

BRITISH STANDARD

**BS EN
60335-2-29 :
1997**

*Implementing
Amendment No. 1, not
published separately*

Specification for

Safety of household and similar electrical appliances

Part 2. Particular requirements

Section 2.29 Battery chargers

The European Standard EN 60335-2-29 : 1996 with the inclusion of amendment A11 : 1997 has the status of a British Standard

ICS 97.180

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee CPL/61, Safety of electrical appliances, to Subcommittee CPL/61/24, Battery chargers, upon which the following bodies were represented:

- Agricultural Engineers Association
- Association of Control Manufacturers
- Association of Manufacturers of Domestic Electrical Appliances
- British Electrotechnical Approvals Board
- Consumer Policy Committee of BSI
- Society of Motor Manufacturers and Traders Ltd
- Rotating Electrical Machines Association (BEAMA Ltd)
- Electricity Association
- Department of Trade and Industry - Consumer Safety Unit, CA Division

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Amendments issued since publication

Amd. No.	Date	Text affected
9989	May 1998	Indicated by a double sideline in the margin. Addition of new annex ZAA.

Summary of pages

The following table identifies the current issue of each page. Issue 1 indicates that a page has been introduced for the first time by amendment. Subsequent issue numbers indicate an updated page. Double vertical sidelining on replacement pages indicates the most recent changes (amendment, addition, deletion).

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National foreword

This British Standard has been prepared by Subcommittee CPL/61/24 and is the English language version of EN 60335-2-29 : 1996, *Safety of household and similar electrical appliances Part 2 : Particular requirements for battery chargers*, including amendment A11 : 1997 published by the European Committee for Electrotechnical Standardization (CENELEC). It was derived by CENELEC from IEC 335-2-29 : 1994, published by the International Electrotechnical Commission (IEC).

This British Standard supersedes BS EN 60335-2-29 : 1991 which will be withdrawn on 1 April 1999 in accordance with the CENELEC Internal Regulations. Certificates and marks will not be awarded after this date with respect to BS EN 60335-2-29 : 1991. However, such certificates and marks, already awarded, may continue to apply for production until 1 April 2004.

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by a side line in the margin.

This British Standard is to be read in conjunction with BS EN 60335-1 : 1995 *Specification for safety of household and similar electrical appliances Part 1: General requirements*, and amendment No.1 : 1995. The many references to Part 1 should be read as references to BS EN 60335-1, which is the English language version of EN 60335-1 : 1994 which was derived from the second impression, 1993, of IEC publication 335-1 (third edition 1991). Amendments and revisions of Part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of Part 1.

Product approval. Attention is drawn to the fact that products conforming to this British Standard may be approved by the British Electrotechnical Approvals Board for the purposes of participation in the CENELEC Certification Agreement and in the CB Scheme of the IECEE. (Details of the BEAB Approval Scheme are given on the inside back cover.)

Cross-reference

Publication referred to	Corresponding British Standard
EN 60068-2-6 : 1995	BS EN 60068 <i>Environmental testing Part 2 Test methods Section 2.6 : 1996 Test Fc. Vibration (sinusoidal)</i>

From 1 January 1997, all IEC publications have the number 60000 added to the old number. For instance, IEC 27-1 has been renumbered as IEC 60027-1. For a period of time during the change over from one numbering system to the other, publications may contain identifiers from both systems.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60335-2-29

December 1996

+ A11

December 1997

ICS 29.200

Supersedes EN 60335-2-29 : 1991 and its amendment

Descriptors: Household electrical appliances, battery chargers, safety requirements, protection against electric shock, fire protection, protection against mechanical hazard

English version

Safety of household and similar electrical appliances
Part 2: Particular requirements for battery chargers

(includes amendment A11 : 1997)

(IEC 335-2-29 : 1994, modified)

Sécurité des appareils électrodomestiques
et analogues
Partie 2: Règles particulières pour les chargeurs
de batterie
(inclut l'amendement A11 : 1997)
(CEI 335-2-29 : 1994, modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke
Teil 2: Besondere Anforderungen
für Batterieladegeräte
(enthält Änderung A11 : 1997)
(IEC 335-2-29 : 1994, modifiziert)

This European Standard was approved by CENELEC on 1996-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN 60335-2-29 : 1996 + A11 : 1997 E

Foreword

The proposal to endorse IEC 335-2-29:1994, document CLC/TC 61 (SEC) 990, was circulated under the enquiry procedure in December 1994. This proposal was discussed during the Amsterdam meeting in September 1995, when it was decided to submit a draft for EN 60335-2-29 to the formal vote.

