



CSA C22.2 No. 60335-2-40:19
(IEC 60335-2-40:2018, MOD)
National Standard of Canada



CSA C22.2 No. 60335-2-40:19
Household and similar electrical appliances — Safety — Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers
(IEC 60335-2-40:2018, MOD)



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

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PREFACE

This is the harmonized CSA Group and UL standard for Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers. It is the third edition of CAN/CSA-C22.2 No. 60335-2-40, and the third edition of UL 60335-2-40. This edition of CAN/CSA-C22.2 No. 60335-2-40 supersedes the previous edition(s) published on September 15, 2017. This edition of UL 60335-2-40 supersedes the previous edition(s) published on September 15, 2017.

This harmonized standard is based on IEC Publication 60335-2-40: 6.0 edition Household and similar electrical appliances – Safety – Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers issued January 2018. IEC publication 60035-2-40 is copyrighted by the IEC.

At the time of this publication, IEC 60335-2-40, Edition 6.0 is available from IEC in English only. CSA Group will publish the French version when it becomes available from the IEC.

In Canada, for general requirements on the standards of the Canadian Electrical Code, Part II, see CAN/CSA-C22.2 No. 0.

This harmonized standard was prepared by CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the Technical Harmonization Subcommittee on Air-Conditioning and Refrigeration (THSC 61D WG10) of the Council on the Harmonization of Electrotechnical Standards of the Nations of the Americas (CANENA) are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

This standard was reviewed by the CSA Subcommittee on Appliances for Air-Conditioning for Household and Similar Purposes, under the jurisdiction of the CSA Technical Committee on Consumer and Commercial Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee. This Standard was also reviewed and approved by UL's Standards Technical Panel for Heating and Cooling Equipment – Heat Pumps, Air-Conditioners and Dehumidifiers, STP 60335-2-40.

This standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

This CAN/CSA-C22.2 No. 60335-2-40, Standard for Safety for Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers is to be used in conjunction with the second edition of CAN/CSA-C22.2 No. 60335-1:16. The requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers are contained in this Part 2 Standard and CAN/CSA-C22.2 No. 60335-1:16. Requirements of this Part 2 Standard, where stated, amend the requirements of CAN/CSA-C22.2 No. 60335-1:16. Where a particular subclause of CAN/CSA-C22.2 No. 60335-1:16 is not mentioned in CAN/CSA-C22.2 No. 60335-2-40, the CAN/CSA-C22.2 No. 60335-1:16 subclause applies.

This UL Standard 60335-2-40 Standard for Safety for Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers, is to be used in conjunction with the sixth edition of UL 60335-1. The requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers are contained in this Part 2 Standard and UL 60335-1. Requirements of this Part 2 Standard, where stated, amend the requirements of UL 60335-1. Where a particular subclause of UL 60335-1 is not mentioned in UL 60335-2-40, the UL 60335-1 subclause applies.

Level of Harmonization

This standard adopts the IEC text with national differences.

This standard is published as an equivalent standard for CSA and UL.

An equivalent standard is a standard that is substantially the same in technical content, except as follows:

a) Technical national differences are allowed for national differences resulting from conflicts in codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate.

b) Presentation is word for word except for editorial changes that do not alter the technical content of the standard. Examples of editorial changes include:

- 1) different font sizes, figure sizes, and table sizes;
- 2) minor variations in format, such as indentation and pagination;
- 3) font appearance (including the use of italic or bold text or uppercase or lowercase letters);
- 4) the use of a symbol (e.g., A or %) rather than the word (Ampere or percent), or the word rather than the symbol;
- 5) inclusion of inch-pound units for informational purposes;
- 6) corrections of misprints or typographical errors;
- 7) bilingual column headings or figure captions on a common table or figure in a bilingual edition;
- 8) change from first-angle to third-angle drawing;
- 9) addition of a statement: "This is a first-angle drawing"; and
- 10) substitution of a point (.) for a comma (,) as the decimal marker.

All national differences from the IEC text are included in the CSA Group and UL versions of the standard. While the technical content is the same in each organization's version, the format and presentation may differ.

Reasons for Differences From IEC

Differences from the IEC are being added in order to address safety and regulatory situations present in the US and Canada.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

IEC Copyright

For CSA Group, the text, figures, and tables of International Electrotechnical Commission Publication 60335-2-40, Household and Similar Electrical Appliances – Safety – Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers, copyright 2018, are used in this standard with the consent of the International Electrotechnical Commission. The IEC Foreword and Introduction are not a part of the requirements of this standard but are included for information purposes only.

