

AS/NZS 62115:2018
(Incorporating Amendment No. 1)



Australian/New Zealand Standard™

Electric toys — Safety



AS/NZS 62115:2018

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee EL-002, Safety of Household and Similar Electrical Appliances and Small Power Transformers and Power Supplies. It was approved on behalf of the Council of Standards Australia on 5 June 2018 and by the New Zealand Standards Approval Board on 6 June 2018.

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- Association of Accredited Certification Bodies
- Australian Industry Group
- Australian Retailers Association
- Business New Zealand
- Consumer Electronics Suppliers Association
- Consumers Federation of Australia
- Electrical Regulatory Authorities Council
- Engineers Australia
- Joint Accreditation System of Australia and New Zealand
- New Zealand Electric Fence Energiser Manufacturers Standards WG
- NSW Fair Trading
- UL (Testing Interests New Zealand)
- Worksafe New Zealand

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Australian/New Zealand Standard™

Electric toys — Safety

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

AS/NZS 62115:2018

ELECTRIC TOYS –SAFETY

Foreword

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-002 - Safety of Household and Similar Electrical Appliances and Small Power Transformers to supersede AS/NZS 62115:2011 three years from the date of publication.

The objective of this Standard is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with safety requirements designed to give the user protection against hazards that might occur during normal operation and abnormal operation of the appliance and which may be used as the basis for approval for sale or for connection to the electricity supply mains in Australia and New Zealand.

The text of IEC 62115 Ed 2, prepared by IEC Technical Committee TC 61, was submitted to the Standards Australia/Standards New Zealand Combined Procedure (dual public comment and committee vote) for adoption of the IEC standard as a Standards Australia/Standards New Zealand joint standard.

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

- the general conditions for tests has been rewritten and modified (Clause 5);
- the criteria for reduced testing has been modified (Clause 6);
- warnings for toys using button batteries or coin batteries have been added (7.3.3.2, 7.3.3.3);
- warnings on ride-on toys have been added (7.5);
- the requirements concerning accessibility of batteries have been updated (13.4.1 and 13.4.2);
- added requirements to cover toys placed above a child (13.4.4);
- added requirements to cover toys connected to other equipment (13.9);
- modified the requirements for safety of toys incorporating optical radiation sources (Annex E), to include requirements for using the technical LED data sheet for checking compliance with the specified accessible emission limits (AEL);
- updated the details for measurements of the optical radiation from the toy (Annex E);
- introduced an informative Annex I concerning measurement methods for toys with an integrated field source generating EMF;
- included a normative Annex J concerning safety of remote controls for electric ride-on toys.

A1 | This standard incorporates Amendment No.1 (November 2021). The changes introduced by amendments are indicated in the text by a marginal bar and amendment number against the part affected. Where an application date other than immediate is applicable to an amendment the date of application (DOA) and the date of withdrawal (DOW) if relevant, is indicated by the marginal bar against the part affected.

This Standard is an adoption with national modifications of the second edition of IEC 62115 *Electric toys – Safety*.

The essential safety requirements in AS/NZS 3820¹ that could be applicable to requirements for electric toys are covered by this standard.

The national variations to IEC 62115 Ed 2 form the Australian and New Zealand national variations for purposes of the IECEE scheme for recognition of results of testing to standards for safety of electrical equipment (the CB scheme).

¹ AS/NZS 3820 *Essential safety requirements for electrical equipment*

The text of the International Standard IEC 62115 Ed 2 was approved as a joint Australia/New Zealand Standard with the agreed national variations as given below.

AUSTRALIAN NATIONAL VARIATIONS

13 Construction

13.6 *Replace* the fourth dashed item of the first paragraph of the requirement by the following variation:

— the **power supply** shall comply with 15.3;

Annex E

19.E.4 *Replace* in the first paragraph of the requirement

$\lambda < 315 \text{ nm}$ $\delta = 10 \text{ mm}$ Children 3 years or younger $0,001 \text{ Wm}^{-2}$

$\lambda < 315 \text{ nm}$ $\delta = 10 \text{ mm}$ Children older than 3 years $0,01 \text{ Wm}^{-2}$

by the following variation:

