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# UL 2595

## **STANDARD FOR SAFETY**

### General Requirements for Battery-Powered Appliances

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UL Standard for Safety for General Requirements for Battery-Powered Appliances, UL 2595

Second Edition, Dated September 9, 2015

### **Summary of Topics**

***This new Bi-National Standard for ANSI/UL 2595, Standard for General Requirements for Battery-Powered Appliances Resulting includes the following changes:***

- ***Revisions to Add References to the Applicable CSA Standards;***
- ***New and Clarified Definitions;***
- ***Clarifications and New Requirements for Markings and Instructions;***
- ***Clarification of Requirements for Harnesses;***
- ***Clarification that All Cells Shall Comply with the Requirements of UL 62133; and***
- ***Revision of indent G Instructions Providing Guidance that the End Product Standard be Revised to Also Include a Statement that UL 2595 Functional Safety Requirements for an Electronic Safety Control Circuit Fulfills the Requirements of the End-Product Standard.***

The new requirements are substantially in accordance with Proposal(s) on this subject dated February 13, 2015 and May 15, 2015.

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CSA Group  
CSA C22.2 No. 0.23  
First Edition



Underwriters Laboratories Inc.  
UL 2595  
Second Edition

## General Requirements for Battery-Powered Appliances

September 9, 2015

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ANSI/UL 2595-2015

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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 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](mailto: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 Second Edition. The most recent designation of ANSI/UL 2595 as an American National Standard (ANSI) occurred on September 9, 2015. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface.

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## PREFACE

This is the harmonized CSA Group and UL standard for General Requirements for Battery-Powered Appliances. It is the first edition of CSA C22.2 No. 023, and the second edition of UL 2595. This edition of UL 2595 supersedes the previous edition published on May 22, 2013.

This harmonized standard was prepared by the CSA Group and Underwriters Laboratories Inc. (UL).

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 Batteries and Battery Systems, under the jurisdiction of the CSA Technical Committee on General Requirements, CE Code, Part II 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 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.

### Level of Harmonization

This standard is published as an identical standard for CSA Group and UL.

An identical standard is a standard that is exactly the same in technical content except for national differences resulting from conflicts in codes and governmental regulations. Presentation is word for word except for editorial changes.

### Reasons for Differences From IEC

This standard is the result of many source documents including IEC 60745-1 Ed. 4.0 b:2006 and IEC 62841-1 Ed. 1.0. This standard is not based on a single IEC document.

### 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 IEC 60745-1 Ed. 4.0b:2006, Hand-Held Motor-Operated Electric Tools — Safety — Part 1: General Requirements and IEC 62841-1 Ed. 1.0: 2014, Standard for Safety for Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 1: General Requirements, copyright 2006 and 2014 respectively, are used in this standard with the consent of the International Electrotechnical Commission.

For UL, parts of this text have been taken from or adapted from IEC 60745-1 Ed. 4.0b:2006, Hand-Held Motor-Operated Electric Tools — Safety — Part 1: General Requirements and IEC 62841-1 Ed. 1.0: 2014, Standard for Safety for Electric Motor-Operated Hand-Held Tools, Transportable Tools And Lawn And Garden Machinery – Safety – Part 1: General Requirements, copyright 2006 and 2014 respectively are used in this standard with the consent of the IEC and the American National Standards Institute (ANSI). The IEC copyrighted material has been reproduced with permission from ANSI. Additional information regarding the permission from ANSI can be found in Annex F. ANSI should be contacted regarding the reproduction of any portion of the IEC material. Copies of IEC Publication 60745-1 and 62841-1 may be purchased from ANSI, 25 West 43rd Street, 4th Floor, New York, New York, 10036, (212) 642- 4900.

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## 1 Scope

1.1 This standard applies to battery operated appliances. This standard applies to appliances incorporating detachable, integral and separable battery packs. The maximum rated voltage for appliances and battery packs is 75 V d.c.

1.2 This standard also applies to battery-powered appliances that are also operated and/or charged directly from the mains or a non-isolated source, including appliances provided with integral battery chargers. The additional considerations for these constructions are contained in Additional Requirements for Battery Operated Appliances with a Connection to Mains or a Non-isolated Source, Clause 22.

1.3 These requirements are structured so as to be used in conjunction with an end product standard. These requirements are not intended to provide comprehensive evaluation of a battery operated appliance independent of an end-product standard.

1.4 These requirements only address the potential risks unique to the utilization of a battery supply in a product. With the exception of appliances that also have a mains or non-isolated source, these requirements replace or modify the requirements associated with risk of fire and electric shock for mains powered versions of the appliance in the end product standard. See Indent A in Table D1.1.

1.5 Conditions of use of the product that are the basis for test and other evaluations in the standard are retained and applied, as far as practicable, to these products employing a battery supply.

1.6 Battery operated appliances not able to be connected to mains connected power covered by this standard are not considered to be grounded (class I) or double-insulated (class II), appliances and therefore are not required to have basic, supplementary or reinforced insulation. Electric shock hazard is considered to exist only between parts of opposite polarity.

1.7 Battery packs for appliances covered under this standard intended to be charged by a non-isolated charger are to be evaluated by this standard and the requirements for protection against electric shock of the end-product standard. When evaluating a battery pack for protection against electric shock, the construction and test requirements are to be assessed with the battery fitted to the intended charger.

1.8 When evaluating the risk of fire associated with detachable battery packs, consideration has been given to the fact that these battery packs are unattended energy sources and have been evaluated as such in this standard. Detachable battery packs evaluated by this standard are therefore considered to fulfill an effective protection against the risk of fire equivalent to that of the end-product standard.

