



**CSA C22.2 NO. 60335-2-107:20**  
(IEC 60335-2-107:2017, MOD)  
**National Standard of Canada**

**ANSI/OPEI 60335-2-107-2020**  
**American National Standard**



**Household and similar electrical appliances — Safety —  
Part 2-107: Particular requirements for robotic battery powered  
electrical lawnmowers**



**Standards Council of Canada**  
**Conseil canadien des normes**

*National Standard of Canada  
American National Standard*

*CSA C22.2 No. 60335-2-107:20  
ANSI/OPEI 60335-2-107-2020*

***Household and similar electrical  
appliances — Safety — Part 2-107:  
Particular requirements for robotic  
battery powered electrical lawnmowers***

JANUARY 31, 2020

This national standard is based on publication IEC 60335-2-107, Second Edition (2017).



**CSA Group**  
CSA C22.2 No. 60335-2-107:20  
First Edition  
(IEC 60335-2-107:2017, MOD)



**Outdoor Power Equipment Institute**  
ANSI/OPEI 60335-2-107-2020  
First Edition



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*CSA C22.2 No. 60335-2-107:20*  
*ANSI/OPEI 60335-2-107-2020*  
***Household and similar electrical***  
***appliances — Safety — Part 2-107:***  
***Particular requirements for robotic***  
***battery powered electrical lawnmowers***  
***(IEC 60335-2-107:2017, MOD)***

## ***Preface***

This is the harmonized CSA Group, and ANSI/OPEI standard for particular requirements for robotic battery powered electrical lawnmowers. It is the first edition of CSA C22.2 No. 60335-2-107 and the first edition of ANSI/OPEI 60335-2-107.

This harmonized standard is based on IEC Publication 60335-2-107, Second edition, *Household and Similar Electrical Appliances — Safety — Part 2-107:Particular requirements for robotic battery powered electrical lawnmowers*, issued December 2017. IEC 60335-2-107 is copyrighted by the IEC.

This harmonized standard was prepared by the CSA Group and the Outdoor Power Equipment Institute (OPEI). The efforts and support of the OPEI US Robotic Lawnmower Committee 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 Electrical Motor and Battery-Operated Cleaning Appliances for Industrial and Commercial Use, 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 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.

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.*

CSA C22.2 No. 60335-2-107, *Household and similar electrical appliances — Safety — Part 2-107: Particular requirements for robotic battery powered electrical lawnmowers*, is to be used in conjunction with the second edition of CAN/CSA-C22.2 No. 60335-1:16. The particular requirements for robotic battery powered electrical lawnmowers are contained in this Part 2 Standard and CAN/CSA-C22.2 No. 60335-1: 16. The 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 CSA C22.2 No. 60335-2-107, the CAN/CSA-C22.2 No. 60335-1:16 subclause applies.

ANSI/OPEI Standard 60335-2-107, standard for safety for *Household and similar electrical appliances — Safety — Part 2-107: Particular requirements for robotic battery powered electrical lawnmowers*, is to be used in conjunction with the sixth edition of UL 60335-1. The 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 ANSI/OPEI 60335-2-107, 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 OPEI.

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 OPEI 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 and OPEI, the text, figures, and tables of International Electrotechnical Commission Publication 60335-2-107, *Household and Similar Electrical Appliances - Safety - Part 2-107: Particular requirements for robotic battery powered electrical lawnmowers*, copyright 2017, 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 modified versions are included for information purposes only.

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## NATIONAL DIFFERENCES

In the CSA Group and OPEI publications of this standard, National Differences from the text of International Electrotechnical Commission (IEC) 60335-2-107 Ed. 2.0, *Household and similar appliances — Safety — Part 2-107: Particular requirements for robotic battery powered electrical lawnmowers*, are indicated by notations (differences) and are presented in bold, indented 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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# ***OPEI Consensus Member Roster***

**Foreword** (This foreword is not part of American National Standard  
ANSI/OPEI 60335-2-107-2020, CSA C22.2 No. 60335-2-107:20.)

