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Date: 22 January 2024

Origin: International

Latest date for receipt of comments: 13 March 2024

Project No. 2023/02909

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

Interested committees:

Title: BS EN IEC 60335-2-34 Household and similar electrical appliances - Safety

Part 2-34: Particular requirements for motor-compressors

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

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

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THIS DRAFT IS NOT CURRENT BEYOND 13 March 2024**

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

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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 Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.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/912/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:
IEC 60335-2-34 ED7

DATE OF CIRCULATION:
2024-01-19

CLOSING DATE FOR VOTING:
2024-04-12

SUPERSEDES DOCUMENTS:
61C/897/CD, 61C/899B/CC

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 31, TC 61, SC 61D, TC 66

PROPOSED HORIZONTAL STANDARD:



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

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☒ SAFETY

☐ SUBMITTED FOR CENELEC PARALLEL VOTING

☒ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Household and similar electrical appliances - Safety - Part 2-34: Particular requirements for motor-compressors

PROPOSED STABILITY DATE: 2024

NOTE FROM TC/SC OFFICERS:

SC61C/MT1 is working on a new proposal to delete the warning sign ISO 7010 W021 (2011-05) and to revise the Cl. 19.13 and 24.101. A Q doc could circulate after the MT1 web-meeting on Jan 9th 2024. The new text could be added in the FDIS.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –
SAFETY –****Part 2-34: Particular requirements for motor-compressors**

FOREWORD

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

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 seventh edition cancels and replaces the sixth edition published in 2021. This edition constitutes a technical revision.

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

- it aligns the text with IEC 60335-1, Ed 6;
- in the scope added the rating up to 600 V (1);
- the definition of design pressure has been changed in maximum allowable pressure (3.1.101, 7.102, 22.7);
- introduction of maximum load conditions (MLC) as declared by the manufacturer (3.1.103, 5.6, 7.12, Annex AA);

- transcritical back pressure categories (R-744) have been introduced (3.1.102, table AA.1, table AA.2);
- new definition of coilette has been introduced (3.8.103);
- new definition of bypass valve has been introduced (3.8.104);
- the evaluation of motor-compressors using a motor-compressor control system has been clarified (6.101, 6.103, 6.104, 19.1);
- modification of electric strength test has been added (16.2);
- reference to the fatigue test has been deleted (18);
- compliance for pressure tests has been updated (22.7; Annex EE);
- reference for the motorette has been transferred from annex BB to the new annex FF;
- annex for insulation materials and parts has been updated and tie cord relaxation has been removed (annex CC);
- new annex for motorette or coilette has been introduced (annex FF).

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

Draft	Report on voting
61C/XX/FDIS	61C/XX/RVD

Full information on the voting for its approval 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 was drafted in accordance with 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 motor-compressors.

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.

- 7.1: The locked-rotor current marking is required for some motor-compressors (USA).
- 22.7: Different test pressures are used (Japan, USA).

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 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.

If testing of the **motor-compressor** includes testing in accordance with Annex AA, temperatures of the **motor-compressor** windings, **housing** and other parts related to the **motor-compressor**, such as terminals, internal wiring and insulating materials, are not measured when the complete appliance in which the **motor-compressor** is used is tested.

These requirements apply to sealed (hermetic and semi-hermetic type) **motor-compressors** with their associated starting, cooling capacity control and protection systems tested separately.

238 under the most severe conditions of the refrigerating system operation which, within reasonable
239 limits, could occur in the applications for which they are used.

240 In particular, the construction detail inspection and locked-rotor testing may be done separately
241 on the **motor-compressor**, thereby eliminating the need for inspection and testing when the
242 **motor-compressor** is applied to many different appliances and factory-built assemblies.

243 Operational tests may also be conducted on the **motor-compressor** separately in certain
244 circumstances. The specification for this type testing is provided in Annex AA. However, the
245 tests of the existing standards relevant to the given kind of application, such as
246 IEC 60335-2-24 and IEC 60335-2-40, may need to be conducted on the final application and
247 used as the final determination of acceptability.

