



INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –
Part 2-40: Particular requirements for electrical heat pumps, air-conditioners
and dehumidifiers**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	5
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	10
3 Terms and definitions	11
4 General requirement.....	14
5 General conditions for the tests	14
6 Classification.....	15
7 Marking and instructions.....	15
8 Protection against access to live parts.....	18
9 Starting of motor-operated appliances	18
10 Power input and current.....	18
11 Heating.....	19
12 Void.....	24
13 Leakage current and electric strength at operating temperature.....	24
14 Transient overvoltages	25
15 Moisture resistance	25
16 Leakage current and electric strength.....	26
17 Overload protection of transformers and associated circuits	26
18 Endurance.....	26
19 Abnormal operation	26
20 Stability and mechanical hazards.....	31
21 Mechanical strength	31
22 Construction.....	32
23 Internal wiring.....	36
24 Components.....	36
25 Supply connection and external flexible cords	37
26 Terminals for external conductors.....	37
27 Provision for earthing	37
28 Screws and connections.....	37
29 Clearances, creepage distances and solid insulation	37
30 Resistance to heat and fire	38
31 Resistance to rusting.....	38
32 Radiation, toxicity and similar hazards.....	38
Annexes	42
Annex D (normative) Thermal motor protectors.....	42
Annex I (normative) Motors having basic insulation that is inadequate for the rated voltage of the appliance.....	42
Annex AA (informative) Examples for operating temperatures of the appliance	43
Annex BB (normative) Selected information about refrigerants.....	45

Annex CC (informative) Transportation, marking and storage for units that employ flammable refrigerants	47
CC.1 Transport of equipment containing flammable refrigerants	47
CC.2 Marking of equipment using signs	47
CC.3 Disposal of equipment using flammable refrigerants	47
CC.4 Storage of equipment/appliances	47
CC.5 Storage of packed (unsold) equipment	47
Annex DD (normative) Instruction manual for servicing refrigerant containing appliances	48
DD.1 Symbols	48
DD.2 Information in manual	48
DD.2.1 General	48
DD.2.2 Unventilated areas	49
DD.2.3 Qualification of workers	49
DD.3 Information on servicing	49
DD.3.1 Checks to the area	49
DD.3.2 Work procedure	49
DD.3.3 General work area	49
DD.3.4 Checking for presence of refrigerant	49
DD.3.5 Presence of fire extinguisher	50
DD.3.6 No ignition sources	50
DD.3.7 Ventilated area	50
DD.3.8 Checks to the refrigeration equipment	50
DD.3.9 Checks to electrical devices	50
DD.4 Repairs to sealed components	51
DD.5 Repair to intrinsically safe components	51
DD.6 Cabling	51
DD.7 Detection of flammable refrigerants	51
DD.8 Leak detection methods	52
DD.9 Removal and evacuation	52
DD.10 Charging procedures	53
DD.11 Decommissioning	53
DD.12 Labelling	54
DD.13 Recovery	54
Annex EE (normative) Pressure tests	55
EE.1 General	55
EE.2 Pressure test value determined under testing carried out in Clause 11	55
EE.3 Pressure test value determined under testing carried out in Clause 19	55
EE.4 Pressure test value determined under testing carried out under standstill conditions	55
EE.5 Fatigue test option for Clauses EE.1 and EE.4.1	56
Annex FF (normative) Leak simulation tests	58
FF.1 General	58
FF.2 Test methods	58
Annex GG (normative) Charge limits, ventilation requirements and requirements for secondary circuits	60
GG.1 General	60
GG.2 Requirements for charge limits in unventilated areas	61
GG.3 Requirements for charge limits in areas with mechanical ventilation	61

GG.4	Requirements for mechanical ventilation within the appliance enclosure	62
GG.5	Requirements for mechanical ventilation for rooms complying with ISO 5149	62
GG.6	Requirements for refrigeration systems employing secondary heat exchangers	63
GG.7	Additional testing	64
GG.8	Non fixed factory sealed single package units with a charge amount of $m_1 < M \leq 2 \times m_1$	64
Annex HH (informative)	Competence of service personnel	69
HH.1	General	69
HH.2	Training	69
Bibliography	72
Figure 101a	– Upflow application	39
Figure 101b	– Downflow application	40
Figure 101	– Arrangement for heating test of appliances with supplementary heater	40
Figure 102	– Supply circuit for locked-rotor test of a motor of the single-phase type – Revise as needed for three-phase test	41
Figure GG.1	– Unventilated area	67
Figure GG.2	– Mechanical ventilation	68
Figure GG.3	– Isosceles triangle arrow test gauge	68
Figure GG.4	– Measurement of vibration amplitude	68
Table 3	– Temperature limits (1 of 3)	22
Table BB.1	– Selected information about refrigerants	45
Table GG.1	– Mass of refrigerants	60
Table GG.2	– Appliance with packaging	65
Table GG.3	– Appliance without packaging	65
Table GG.4	– Maximum charge (kg) (see Note 2 of Clause GG.2)	66
Table GG.5	– Minimum room area (m ²) (see Note 2 of Clause GG.2)	67

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers

FOREWORD

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International Standard IEC 60335 has been prepared by subcommittee 61D: Appliances for air-conditioning for household and similar purposes, of IEC technical committee 61: Safety of household and similar electrical appliances.

