UL 60335-2-29:2026

(IEC 60335-2-29:2016+A1:2019, MOD)

STANDARD FOR SAFETY

Household and Similar Electrical Appliances – Safety – Part 2-29: Particular Requirements For Battery Chargers

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UL Standard for Safety for Household and Similar Electrical Appliances – Safety – Part 2-29: Particular Requirements For Battery Chargers, UL 60335-2-29

First Edition, Dated October 12, 2020

Summary of Topics

This revision of ANSI/UL 60335-2-29, dated August 10, 2026 includes an addition to National Difference: 15.101ADV.

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

The revised requirements are substantially in accordance with Proposal(s) on this subject dated November 7, 2025 and May 15, 2026.

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CONTENTS

PREFACE 7

NATIONAL DIFFERENCES 9

FOREWORD 11

INTRODUCTION 15

1 Scope 17
1DV.1 Modification to add the following text to Clause 1 of the Part 2 after the second paragraph: 17
1DV.2 Modification to replace the fourth paragraph of Clause 1 of the Part 2 with the following NOTE: 17
1DV.3 Modification to add the following text and NOTE 101BDV to Clause 1 of the Part 2 after the fifth paragraph: 17
1DV.4 Modification to replace NOTE 102 of Clause 1 of the Part 2 with the following: 18
1DV.5 Add NOTE 103DV to Clause 1 of the Part 2: 19
2 Normative references 19
2DV Modification to replace Clause 2 of the Part 2 with the following: 19
3 Terms and definitions 20
3.1 Definitions relating to physical characteristics 20
3.2 Definitions relating to means of connection 20
3.5 Definitions relating to types of appliances 21
3.5.101DV Delete 3.5.101 of the Part 2: 21
3.6 Definitions relating to parts of an appliance 21
4 General requirement 21
5 General conditions for the tests 21
6 Classification 21
6.1DV Modification to replace 6.1DV of the Part 1 with the following: 22
6.2DV Delete 6.2 of the Part 2: 22
7 Marking and instructions 22
7.1DV.1 Modification to add the following after the first paragraph of the “Addition” to 7.1 of the Part 2: 23
7.1DV.2 Modification to delete the third dashed item from the list in the first paragraph of the “Addition” to 7.1 of the Part 2. 23
7.1DV.3 Modification to replace the sixth dashed item in the list in the first paragraph of the “Addition” to 7.1 of the Part 2 with the following: 23
7.1DV.4 Modification to replace the seventh dashed item in the list in the first paragraph of the “Addition” to 7.1 in the Part 2 with the following: 23
7.1DV.5 Modification to delete the last paragraph of the “Addition” to 7.1 in the Part 2. 23
7.6DV Modification to add the following symbol and text: 24
7.12DV National Difference Deleted 25
7.12.1DV Delete 7.12.1 of the Part 2: 25
7.101DV Delete 7.101 of the Part 2: 25
8 Protection against access to live parts 26
8.1.4DV Modification to replace 8.1.4DV of the Part 1 with the following: 26
9 Starting of motor-operated appliances 26
10 Power input and current 26
11 Heating 26
12 Void 27
13 Leakage current and electric strength at operating temperature 27
14 Transient overvoltages 27
15 Moisture resistance 27

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15DV Modification to replace the first sentence of Clause 15 of the Part 2 with the following: 27
15.101ADV Add the following subclause to Clause 15 of the Part 2: 27
16 Leakage current and electric strength 28
17 Overload protection of transformers and associated circuits....28
18 Endurance 28
19 Abnormal operation 28
19.1DV Modification to replace 19.1 of the Part 2 with the following:....28
19.101DV Modification to replace 19.101 of the Part 2 with the following: 28
19.102DV Modification to add the following to 19.102 of the Part 2:....29
19.103DV Delete 19.103 of the Part 2:....29
20 Stability and mechanical hazards....29
21 Mechanical strength 29
21.1DV Modification to replace 21.1 of the Part 2 with the following:....29
21.101DV Modification to replace the first paragraph of 21.101 of the Part 2 with the following: 30
21.102DV Delete 21.102 of the Part 2:....30
22 Construction 30
22.26DV Modification to replace 22.26 of the Part 2 with the following: 31
22.101DV Delete 22.101 of the Part 2:....31
22.102DV Delete 22.102 of the Part 2:....31
23 Internal wiring 32
24 Components 32
24.1.2DV Modification to replace 24.1.2 of the Part 2 and 24.1.2 and 24.1.2DV of the Part 1 with the following: 32
24.1.4DV Modification to replace the first paragraph of 24.1.4 of the Part 1 with the following: 32
25 Supply connection and external flexible cords....32
25.1DV Modification to add the following to 25.1 of the Part 1: 32
25.3DV Modification to delete the first and second dashed items of 25.3 of the Part 1....33
25.5DV Modification to replace 25.5 of the Part 2 with the following:....33
25.7DV Modification to replace 25.7 of the Part 2 with the following:....33
25.8DV Modification to replace 25.8 of the Part 2 with the following:....34
25.15DV Modification to replace 25.15 of the Part 2 with the following: 34
25.23DV Modify 25.23 of the Part 1 by adding the following dashed item after the second dashed item: 35
26 Terminals for external conductors 35
26.5DV Modification to replace 26.5 of the Part 2 with the following:....35
27 Provision for earthing....35
28 Screws and connections 35
29 Clearances, creepage distances and solid insulation....35
30 Resistance to heat and fire....36
30.2DV National Difference Deleted 36
31 Resistance to rusting 36
32 Radiation, toxicity and similar hazards 36

