SRI LANKA STANDARD 828: 2022
(IEC 60335-2-29: 2019)
UDC 621.354.322

SPECIFICATION FOR HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY – PARTICULAR REQUIREMENTS FOR BATTERY CHARGES

(First Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard

SPECIFICATION FOR HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –PARTICULAR REQUIREMENTS FOR BATTERY CHARGES

(First Revision)

SLS 828: 2022
(IEC 60335-2-29:2019)

Gr. IM

SRI LANKA STANDARDS INSTITUTION
No. 17, Victoria Place,
Elvitigala Mawatha,
Colombo 08.
SRI LANKA

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This Standard does not purport to include all the necessary provisions of a contract

Sri Lanka Standard
SPECIFICATION FOR HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –PARTICULAR REQUIREMENTS FOR BATTERY CHARGES
(First Revision)

NATIONAL FOREWORD

This standard was approved by the Sectoral Committee on Electrical Appliances and Accessories and was authorized for adoption and publication as a Sri Lanka Standard by the Council of Sri Lanka Standards Institution on 2022-12-28.

This is the first revision of **SLS 828** and identical with **IEC 60335-2-29** Edition 5.1 2019-03, Specification for household and similar electrical appliances – Safety –Particular requirements for battery charges published by the International Electrotechnical Commission (IEC).

Terminology and conventions

The text of the International Standard has been accepted as suitable for publication as a Sri Lanka standard. However, certain terminology and conventions are not identical with those used in Sri Lanka Standard; attention is therefore drawn to the following:

a) Wherever the words “International Standard” appear referring to this standard they should be interpreted as “Sri Lanka Standard”.

b) Wherever standard values of rated frequency appears it shall be taken as 50 Hz.

c) Wherever the page numbers are quoted they are the page numbers of IEC standard.

d) The comma has been used as a decimal marker. In Sri Lanka Standard, it is the current practice to use a full point on the base line as a decimal marker.

NOTE : *Corresponding Sri Lanka Standards for international standards listed under references in IEC 60335-2-29 are not available.*

SLS 828: 2022

IEC 60335-2-29

Edition 5.1 2019-03
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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 60335-2-29:2016-06+AMD1:2019-03 CSV(en-fr)

IEC 60335-2-29

Edition 5.1 2019-03
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.200; 97.180

ISBN 978-2-8322-6771-4

SLS 828: 2022

IEC 60335-2-29

Edition 5.1 2019-03
CONSOLIDATED VERSION

FINAL VERSION

VERSION FINALE

colour inside

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 60335-2-29:2016-06+AMD1:2019-03 CSV(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-29: Particular requirements for battery chargers

FOREWORD

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 non-governmental 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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
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.

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].

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.

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).

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 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 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.

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.

3.5 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;

– “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

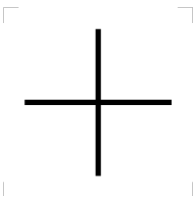
– the maximum "on" time;

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

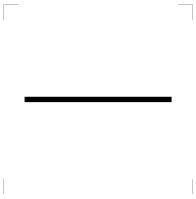
7.4 *Addition:*

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.

7.6 *Addition:*



[symbol IEC 60417-5005 (2002-10)] plus; positive polarity



[symbol IEC 60417-5006 (2002-10)] minus; negative polarity

[symbol IEC 60417-5957 (2004-12)] for indoor use only

[symbol IEC 60417-6062 (2011-05)] do not expose to moisture

7.12 *Addition:*

The instructions shall

– state that during charging, the battery must be placed in a well-ventilated area (for chargers for batteries that release gases into the atmosphere during normal charging);
– state that the battery charger must only be plugged into an earthed socket-outlet (for **portable class I battery chargers** for outdoor use);
– explain the automatic function, stating any limitation (for automatic battery chargers).

The instructions for **type 1 battery chargers** shall also

– specify the types, the number of batteries and the rated capacity of the batteries that can be charged;
– include a warning against recharging non-rechargeable batteries.