This draft was circulated in March 1996 and was ratified by CENELEC as EN 60335-2-29 on 1996-10-01.

This European Standard has been prepared by the secretariat of CENELEC Technical Committee TC 61.

The following dates are applicable:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 1997-04-01
- date on which national standards
conflicting with the EN have to be withdrawn (dow) 1999-04-01

For products which have complied with EN 60335-2-29:1991 including its amendment A2:1993 before 1999-04-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2004-04-01.

This standard has to be used in conjunction with EN 60335-1, Safety of household and similar electrical appliances, Part 1: General requirements. It was established on the basis of the 1994 edition of that standard. Amendments and revisions of part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of part 1.

This part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for electric battery chargers.

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

Subclauses and figures which are additional to those in part 1 are numbered starting with 101.

Special national conditions causing a deviation from this European Standard are listed in annex ZA and are in addition to those in EN 60335-1.

There are no national deviations from this European Standard, other than those listed in annex ZB to EN 60335-1.

NOTE - 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 2. When a definition of part 1 concerns an adjective, the adjective and the associated noun are also in bold.

Foreword to amendment A11

A proposal to amend EN 60335-2-29:1996, document CLC/TC 61 (SEC) 1049, was circulated under the enquiry procedure in September 1995. This proposal was discussed during the Copenhagen meeting in May 1996, when it was decided to submit a draft for an amendment to EN 60335-2-29 to the formal vote.

This draft was circulated as prAA in May 1997 and was approved by CENELEC as amendment A11 on 1997-10-01.

This amendment has been prepared by the secretariat of CENELEC Technical Committee TC 61.

The following dates are applicable:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-07-01
- date on which national standards conflicting with the amendment have to be withdrawn (dow) 2000-07-01

For products which have complied with the relevant national standard before 2000-07-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2004-07-01.

This amendment supplements or modifies the corresponding clauses of EN 60335-2-29:1996.

There are no special national conditions causing a deviation from this amendment.

There are no national deviations from this amendment.

NOTE - Amendment numbers commencing A1 refer to the endorsement of IEC amendments, while those commencing A11 originate in CENELEC.

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SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES**Part 2: Particular requirements for battery chargers****1 Scope**

This clause of part 1 is replaced by:

This standard deals with the safety of battery chargers for household and similar use having an output at safety extra-low voltage, their rated voltage being not more than 250 V.

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.

So far as is practicable, this standard deals with the common hazards presented by appliances which are encountered by all persons in and around the home.

This standard does not in general take into account:

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliance by young children.

NOTES

1 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;
- for appliances intended to be used in tropical countries, special 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.

2 This standard does not apply to

- built-in battery chargers, except those for installing in caravans and similar vehicles;
 - battery chargers which 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);
 - rechargeable battery-operated appliances (IEC 335-1, annex B);
 - battery chargers comprising more than one unit;
-
- supply units for electronic equipment;
 - battery chargers and supply units for electronic flash apparatus for photographic purposes (IEC 491);
 - battery chargers intended for use in electric vehicles (IEC 718).

NOTE Z1 Requirements for battery chargers for use by children are given in annex ZAA.

2 Definitions

This clause of part 1 is applicable except as follows:

2.2.1 Addition:

The **rated voltage** is the rated input voltage.

2.2.6 Addition:

The **rated current** is the rated input current.

2.2.9 Replacement:

normal operation: The battery charger is operated as follows:

Battery chargers for charging lead-acid batteries and battery chargers which have a **rated d.c. output current** not exceeding 20 A for charging other batteries, are connected to the circuit of figure 101. The variable resistor is adjusted so that the current in the circuit is the **rated d.c. 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 for use.

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

NOTE – Batteries are considered to be discharged when:

- for lead-acid batteries, the specific gravity of the electrolyte is less than 1,16;
- for nickel-cadmium batteries, the voltage per cell is less than 0,9 V.

2.101 rated d.c. output voltage: The d.c. output voltage assigned to the battery charger by the manufacturer.

NOTE – The **rated d.c. output voltage** of a battery charger is equal to the product of the number of cells connected in series and the nominal voltage of one cell of the battery for which the charger is to be used.

2.102 rated d.c. output current: The d.c. output current assigned to the battery charger by the manufacturer.

2.103 d.c. distribution board: Panel in a caravan having circuits for distributing d.c. power to socket-outlets or terminals.

3 General requirement

This clause of part 1 is applicable.

* 5 *

4 General conditions for the tests

This clause of part 1 is applicable except as follows:

4.2 Addition:

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

4.101 Unless otherwise specified, battery chargers are tested as motor-operated appliances.

5 Void

6 Classification

This clause of part 1 is applicable.