Annexes

Annex A (informative) Routine tests

A.2 Electric strength test....39

Annex AA (normative) Battery chargers for use by children

AADV Modify Annex AA by replacing “normative” with “informative”:....40

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5 General conditions for the tests 40
6 Classification 40
7 Marking and instructions 40
8 Protection against access to live parts 41
10 Power input and current 41
11 Heating 42
17 Overload protection of transformers and associated circuits 42
19 Abnormal operation 42
21 Mechanical strength 42
22 Construction 43
24 Components 43
25 Supply connection and external flexible cords 43

Annex BB (normative) Isolating transformers

7 Marking and instructions 44
17 Overload protection of transformers and associated circuits 44
22 Construction 44
29 Clearances, creepage distances and solid insulation 44

Annex DVA (normative) North American additional requirements

Table DVA.1DV.1 Modify Table DVA.1 of the Part 1 by deleting the row for “Clauses 24.1.2 and 17” for transformers. 45
Table DVA.1DV.2 Modify Table DVA.1 of the Part 1 by replacing the row for “Clauses 24.1, 25.3, and 7.1 (IP markings)” with the following: 45

Bibliography

BIBDV Modification to replace the Bibliography of the Part 2 with the following: 46

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PREFACE

This is the harmonized CSA Group and ULSE standard for Household and Similar Electrical Appliances – Safety – Part 2-29: Particular Requirements for Battery Chargers. It is the fourth edition of CSA C22.2 No. 60335-2-29 and the first edition of UL 60335-2-29. This edition of CSA C22.2 No. 60335-2-29 supersedes the previous edition published in 2006 as CAN/CSA-E60335-2-29 (adopted IEC 60335-2-29:2003). This harmonized standard has been jointly revised on August 10, 2026. For this purpose, CSA Group and ULSE are issuing revision pages dated August 10, 2026.

This harmonized standard is based on IEC Publication 60335-2-29: Edition 5.1, Household and similar electrical appliances – Safety – Part 2-29: Particular requirements for battery chargers, issued March 2019. IEC 60335-2-29 is copyrighted by the IEC.

This harmonized standard was prepared by CSA Group and ULSE Inc. (ULSE). The efforts and support of the Technical Harmonization 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 Technical Committee on Consumer and Commercial Products, under the jurisdiction of 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.

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. 60335-2-29 is to be used in conjunction with the second edition of 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 the Part 2, the CAN/CSA-C22.2 No. 60335-1:16 subclause applies.

UL 60335-2-29 is to be used in conjunction with the sixth edition of 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 60335-2-29, the UL 60335-1 subclause applies.

Level of Harmonization

This standard adopts the IEC text with national differences.

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

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 and basic safety principles and requirements. Presentation is word for word except for editorial changes.

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All national differences from the IEC text are included in the CSA Group and ULSE 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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NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60335-2-29, ed 5.1, Household and similar electrical appliances – Safety – Part 2-29: Particular requirements for battery chargers, copyright 2019, 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:

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>
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FOREWORD

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – Part 2-29: Particular requirements for battery chargers

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This Consolidated version of IEC 60335-2-29 bears the edition number 5.1. It consists of the fifth edition (2016-06) [documents 61/5142/FDIS and 61/5173/RVD] and its amendment 1 (2019-03) [documents 61/5760/FDIS and 61/5799/RVD]. The technical content is identical to the base edition and its amendment.

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

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This part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This fifth edition constitutes a technical revision.