The instructions for **type 2 battery chargers** shall also

– specify the batteries intended to be charged, such as by a catalogue number, series identification or the equivalent;
– specify the ambient temperature range for the charger during charging.

The instructions for battery chargers for charging automobile batteries shall include the substance of the following:

– the battery terminal not connected to the chassis has to be connected first. The other connection is to be made to the chassis, remote from the battery and fuel line. The battery charger is then to be connected to the supply mains;
– after charging, disconnect the battery charger from the supply mains. Then remove the chassis connection and then the battery connection.

If symbol IEC 60417-5957 (2004-12) or symbol IEC 60417-6062 (2011-05) is used, its meaning shall be explained.

7.12.1 *Addition:*

The instructions for battery chargers for installation in caravans and similar vehicles shall state that the connection to the supply mains is to be in accordance with the national wiring rules.

7.101 DC distribution boards shall be marked with

– the maximum output current, in amperes, for each output circuit;
– the types of any additional power supply that may be connected.

Compliance is checked by inspection.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1 *Addition:*

*During insertion or removal of batteries having a battery voltage exceeding 42,4 V, protection against contact with **live parts** of the battery or of the battery charger shall be ensured.*

8.1.4 *Addition:*

*For **type 2 battery chargers**, voltages and currents are also measured between relevant accessible parts of opposite polarity.*

9 Starting of motor-operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable except as follows.

10.101 The DC output voltage of **type 1 battery chargers** shall not exceed 120 V. The DC output voltage of **type 2 battery chargers** shall not exceed 250 V.

*Compliance is checked by supplying the battery charger at **rated voltage** and measuring the DC output voltage.*

10.102 For **type 1 battery chargers**, the arithmetic mean value of the output current shall not deviate from the **rated DC output current** by more than 10 %.

For **type 2 battery chargers**, the arithmetic mean value of the output current shall not exceed the **rated DC output current** by more than 10 %.

*Compliance is checked by connecting the battery charger to the circuit of Figure 101. The battery charger is supplied at **rated voltage** and the variable resistor is adjusted to obtain the **rated DC output voltage**. The output current is then measured. A battery of the largest voltage and a battery with the largest capacity (if different) for each battery chemistry may be used instead of the circuit of Figure 101.*

11 Heating

This clause of Part 1 is applicable except as follows.

11.2 *Modification:*

*Battery chargers are placed in the test corner as specified for **heating appliances**.*

11.5 11.7 *Replacement:*

Battery chargers are operated until steady conditions are established.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable.

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable except as follows.

Addition:

The output terminals of the battery charger are short-circuited.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 *Modification:*

Instead of the tests specified, battery chargers are subjected to the tests of 19.11, 19.12 and 19.101 to 19.103, as applicable.

19.13 *Addition:*

During the tests, the values of Table 8 apply.

There shall be no rupture of the battery.

19.101 *Battery chargers are supplied at* ***rated voltage*** *and operated under* ***normal operation****, any control that operates during the test of Clause 11 being short-circuited.*

19.102 *The battery charger is connected to a fully charged battery, the connections being in reverse to normal use. The battery is to have the largest capacity of the types specified in the*

*instructions, the capacity of a lead-acid battery, however, being 70 Ah. The battery charger is operated while supplied at **rated voltage**.*

19.103 *Battery chargers intended to be used with a DC **distribution board** are supplied at **rated voltage** and operated under **normal operation** until steady conditions are established. The load is increased to raise the output current by 10 % until steady conditions are again established. This procedure is repeated until the **protective device** operates or short-circuit conditions are established.*

20 Stability and mechanical hazards

This clause of Part 1 is applicable.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

21.1 *Modification:*

The impact energy is increased to 1,0 J ± 0,05 J.

Addition:

Compliance is also checked by the test of 21.101.

21.101 *Battery chargers, other than **built-in battery chargers**, having a mass not exceeding 5 kg are subjected to the test free-fall – procedure 1, of IEC 60068-2-31, which is carried out on three appliances.*

The battery chargers are dropped from a height of 1 m, each appliance being dropped from a different position.

