remote **refrigerant unit** or motor-compressor, then only the **refrigerated display and storage***

cabinet is installed in the test enclosure, the remote **refrigerant unit** or motor-compressor is placed on the floor of the test corner away from walls.

For appliances incorporating remote **refrigerant units** or remote motor-compressors, the refrigerant line between the **refrigerant unit** or motor-compressor and the **refrigerated display and storage cabinet** shall have a length of 5 m to 7,5 m. The refrigerant line shall be installed with thermal insulation applied in accordance with the instructions. If the appliance employs R-744 refrigerant in a **transcritical refrigeration system**, a **pressure relief device** shall be installed on the high-pressure side between the motor-compressor and the **gas cooler** unless it is pre-fitted to the motor-compressor.

5.101 Appliances that use **flammable refrigerants** and that, according to the instructions, may be used with other electrical appliances inside a food/ice storage compartment are tested with such recommended appliances incorporated and in operation as they would be in normal use.

NOTE An example of such electrical appliances are deodorizers.

Ice-makers that use **flammable refrigerants** and that, according to the instructions, may be used in conjunction with accessories such as ice-bins are tested with such recommended accessories installed and in operation as they would be in normal use.

6 Classification

This clause of Part 1 is applicable except as follows.

6.101 Refrigerated display and storage cabinets shall be classified for at least one of the following test room climatic classes:

- test room climate class 0;
- test room climate class 1;
- test room climate class 2;
- test room climate class 3;
- test room climate class 4;
- test room climate class 5;
- test room climate class 6;
- test room climate class 7;
- test room climate class 8.

Compliance is checked by inspection.

NOTE The test room climate classes are specified in ISO 23953-2.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Modification:

Replace the third dash by:

- **rated current**, in amperes;

Addition:

- power input, in watts, of heating systems, if greater than 100 W;
- defrosting power input, in watts, if the current corresponding to the defrosting power input is greater than the **rated current** of the appliance;
- one or more of the numerals; 0, 1, 2, 3, 4, 5, 6, 7 or 8, indicating the test room climatic class for **refrigerated display and storage cabinets**;

- for lamps, the rated wattage of the lamp, in watts;
- **refrigerant charge** for each **refrigerating circuit**;
- 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 its components,
 - the chemical formula and nominal proportion of each of its components,
 - the refrigerant number and nominal proportion of each of its components,
 - the refrigerant number of the refrigerant blend.
- chemical name or refrigerant number of the principal component of the insulation blowing gas.

Refrigerant numbers shall be designated in accordance with ISO 817.

NOTE 101 Pipe insulation or small items of insulation are not required to be marked.

Appliances that use **flammable refrigerants** shall be marked with the warning sign ISO 7010-W021 (2011-05).

Appliances having a **refrigerant charge** exceeding 150 g of **flammable refrigerants** within any **refrigerating circuit** shall be marked with the maximum allowable pressure for which the system is designed to withstand.

Appliances having a **refrigerant charge** within any **refrigerating circuit** exceeding 4 times the lower flammability limit (LFL) for refrigerants having a flammability classification of Class A2 or Class A3 and exceeding 6 times the lower flammability limit (LFL) for refrigerants having a flammability classification of Class A2L, shall be marked with symbol IEC 60417-6412 (2019-03).

The values of A used in the symbol IEC 60417-6412 (2019-03) shall be the test room floor areas used to demonstrate compliance with Annex CC or DD.

Packaged refrigerating systems intended for use as part of a cold room shall have two minimum floor area markings, one applicable to the internal cold room and one applicable to the floor external to the cold room.

Packaged refrigerating system shall be marked with minimum installation height above floor level in the symbol IEC 60417-6320 (2015-02) in vertical orientation shown in clause 7.6.

Packaged refrigerating systems intended for use in a prefabricated cold room shall be marked with both the minimum room floor area symbol IEC 60417-6412 (2019-03) and the read the operator's manual symbol ISO 7000-0790 (2004-01) in the same frame shown in clause 7.6.

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

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

Appliances employing R-744 refrigerant in a **transcritical refrigeration system** shall be marked with symbol ISO 7000-1701 (2004-01).

Appliances with a remote **refrigerant unit** employing R-744 refrigerant in a **transcritical refrigeration system** shall be marked with the **design pressure**, unless the appliance incorporates a **pressure relief device** pre-fitted to the high-pressure side of the motor-compressor.

656 Appliances without automatic liquid-level control and which are intended to be connected to the
 657 water supply mains or to be filled with liquid by the user shall be marked with the maximum
 658 liquid level.

659 **Ice-makers** intended to be connected to the water supply shall be marked with symbol
 660 IEC 60417-6375 (2017-03) or with the substance of the following warning:

661 WARNING: Connect to potable water supply only.

662 The **safety shut-off valves** shall be permanently marked with the information below for the
 663 identification of the valve in case of replacement:

664 – means of identification of the **safety shut-off valves for facilitating correct replacement**
 665 (e.g., refrigerant type, part number, etc.), and

666 – arrow indicating the direction of flow, when applicable.

