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INTERNATIONAL STANDARD

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Household and similar electrical appliances – Safety – Part 2-104: Particular requirements for appliances to recover and/or recycle refrigerant from air conditioning and refrigeration equipment

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD 4
INTRODUCTION 8
1 Scope 9
2 Normative references 9
3 Terms and definitions 10
4 General requirement 12
5 General conditions for the tests 12
6 Classification 12
7 Marking and instructions 12
8 Protection against access to live parts 14
9 Starting of motor-operated appliances 14
10 Power input and current 14
11 Heating 14
12 Void 19
13 Leakage current and electric strength at operating temperature 19
14 Transient overvoltages 19
15 Moisture resistance 19
16 Leakage current and electric strength 20
17 Overload protection of transformers and associated circuits 20
18 Endurance 20
19 Abnormal operation 20
20 Stability and mechanical hazards 26
21 Mechanical strength 26
22 Construction 28
23 Internal wiring 35
24 Components 35
25 Supply connection and external flexible cords 36
26 Terminals for external conductors 36
27 Provision for earthing 36
28 Screws and connections 36
29 Clearances, creepage distances and solid insulation 36
30 Resistance to heat and fire 37
31 Resistance to rusting 37
32 Radiation, toxicity and similar hazards 37
Annexes 39
~~Annex AA (normative) Vacuum levels ..... 50~~
Annex AA (normative) Temperature and pressure test 50
~~Annex BB (normative) Particulate used in standard contaminated refrigerant ..... 53~~
Annex ~~CC~~ BB (normative) Compatibility requirements 53
Annex CC (normative) Pressure tests 54
CC.1 General 54

CC.2 Pressure test value determined under testing carried out in Clause 11 54
CC.3 Pressure test value determined under testing carried out in Clause 19 54
CC.4 Pressure test value determined under testing carried out under standstill conditions 54
CC.5 Fatigue test option for Clause CC.2 and CC.4 55
~~Annex DD (normative) Requirements for swelling oil .....~~
Annex DD (normative) Leak simulation tests 58
DD.1 General 58
DD.2 Test methods 58
Annex EE (normative) Manual – Installation and operating instructions 60
Bibliography 62

Figure 101 – Supply circuit for locked-rotor test of a motor of the single-phase type 38

Table ~~3~~ 1 – Temperature limits 16
Table ~~8~~ 2 – Maximum winding temperature 21
Table ~~9~~ 3 – Maximum abnormal temperature 25
Table 4 − High side pressure for strength tests 32
Table 5 – Low side pressure for strength tests 33
~~Table AA.1 – Standard contaminated refrigerant samples .....~~
~~Table BB.1 – Weight % in various size ranges pm .....~~
Table ~~CC.1~~ BB.1 – Alternate values of time and temperature for the compatibility test 53

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-104: Particular requirements for appliances to recover and/or recycle refrigerant from air conditioning and refrigeration equipment

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60335-2-104:2003. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 60335-2-104 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. It is an International Standard.

This second edition cancels and replaces the first edition published in 2003. This edition constitutes a technical revision.

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

a) Clause 1 – The scope has been edited to reflect that "appliance" in this document means recovery and/or recycle equipment to recover and/or recycle refrigerant from air-conditioning and refrigeration equipment.
b) Clause 2 – Normative references were added.
c) Clause 3 – Some definitions were deleted, some were added.
d) Subclause 7.1 – Some markings were deleted, some were added.
e) Subclause 7.6 – Symbols were added for “read operator’s manual”, “operator’s manual; operating instructions” including coloring are placed in visible location; maximum allowable pressure markings following X MPa.
f) Subclause 19.11.4 was modified.
g) Subclause 21.1 was modified.
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i) Subclause 22.102 was modified.
j) Subclause 22.104.1.1 was modified.
k) Subclause 22.104.5 was modified.
l) Subclause 22.104.10 was modified.
m) Subclause 22.104.11 was modified.
n) Subclause 22.105.1 was modified.
o) Subclause 22.107 was modified.
p) Subclause 30.2 was moved to Clause 29.
q) Annex AA was deleted and replaced with Annex AA.
r) Annex BB was deleted and replaced with former IEC 60335-2-104 Annex CC (normative) Compatibility requirements following addition to Annex BB.
s) Annex DD was deleted and replaced with Annex CC.
t) New Annex DD was added.
u) New Annex EE was added.