These materials are subject to copyright claims of IEC and UL. No part of this publication may be reproduced in any form, including an electronic retrieval system, without the prior written permission of UL. All requests pertaining to the Household and Similar Electrical Appliances – Safety – Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers, UL 60335-2-40 Standard should be submitted to UL.

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NATIONAL DIFFERENCES

GENERAL

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60335-2-40, Household and similar electrical appliances – Safety – Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers, copyright 2018, are indicated by notations (differences) and are presented in bold text.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are National Differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

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FOREWORD

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers

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.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

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.

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

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

FDIS	Report on voting
61D/XX/FDIS	61D/XX/RVD

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

This sixth edition cancels and replaces the fifth edition published in 2013 and its Amendment 1:2016. This edition constitutes a technical revision.

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

- Clause 1 – limiting A2L refrigerants to those of a molar mass of more than or equal to 42 kg/kmol;
- Clause 7 – added requirements for A2L refrigerants,
- Clause 7 – added requirement for pre-charge pipe sets, detection systems, ventilation and the resulting charge;
- Clause 7 – added requirements for UV-C systems;
- Clause 7 – added requirements for transcritical refrigerating systems;
- Subclause 19.7 – amended text to match the intention of the subclause;
- Clause 21 – added requirements for transcritical refrigerating systems;
- Subclause 22 – added requirements for A2L refrigerants;
- Subclause 22– added detection systems;
- Subclause 22 – added new requirements for enhanced tightness refrigerating systems;
- Subclause 22 – added new requirements for UV-C;
- Clause 23 – added new requirements for UV-C;
- Clause 24 – added requirements for transcritical refrigerating systems;
- Subclause 24 – added requirements for detection systems and airflow;
- Clause 32 added new requirements for UV-C;
- Annex BB – revised to add surface temperatures;
- Annex DD – added requirements for A2L refrigerants and amended requirements for flammable refrigerants to exempt A2L refrigerants;
- Annex GG – added requirements for A2L refrigerants;
- Annex GG.1 – amended Table GG.1 and related wording
- Annex GG.7 – added requirement to test;
- Annex GG.8 to GG.13 – new coverage for A2L refrigerants;
- Annex HH – revised to take into account A2L refrigerants;
- Annex JJ – new coverage of allowable opening of relays and similar components to prevent ignition of A2L refrigerants;
- Annex KK – new coverage of test method for hot surface ignition temperature for A2L;
- Annex LL – new coverage of refrigerant detection systems for A2L Refrigerants;
- Annex MM – new coverage of refrigerant sensor location confirmation test;
- Annex NN – new coverage of flame arrest enclosure verification test for A2L refrigerants;
- Annex OO – new coverage of UV radiation conditioning
- Bibliography – added new references.

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

This part 2-40 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of IEC 60335-1:2010, its Amendment 1:2013 and its Amendment 2:2016.

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

This part 2-40 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 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.

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.

101DV D2 Modification of the of the first sentence of the 7th paragraph after item 9 by replacing it with the following paragraph:

This Part 2-40 is intended to be used in conjunction with CAN/CSA-C22.2 No. 60335-1:16 and the sixth edition of UL 60335-1. All references in this standard to IEC 60335-1 shall be replaced by CAN/CSA-C22.2 No. 60335-1:16 and the sixth edition of UL 60335-1.

102DV DE *Modify the paragraph following NOTE 3 in the Part 2 Foreword by replacing it with the following:*

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

103DV DE *Modify by adding the following text at the end of the Part 2 Foreword:*

The numbering system in this Standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

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 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.

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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 FAN COILS UNITS, their maximum RATED VOLTAGES being not more than 250 V for single phase appliances and 600 V for all other appliances. PARTIAL UNITS are within the scope of this International Standard.

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.

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 refrigerating safety are covered by ISO 5149-1, ISO 5149-2, and ISO 5149-3. 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 refrigerants other than group A1, A2L, A2 and A3 as defined by ISO 817 classification, A2L REFRIGERANTS are limited to those of a molar mass of more than or equal to 42 kg/kmol based on WCF as specified in ISO 817.

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 parts of ISO 5149 of particular concern to this standard are as follows:

- ISO 5149-1:2014, Refrigerating systems and heat pumps – Safety and environmental requirements – Part 1: Definitions, classification and selection criteria.
- ISO 5149-2, Refrigerating systems and heat pumps – Safety and environmental requirements – Part 2: Design, construction, testing, marking and documentation;
- ISO 5149-3:2014, Refrigerating systems and heat pumps – Safety and environmental requirements – Part 3: Installation site.

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