$\lambda < 315 \text{ nm}$ $\delta = 10 \text{ mm}$ $0,01 \text{ Wm}^{-2}$

NEW ZEALAND NATIONAL VARIATIONS

13 Construction

13.6 *Replace* the fourth dashed item of the first paragraph of the requirement by the following variation:

— the **power supply** shall comply with 15.3;

Annex E

19.E.4 *Replace* in the first paragraph of the requirement

$\lambda < 315 \text{ nm}$ $\delta = 10 \text{ mm}$ Children 3 years or younger $0,001 \text{ Wm}^{-2}$

$\lambda < 315 \text{ nm}$ $\delta = 10 \text{ mm}$ Children older than 3 years $0,01 \text{ Wm}^{-2}$

by the following variation:

$\lambda < 315 \text{ nm}$ $\delta = 10 \text{ mm}$ $0,01 \text{ Wm}^{-2}$

Annex ANZ
(normative)
Normative references to international publications with their corresponding joint
Australia/New Zealand publications

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by national variations the relevant joint Australia/New Zealand publications applies if the national variations are needed to ensure the safety of the appliance for Australia/New Zealand conditions. These international publications are indicated by (mod). If an international publication is not so indicated, then either it or the listed Australia/New Zealand publication may be used.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>AS/NZS</u>	<u>Year</u>
IEC 60068-2-75:	2014,	<i>Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests</i>		
IEC TR 60083,		<i>Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC</i>		
IEC 60086-2:	2015,	<i>Primary batteries – Part 2: Physical and electrical specifications</i>		
IEC 60068 (All Parts),		<i>Primary batteries</i>		
IEC 60335-1	2010,	<i>Household and similar electrical appliances – Safety – Part 1: General requirements</i>		
IEC 60335-1:2010/AMD1	2013,			
IEC 60335-1:2010/AMD2: ¹	2016,			
IEC 60335-2-29:	2016,	<i>Household and similar electrical appliances – Safety – Part 2-29: Particular requirements for battery chargers</i>		
IEC 60384-14,		<i>Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains</i>		
IEC 60417,		<i>Graphical symbols for use on equipment</i>		
IEC 60529:	1989,	<i>Degrees of protection provided by enclosures (IP Code)</i>		
IEC 60529/AMD1:	1999,			
IEC 60529/AMD2: ²	2013,			
IEC 60695-2-11,		<i>Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)</i>		

¹ There exists a consolidated edition 5.2 (2016) that includes edition 5 and its Amendment 1 and Amendment

² There exists a consolidated edition 2.2 (2013) that includes edition 2 and its Amendment 1 and Amendment 2.

IEC 60695-2-13,		<i>Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials</i>
IEC 60695-10-2,		<i>Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method</i>
IEC 60695-11-5:	2005,	<i>Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance</i>
IEC 60695-11-10,		<i>Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods</i>
IEC 60730 (All Parts),		<i>Automatic electrical controls</i>
IEC 60730-1:	2013,	<i>Automatic electrical controls – Part 1: General requirements</i>
IEC 60730-1:2013/AMD1 ³	2013,	
IEC 60748-1,		<i>Thermistors – Directly heated positive temperature coefficient – Part 1: Generic specification</i>
IEC 60990:	2016,	<i>Methods of measurement of touch current and protective conductor current</i>
IEC 61000-4-2:	2008,	<i>Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test</i>
IEC 61000-4-3:	2006,	<i>Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test</i>
IEC 61000-4-3/AMD1:	2007,	
IEC 61000-4-3/AMD2:	2010,	
IEC 61000-4-4:	2012,	<i>Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test</i>
IEC 61000-4-5:	2014,	<i>Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test</i>
IEC 61000-4-6:	2013,	<i>Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields</i>

³ There exists a consolidated edition 5.1 (2015) that includes edition 5 and its Amendment 1.

⁴ There exists a consolidated edition 3.2 (2010) that includes edition 3 and its Amendment 1 and Amendment 2.