After the test the battery chargers shall show no damage that could impair compliance with 8.1, 15.1.1, 16.3 and Clause 29.

21.102 *Battery chargers for installing in caravans and similar vehicles shall withstand vibrations to which they may be subjected.*

Compliance is checked by carrying out the vibration tests specified in IEC 60068-2-6 under the following conditions:

- *the battery charger is built into an enclosure made from plywood approximately 20 mm thick, the internal dimensions being the minimum stated in the installation instructions;*
- *the enclosure is strapped to the vibration generator with the battery charger in its normal position of use;*
- *the direction of vibration is vertical;*
- *the amplitude of vibration is 0,35 mm;*
- *the sweep frequency range is 10 Hz to 55 Hz;*
- *the duration of the test is 30 min.*

The battery charger shall show no damage that could impair compliance with 8.1, 15.1.1, 16.3 and Clause 29, and connections shall not have worked loose.

22 Construction

This clause of Part 1 is applicable except as follows.

22.26 *Replacement:*

The output circuit of a **type 1 battery charger** shall be supplied through a **safety isolating transformer** and shall not be connected to **accessible metal parts** or an earthing terminal. The insulation between parts operating at **safety extra-low voltage** and **live parts** shall comply with the requirements for **double insulation** or **reinforced insulation**.

The output circuit of a **type 2 battery charger** shall be supplied through an **isolating transformer** and shall not be connected to **accessible metal parts** or an earthing terminal. The insulation between parts operating at **safety extra-low voltage** and **live parts** shall comply with the requirements for **double insulation** or **reinforced insulation**.

*Compliance is checked by inspection and by the tests specified for **double insulation** or **reinforced insulation**.*

22.101 Each circuit supplied from a **DC distribution board** shall incorporate an overload **protective device**.

Compliance is checked by inspection.

22.102 Battery chargers for installing in caravans and similar vehicles shall be constructed so that they can be securely fixed to a support. Keyhole slots, hooks and similar means, without any further means to prevent the battery charger from being inadvertently lifted off the support, are not considered to be securely fixed.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows

24.1.2 *Addition:*

*The relevant standard for **isolating transformers** is IEC 61558-2-4. If they have to be tested, they are tested in accordance with Annex BB.*

24.4 *Addition:*

The requirement is also applicable to plugs, connectors, socket-outlets and appliance outlets in the battery charger output circuit.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.5 *Addition:*

The requirement is also applicable to output flexible cords for battery chargers having a **rated output voltage** exceeding 42,4 V.

25.7 *Addition:*

The requirement is also applicable to output flexible cords for battery chargers having a **rated output voltage** exceeding 42,4 V.

Battery chargers for charging vehicle batteries shall not be fitted with natural rubber-sheathed **supply cords**.

For battery chargers intended for use at low temperatures, the **supply cord** shall have properties not less than those specified for ordinary polychloroprene sheathed cords (code designation 60245 IEC 57).

25.8 *Addition:*

The requirement is also applicable to output flexible cords for battery chargers having a **rated output voltage** exceeding 42,4 V.

25.15 *Addition:*

The requirement is also applicable to output flexible cords for battery chargers having a **rated output voltage** exceeding 42,4 V.

26 Terminals for external conductors

This clause of Part 1 is applicable except as follows.

26.5 *Modification:*

This requirement does not apply to the terminals of the output circuit having a no-load voltage not exceeding 42,4 V.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.2 *Addition*:

For battery chargers for outdoor use, the microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

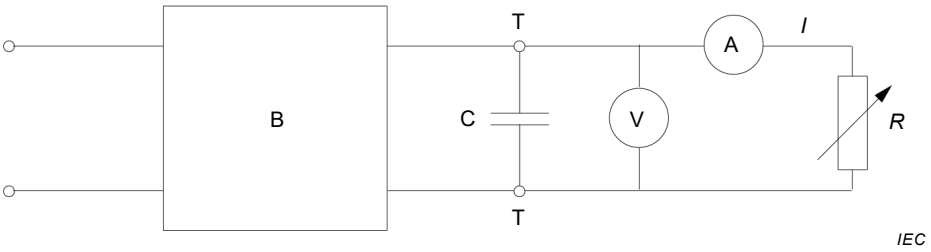
30.2.2 Not applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.