The principal changes in this edition as compared with the fourth edition of IEC 60335 2 29 are as follows (minor changes are not listed):

• Revised the drop test to refer to IEC 60068-2-31 (21.101);

• Requirements for supply cords on battery chargers used at low temperatures (25.7);

• Requirements for battery chargers having an output voltage exceeding SELV have been added (1, 3.2.2, 3.4.3, 10.101, 24.4, 25.5, 25.7, 25.8, 25.15. 26.5);

• A classification for battery chargers used outdoors has been added (6.2, 29.2);

• Some notes in Clause 1, Subclauses 7.1 and 22.102, Figure 101 and Annex AA 11.8 have been converted to normative text.

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 battery chargers.

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.

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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 standard 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.

– 3.1.9: The artificial load may not be used (USA).

– 11.2: The appliance is not placed in a test corner (USA).

– 21.101: The drop test is carried out differently on outdoor direct plug-in battery chargers (USA).

– 21.102: The test is different (USA).

– 22.26: Basic insulation is allowed between live parts and SELV circuits (USA).

– Annex AA, 11.8: Higher temperature rises are allowed (USA).

– Annex AA, Clause 17: Higher temperature rises are allowed (USA).

– Annex AA, 19.13: Higher temperature rises are allowed (USA).

101DV D2 ***Modify NOTE 1 and the paragraph following it in the Part 2 IEC Foreword by replacing them with the following:***

NOTE 1 When “Part 1” is mentioned in this Standard, it refers to CAN/CSA-C22.2 No. 60335-1:16 / UL 60335-1 (6th Ed.).

This Part 2 supplements or modifies the corresponding clauses in CAN/CSA-C22.2 No. 60335-1, Ed 2: 2016-10-31 / UL 60335-1, Ed. 6: 2016-10-31 (based on IEC 60335-1 Ed. 5.1:2013), so as to convert that publication into the CSA/UL standard: *Particular requirements for battery chargers.*

102DV DE ***Modify the last paragraph in NOTE 3 of the Part 2 IEC Foreword by replacing it with the following:***

Words in bold or 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 bold or SMALL ROMAN CAPS.

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103DV D2 ***Modification to delete the text of the last paragraph of the Part 2 IEC Foreword, including all eight dashed items.***

104DV DE ***Modification to add 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 2-29: Particular requirements for battery chargers

1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of electric battery chargers for household and similar use having an output not exceeding 250 V ripple-free direct current, their **rated voltage** being not more than 250 V.

1DV.1 DR ***Modification to add the following text to Clause 1 of the Part 2 after the second paragraph:***

This standard covers the above-noted products that are intended to be installed or used in accordance with:

– CSA C22.1, Canadian Electrical Code (CE Code), Part I;

– NFPA 70, National Electrical Code (NEC), in the United States.

Battery chargers intended for charging batteries in a household end use application outside the scope of the IEC 60335 series of standards are within the scope of this standard.

Requirements for battery chargers for use by children at least 8 years old without supervision are given in Annex AA.

1DV.2 D2 ***Modification to replace the fourth paragraph of Clause 1 of the Part 2 with the following NOTE:***

NOTE 101ADV Annex AA, which is a normative annex in IEC 60335-2-29, is included in this Standard as an informative annex for reference only.

Battery chargers not intended for normal household use, but which nevertheless may be a source of danger to the public, such as battery chargers intended for use in garages, shops, light industry and on farms, are within the scope of this standard.

1DV.3 D2 ***Modification to add the following text and NOTE 101BDV to Clause 1 of the Part 2 after the fifth paragraph:***

Battery chargers intended for use in a commercial environment are within the scope of this standard.

NOTE 101BDV The following list, although not comprehensive, gives an indication of commercial environments:

– public use areas such as hotels, schools, hospitals;

– retail outlets, for example shops and supermarkets;

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– business premises, for example offices and banks.

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 101 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 the national health authorities, the national authorities responsible for the protection of labour and similar authorities.

NOTE 102 This standard does not apply to

– built-in battery chargers, except those for installing in caravans and similar vehicles;

– battery chargers that are part of an appliance, the battery of which is not accessible to the user;

– battery chargers intended exclusively for industrial purposes;

– battery chargers intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);

– battery chargers for emergency lighting (IEC 60598-2-22);

– supply units for electronic equipment.