IEC 61000-4-11:	2004,	<i>Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests</i>
IEC 61000-4-13	2002,	<i>Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests</i>
IEC 61000-4-13/AMD1:	2009,	
IEC 61000-4-13/AMD2: ⁵	2015,	
IEC 61032,		<i>Protection of persons and equipment by enclosures – Probes for verification</i>
IEC 61058-1:	2016,	<i>Switches for appliances – Part 1: General requirements</i>
IEC 61058-1-1:	2016	<i>Switches for appliances – Part 1-1: Requirements for mechanical switches</i>
IEC 61058-1-2:	2016,	<i>Switches for appliances – Part 1-2: Requirements for electronic switches</i>
IEC 61180,		<i>High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment</i>
IEC 61558-2-7,		<i>Safety of power transformers, power supplies, reactors and similar products – Part 2-7: Particular requirements and tests for transformers and power supplies for toys</i>
IEC 61558-2-16,		<i>Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units</i>
IEC 62133,		<i>Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications</i>
IEC 62233:	2005,	<i>Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure</i>
IEC 60471:	2006,	<i>Photobiological safety of lamps and lamp systems</i>

⁵ There exists a consolidated edition 1.2 (2015) that includes edition 1 and its Amendment 1 and Amendment 2.

ISO 3864-1,		<i>Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings</i>
ISO 8124-1:	2014,	<i>Safety of toys – Part 1: Safety aspects related to mechanical and physical properties</i>
ISO 7000,		<i>Graphical symbols for use on equipment – Registered symbols</i>
ISO 9772,		<i>Cellular plastics – Determination of horizontal burning characteristics of small specimens subjected to a small flame</i>

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRIC TOYS – SAFETY

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.
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- 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.

International Standard IEC 62115 has been prepared by subcommittee IEC technical committee 61: Safety of household and similar electrical appliances.

This second edition cancels and replaces the first edition published in 2003, Amendment 1 (2004) and Amendment 2 (2010). This edition constitutes a technical revision.

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

- the general conditions for tests has been rewritten and modified (Clause 5);
- the criteria for reduced testing has been modified (Clause 6);
- warnings for toys using button batteries or coin batteries have been added (7.3.3.2, 7.3.3.3);
- warnings on ride-on toys have been added (7.5);
- the requirements concerning accessibility of batteries have been updated (13.4.1 and 13.4.2);
- added requirements to cover toys placed above a child (13.4.4);
- added requirements to cover toys connected to other equipment (13.9);

- modified the requirements for safety of toys incorporating optical radiation sources (Annex E), to include requirements for using the technical LED data sheet for checking compliance with the specified accessible emission limits (AEL);
- updated the details for measurements of the optical radiation from the toy (Annex E);
- introduced an informative Annex I concerning measurement methods for toys with an integrated field source generating EMF;
- included a normative Annex J concerning safety of remote controls for electric ride-on toys.

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

FDIS	Report on voting
61/5319/FDIS	61/5371/RVD

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

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

NOTE 1 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 associated noun are also in bold.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE 2 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 publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 people.

As a general rule, electric toys are designed and manufactured for particular categories of children. Their characteristics are related to the age and stage of development of the children and their intended use presupposes certain capabilities.

Accidents are frequently due to an electric toy either being given to a child for whom it is not intended or being used for a purpose other than for which it was designed. This standard does not eliminate parental responsibility for the appropriate selection of electric toys. It is assumed that when choosing an electric toy or a game, account is taken of the physical and mental development of the child who will be playing with it.

The aim of this standard is to reduce risks when playing with electric toys, especially those risks that are not evident to users. However, it has to be recognized that some electric toys have risks inherent in their use that cannot be avoided. Consideration has been given to reasonably foreseeable use, bearing in mind that children are not generally as careful as adults.

While this standard applies to new electric toys, it nevertheless takes into account the wear and tear of electric toys in use.

The fact that an electric toy complies with this standard does not absolve parents and other persons in charge of a child from the responsibility of supervising the child. Supervision is also necessary when children of various ages have access to the same electric toy.

This standard covers the whole range of electric toys from small button battery or coin battery operated lights to large ride-on electric toys powered by rechargeable batteries. This results in different requirements and tests according to the type of electric toy. For some electric toys, testing can be reduced if particular criteria are met (see Clause 6).

Other safety aspects of electric toys are described in the ISO 8124 series of standards.

An electric toy that complies with the text of this standard will not necessarily be judged to comply with the safety principles of the standard if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

A electric toy 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 judged to comply with the standard.

Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent.

IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the IEC that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from:

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

IEC (<http://patents.iec.ch>) maintains an on-line database of patents relevant to its standards. Users are encouraged to consult the database for the most up to date information concerning patents.

ELECTRIC TOYS – SAFETY

1 Scope

This International Standard specifies safety requirements for **electric toys** that have at least one function dependant on electricity, **electric toys** being any product designed or intended, whether or not exclusively, for use in play by children under 14 years of age.

NOTE 1 Examples of **electric toys** also within the scope of this standard are

- **constructional sets**;
- **experimental sets**;
- functional **electric toys** (an **electric toy** that performs and is used in the same way as a product, appliance or installation intended for use by adults, and which may be a scale model of such product, appliance or installation);
- **electric toy** computers;
- a doll's house having an interior lamp.

Additional requirements for **experimental sets** are given in Annex A.

Additional requirements for **electric toys** incorporating optical radiation sources are given in Annex E.

Measurement methods for **electric toys** generating electromagnetic fields (EMF) are given in Annex I.

Additional requirements for the safety of **remote controls** for **electric ride-on toys** are given in Annex J.

If the packaging is intended to have play value then it is considered to be part of the **electric toy**.

This International Standard only covers the safety aspects of **electric toys** that relate to an electrical function.

NOTE 2 The ISO 8124 series of standards address other aspects of the safety of **electric toys**. Other horizontal product standards may also apply to **electric toys**.

This standard covers the safety of **electric toys** taking power from any source, such as batteries, transformers, solar cells and inductive connections.

NOTE 3 **Transformers for toys** (IEC 61558-2-7 for linear types or IEC 61558-2-7 and IEC 61558-2-16 for switch mode types), **battery chargers** (IEC 60335-2-29) and **battery chargers** for use by children (IEC 60335-2-29 Annex AA:) are not considered to be part of an **electric toy** even if supplied with an **electric toy**.

NOTE 4 This standard is not intended to assess the safety of batteries however it does address the safety of the **electric toy** with the batteries inserted.

This International Standard does not apply to the following products:

- automatic playing machines, whether coin operated or not, intended for public use (IEC 60335-2-82);
- **toy** vehicles equipped with combustion engines;
- **toy** steam engines;
- slings and catapults;
- electric decorative robots;

- decorative objects for festivities and celebrations;
- sports equipment, including roller skates, inline skates, and skateboards intended for children with a body mass of more than 20 kg;
- bicycles with a maximum saddle height of more than 435 mm, measured as the vertical distance from the ground to the top of the seat surface, with the seat in a horizontal position and with the seat pillar set to the minimum insertion mark;
- scooters and other means of transport designed for sport or which are intended to be used for travel on public roads or public pathways;
- electrically driven vehicles which are intended to be used for travel on public roads, public pathways, or the pavement thereof;
- aquatic equipment intended to be used in deep water, and swimming learning devices for children, such as swim seats and swimming aids;
- puzzles with more than 500 pieces;
- guns and pistols using compressed gas, with the exception of water guns and water pistols, and bows for archery over 120 cm long;
- products and games using sharp-pointed missiles, such as sets of darts with metallic points;
- functional educational products, such as electric ovens, irons or other functional products operated at a nominal voltage exceeding 24 V which are sold exclusively for teaching purposes under adult supervision;
- fireworks, including percussion caps which are not specifically designed for **electric toys**;
- products intended for use for educational purposes in schools and other pedagogical contexts under the surveillance of an adult instructor, such as science equipment;
- electronic equipment, such as personal computers and game consoles, used to access interactive software and their associated peripherals, unless the electronic equipment or the associated peripherals are specifically designed for and targeted at children and have a play value on their own, such as specially designed personal computers, key boards, joy sticks or steering wheels;
- interactive software, intended for leisure and entertainment, such as computer games, and their storage media, such as CDs;
- fashion accessories for children which are not for use in play;
- babies soothers;
- personal protective equipment including swimming goggles, sunglasses and other eye protectors as well as bicycle and skateboard helmets;
- products for collectors, provided that the product or its packaging bears a visible and legible indication that it is intended for collectors of 14 years of age and above.