Key

A mean reading ammeter

B battery charger

C capacitor having a capacitance, in farads, given by: $12{,}5 \frac{I_r}{p \times f \times U_r}$

where

I_r = **rated DC output current**, in amperes;

p = 1, for half-wave rectification and 2, for full-wave rectification;

f = supply frequency, in hertz;

U_r = **rated DC output voltage**, in volts.

I output current

R variable resistor

T output terminals of the battery charger

V mean reading voltmeter

NOTE 1 The capacitor can have a capacitance deviating from the calculated values of ±20 %.

NOTE 2 The capacitor may have to be precharged before the battery charger can operate.

Figure 101 – Circuit for testing battery chargers

Annexes

The annexes of Part 1 are applicable except as follows.

Annex A
(informative)

Routine tests

A.2 Electric strength test

Addition:

An electric strength test is carried out between the input and output circuits, the test voltage being

– *2 000 V, for battery chargers having a **rated voltage** not exceeding 150 V;*
– *2 500 V, for other battery chargers.*

Annex AA
(normative)

Battery chargers for use by children

Battery chargers intended to be used by children at least eight years old without supervision shall comply with this standard but as modified by this annex. The battery chargers have a DC output at **safety extra-low voltage** not exceeding 30 V and a rated output not exceeding 50 VA.

NOTE 1 Battery chargers covered by this annex are not considered to be toys.

NOTE 2 Additional subclauses and notes in the annex are numbered starting with 201.

5 General conditions for the tests

5.201 *When batteries are used, the generally available rechargeable batteries giving the most unfavourable conditions are used.*

6 Classification

6.1 *Modification:*

Battery chargers suitable for outdoor use shall be **class III**. Other battery chargers shall be **class II** or **class III**.

6.2 *Addition*:

Battery chargers suitable for outdoor use shall be at least IPX7.

6.201 Enclosures shall be classified at least IP3X with regard to protection against ingress of solid foreign objects.

Compliance is checked by inspection.

7 Marking and instructions

7.1 *Addition:*

Battery chargers for indoor use only shall be marked with symbol IEC 60417-5957 (2004-12) or with the substance of the following:

For indoor use only.

Battery chargers shall be marked with the IP number according to the degree of protection against ingress of solid foreign objects.

Battery chargers shall be marked with the smiling face symbol together with 8+.

7.6 *Addition*:

[symbol IEC 60417-5957 (2004-12)] For indoor use only

8+  [smiling face] Suitable for use by children at least 8 years old

7.12 *Addition:*

The instructions shall include the substance of the following:

– CAUTION: Only allow children at least 8 years old to use the battery charger. Give sufficient instruction so that the child is able to use the battery charger in a safe way and explain that it is not a toy and must not be played with.

– instruct the child not to try and recharge non-rechargeable batteries because of the danger of eruption;

– examine the battery charger regularly for damage, especially the cord, plug and enclosure. If the battery charger is damaged, it must not be used until it has been repaired.

The instructions for **class III battery chargers** shall state that they must be supplied from a transformer for toys.

7.14 *Addition:*

The height of symbols marked on the appliance shall be at least 10 mm. The height of lettering shall be at least 3 mm.

Compliance is checked by measurement.

8 Protection against access to live parts

8.1.1 *Modification:*

*It shall not be possible to gain access to **live parts** or to metal parts separated from **live parts** by **basic insulation** only, even after a **tool** has been used to remove parts of the enclosure.*

Test probe 18 of IEC 61032 is also applied, as specified for test probe B.

10 Power input and current

10.101 *Addition:*

The output voltage shall not exceed 42,4 V peak.

11 Heating

11.8 *Addition:*

The temperature rise for the surface of batteries that can be touched by test probe 18 of IEC 61032 shall not exceed 25 K.