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

Draft	Report on voting
61D/472/FDIS	61D/474/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 fifth edition of IEC 60335-1:2010 and its amendments.

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 appliances to recover and/or recycle refrigerant from air conditioning and refrigeration equipment.

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 smaller 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:

- 6.1: Class 01 appliances are allowed (Japan).
- 11.8: The temperature of the wooden walls in the test casing is limited to 85 °C (Sweden).

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-104: Particular requirements for appliances to recover and/or recycle refrigerant from air conditioning and refrigeration equipment

1 Scope

This clause of Part 1 is replaced by the following:

This part of IEC 60335 deals with the safety of electrical ~~appliances~~ **recovery** and/or **recycle** equipment to recover and/or **recycle refrigerant** from air conditioning and refrigeration equipment. This applies to air-conditioning, heat-pumps and refrigeration equipment incorporating open drive or motor-**compressors**, their maximum **rated voltages** being not more than ~~250~~ 300 V for single phase appliances and 600 V for all other ~~appliances~~ equipment.

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 service personnel in shops, in light industry and on farms, are within the scope of this standard.

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 "sealed motor-**compressor**" is given in IEC 60335-2-34.~~

~~NOTE 102 Requirements for refrigeration safety are covered by ISO 5149.~~

~~NOTE 103 For appliances using flammable refrigerants, additional requirements are under consideration.~~

~~NOTE 104 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 by the national health authorities, the national authorities responsible for the protection of labour, national water supply authorities and similar authorities.~~

~~NOTE 105 This standard does not apply to~~

~~– 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).~~

NOTE 101 In this document, the term appliance is to denote **recovery** equipment.

2 Normative references

This clause of Part 1 is applicable except as follows.

Replacement:

IEC 60065:2014, *Audio, video and similar electronic apparatus − Safety requirements*

Addition:

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

IEC 60079-15:2010[1], *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

IEC 600320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60335-2-34:~~2002~~2012, *Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for motor-compressors*

IEC 60335-2-40:2018, *Household and similar electrical appliances – Safety – Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers*

IEC 62640:2011, *Residual current devices with or without overcurrent protection for socket-outlets for household and similar uses*
IEC 62640:2011/AMD1:2015

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

ISO 5149-2, *Refrigerating systems and heat pumps – Safety and environmental requirements – Part 2: Design, construction, testing, marking and documentation*

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

ASTM D4728-17, *Standard Test Method for Random Vibration Testing of Shipping Containers*

SAE J2210 HFC-134a (R-134a), *Recovery/Recycling Equipment for Mobile Air-Conditioning Systems*

SAE J2843 R-1234yf [HFO-1234yf], *Recovery/Recycling/Recharging Equipment for Flammable Refrigerants for Mobile Air-Conditioning Systems*

SAE J3030, A*utomotive Refrigerant Recovery/Recycling/Recharging Equipment Intended for use with Both R-1234yf and R-134a*

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1 Withdrawn.