7 Marking and Instructions

This clause of part 1 is applicable except as follows:

7.1 Addition:

Battery chargers shall be marked with:

- **rated d.c. output voltage, in volts;**
- **rated d.c. output current, in amperes;**

NOTE 1 – No other output current is to be marked.

- **the rated current, in amperes, of protective devices incorporated in a d.c. distribution board;**
- **the polarity of the output terminals. The positive terminal shall be indicated by the colour red or the symbol + and the negative terminal by the colour black or the symbol –;**

NOTE 2 – Marking of the polarity is not required for battery chargers where an incorrect polarity connection is prevented.

- **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).**
- **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.**

D.C. distribution boards shall be marked with:

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

Battery chargers incorporating an engine cranking switch which 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 d.c. output voltages, the output voltage to which the battery charger is adjusted shall be clearly discernible.

7.12 Addition:

The instructions for use shall:

- specify the types, the number of cells and the rated capacity in ampere-hours, of the battery which can be charged;
- include a warning against recharging non-rechargeable batteries;
- for chargers for lead-acid batteries, state that during charging the battery must be placed in a well ventilated area;
- for portable class I battery chargers for outdoor use, state that they must only be plugged-in to an earthed socket-outlet;
- for automatic battery chargers, explain the automatic function, stating any limitation;
- for battery chargers for charging automobile batteries, 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 supply mains. Then remove the chassis connection and the battery connection, in this order.

7.12.4 Addition:

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

8 Protection against access to live parts

This clause of part 1 is applicable.

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 no-load d.c. output voltage shall not exceed 42,4 V.

Compliance is checked by measuring the no-load d.c. output voltage when the battery charger is supplied at rated voltage.

10.102 The arithmetic mean value of the output current shall not deviate from the rated d.c. 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 d.c. output voltage. The output current is then measured.

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 Modification:

Battery chargers are only supplied at 1,06 times rated voltage.

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 Void**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 Addition:

Compliance is also checked by the tests of 19.101 to 19.103.

19.13 Addition:

During the tests, the values of table 6 apply.

19.101 *Battery chargers are supplied at rated voltage and operated under normal operation, any control which 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 of the type and has the largest capacity specified in the instructions for use; the capacity, however, of a lead-acid battery being 70 Ah. The battery charger is operated while supplied at rated voltage.*

19.103 *Battery chargers in combination with a d.c. 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.*

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:

Modification:

Instead of the value specified, the impact energy is 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 following test which is carried out on three appliances.

The battery charger is dropped from a height of 1 m onto a concrete floor, each appliance being dropped from a different position.

The battery charger shall show no damage which could impair compliance with 8.1, 15.1.1, 16.3 and 29.1.

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

Compliance is checked by carrying out the vibration tests specified in IEC 68-2-6, the test conditions being:

- the battery charger is built in to an enclosure made from plywood approximately 20 mm thick, the internal dimensions being the minimum stated in the instructions for installation;***
- 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 which could impair compliance with 8.1, 15.1.1, 16.3 and 29.1 and connections shall not have worked loose.

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24 Components

This clause of part 1 is applicable except as follows:

24.5 Addition:

The requirement applies to socket-outlets in the output circuit.

25 Supply connection and external flexible cords

This clause of part 1 is applicable except as follows:

25.7 Addition:

Natural rubber cords are not allowed for battery chargers for charging automobile batteries.

NOTE Z1: Refer to annex ZA.

26 Terminals for external conductors

This clause of part 1 is applicable except as follows:

26.10 Addition:

This requirement does not apply to the terminals of the output circuit.

27 Provision for earthing

This clause of part 1 is applicable.

28 Screws and connections

This clause of part 1 is applicable.

29 Creepage distances, clearances and distances through insulation

This clause of part 1 is applicable.

30 Resistance to heat, fire and tracking

This clause of part 1 is applicable except as follows:

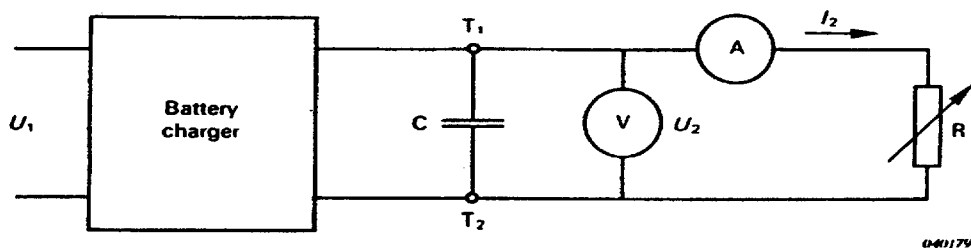
30.2.2 Not applicable.