Consensus for this standard was achieved by use of the Canvass Method. Suggestions for improvements to this standard are welcome, They should be sent to the Outdoor Power Equipment Institute, 1605 King Street, Alexandria, VA 22314.

The following organizations recognized as having an interest in the standardization of safety requirements for robotic battery powered electrical lawnmowers were contacted prior to the approval of this standard. Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposal to ANSI.

Larry Albert, Chairman  
(Stanley Black and Decker)

## **Consensus Body (Canvass) List:**

### Users

Erik Steltz  
Dana Lonn  
William Lessig  
John Olson

### General Interest

Consumer Reports (John Galeotafiore)  
CSA (Leonard Letea)  
Intertek (Kevin Miller)  
Power Tools Institute (Joe Harding)  
U.S. Consumer Product Safety Commission (Caroleene Paul)  
UL (John Stimitz)

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Husqvarna (Therese Berg)  
John Deere (Nate Hemming)  
MTD Products (Matt Wolf)  
Positec (Allen Ding)  
Stihl (John Foster)

# Foreword

## INTERNATIONAL ELECTROTECHNICAL COMMISSION Household and Similar Electrical Appliances — Safety — Part 2-107: Particular requirements for robotic battery powered electrical lawnmowers

- 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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- 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.

International Standard IEC 60335-2-107 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

This second edition cancels and replaces the first edition published in 2012. This edition constitutes a technical revision.

**DV.1 DE Modification: Add the following to the second paragraph following Item 9) of the IEC Foreword:**

This publication does not include the technical content of IEC Amendment 1.

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

- a) Clause 7: Markings and instructions, new requirements for markings, warnings and the instruction manual;
- b) Clause 8: Protection against access to live parts, new requirements for protection against electric shock for hazardous battery voltages;
- c) Clause 20: Stability and mechanical hazards, revised requirements for manual controller, manual stop, cutting means stopping time, traction drive stopping and restart procedures, as well as a new standing child foot probe test;
- d) Clause 22: Construction, revised requirements for disabling devices, working area, perimeter delimiter, sensors and manual controller, as well as new requirements for machine connectors used for charging and contact surfaces used as obstruction sensing devices;
- e) Clause 24: Components, revised requirements for switches;
- f) Clause 29: Clearances, creepage distances and solid insulation, revised requirements for the machine and non-mains-powered peripherals.

**DV.2 D2 Modification by adding the following items after Item f) of the IEC Foreword to describe additional principal changes (National Differences) to the North American harmonized version of this standard (minor changes are not listed):**

- gDV) Modified and updated Annex DVA to eliminate unnecessary component standards references and to clarify where there are additional requirements for components;
- hDV) Added national difference wording throughout the standard to better reflect when the additional component requirements of Annex DVA apply;
- iDV) Added national differences that include certain additional requirements of the national electrical codes or laws that have been applicable;
- jDV) Updated Scope to enable use of this standard for pre-selection of components and sub-assemblies, as appropriate;
- kDV) Clause 1: Heat;
- lDV) Clause 13: Leakage current and electric strength at operating temperature;
- mDV) Clause 14: Transient overvoltages;
- nDV) Clause 15: Moisture resistance;
- oDV) Clause 16: Leakage current and electric strength;
- pDV) Clause 22: Construction; and
- qDV) Clause 24: Components.

The text of this standard is based on the following documents:

FDIS	Report on voting
116/350/FDIS	116/354/RVD

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

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

This Part 2-107 is to be used in conjunction with the fifth edition (2010) of IEC 60335-1 and its amendments.

**DV.3 DE Modification: Replace the above paragraph with the following:**

This Part 2-107 is to be used in conjunction with the sixth edition (2016) of UL 60335-1 and the second edition (2016) of CAN/CSA-C22.2 No. 60335-1 and their amendments.

