

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Household and similar electrical appliances – Safety –
Part 2-29: Particular requirements for battery chargers**

**Appareils électrodomestiques et analogues – Sécurité –
Partie 2-29: Exigences particulières pour les chargeurs de batterie**

IEC 60335-2-29:2016

<https://standards.iteh.ai/catalog/standards/iec/c3c6eac8-a820-4513-b584-406227b4b390/iec-60335-2-29-2016>



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-29: Particular requirements for battery chargers

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60335-2-29 edition 5.1 contains 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].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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.

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).

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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.

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 ~~420~~ 250 V ripple-free direct current, their **rated voltage** being not more than 250 V.

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.

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.

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 knowledgeprevents 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.

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*

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

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.

~~3.101~~

~~rated DC output voltage~~

~~output voltage assigned to the battery charger by the manufacturer~~

~~3.102~~

~~rated DC output current~~

~~output current assigned to the battery charger by the manufacturer~~

~~3.103~~

~~DC distribution board~~

~~panel having circuits for distributing DC power to socket outlets or terminals~~

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

3.5.102

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.

6.2 Addition:

Battery chargers for outdoor use shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

Battery chargers shall be marked with

- **rated DC output voltage**, in volts;
- **rated DC output current**, in amperes, however no other output current shall be marked;
- the rated current, in amperes, of **protective devices** incorporated in a **DC distribution board**;
- the polarity of the output terminals unless incorrect polarity connection is prevented. The positive terminal shall be indicated by symbol IEC 60417-5005 (2002-10) and the negative terminal by symbol IEC 60417-5006 (2002-10);
- the time-current characteristic of fuse-links of the time-lag type;
- ~~– the substance of the following, if the output is at least 20 VA:~~
 - ~~• before charging, read the instructions;~~
 - ~~• for indoor use, or do not expose to rain (unless the battery charger is at least IPX4);~~
- “Before charging, read the instructions” or symbol ISO 7000-0790 (2004-01); (not required if the battery charger output is less than 20 VA);
- “For indoor use” or symbol IEC 60417-5957 (2004-12) or “Do not expose to rain” or symbol IEC 60417-6062 (2011-05); (not required if the battery charger output is less than 20 VA or the battery charger has a degree of protection against harmful ingress of water of at least IPX4);
- the substance of the following, if the output is at least 20 VA and the battery charger is for charging lead-acid batteries:
 - disconnect the supply before making or breaking the connections to the battery;
 - **WARNING:** Explosive gases. Prevent flames and sparks. Provide adequate ventilation during charging.

Battery chargers incorporating an engine-cranking switch that allows the battery charger to supply a supplementary starting current for the engine shall be marked with

- the maximum "on" time;
- the minimum "off" time or the maximum ratio between the "on" time and the "off" time.

7.4 Addition:

If the battery charger can be adjusted to different **rated DC output voltages**, the output voltage to which the battery charger is adjusted shall be clearly discernible.