



UL 60335-1

STANDARD FOR SAFETY

Safety of Household and Similar Electrical Appliances, Part 1: General Requirements

UL Standard for Safety for Safety of Household and Similar Electrical Appliances, Part 1: General Requirements, UL 60335-1

Sixth Edition, Dated October 31, 2016

Summary of Topics

UL 60335-1 is an adoption of IEC 60335-1, Safety Standard for of Household and Similar Electrical Appliances, Part 1: General Requirements, (Edition 5.1, Issued by the IEC April, 2014). Please note that the national difference document incorporates all of the U.S. national differences for UL 60335-1.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated February 5, 2016 and July 15, 2016.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical photocopying, recording, or otherwise without prior permission of UL.

UL provides this Standard “as is” without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will UL be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this Standard, even if UL or an authorized UL representative has been advised of the possibility of such damage. In no event shall UL’s liability for any damage ever exceed the price paid for this Standard, regardless of the form of the claim.

Users of the electronic versions of UL’s Standards for Safety agree to defend, indemnify, and hold UL harmless from and against any loss, expense, liability, damage, claim, or judgment (including reasonable attorney’s fees) resulting from any error or deviation introduced while purchaser is storing an electronic Standard on the purchaser’s computer system.

No Text on This Page



CSA Group
CAN/CSA-C22.2 No. 60335-1:16
Second Edition



Underwriters Laboratories Inc.
UL 60335-1
Sixth Edition

Safety of Household and Similar Appliances, Part 1: General Requirements

October 31, 2016

This national standard is based on publication IEC 60335–1, Edition 5.1 (Edition 5:2010 including corrigendum 1:2010, corrigendum 2:2011, and amendment 1:2013) issued April 2014.



ANSI/UL 60335-1-2016

Approved by



Standards Council of Canada
Conseil canadien des normes

This is a preview. [Click here to purchase the full publication.](#)

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.

ISBN 978-1-4883-0257-2 © 2016 CSA Group

All rights reserved. No part of this publication may be reproduced in any form whatsoever without the prior permission of the publisher.

This Standard is subject to review 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.

To purchase CSA Group Standards and related publications, visit CSA Group’s Online Store at shop.csa.ca or call toll-free 1-800-463-6727 or 416-747-4044.

Copyright © 2016 Underwriters Laboratories Inc.

UL’s Standards for Safety are copyrighted by UL. Neither a printed nor electronic copy of a Standard should be altered in any way. All of UL’s Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of UL.

This ANSI/UL Standard for Safety consists of the Sixth Edition. The most recent designation of ANSI/UL 60335-1 as an American National Standard (ANSI) occurred on October 31, 2016. 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. Any other portions of this ANSI/UL standard that were not processed in accordance with ANSI/UL requirements are noted at the beginning of the impacted sections.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL’s On-Line Collaborative Standards Development System (CSDS) at <https://csds.ul.com>.

To purchase UL Standards, visit Comm 2000 at <http://www.comm-2000.com/HowToOrder.aspx> or call toll-free 1-888-853-3503.

CONTENTS

Preface	7
NATIONAL DIFFERENCES	9
FOREWORD	10
INTRODUCTION	15
1 Scope	17
2 Normative references	18
3 Terms and definitions	22
3.1 Definitions relating to physical characteristics	23
3.2 Definitions relating to means of connection	24
3.3 Definitions relating to protection against electric shock	25
3.4 Definitions relating to EXTRA-LOW VOLTAGE	27
3.5 Definitions relating to types of appliances	28
3.6 Definitions relating to parts of an appliance	29
3.7 Definitions relating to safety components	30
3.8 Definitions relating to miscellaneous matters	31
3.9 Definitions relating to ELECTRONIC CIRCUITS	32
4 General requirement	33
5 General conditions for the tests	33
6 Classification	37
7 Marking and instructions	38
8 Protection against access to LIVE PARTS	47
9 Starting of MOTOR-OPERATED APPLIANCES	49
10 Power input and current	50
11 Heating	51
12 Void	60
13 Leakage current and electric strength at operating temperature	60
14 Transient overvoltages	64
15 Moisture resistance	65
16 Leakage current and electric strength	68
17 Overload protection of transformers and associated circuits	71
18 Endurance	71
19 Abnormal operation	72
20 Stability and mechanical hazards	84
21 Mechanical strength	86
22 Construction	87
23 Internal wiring	102
24 Components	105
25 Supply connection and external flexible cords	112
26 Terminals for external conductors	123
27 Provision for earthing	126
27.7DV.1 Size of protective conductors	129
28 Screws and connections	131
29 CLEARANCES, CREEPAGE DISTANCES and solid insulation	135
30 Resistance to heat and fire	145
31 Resistance to rusting	154
32 Radiation, toxicity and similar hazards	154

Annex A (informative) Routine tests

A.1 Earth continuity test	169
A.2 Electric strength test	170
A.3 Functional test	170

