



UL 60335-2-24

STANDARD FOR SAFETY

Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers

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UL Standard for Safety for Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers, UL 60335-2-24

Third Edition, Dated July 29, 2022

Summary of Topics

This new edition of ANSI/UL 60335-2-24 dated July 29, 2022 is an adoption of IEC 60335-2-24, Edition 8 issued by the IEC September 2020. Please note that the National Difference document incorporates all the U.S. national differences.

This new edition includes replacement of the ISO 7010 W021 flammable refrigerant label with the United Nations GHS red diamond flame symbol in all HVAC/R standards.

The requirements are substantially in accordance with Proposal(s) on this subject dated November 5, 2021 and March 18, 2022.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

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CSA Group
CSA C22.2 No. 60335-2-24:22
Third Edition
(IEC 60335-2-24:2020, MOD)



Underwriters Laboratories Inc.
UL 60335-2-24
Third Edition

Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers

July 29, 2022

This national standard is based on IEC 60335-2-24, eighth edition (2020).

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ANSI/UL 60335-2-24-2022



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This ANSI/UL Standard for Safety consists of the Third Edition. The most recent designation of ANSI/UL 60335-2-24 as an American National Standard (ANSI) occurred on July 29, 2022. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

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PREFACE

This is the harmonized CSA Group and UL standard for Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers. It is the third edition of CSA C22.2 No. 60335-2-24 and the third edition of UL 60335-2-24. This edition of CSA C22.2 No. 60335-2-24 supersedes the previous edition published in 2017 as CAN/CSA-C22.2 No. 60335-2-24 (adopted IEC 60335-2-24:2010+A1:2012). This edition of UL 60335-2-24 supersedes the previous edition(s) published on February 27, 2020.

This harmonized standard is based on IEC Publication 60335-2-24, Eighth Edition, Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers, issued September 2020. IEC 60335-2-24 is copyrighted by the IEC.

This harmonized Standard was prepared by CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the appliance manufacturing industry 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 Household Appliances for Refrigeration 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 Household Refrigerators and Freezers, STP 60335-2-24. 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.

CSA C22.2 No. 60335-2-24 is intended to be used in conjunction with the second edition of CAN/CSA-C22.2 No. 60335-1. The requirements for refrigerating appliances, ice-cream appliances and ice makers are contained in this Part 2 Standard and CAN/CSA-C22.2 No. 60335-1. Requirements of this Part 2 Standard, where stated, amend the requirements of CAN/CSA-C22.2 No. 60335-1. Where a particular subclause of CAN/CSA-C22.2 No. 60335-1 is not mentioned in CSA C22.2 No. 60335-2-24, the CAN/CSA-C22.2 No. 60335-1 subclause applies.

UL 60335-2-24 is to be used in conjunction with the sixth edition of UL 60335-1. The requirements for refrigerating appliances, ice-cream appliances and ice makers 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 60335-2-24, 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 Group and UL.

An equivalent standard is a standard that is substantially the same in technical content, except as follows: Technical national differences are allowed for 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. Presentation is word for word except for editorial changes.

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

National 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.

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For CSA Group, the text, figures, and tables of International Electrotechnical Commission Publication 60335-2-24, Household and Similar Electrical Appliances – Safety – Part 2-24: Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances and Ice-Makers, copyright 2020, 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.

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NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60335-2-24, Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers, copyright 2020, are indicated by notations (differences) and are presented in bold text. The national difference type is included in the body.

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 2–24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers

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 nongovernmental 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 eighth edition cancels and replaces the seventh edition published in 2010, Amendment 1:2012 and Amendment 2:2017. This edition constitutes a technical revision.

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

– aligns the text with IEC 60335-1, Ed 5.2;

– some notes have been converted to normative text or deleted ([4](#), [5.2](#), [5.7](#), [7.1](#), [7.6](#), 7.10, [7.12](#), [19.1](#), [19.101](#), [19.102](#), [20.101](#), [20.102](#), [20.103](#), [20.104](#), [21](#), [22.7](#), [22.33](#), [22.101](#), [22.102](#), [22.103](#), [22.107](#), [22.108](#), [22.109](#), [30.1](#));

- normative references and associated text have been updated ([2](#), [22.108](#), [22.109](#), [Table 102](#), Annex [CC](#));
- definition of free space has been clarified ([3.6.104](#));
- measurement of the input current of refrigerating appliances using inverter driven motor-compressors is included ([10.2](#));
- compatibility tests for winding insulation of motor-compressors used with different types of refrigerants and oils have been introduced ([22.9](#));
- requirements for inadvertent contact points between uncoated aluminium pipes and copper pipes have been updated ([22.111](#));
- testing of accessible glass panels has been clarified ([22.116](#));
- in refrigerating appliances, requirements for material encasing and in contact with thermal insulation have been introduced and consequential text has been deleted ([22.117](#), [30.2](#), [30.2.101](#), Annex [EE](#));
- requirements for motor running capacitors have been updated ([24.5](#), [24.8](#));
- the locked rotor test for fan motors has been clarified (Annex [AA](#));

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

FDIS	Report on voting
61C/861/FDIS	61C/863/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 document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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. 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 refrigerating appliances, ice-cream appliances and ice-makers.

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.

- 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).
- 22.110 : For unsealed glass tube heaters, the temperature requirements are different (Japan).
- 22.117: Only the first two dashed items in the first paragraph of the requirement are allowed (Australia and New Zealand).

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 Modify the 8th paragraph after Item 9) and Note 1 of the Part 2 IEC Foreword by replacing them with the following:

This Part 2-24 is intended to be used in conjunction with the CSA/UL harmonized standard of the second edition of CAN/CSA-C22.2 No. 60335-1 and the sixth edition of UL 60335-1

dated October 31, 2016. This harmonized standard is an adoption of IEC 60335-1, Household and Similar Electrical Appliances – Safety – Part 1: General Requirements, (Edition 5.1, Issued by the IEC April 2014.) All references in this Standard to IEC 60335-1 shall be replaced by reference to this CSA/UL harmonized standard.

102DV DE *Modify the paragraph following Note 3 in the Part 2 IEC 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 *Modification by adding the following text at the end of the Part 2 IEC Foreword:*

The numbering system in the 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.

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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.

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers

1 Scope

This clause of Part 1 is replaced by the following:

This International Standard deals with the safety of the following appliances, their RATED VOLTAGE being not more than 250 V for single-phase appliances, 480 V for other appliances and 24 V DC for appliances when battery operated:

- REFRIGERATING APPLIANCES for household and similar use;
- ICE-MAKERS incorporating a motor-compressor and ICE-MAKERS intended to be incorporated in frozen food storage compartments;
- REFRIGERATING APPLIANCES and ICE-MAKERS for use in camping, touring caravans and boats for leisure purposes.

These appliances may be operated from the mains, from a separate battery or operated either from the mains or from a separate battery.

This standard also deals with the safety of ICE-CREAM APPLIANCES intended for household use, their RATED VOLTAGE being not more than 250 V for single-phase appliances and 480 V for other appliances.

It also deals with COMPRESSION-TYPE APPLIANCES for household and similar use, which use FLAMMABLE REFRIGERANTS.

This standard does not cover features of the construction and operation of those REFRIGERATING APPLIANCES which are dealt with in other IEC standards.

REFRIGERATING APPLIANCES not intended for normal household use but which nevertheless may be a source of danger to the public, such as

- REFRIGERATING APPLIANCES used in staff kitchen areas in shops, offices and other working environments,
- REFRIGERATING APPLIANCES used in farm houses and by clients in hotels, motels and other residential type environments,
- REFRIGERATING APPLIANCES used in bed and breakfast type environments, and
- REFRIGERATING APPLIANCES used in catering and similar non-retail applications

are within the scope of this standard.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

- persons (including children) whose

- physical, sensory or mental capabilities or
- lack of experience and knowledge

prevents them from using the appliance safely without supervision or instruction;

– children playing with the appliance.

NOTE 1 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;
- 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 intended to be used in the open air;
- appliances designed exclusively for industrial purposes;
- 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);
- appliances incorporating a battery intended as a power supply for the refrigerating function;
- appliances assembled on site by the installer;
- appliances with remote motor-compressors;
- motor-compressors (IEC 60335-2-34);
- commercial dispensing appliances and vending appliances (IEC 60335-2-75);
- commercial refrigerating appliances and ice-makers with an incorporated or remote refrigerant unit or motor-compressor (IEC 60335-2-89);
- professional ice-cream makers (IEC 60335-2-118).

1DV.1 D2 Modification to add the following to Clause 1 of the Part 2:

This part of UL/CSA 60335 applies to products that are intended to be installed or used in accordance with

- **CSA C22.1, Canadian Electrical Code, Part I, in Canada;**
- **NFPA 70, National Electrical Code, in the United States.**

2 Normative references

This clause of Part 1 is applicable except as follows.