1DV.4 D2 *Modification to replace NOTE 102 of Clause 1 of the Part 2 with the following:*

NOTE 102 This standard does not apply to

– built-in battery chargers;

– battery chargers installed on land vehicles, including caravans;

– battery chargers installed on marine craft;

– automotive battery chargers intended to charge lead-acid engine-starter and other starting, lighting, and ignition (SLI) type batteries;

– battery chargers for e-mobility devices and e-bikes, provided the batteries are separately charged;

– battery chargers that are part of an appliance, the battery of which is not accessible to the user;

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– battery chargers intended exclusively for industrial purposes where use by trained operators in an environment that is not accessible by the general public is relied upon as a measure of risk reduction;

– battery chargers intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas);

– battery chargers for emergency lighting;

– supply units for electronic equipment;

– battery chargers for uninterruptable power supplies;

– DC distribution boards.

1DV.5 D2 *Add NOTE 103DV to Clause 1 of the Part 2:*

NOTE 103DV This Part 2-29 may be employed for investigation of components and sub-assemblies for the purpose of their pre-selection for use in appliances. If the component or sub-assembly used complies with this standard, the tests for the component or sub-assembly specified in the particular appliance standard in some cases will not need to be made in the particular appliance or assembly. Additional testing on a component or subassembly might be required. For example, if a control system is associated with the particular appliance control system, additional tests could potentially be necessary on the final appliance.

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 61558-2-4:2009, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers*

IEC 61558-2-7:2007, *Safety of power transformers, power supplies, reactors and similar products – Part 2-7: Particular requirements and tests for transformers and power supplies for toys*

2DV D2 *Modification to replace Clause 2 of the Part 2 with the following:*

This clause of Part 1 is applicable except as follows.

Addition:

CSA C22.2 No. 94.2-15, *Enclosures for electrical equipment, environmental considerations*

IEC 61558-2-4:2009, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers*

IEC 61558-2-7:2007, *Safety of power transformers, power supplies, reactors and similar products – Part 2-7: Particular requirements and tests for transformers and power supplies for toys*

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UL 50E, *Enclosures for electrical equipment, environmental considerations*

3 Terms and definitions

This clause of Part 1 is applicable except as follows.

3.1 Definitions relating to physical characteristics

3.1.1 *Addition:*

Note 1 to entry: The **rated voltage** is the rated input voltage.

3.1.6 *Addition:*

Note 2 to entry: The **rated current** is the rated input current.

3.1.9 *Replacement:*

normal operation
operation of the appliance under the following conditions:

Battery chargers for charging lead-acid batteries, and other battery chargers having a **rated DC output current** not exceeding 20 A, are connected to the circuit of Figure 101. The variable resistor is adjusted so that the current in the circuit is the **rated DC output current** when the battery charger is supplied at **rated voltage**.

When the charging current is controlled by the state of charge of the battery, the variable resistor and the capacitor are replaced by a discharged battery of the type and having the largest capacity specified in the instructions.

Other battery chargers are connected to a discharged battery of the type and having the largest capacity specified in the instructions.

3.1.101
rated DC output voltage
output voltage assigned to the battery charger by the manufacturer

3.1.102
rated DC output current
output current assigned to the battery charger by the manufacturer

3.2 Definitions relating to means of connection

3.2.2 *Addition:*

Output flexible cords are not considered to be interconnection cords.

3.4.3 *Replacement:*

safety isolating transformer

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transformer, the input winding of which is electrically separated from the output winding by an insulation at least equivalent to **double insulation** or **reinforced insulation**, that is intended to supply a battery charging circuit having an output voltage not exceeding 120 V ripple-free direct current

Note 1 to entry: Ripple-free means an r.m.s. ripple voltage not exceeding 10 % of the DC component.

3.5 Definitions relating to types of appliances

3.5.101
DC distribution board
panel having circuits for distributing DC power to socket-outlets or terminals

3.5.101DV D2 ***Delete 3.5.101 of the Part 2:***

This definition does not apply.

3.5.102
type 1 battery charger
battery charger the output circuit of which is supplied through a **safety isolating transformer**

3.5.103
type 2 battery charger
battery charger the output circuit of which is supplied through an **isolating transformer**

3.6 Definitions relating to parts of an appliance

3.6.101
isolating transformer
transformer, the input winding of which is electrically separated from the output winding by an insulation at least equivalent to **double insulation** or **reinforced insulation**, that is intended to supply a battery charging circuit having an output voltage not exceeding 250 V ripple free DC

Note 1 to entry: Ripple-free means an RMS ripple voltage not exceeding 10 % of the DC component.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

5.2 *Addition:*

If the test of 21.101 is carried out, two additional battery chargers are required.

5.101 Battery chargers are tested as **motor-operated appliances**.

6 Classification

This clause of Part 1 is applicable except as follows.

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