Annex B (normative) Appliances powered by rechargeable batteries that are recharged in the appliance

3 Terms and definitions	171
5 General conditions for the tests	172
7 Marking and instructions	172
8 Protection against access to LIVE PARTS	173
11 Heating	173
19 Abnormal operation	174
21 Mechanical strength	176
22 Construction	176
25 Supply connection and external flexible cords	176
30 Resistance to heat and fire	176

Annex C (normative) Ageing test on motors**Annex D (normative) Thermal motor protectors****Annex E (normative) Needle-flame test**

7 Severities	180
9 Test procedure	180
9.1 Position of test specimen	180
9.2 Application of needle-flame	180
9.3 Number of test specimens	180
11 Evaluation of test results	180

Annex F (normative) Capacitors**Annex G (normative) SAFETY ISOLATING TRANSFORMERS**

7 Marking and instructions	183
17 Overload protection of transformers and associated circuits	183
22 Construction	183
29 CLEARANCES, CREEPAGE DISTANCES and solid insulation	183

Annex H (normative) Switches**Annex I (normative) Motors having BASIC INSULATION that is inadequate for the RATED VOLTAGE of the appliance**

8 Protection against access to LIVE PARTS	186
11 Heating	186
16 Leakage current and electric strength	186
19 Abnormal operation	186
22 Construction	187

Annex J (normative) Coated printed circuit boards**Annex K (normative) Overvoltage categories****Annex L (informative) Guidance for the measurement of CLEARANCES and CREEPAGE DISTANCES****Annex M (normative) Pollution degree****Annex N (normative) Proof tracking test****Annex O (informative) Selection and sequence of the tests of Clause 30****Annex P (informative) Guidance for the application of this standard to appliances used in warm damp equable climates**

5 General conditions for the tests	203
7 Marking and instructions	203
11 Heating	203
13 Leakage current and electric strength at operating temperature	203
15 Moisture resistance	203
16 Leakage current and electric strength	203
19 Abnormal operation	203

Annex Q (informative) Sequence of tests for the evaluation of ELECTRONIC CIRCUITS**Annex R (normative) Software evaluation**

R.1 Programmable ELECTRONIC CIRCUITS using software	207
R.2 Requirements for the architecture	207
R.2.1 General	207
R.2.2 Measures to control faults/errors	208
R.3 Measures to avoid errors	215

R.3.1 General	215
R.3.2 Specification	215

Annex S (normative) BATTERY-OPERATED APPLIANCES powered by batteries that are non-rechargeable or not recharged in the appliance

5 General conditions for the tests	220
7 Marking and instructions	220
11 Heating	221
19 Abnormal operation	222
25 Supply connection and external flexible cords	222
26 Terminals for external conductors	222
30 Resistance to heat and fire	223

Annex DVA (normative) North American additional requirements

Annex DVB

Annex DVC (normative) Mechanical requirements for direct plug in appliances

DVC.1 Maximum tipping moment	237
------------------------------------	-----

Annex DVD (normative) Adequacy of adhesive bonding properties

Bibliography

Index of defined words

Preface

This is the harmonized CSA Group and UL standard for general requirements for safety of household and similar appliances. It is the second edition of CAN/CSA C22.2 No. 60335-1, and the sixth edition of UL 60335-1. This edition of CAN/CSA-C22.2 No. 60335-1 coexists with the previous edition(s) published on October 31, 2011. This edition of UL 60335-1 supersedes the previous edition(s) published on October, 31, 2011.

This harmonized standard is based on IEC Publication 60335-1: edition 5.1 Standard for Safety of Household and Similar Appliances, Part 1: General Requirements issued April, 2014, including corrigendum 1 (2010), corrigendum 2 (2011) and its amendment 1 (2013). IEC publication 60335-1 is copyrighted by the IEC.

This harmonized standard was prepared by CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of Industry Associations [Cámara Nacional de Manufacturas Eléctricas (CANAME), the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI), the Air-Conditioning, Heating, and Refrigeration Institute (AHRI), and the Association of Home Appliance Manufacturers (AHAM)], and of the Technical Harmonization Sub-Committee (THSC 61D WG1) 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 Safety of Household Electrical Appliances, 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 has been approved by the Standards Council of Canada (SCC) as a National Standard of Canada.

This Standard has been approved by the American National Standards Institute (ANSI) 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.

This is the CAN/CSA-C22.2 No. 60335-1 Standard for Safety of Household and Similar Appliances, Part 1: General Requirements. This CSA Group Part 1 is to be used in conjunction with the appropriate CSA Group Part 2 Standard, which contains clauses to supplement or modify the corresponding clauses in the Part 1, to provide relevant requirements for each type of product.

This is the UL Standard for Safety of Household and Similar Appliances, Part 1: General Requirements. This UL Part 1 is to be used in conjunction with the appropriate UL Part 2 Standard, which contains clauses to supplement or modify the corresponding clauses in the Part 1, to provide relevant requirements for each type of product.