EXAMPLES of this category are

- detailed and faithful scale models,
- kits for the assembly of detailed scale models,
- folk dolls and decorative dolls and other similar articles,
- historical replicas of **electric toys**, and
- reproductions of real firearms.
- equipment intended to be used collectively in playgrounds;
- amusement machines and personal service machines (IEC 60335-2-82);
- professional **electric toys** installed in public places (such as shopping centres and railway stations);
- products containing heating elements intended for use under the supervision of an adult in a teaching context;
- portable luminaries for children (IEC 60598-2-10);
- blowers for inflatable activity **toys** (such as blowers for bouncy castles);

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-75:2014, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC TR 60083, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

IEC 60086-2: 2015, *Primary batteries – Part 2: Physical and electrical specifications*

IEC 60086 (all parts), *Primary batteries*

IEC 60335-1:2010, *Household and similar electrical appliances – Safety – Part 1: General requirements*

IEC 60335-1:2010/AMD1: 2013

IEC 60335-1:2010/AMD2:2016¹⁾

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

IEC 60384-14, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60417, *Graphical symbols for use on equipment*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529/AMD1:1999

IEC 60529/AMD2:2013²⁾

IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-2-13, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials*

IEC 60695-10-2, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

IEC 60695-11-5:2004, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60730 (all parts), *Automatic electrical controls*

¹ There exists a consolidated edition 5.2 (2016) that includes edition 5 and its Amendment 1 and Amendment 2.

² There exists a consolidated edition 2.2 (2013) that includes edition 2 and its Amendment 1 and Amendment 2.

IEC 60730-1:2013, *Automatic electrical controls – Part 1: General requirements*
IEC 60730-1:2013/AMD1:2015³⁾

IEC 60738-1, *Thermistors – Directly heated positive temperature coefficient – Part 1: Generic specification*

IEC 60990:2016, *Methods of measurement of touch current and protective conductor current*

IEC 61000-4-2: 2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*
IEC 61000-4-3/AMD1:2007
IEC 61000-4-3/AMD2:2010⁴⁾

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests*
IEC 61000-4-13/AMD1:2009
IEC 61000-4-13/AMD2:2015⁵⁾

IEC 61032, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61058-1:2016, *Switches for appliances – Part 1: General requirements*

IEC 61058-1-1:2016, *Switches for appliances – Part 1-1: Requirements for mechanical switches*

IEC 61058-1-2:2016, *Switches for appliances – Part 1-2: Requirements for electronic switches*

IEC 61180, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

IEC 61558-2-7, *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 There exists a consolidated edition 5.1 (2015) that includes edition 5 and its Amendment 1.

4 There exists a consolidated edition 3.2 (2010) that includes edition 3 and its Amendment 1 and Amendment 2.

5 There exists a consolidated edition 1.2 (2015) that includes edition 1 and its Amendment 1 and Amendment 2.

IEC 61558-2-16, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units*

IEC 62133, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications*

IEC 62233:2005, *Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure*

IEC 62471:2006, *Photobiological safety of lamps and lamp systems*

ISO 3864-1, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

ISO 8124-1:2014, *Safety of toys – Part 1: Safety aspects related to mechanical and physical properties*

ISO 7000, *Graphical symbols for use on equipment – Registered symbols*

ISO 9772, *Cellular plastics – Determination of horizontal burning characteristics of small specimens subjected to a small flame*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE 1 An Index of the defined terms and definitions in alphabetic order is provided at the end of this publication.

NOTE 2 When the terms “voltage” and “current” are used, they are root mean square (r.m.s). values unless otherwise specified.

3.1 Definitions relating to physical characteristics

3.1.1

dangerous malfunction

unintended operation of the **electric toy** that may impair safety

3.1.2

normal operation

condition under which the **electric toy** is played with as intended or in a foreseeable way when it is energized

3.1.3

rated current

current assigned to the **electric toy** by the manufacturer

Note 1 to entry: If no current is assigned to the **electric toy**, the **rated current** is the current measured when the **electric toy** is supplied at **rated voltage** and operated under **normal operation**.