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

**DV.4 DE Modification: Replace the above NOTE with the following:**

NOTE When "Part 1" is mentioned in this standard, it refers to UL 60335-1 / CAN/CSA-C22.2 No. 60335-1.

This Part 2-107 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert it into the IEC standard: Particular requirements for robotic battery powered electrical lawnmowers.

**DV.5 DE Modification: Replace the above paragraph with the following:**

This Part 2-107 supplements or modifies the corresponding clauses in UL 60335-1 / CAN/CSA-C22.2 No. 60335-1, so as to convert it into the standard: Particular requirements for robotic battery powered electrical lawnmowers.

When a particular subclause of Part 1 is not mentioned in this Part 2-107, that subclause applies as far as is relevant. Where this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

The terms defined in Clause 3 are printed in **bold typeface**.

**DV.6 DE Modification: to add the following item after the above paragraph:**

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.

Subclauses, notes and figures which are additional to those in Part 1 are numbered starting from 101. Additional annexes are lettered AA, BB, etc.

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 amendment and the base publication 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.

# ***Household and similar electrical appliances — Safety — Part 2-107: Particular requirements for robotic battery powered electrical lawnmowers***

## ***Introduction***

It has been assumed in the drafting of this document that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This document recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of machines 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 machines.

This document takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the machine is connected to the supply mains. However, national wiring rules may differ.

If a machine within the scope of this document 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 machine in question over and above the general requirements.

This standard series is a product family standard series 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 documents.

A machine that complies with the text of this document 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.

A machine employing materials or having forms of construction differing from those detailed in the requirements of this document 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 document.

**DV.7 DE Modification: Replace the IEC Introduction with the following:**

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 the functions of an appliance are covered by different parts 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.

NOTE 1 Throughout this publication, when "Part 2" is mentioned, it refers to the relevant part of IEC 60335.

When a part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 2 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 3 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.

Individual countries may wish to consider the application of the standard, as far as is reasonable, to appliances not mentioned in a part 2, and to appliances designed on new principles.

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 which 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.

NOTE 4 Standards dealing with non-safety aspects of household appliances are

- IEC standards published by TC 59 concerning methods of measuring performance;
- CISPR 11, CISPR 14-1, IEC 61000-3-2 and IEC 61000-3-3 concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters.

## HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES — SAFETY —

### Part 2-107: Particular requirements for robotic battery powered electrical lawnmowers

## 1 Scope

### *Replacement:*

This document specifies safety requirements and their verification for the design and construction of **robotic battery** powered electrical **rotary lawnmowers** and their **peripherals** with the **rated voltage** of the **battery** being not more than 75 V d.c.

EMC and environmental aspects, except noise have not been considered in this standard.

This document does not apply to the additional risks associated with internal combustion engine(s), hybrid and fuel cell powered machines and associated charging systems.

This document deals with all the significant hazards presented by **battery** powered **robotic lawnmowers** and their **peripherals** when they are used as intended and under conditions of misuse which are reasonably foreseeable.

Throughout this document, the term machine is used to refer to the **robotic lawnmower**, separate from its **charging station**.

This document also provides requirements for the safety of mains powered **charging stations** and signal sources for **perimeter delimiters**.

Additional **battery** operation and charging requirements for **robotic lawnmowers**, including the charging of lithium ion batteries, are specified in Annex KK which replaces Annexes B and S (except for requirements for non-rechargeable **batteries**) of Part 1.

This document is not applicable to machines which are manufactured before the date of publication of this document by IEC.

NOTE Informative Annex FF is provided as a test code for convenience to the users of this document.

## 2 Normative references

This clause of Part 1 is applicable except as follows.

### *Addition:*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60335-2-29:2016, *Household and similar electrical appliances — Safety — Part 2-29: Particular requirements for battery chargers*

### **2DV.1 DE Modification: Replace the above reference with the following reference:**

IEC 61032:1997, *Protection of persons and equipment by enclosures — Probes for verification*