31 Resistance to rusting

This clause of part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of part 1 is applicable.



- U_1 supply voltage
- U_2 output voltage
- I_2 output current
- A mean reading ammeter
- V mean reading voltmeter
- R variable resistor
- T_1 and T_2 terminals of the output circuit of the battery charger

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

where

- I_r = rated d.c. output current, in amperes;
- ρ = 1, for half wave rectification, and
= 2, for full wave rectification;
- f = supply frequency, in hertz;
- U_r = rated d.c. output voltage, in volts.

NOTES

- 1 The capacitor used may have a capacitance deviating from the value resulting from the formula by $\pm 20\%$.
- 2 The capacitor may have to be pre-charged 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

**Normative references
International publications with their relevant European publication**

Addition:

<u>IEC standard</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
68-2-6	1982	Test Fc and guidance: Vibration (sinusoidal) Vibration (sinusoidal)	HD 323.2.6 S2 ¹⁾	1988
491	1984	Safety requirements for electronic flash apparatus for photographic purposes	HD 327 S2	1988
718	1992	Electrical equipment for the supply of energy to battery powered road vehicles	—	—
61558-2-7 (mod)	1997	Safety of power transformers, power supply units and similar — Part 2-7: Particular requirements for transformers for toys	EN 61558-2-7	1997

Annex ZA (normative)

Special national conditions

Addition:

<u>Clause</u>	<u>Special national condition</u>
25.7	Finland

Polyvinylchloride sheathed cords are not allowed for battery chargers for charging automobile batteries.

¹⁾ HD 323.2.6 S2 is superseded by EN 60068-2-6:1995.

Annex ZAA
(normative)**Battery chargers for use by children**

All clauses of this standard apply, except as specified in this annex.

ZAA.1 Scope*Addition:*

This annex deals with the safety of **battery chargers for use by children**, having a d.c. output at **safety extra-low voltage** not exceeding 33 V and a rated output not exceeding 50 VA.

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

ZAA.2 Definitions*Additional subclause:*

ZAA.2.101 battery charger for use by children: Battery charger intended to be used by children 8 years old and above, without adult supervision.

NOTE - A **battery charger for use by children** may be supplied together with a toy.

ZAA.4 General conditions for the tests*Additional subclause:*

ZAA.4.101 When batteries are used, the generally available rechargeable batteries giving the most unfavourable conditions are used.

ZAA.6 Classification**ZAA.6.1 Addition:**

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

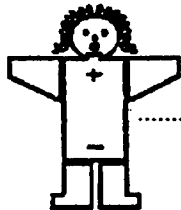
ZAA.6.2 Addition:

Enclosures shall also provide the appropriate degree of protection against ingress of solid foreign objects. Battery chargers for indoor use shall be at least IP3X. Battery chargers for outdoor use shall be at least IP37.

ZAA.7 Marking and instructions**ZAA.7.1 Addition:**

Battery chargers shall be marked with:

- the symbol for **battery chargers for use by children**;
- the relevant IP number;
- "for indoor use only" or "for outdoor use", as applicable.

ZAA.7.6 Addition:

..... symbol for **battery chargers for use by children**

The symbol shall have a height of at least 5 mm.

ZAA.7.12 Replace the addition by:

The instructions for use shall include the substance of the following:

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

Instruct the child not to try and recharge non-rechargeable batteries because of the danger of eruption.

The battery charger is to be regularly examined for damage, especially to the cord, plug and the 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.

ZAA.8 Protection against access to live parts**ZAA.8.1.1 Addition:**

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 the removal of covers which can only be removed with the aid of a tool.

In addition to the test finger of figure 1, the small test finger of figure ZAA.1 is applied in the same way.

ZAA.10 Power input and current**ZAA.10.101 Addition:**

Any peak of the output voltage shall not exceed 46 V.

ZAA.11 Heating**ZA.11.8 Addition:**

The temperature rise of parts which can be touched by the small test finger of figure ZAA.1 shall not exceed the following values:

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

NOTE - The temperature rise limit for metal applies to the surface of the batteries.

ZAA.17 Overload protection of transformers and associated circuits**Addition:**

The temperature rise of parts which can be touched by the small test finger of figure ZAA.1 shall not exceed the following values:

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

ZAA.19 Abnormal operation**ZAA.19.13 Addition:**

The temperature rise of parts which can be touched with the small test finger of figure ZAA.1 shall not exceed the following values:

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

ZAA.21 Mechanical strength

Addition:

Compliance is also checked by the test of ZAA.21.101.