3.1.4

rated power input

power input assigned to the **electric toy** by the manufacturer

3.1.5

rated voltage

voltage assigned to the **electric toy** by the manufacturer

3.1.6**working voltage**

maximum voltage to which the part under consideration is subjected when the **electric toy** is supplied at its **rated voltage** and operating under **normal operation**

Note 1 to entry: The change of voltage resulting from the operation of a switch or failure of a lamp is taken into account. However, the effect of transient voltages is ignored.

3.2 Definitions relating to means of connection**3.2.1****interconnection cord set**

assembly consisting of one cord with one non-rewirable plug connector and one non-rewirable connector, intended for the interconnection of the electrical supply from one electrical appliance or equipment to the **electric toy**

3.3 Definitions relating to protection against electric shock**3.3.1****clearance**

shortest distance in air between two conductive parts or between a conductive part and the accessible surface

3.3.2**creepage distance**

shortest distance along the surface of insulation between two conductive parts or between a conductive part and the accessible surface

3.3.3**functional insulation**

insulation between conductive parts of different potential that is necessary only for the proper functioning of the **electric toy**

3.4 Definitions relating to extra-low voltage**3.4.1****battery charger**

equipment supplied by mains voltage, the only purpose of which is to recharge batteries

Note 1 to entry: If the batteries can be charged in the **electric toy**, and if the **electric toy** can be operated while the batteries are being charged, the **battery charger** is also considered to be a **transformer for toys** or a **power supply for toys**.

3.4.2**power supply for toys**

power supply incorporating a **transformer for toys** not fixed to, or incorporated in, **electric toys** designed to have a **rated voltage** of 24 V direct current (DC) or 24 V alternating current (AC)

Note 1 to entry: **Power supplies for toys** are hereinafter also referred to as **power supplies**.

3.4.3**safety isolating transformer**

transformer, the input winding of which is electrically separated from the output winding by insulation at least equivalent to double insulation or reinforced insulation, which provides a supply at safety extra-low voltage

3.4.4**transformer for toys**

independent **safety isolating transformer** designed to supply **electric toys** not fixed to, or incorporated in, **electric toys** designed to have a **rated voltage** not exceeding 24 V AC

Note 1 to entry: **Transformers for toys** are hereinafter also referred to as **transformers**.

3.5 Definitions relating to types of toys

3.5.1

constructional set

collection of electric components, **electronic components** or mechanical parts intended to be assembled as an **electric toy** or various **electric toys**

3.5.2

electric toy

product having at least one function dependant on electricity, designed or intended, whether or not exclusively, for use in play by children under 14 years of age

Note 1 to entry: Transformer toys and power supply toys are types of **electric toys**.

3.5.3

experimental set

collection of electric components, **electronic components** or mechanical parts intended to be assembled by a child to demonstrate physical phenomena or other functions

Note 1 to entry: The assembly is not intended to create an **electric toy** or product for practical use.

3.5.4

large and bulky electric toy

electric toy that has a projected base area of more than 0,26 m² or a volume of more than 0,08 m³ calculated without regard to minor appendages or a mass equal to or greater than 4,5 kg

Note 1 to entry: The base area of an **electric toy** having permanently attached legs is the area enclosed by straight lines connecting the outermost edge of each leg of the perimeter.

3.6 Definitions relating to parts of a toy

3.6.1

accessible part

part or surface that can be touched by means of test probe 18 or 19 of IEC 61032, depending on the relevant age group

Note 1 to entry: Both probes are relevant for **electric toys** intended for children spanning the two age groups.

3.6.2

battery box

separate compartment for containing the batteries that is detachable from the **electric toy**

3.6.3

button battery

small round battery where the overall height is less than the diameter and having an electrochemical system that does not contain lithium

3.6.4

coin battery

small round battery where the overall height is less than the diameter and having an electrochemical system that contains lithium

3.6.5

detachable part

part that can be removed without the aid of a **tool**, part that can be removed by a **tool** supplied with the **electric toy**, unless the **electric toy** is required to be assembled by an adult, or a part that is removed in accordance with the instructions for use even if a **tool** is needed for removal

3.6.6**movable part**

part, which is intended to move or can be moved by the child during play

Note 1 to entry: For example the legs or arms of a doll or the doors of a **remote control** car.