IEC 60335-2-104

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INTERNATIONAL STANDARD

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Household and similar electrical appliances – Safety –
Part 2-104: Particular requirements for appliances to recover and/or recycle refrigerant from air conditioning and refrigeration equipment



IEC 60335-2-104:2021-05(en)

CONTENTS

FOREWORD 4
INTRODUCTION 7
1 Scope 8
2 Normative references 8
3 Terms and definitions 9
4 General requirement 10
5 General conditions for the tests 10
6 Classification 10
7 Marking and instructions 11
8 Protection against access to live parts 12
9 Starting of motor-operated appliances 13
10 Power input and current 13
11 Heating 13
12 Void 17
13 Leakage current and electric strength at operating temperature 17
14 Transient overvoltages 17
15 Moisture resistance 17
16 Leakage current and electric strength 18
17 Overload protection of transformers and associated circuits 18
18 Endurance 18
19 Abnormal operation 18
20 Stability and mechanical hazards 23
21 Mechanical strength 23
22 Construction 26
23 Internal wiring 32
24 Components 33
25 Supply connection and external flexible cords 33
26 Terminals for external conductors 33
27 Provision for earthing 33
28 Screws and connections 34
29 Clearances, creepage distances and solid insulation 34
30 Resistance to heat and fire 34
31 Resistance to rusting 34
32 Radiation, toxicity and similar hazards 34
Annexes 36
Annex AA (normative) Temperature and pressure test 37
Annex BB (normative) Compatibility requirements 39
Annex CC (normative) Pressure tests 40
CC.1 General 40
CC.2 Pressure test value determined under testing carried out in Clause 11 40
CC.3 Pressure test value determined under testing carried out in Clause 19 40

CC.4 Pressure test value determined under testing carried out under standstill conditions 40
CC.5 Fatigue test option for Clause CC.2 and CC.4 41
Annex DD (normative) Leak simulation tests 43
DD.1 General 43
DD.2 Test methods 43
Annex EE (normative) Manual – Installation and operating instructions 45
Bibliography 47

Figure 101 – Supply circuit for locked-rotor test of a motor of the single-phase type 35

Table 1 – Temperature limits 14
Table 2 – Maximum winding temperature 19
Table 3 – Maximum abnormal temperature 22
Table 4 − High side pressure for strength tests 30
Table 5 – Low side pressure for strength tests 30
Table BB.1 – Alternate values of time and temperature for the compatibility test 39

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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.

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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 2-104: Particular requirements for appliances to recover and/or recycle refrigerant from air conditioning and refrigeration equipment

1 Scope

This clause of Part 1 is replaced by the following:

This part of IEC 60335 deals with the safety of electrical **recovery** and/or **recycle** equipment to recover and/or **recycle refrigerant** from air conditioning and refrigeration equipment. This applies to air-conditioning, heat-pumps and refrigeration equipment incorporating open drive or motor-**compressors**, their maximum **rated voltages** being not more than 300 V for single phase appliances and 600 V for all other equipment.

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 service personnel in shops, in light industry and on farms, are within the scope of this standard.

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 In this document, the term appliance is to denote **recovery** equipment.

2 Normative references

This clause of Part 1 is applicable except as follows.

Replacement:

IEC 60065:2014, *Audio, video and similar electronic apparatus − Safety requirements*

Addition:

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

IEC 60079-15:2010[1], *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

IEC 600320 (all parts), *Appliance couplers for household and similar general purposes*

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

[1] Withdrawn.

IEC 60335-2-40:2018, *Household and similar electrical appliances – Safety – Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers*

IEC 62640:2011, *Residual current devices with or without overcurrent protection for socket-outlets for household and similar uses*
IEC 62640:2011/AMD1:2015

ISO 5149-2, *Refrigerating systems and heat pumps – Safety and environmental requirements – Part 2: Design, construction, testing, marking and documentation*

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

ASTM D4728-17, *Standard Test Method for Random Vibration Testing of Shipping Containers*

SAE J2210 HFC-134a (R-134a), *Recovery/Recycling Equipment for Mobile Air-Conditioning Systems*

SAE J2843 R-1234yf [HFO-1234yf], *Recovery/Recycling/Recharging Equipment for Flammable Refrigerants for Mobile Air-Conditioning Systems*

SAE J3030, A*utomotive Refrigerant Recovery/Recycling/Recharging Equipment Intended for use with Both R-1234yf and R-134a*