667 Compliance is checked by inspection.

668 **7.6 Addition:**



[symbol ISO 7000-0790 (2004-01)] read operator's manual



[symbol IEC 60417-6375 (2017-03)] connection to potable water supply



[Warning sign ISO 7010-W021 (2011-05)] warning; Risk of fire/flammable materials



[symbol ISO 7000-1701 (2004-01)] pressure



$\geq A \text{ m}^2$

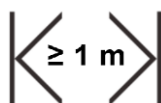
[symbol IEC 60417-6412 (2019-03)] minimum room floor area



[symbol IEC 60417-6412 (2019-03)] For minimum room floor area, read operator's manual

+

[symbol ISO 7000-0790 (2004-01)]



[symbol IEC 60417-6320 (2015-02)] Distance, general; dimension, general



[symbol IEC 60417-6320 (2015-02)] Distance, general; dimension, general

7.12 *Addition:*

The instructions shall contain information regarding the maximum loading of each type of shelf.

The instructions shall state the substance of the following.

Do not store explosive substances such as aerosol cans with a flammable propellant in this appliance.

Instructions for **packaged refrigerating system** shall contain information on minimum installation height and impact protection requirements.

The instruction manual shall indicate that combination of minimum room floor area and the read instruction symbols indicate that for the packaged refrigerating system intended for **prefabricated cold rooms** shall not be installed in another installation, as this may create unsafe conditions.

If symbol ISO 7000-1701 (2004-01) is used, its meaning shall be explained.

The instructions shall include information pertaining to the handling, servicing and disposal of the appliance.

The instructions for appliances which use **flammable refrigerants** shall include the substance of the following warnings:

WARNING: Keep clear of obstruction all ventilation openings in the appliance enclosure or in the structure for building-in.

WARNING: Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.

WARNING: Do not damage the refrigerating circuit.

This warning is only applicable for appliances with refrigerating circuits which are accessible by the user.

WARNING: Do not use electrical appliances inside the food/ice storage compartments unless they are of the type recommended by the manufacturer.

For appliances which use flammable insulation blowing gases, the instructions shall include information regarding disposal of the appliance.

For appliances provided with double-capped fluorescent lamps, the instructions shall include the information that lamps have to be replaced by identical lamps only.

An explanation shall be given of the meaning of the alpha-numeric characters, indicating the test room climatic class of the appliance, that are marked on the appliance.

The instructions for split systems that use a **flammable refrigerant** shall include the substance of the following warning.

WARNING: In order to reduce flammability hazards the installation of this appliance must only be carried out by a suitably qualified person.

If warning sign ISO 7010-W021 (2011-05) is used, its meaning shall be explained.

The manufacturer shall declare that the appliance is also intended to be used in an **area open to the public** or, if the appliance is not suitable for use in an **area open to the public**, the instruction shall include the substance of the following warning:

CAUTION: This appliance shall not be installed where the public has access

7.12.1 *Addition:*

For appliances with a remote **refrigerant unit**, the instructions shall include a statement containing the substance of the following:

The installation of the appliance and the refrigerant unit must only be made by the manufacturer's service personnel or suitably qualified person.

The information provided with an appliance with a remote **refrigerant unit** shall include

- information on the type of remote **refrigerant unit** to which the cabinet shall be connected;
- an electrical diagram showing the electrical terminals for connections.

In appliances employing R-744 in a **transcritical refrigeration system** the instructions shall include the substance of the following:

WARNING: The refrigeration system is under high pressure. Do not tamper with it. Contact qualified service personal before disposal.

For appliances which are monoblock units or as part of a **prefabricated cold room**, the condenser part shall be marked with symbol IEC 60417-6320 (2015-02) and installed at least 1 m away from any wall of the installation space or structure that could inhibit the free flow of air or leaked refrigerant.

WARNING: Condenser part shall be installed at least 1 m away from any wall of the installation space or structure that could inhibit the free flow of air or leaked refrigerant.

For appliances with a remote **refrigerant unit** employing R-744 refrigerant in a **transcritical refrigeration system**, unless the appliance incorporates a **pressure relief device** pre-fitted to the high-pressure side of the motor-compressor, the instructions shall include a statement containing the substance of the following:

A pressure relief device shall be installed in the high-pressure side of the refrigeration system between the motor-compressor and the gas cooler. There shall be no shut off devices or other components except piping between the motor-compressor and the pressure relief device that could introduce a pressure drop.

The pressure relief device shall be mounted so that any refrigerant released from the system during its operation cannot cause harm to the user of the appliance. The aperture shall be located so that it is unlikely to be obstructed in normal use.

The installed pressure relief device shall have no provisions for setting by the end user.

The pressure setting of the installed pressure relief device shall be no higher than the design pressure of the high-pressure side.

For appliances intended for connection to a water supply for cooling purposes, the instructions shall contain information on the maximum permitted temperature of the inlet water consistent with safe operation of the appliance.

If symbol IEC 60417-6375:2017-03 is used, its meaning shall be explained.

If symbol IEC 60417-6415:2019-03 is used, its meaning shall be explained.

All site made joints in **hermetically sealed systems** shall be tested for leaks at a pressure of at least 0,25 × maximum allowable pressure using detection equipment with a sensitivity of at least 3 g/year of refrigerant.

If other fluid circuits, such as water heat exchangers, are connected to an appliance that uses **flammable refrigerant**, the instructions shall state the substance of the following:

Any fluid circuits connected to the appliance shall safely release abnormal pressure. It shall not allow the release of **flammable refrigerant** into areas served by the other circuits if these do not comply with minimum room area limit.