This fifth edition cancels and replaces the fourth edition published in 2002, its Amendment 1 (2005), its Amendment 2 (2005) and its Corrigendum 1 (2006). It constitutes a technical revision.

The principal changes in this edition as compared with the fourth edition are as follows (minor changes are not listed):

- 3.127 and 3.128 – added new definitions;
- 5.10 – length of refrigerant lines now specified for testing;
- 7.1 – changed marking requirements for **flammable refrigerants**;

- 8.15 – added requirement to clarify the placement of installation panels during testing;
- 11.2.1 – clarification of test procedure;
- 19 – (whole clause) – replaced in its entirety;
- 21.2 – added new coverage for vibration considerations during transport;
- 22.46 – added clarification for PEC;
- 22.118 – added coverage for use of mechanical connectors indoors when employing **flammable refrigerants**;
- 32 – made this section of Part 1 applicable;
- Annex FF2.4 – revised calculation for calculating volume (V);
- Annex FF2.5 – revision of allowable concentration of flammable refrigerant gas;
- Annex GG8 – new coverage added;
- Annex HH – added informative annex.

The text of this standard is based on the following documents:

FDIS	Report on voting
61D/213/FDIS	61D/220/RVD

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

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

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 electrical heat pumps, air-conditioners and dehumidifiers.

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 associated noun are also in bold.

The following differences exist in the countries indicated below:

- 6.1: Class 0I appliances are allowed (Japan).
- 11.8: The temperature of the wooden walls in the test casing is limited to 85 °C (Sweden).

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.

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

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

A bilingual version of this publication may be issued at a later date.

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.

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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric **heat pumps**, including **sanitary hot water heat pumps**, **air-conditioners**, and **dehumidifiers** incorporating motor-compressors and hydronic room **fan coils**, their maximum **rated voltages** being not more than 250 V for single phase appliances and 600 V for all other appliances.

Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as appliances intended to be used by laymen in shops, in light industry and on farms, are within the scope of this standard.

This standard also applies to electric **heat pumps**, **air conditioners** and **dehumidifiers** containing **flammable refrigerant**. **Flammable refrigerants** are defined in 3.121.

The appliances referenced above may consist of one or more factory made assemblies. If provided in more than one assembly, the separate assemblies are to be used together, and the requirements are based on the use of matched assemblies.

NOTE 101 A definition of 'motor-compressor' is given in IEC 60335-2-34, which includes the statement that the term motor-compressor is used to designate either a hermetic motor-compressor or semi-hermetic motor-compressor.

NOTE 102 Requirements for refrigeration safety are covered by ISO 5149, and requirements for containers intended for storage of the heated water included in **sanitary hot water heat pumps** are, in addition, covered by IEC 60335-2-21.

This standard does not take into account chemicals other than group A1, A2, or A3 as defined by ANSI/ASHRAE 34 [ISO 817] classification.

This standard specifies particular requirements for the use of **flammable refrigerants**. Unless specifications are covered by this standard, including the annexes, requirements for refrigerating safety are covered by ISO 5149.

The sections and clauses in ISO 5149 of particular concern to this standard are as follows:

- Section 3: "Design and construction of equipment" applies to all appliances and systems.
- Section 4: "Requirements for utilization" applies to appliances and systems which are for "similar electrical appliances", i.e. commercial and light industrial.
- Section 5: "Operating procedures" applies to appliances and systems which are for "similar electrical appliances", i.e. commercial and light industrial.

Supplementary heaters, or a provision for their separate installation, are within the scope of this standard, but only heaters which are designed as a part of the appliance package, the controls being incorporated in the appliance.

NOTE 103 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- for appliances subjected to pressure, additional requirements may be necessary;
- in many countries, additional requirements are specified, for example, by the national health authorities responsible for the protection of labour and the national authorities responsible for storage, transportation, building constructions and installations.

NOTE 104 This standard does not apply to

- humidifiers intended for use with heating and cooling equipment (IEC 60335-2-88);
- appliances designed exclusively for industrial processing;
- 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).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60068-2-52, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)*

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

IEC 60079-15:2010, *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

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

IEC 60335-2-51, *Household and similar electrical appliances – Safety – Part 2-51: Particular requirements for stationary circulation pumps for heating and service water installations*

ISO 817:2005, *Refrigerants – Designation system*

ISO 5149:1993, *Mechanical refrigerating systems used for cooling and heating – Safety requirements*

ISO 7010: 2011, *Graphic Symbols – Safety colours and safety signs – Registered safety signs*

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

ANSI/ASHRAE 34:2010, *Designation and safety classification of refrigerants*

ASTM D4728-01:2001, *Standard Test Method for Random Vibration Testing of Shipping Containers*