248

249

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-34: Particular requirements for motor-compressors

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of sealed (hermetic and semi-hermetic type) **motor-compressors**, their protection and control systems, if any, which are intended for use in equipment for household and similar purposes and which conform with the standards applicable to such equipment. It applies to **motor-compressors** tested separately, under the most severe conditions that may be expected to occur in normal use, their **rated voltage** being not more than 250 V for single-phase **motor-compressors** and 600 V for multi-phase, 600 V direct-current (DC) **motor-compressors**.

This standard also covers

- multi-speed **motor-compressors**, that are **motor-compressors**, the speed of which can be set to different values;
- variable capacity **motor-compressors** that are **motor-compressors** where the capacity of the compressor is controlled at fixed speeds.

NOTE 101 Examples of equipment which contain **motor-compressors** are

- tumble dryers (IEC 60335-2-11);
- refrigerating appliances, ice-cream appliances and ice-makers (IEC 60335-2-24);
- electrical heat pumps, air-conditioners and dehumidifiers (IEC 60335-2-40);
- commercial dispensing appliances and vending machines (IEC 60335-2-75);
- commercial refrigerating appliances and ice-makers with an incorporated or remote refrigerant unit or compressor (IEC 60335-2-89);
- safety requirements for electrical equipment for measurement, control, and laboratory use – Particular requirements for refrigerating equipment (IEC 61010-2-011);
- professional ice-cream makers (IEC 60335-2-118);
- professional systems and heat pumps (ISO 5149-2);

This standard does not supersede the requirements of standards relevant to the particular appliance in which the **motor-compressor** is used. However, if the **motor-compressor** type used complies with this standard, the tests for the **motor-compressor** specified in the particular appliance standard may not need to be made in the particular appliance or assembly. If the **motor-compressor control system** is associated with the particular appliance control system, additional tests could be necessary on the final appliance.

So far as is practical, this standard deals with the common hazards presented by **motor-compressors** used in appliances which are encountered by all persons in and around the home. However, it does not in general take into account

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliances by young children.

NOTE 102 Attention is drawn to the fact that

- for **motor-compressors** intended to be used in appliances in vehicles or on board ships, additional requirements could be necessary;
- **motor-compressors** used in 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), additional requirements could be necessary;
- in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour and similar authorities.

This standard does not apply to

– **motor-compressors** designed exclusively for industrial purposes.

2 Normative references

This clause of Part 1 is applicable, except as follows.

Addition:

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

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

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

IEC 60851-5:2008, *Winding wires – Test methods – Part 5: Electrical properties*

IEC 60851-5:2008/AMD1:2011

IEC 60851-5:2008/AMD2:2019¹

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

ISO 817:2014/AMD1:2017

ISO 817:2014/AMD2:2021

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

3.1.101

maximum allowable pressure (PS)

maximum pressure for which **motor-compressor** is designed, as specified by the manufacturer, taking into account expected end-use appliance conditions

3.1.102

application category

back pressure relative to the evaporation temperature range over which the **motor-compressor** operates

Note 1 to entry: For the purpose of this standard, the following classifications of **application categories** are made relative to the maximum evaporation temperature:

- very low back pressure (VLBP): denotes a maximum evaporation temperature of –25 °C;
- low back pressure (LBP): denotes a maximum evaporation temperature of –15 °C;
- medium back pressure (MBP): denotes a maximum evaporation temperature of 0 °C;
- high back pressure (HBP): denotes a maximum evaporation temperature of +15 °C;
- very high back pressure (VHBP): denotes a maximum evaporation temperature of +30 °C;
- subcritical R-744 low back pressure (SC R-744LBP): denotes a maximum evaporation temperature of –15 °C;
- transcritical medium back pressure (TC R-744MBP): denotes a maximum evaporation temperature of 0 °C;
- transcritical high back pressure (TC R-744HBP): denotes a maximum evaporation temperature of +15 °C;
- transcritical low back pressure (TC R-744LBP): denotes a maximum evaporation temperature of –15 °C;
- **maximum load condition (MLC)** declared by the manufacturer.