Additional subclause:

ZAA.21.101 The battery charger is allowed to fall against the corner of a right-angle steel bar which is mounted on a solid wall of concrete or similar material, as shown in figure ZAA.2. The bar has dimensions of 40 mm x 40 mm x 5 mm with the corner rounded to a radius of 5 mm. It is mounted with the edges in contact with the wall.

The battery charger is suspended by its supply cord or interconnection cord so that it rests against the corner of the bar, the point of suspension being 1 m above the bar. It is then pulled away from the corner of the plane perpendicular to the wall until it has risen to a height of 400 mm.

The battery charger is allowed to fall against the bar. 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 dropped from a height of 400 mm onto a steel plate, at least 5 mm thick, placed on a concrete base.

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

ZAA.22 Construction

ZAA.22.26 Addition:

Transformers incorporated in battery chargers shall comply with subclauses 7.2, 15, 20.5.1 and 20.101 of IEC 61558-2-7.

Additional subclauses:

ZAA.22.101 Battery chargers shall have only one rated voltage. They shall not incorporate means for manually adjusting the output voltage.

Compliance is checked by inspection.

ZAA.22.102 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.

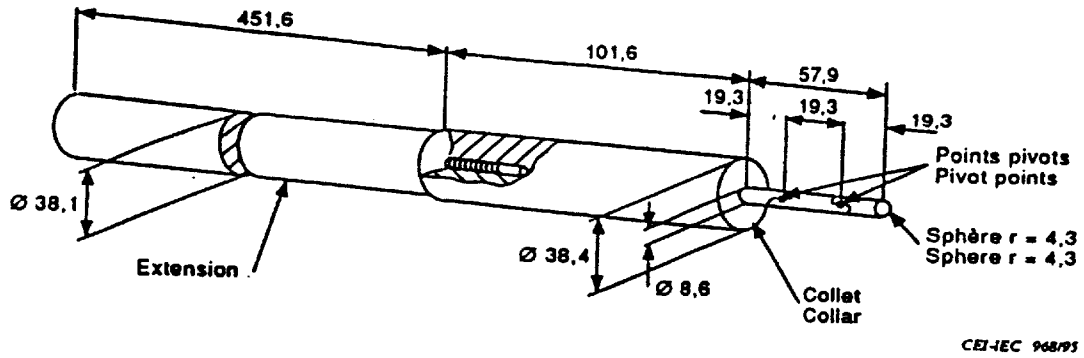
ZAA.25 Supply connection and external flexible cords

ZAA.25.1 Modification:

Battery chargers shall not be provided with an appliance inlet.

ZAA.25.5 Modification:

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



Matière: métal

Dimensions en millimètres

Tolérances sur les dimensions $\pm 0,125$ mm

Les deux articulations doivent permettre un mouvement, dans le même plan et le même sens, de 90° avec une tolérance de 0° à +10°

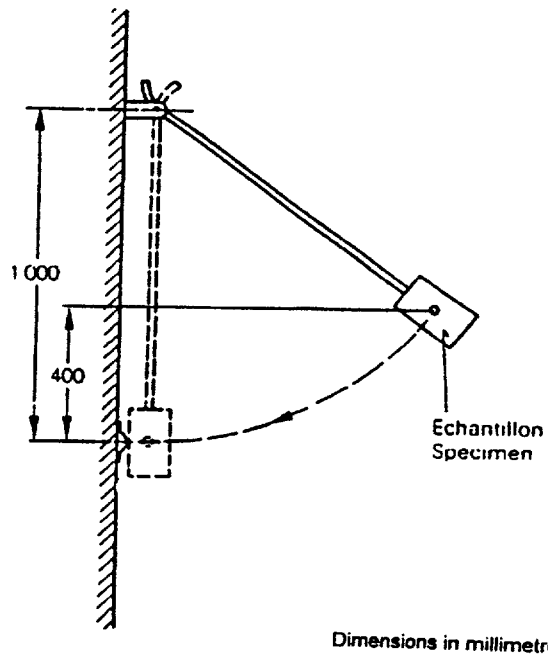
Material: metal

Dimensions in millimetres

Tolerances on dimensions $\pm 0,125$ mm

Both joints shall permit movement in the same plane and the same direction through an angle of 90° with a 0° to +10° tolerance

Figure ZAA.1 – Petit doigt d'épreuve
Small test finger



Dimensions en millimètres

Dimensions in millimetres

Figure ZAA.2 - Arrangement pour l'essai de choc pour les chargeurs de batterie
Arrangement for impact test for battery chargers

List of references

See national foreward

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