1.9 Since battery packs for appliances are submitted to different use patterns (such as rough use, high charging and discharging currents) their safety can be evaluated only by this standard and not by using other standards for battery packs, such as the Standard for Household and Commercial Batteries, UL 2054, unless otherwise indicated in this standard.

1.10 This standard does not apply to the safety of battery chargers themselves. However, this standard covers the safe functioning of lithium-ion battery systems.

1.11 This standard also addresses requirements covering the use of lithium-ion cells employed in battery systems in appliances. The following is considered within the context of these requirements:

- a) These requirements address the risk of fire or explosion of these batteries but do not cover any possible hazards associated with toxicity nor potential hazards associated with transportation or disposal.
- b) Battery systems covered by these requirements are not intended to be serviced by the end user.
- c) These requirements are intended to provide comprehensive evaluation of a battery only if used in products covered by this standard.
- d) These requirements refer to and require parameters supplied in reference to the cells that establish conditions for safe use of those cells. Those parameters form the basis of acceptance criteria for a number of tests contained herein. This standard does not independently evaluate the safety of cells. These parameters, taken as a set, constitute the "Specified Operating Region" for a cell. There may be several sets of specified operating region(s).

1.12 This standard is not intended to apply to appliances using general purpose batteries installed by the user, and this standard alone will not be sufficient to ensure all hazards are considered for these products' "battery packs".

1.13 These requirements do not consider the effect of special applications (such as medical appliances) or special environments (such as hazardous locations).

1.14 These requirements have not been assessed for their suitability for product categories other than appliances such as information technology equipment, telecommunications, laboratory equipment, fire alarm, security systems, emergency lighting, and audio-video apparatus, and may be incomplete with respect to those categories.

1.15 These requirements address the safety of battery systems during storage and use including discharge and charge. These requirements are only considered to be supplementary requirements with respect to the risk of fire and electric shock in battery chargers. The safety of battery chargers for appliances are covered by other standards such as the Standard for Power Units Other Than Class 2, UL 1012, the Standard for Battery Chargers, CAN/CSA C22.2 No. 107.2, the Standard for Class 2 Power Units, UL 1310, the Standard for Power Supplies With Extra-Low-Voltage Class 2 Outputs, CAN/CSA C22.2 No. 223, or the Standard for Information Technology Equipment – Safety – Part 1: General Requirements, UL 60950-1 and CAN/CSA C22.2 No. 60950-1.

1.16 These requirements make frequent reference to the conditions and tests of the end-product standard while also providing minimum conditions or severity of tests. These minimum conditions are not to be construed to imply equivalence to end-product requirements. Conditions or requirements of end-product standards are to prevail over the conditions or requirements of this standard, unless otherwise indicated in this standard.

1.17 This standard is not intended to cover appliances using lithium-metal type cells, and this standard alone will not be sufficient to ensure all hazards are considered for these types of cells. Lithium-ion cells are not lithium-metal cells.

## 2 General

### 2.1 Units of measurement

2.1.1 The values given in SI (metric) units shall be normative. Any other values given shall be for information purposes only.

### 2.2 Normative references

2.2.1 The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

2.2.2 For products intended for use in Canada, general requirements are given in CAN/CSA-C22.2 No. 0.

#### CSA Group Standards

CAN/CSA C22.2 No. 0

*General Requirements – Canadian Electrical Code, Part I*

CAN/CSA C22.2 No. 0.17

*Evaluation of Properties of Polymeric Materials*

CSA C22.2 No. 14

*Industrial Control Equipment*

CSA C22.2 No. 66.1

*Low Voltage Transformers – Part 1: General Requirements*

CSA C22.2 No. 66.2

*Low Voltage Transformers – Part 2: General Purpose Transformers*

CSA C22.2 No. 66.3

*Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

CSA C22.2 No. 107.1

*General Use Power Supplies*

CAN/CSA C22.2 No. 107.2

*Battery Chargers*

CAN/CSA C22.2 No. 223

*Power Supplies With Extra-Low-Voltage Class 2 Outputs*

CAN/CSA C22.2 No. 60950-1

*Information Technology Equipment – Safety – Part 1: General Requirements*

CAN/CSA E60384-14

*Fixed Capacitors for Use in Electronic Equipment – Part 14: Sectional Specification - Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains*

CAN/CSA E62133

*Secondary Cells and Batteries Containing Alkaline or Other Non-acid Electrolytes – Safety Requirements for Portable Sealed Secondary Cells, and for Batteries Made from Them, for Use in Portable Applications*

CSA Component Acceptance Notice No. 5A

*Component Acceptance Service for Optocouplers and Related Devices*

CSA TIL No. CA-3A

*Component Acceptance Requirements for PTC Thermistors for Overcurrent Protection in Electrical and Electronic Equipment*

### **UL Standards**

UL 94

*Tests for Flammability of Plastic Materials for Parts in Devices and Appliances*

UL 508

*Industrial Control Equipment*

UL 969

*Marking and Labeling Systems*

UL 1012

*Power Units Other Than Class 2*

UL 1310

*Class 2 Power Units*

UL 1434

*Thermistor-Type Devices*

UL 1577

*Optical Isolators*

UL 2054

*Household and Commercial Batteries*

UL 2089

*Vehicle Battery Adapters (2011 edition)*

UL 5085-1

*Low Voltage Transformers – Part 1: General Requirements*

UL 5085-2

*Low Voltage Transformers – Part 2: General Purpose Transformers*

UL 5085-3

*Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

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