¹ There exists a consolidated edition 4.2:2019 that includes Edition 4 and its Amendment 1 and Amendment 2.

3.1.103**maximum load condition (MLC)**

maximum application conditions at which the **motor-compressor** is allowed to operate as declared by the manufacturer

3.5 Definitions relating to types of appliances**3.5.101****motor-compressor**

appliance consisting of the mechanical mechanism of the compressor and the motor, both of which are enclosed in the same sealed **housing**, with no external shaft seals, and with the motor operating in a refrigerant atmosphere with or without oil

Note 1 to entry: The **housing** may be permanently sealed, such as by welding or brazing (**hermetic motor-compressor**), or may be sealed by gasketed joints (**semi-hermetic motor-compressor**). A terminal box, a terminal box cover, and other electrical components or an electronic control system may be included.

Note 2 to entry: Hereafter, the term **motor-compressor** will be used to designate either a **hermetic motor-compressor** or **semi-hermetic motor-compressor**.

3.5.102**two-stage motor-compressor**

motor-compressor comprising two compressors and one motor in a single **housing**

3.6 Definitions relating to parts of an appliance**3.6.101****housing**

sealed enclosure for the **motor-compressor**, which contains the compressor mechanism and the motor, and which is subjected to refrigerant pressures

Note 1 to entry: All Connecting tubes to the **motor-compressor** (e.g.: process tube, discharge tube, suction tube) are part of the **housing**.

3.6.102**starting relay**

electrically operated control device intended for integration or incorporation into a **motor-compressor** and used within the **motor-compressor** circuit to control the starting of single-phase **motor-compressors**

3.7 Definitions relating to safety components**3.7.101****thermal motor-protector**

automatic control, built-in or fitted on a **motor-compressor** that is specifically intended to protect the **motor-compressor** against over-heating due to running overload and failure to start

Note 1 to entry: **Motor-compressor protection system** is sensitive to one or both of the following:

- **motor-compressor** temperature;
- **motor-compressor** current.

Note 2 to entry: The control is capable of being reset (either manually or automatically) when its temperature falls to the reset value.

3.7.102**motor-compressor protection system**

thermal motor protector and associated components, if any, or **protective electronic circuit** fully or partly separate or integrated into the **motor-compressor control system** and which is specifically intended to protect the **motor-compressor** against over-heating due to running overload or failure to start

Note 1 to entry: **motor-compressor protection system** is sensitive to one or both of the following:

- **motor-compressor** temperature;
- **motor-compressor** current.

3.7.103**motor-compressor control system**

system comprising one or more electrical or **electronic components**, or **electronic circuits** that provides at least one of the following:

- **motor-compressor** starting control functions;
- **motor-compressor** cooling capacity control functions

3.7.104**pressure relief device**

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

Note 1 to entry: This device has no provisions for setting by the end user.

3.8 Definitions relating to miscellaneous matters**3.8.101****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

3.8.102**motorette**

insulation system model made to embody all of the elements of a random wound insulation system

Note 1 to entry: random wound is used to describe a motor winding in which round insulated conductors occupy random positions in a slot

3.8.103**coilette**

modified arrangement of a **motorette** resembling a partially assembled motor

Note 1 to entry: **Coilette** is a **Motorette** without the frame.

3.8.104**bypass valve**

device that relieves high-side pressure into the low-side at a predetermined pressure differential

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable, except as follows.

5.2 Addition:

At least one additional sample is required for the tests of Clause 19, however further samples may also be provided or are needed.

*For the test of 22.7, two samples of the empty **housing** are required.*

*For the test of normative Annex EE, three samples of the empty **housing** are required.*

5.6 Addition:

*Variable speed **motor-compressors** shall run at maximum speed unless specified differently in declared **maximum load conditions (MLC)**.*

5.7 Replacement: