



UL 60335-2-34

STANDARD FOR SAFETY

Household and Similar Electrical Appliances –
Safety – Part 2-34: Particular Requirements for
Motor-Compressors

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UL Standard for Safety for Household and Similar Electrical Appliances – Safety – Part 2-34: Particular Requirements for Motor-Compressors, UL 60335-2-34

Sixth Edition, Dated November 3, 2017

Summary of Topics

The following is the Sixth Edition of ANSI/UL 60335-2-34, the common CSA Group and UL (binational) standard that is an adoption of IEC 60335-2-34, Safety Standard for of Household and Similar Electrical Appliances – Safety – Part 2-34: Particular Requirements for Motor-Compressors (IEC 60335-2-34, Edition 5.2:2016.)

The new requirements are substantially in accordance with Proposal(s) on this subject dated March 24, 2017 and July 7, 2017.

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Underwriters Laboratories Inc.
UL 60335-2-34
Sixth Edition

Household and Similar Electrical Appliances – Safety – Part 2-34: Particular Requirements for Motor-Compressors

November 3, 2017

This national standard is based on publication IEC 60335-2-34, Edition 5.2:2016 (Edition 5:2012 consolidated with amendment 1:2015 and its corrigendum 1:2015, and amendment 2:2016).



ANSI/UL 60335-2-34-2017

Commitment for Amendments

This standard is issued jointly by the Canadian Standards Association (operating as “CSA Group”) and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to CSA Group or UL at anytime. Revisions to this standard will be made only after processing according to the standards development procedures of CSA Group and UL. CSA Group and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue.

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This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquires@csagroup.org and include “Proposal for change” in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

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This ANSI/UL Standard for Safety consists of the Sixth Edition. The most recent designation of ANSI/UL 60335-2-34 as an American National Standard (ANSI) occurred on November 3, 2017. 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 particular requirements for motor-compressors. It is the second edition of CAN/CSA-C22.2 No. 60335-2-34, and the sixth edition of UL 60335-2-34. This edition of CAN/CSA-C22.2 No. 60335-2-34 supersedes the previous edition published on March 22, 2013. This edition of UL 60335-2-34 supersedes the previous edition published on March 22, 2013.

This harmonized standard is based on IEC Publication 60335-2-34: Edition 5.2, Household and Similar Electrical Appliances – Safety – Part 2-34: Particular Requirements for Motor-Compressors, issued November 2016. IEC 60335-2-34 is copyrighted by the IEC.

This harmonized Standard was prepared by CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the motor-compressor 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 Heating and Cooling Equipment – Particular Requirements for Motor-Compressors, STP 60335-2-34.

This Standard has been approved as a National Standard of Canada by the Standards Council of Canada (SCC) and approved by the American National Standards Institute (ANSI) for publication as an American National Standard.

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.

CAN/CSA-C22.2 No. 60335-2-34 is to be used in conjunction with the second edition of CAN/CSA-C22.2 No. 60335-1:16. The requirements for motor-compressors 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. 60335-2-34, the CAN/CSA-C22.2 No. 60335-1:16 subclause applies.

UL 60335-2-34 is to be used in conjunction with the sixth edition of UL 60335-1. The requirements for motor-compressors 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 60335-2-34, 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 60335-2-34, Household and Similar Electrical Appliances – Safety – Part 2-34: Particular Requirements for Motor-Compressors, copyright 2016, 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

GENERAL

In the CSA Group and UL publications of this standard, National Differences from the text of International Electrotechnical Commission (IEC) Publication 60335-2-34, Household and similar electrical appliances – Safety – Part 2-34: Particular requirements for motor-compressors, copyright 2016, 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.

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.

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.

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

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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 Consolidated version of IEC 60335-2-34 bears the edition number 5.2. It consists of the fifth edition (2012-05) [documents 61C/508/FDIS and 61C/517/RVD], its amendment 1 (2015-05) [documents 61C/597/FDIS and 61C/603/RVD] and its corrigendum (2015-06), and its amendment 2 (2016-11) [documents 61C/686/FDIS and 61C/691/RVD]. The technical content is identical to the base edition and its amendment.

This part of International Standard 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.

The principal changes in this edition as compared with the fourth edition of IEC 60335-2-34 are as follows (minor changes are not listed):

- some notes have been deleted or converted to normative text (1, 6.103, 19.14, 22.7, Figure 101);
- manufacturer must declare the type of motor protection used (5.102, 6.104);
- tests to fault-test MOTOR-COMPRESSORS incorporating ELECTRONIC CIRCUITS introduced (19.11.2, AA.5);
- application of the EMP tests clarified (19.11.4);
- testing of contactors and relays associated with MOTOR-COMPRESSORS introduced (19.14);
- tables 101 and 102 updated and corrected;
- running overload test conditions extended (AA.1, AA.2, AA.3, AA.4, AA.5).

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 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 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.

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 the base publication and its amendment 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.

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).

<p>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.</p>

101DV D2 Modification by replacing the 5th paragraph after Item (9) of the IEC Foreword and Note 1 with the following:

This Part 2-34 is intended to be used in conjunction with the CSA/UL harmonized standard of the second edition of CAN/CSA-C22.2 No. 60335-1:16 and the sixth edition of UL 60335-1 dated October 31, 2016. This harmonized standard is an adoption of IEC 60335-1, Safety Standard for Household and Similar Electrical Appliances, 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 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 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.

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