For all other surfaces that can be touched by test probe 18 of IEC 61032 shall not exceed the following values;

- *25 K, if of metal;*
- *35 K, if of other material.*

17 Overload protection of transformers and associated circuits

Addition:

The temperature rises of parts that can be touched by test probe 18 of IEC 61032 shall not exceed the following values:

- *45 K, if of metal;*
- *55 K, if of other material.*

19 Abnormal operation

19.13 *Addition:*

The temperature rises of parts that can be touched by test probe 18 of IEC 61032 shall not exceed the following values:

- *45 K, if of metal;*
- *55 K, if of other material.*

21 Mechanical strength

21.1 *Addition:*

Compliance is also checked by the test of 21.201.

21.201 *The battery charger is subjected to test Ehb in accordance with IEC 60068-2-75. The impact energy shall be 2 J. For rectangular shaped battery chargers, the four sides and four edges are subjected to an impact. For other battery chargers, the enclosure is subjected to eight impacts equally spaced over the periphery.*

The battery charger is then subjected to test Ec, Procedure 1 – Free fall, in accordance with IEC 60068-2-31. The height of the fall is 500 mm. The battery charger is orientated in its normal position of use prior to being dropped.

The battery charger shall not be damaged to such an extent that compliance with this standard is impaired; in particular, **live parts** shall not become accessible.

22 Construction

22.201 Battery chargers shall have only one **rated voltage** or **rated voltage range**. They shall not incorporate means for manually adjusting the output voltage.

Compliance is checked by inspection.

22.202 Battery chargers shall be constructed so that reverse charging is prevented, regardless of the state of charge of the battery. This applies even if the battery is inserted with the wrong polarity.

Compliance is checked by inspection and by measurement.

24 Components

24.201 *The relevant standard for transformers for toys is IEC 61558-2-7. If they have to be tested, they are tested in accordance with Subclauses 7.2, 20.7.1 and 20.101 and Clause 15 of IEC 61558-2-7: 2007.*

25 Supply connection and external flexible cords

25.1 *Modification:*

Battery chargers shall not be provided with an appliance inlet.

25.5 *Modification:*

Battery chargers shall have **type Y attachment** or **type Z attachment**.

Annex BB
(normative)

Isolating transformers

The following modifications to this standard are applicable for **isolating transformers**.

7 Marking and instructions

7.1 Isolating transformers for specific use shall be marked with:

– name, trademark or identification mark of the manufacturer or responsible vendor;
– model or type reference.

17 Overload protection of transformers and associated circuits

Fail-safe transformers shall comply with Subclause 15.5 of IEC 61558-1.

This test is carried out on three transformers.

22 Construction

Subclauses 19.1 and 19.1.2 of IEC 61558-2-4:2009 are applicable.

29 Clearances, creepage distances and solid insulation

29.1, 29.2 and 29.3 The distances specified in items 2a, 2c and 3 in Table 13 of IEC 61558-1 apply.

For insulated winding wires complying with Subclause 19.12.3 of IEC 61558-1, there are no requirements for **clearances** or **creepage distances**. In addition, for windings providing **reinforced insulation**, the distance specified in item 2c of Table 13 of IEC 61558-1 is not assessed.

For **isolating transformers** subjected to periodic voltages with a frequency exceeding 30 kHz, the **clearances**, **creepage distances** and **solid insulation** values specified in IEC 60664-4 are applicable, if these values are greater than the values specified in items 2a, 2c and 3 in Table 13 of IEC 61558-1.

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

IEC 60598-2-22, *Luminaires – Part 2-22: Particular requirements – Luminaires for emergency lighting*

_____

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

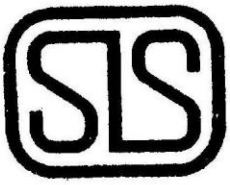
3, rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
Fax: + 41 22 919 03 00
info@iec.ch
www.iec.ch

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

Further particulars of the terms and conditions of the permit may be obtained from the Sri *Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.*



Printed at SLSI (Printing Unit)

SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.