3.6.7**moving part**

part which is moved by the **electric toy**

3.6.8**replaceable battery**

battery that can be replaced without breaking the **electric toy**

Note 1 to entry: If the product can be reassembled after battery replacement and continue to operate, the battery is considered replaceable.

3.6.9**tool**

object such as a coin or a screwdriver that may be used to operate a fixing means

3.7 Definitions relating to safety components**3.7.1****non-self-resetting thermal cut-out**

thermal cut-out that requires a manual operation for resetting or replacement of a part, in order to restore the current

3.7.2**protective electronic circuit**

electronic circuit that prevents a hazardous situation under abnormal operating conditions

Note1 to entry: Parts of the circuit may also be used for functional purposes.

3.7.3**self-resetting thermal cut-out**

thermal cut-out that automatically restores the current after the relevant part of the **electric toy** has cooled down sufficiently

3.7.4**thermal cut-out**

device that during abnormal operation limits the temperature of the controlled part by automatically opening the circuit or by reducing the current and that is constructed so that its setting cannot be altered by the user

3.8 Definitions relating to electronic circuits**3.8.1****electronic circuit**

circuit incorporating at least one **electronic component**

3.8.2**electronic component**

part in which conduction is achieved principally by electrons moving through a vacuum, gas or semiconductor

Note 1 to entry: **Electronic components** do not include resistors, capacitors and inductors.

4 General requirement

Electric toys shall be constructed so that they do not jeopardise the safety and/or health of users or third parties when they are played with as intended or in a foreseeable way, bearing in mind the behaviour of children.

In general, this requirement is achieved by fulfilling the relevant requirements specified in this standard and the appropriate requirements in the ISO 8124 series of standards.

Compliance is checked by carrying out all the relevant tests.

5 General conditions for tests

5.1 General

Unless otherwise specified, the tests of this standard are carried out under the following conditions of this clause.

CAUTION: Some tests on electric toys that are used with batteries may result in rupture or explosion of the batteries. Adequate precautions shall be taken when conducting such tests.

The tests are carried out in the order of the clauses. Tests are carried out on a single sample that shall withstand all the relevant tests.

The cumulative stress resulting from repetitive tests on electronic circuits shall to be avoided. It may be necessary to replace components or to use additional samples. Additional samples may also be required for electric toys that are constructed for different supply voltages, for both AC and DC, different speeds and similar. The number of additional samples shall be kept to a minimum by an evaluation of the relevant circuits.

Tests according to this standard are type tests.

NOTE The testing of components can require the submission of additional samples of these components.

*If it is evident from the construction of the **electric toy** that a particular test is not applicable, this test is not carried out.*

The tests are carried out in a draught-free location at an ambient temperature of $20\text{ °C} \pm 5\text{ °C}$.

Electric toys designed to bear the mass of a child are loaded with

- 25 kg, if intended for children up to 3 years old;
- 50 kg, if intended for older children.

5.2 Preconditioning

*Prior to preconditioning, **electric toys** that require assembly are assembled in accordance with the manufacturer's instructions.*

*Each test or assessment is carried out using either a preconditioned sample or non-preconditioned sample, depending on which ever sample gives the most unfavourable result. For example it is more unfavourable to use the non-preconditioned sample when preconditioning has damaged the enclosure of the **electric toy** creating better air cooled conditions.*

*If parts detach from the **electric toy**, they may be reattached if this creates a more unfavourable condition.*

If the **electric toy** stops functioning such that the tests cannot be conducted then the preconditions may be repeated up to two additional times on fresh samples. Should all three **electric toys** stop functioning in the same way, then the tests of this standard are conducted on a non-preconditioned sample.

The preconditioned sample is prepared by subjecting it to the following test methods of ISO 8124-1 in the order specified below, with batteries in position:

- Tension test – for all **electric toys**; however, the force being $70\text{ N} \pm 2\text{ N}$ independent of the dimensions and applicable independent of age group;
- Drop test – from $93\text{ cm} \pm 5\text{ cm}$, irrespective of the age group. The drop test is not carried out on **large and bulky electric toys**;
- Tip over test – for **large and bulky electric toys**;
- Static strength test – for **electric toys** designed to bear the mass of a child;
- Dynamic strength test – for wheeled ride-on **electric toys**;
- Tension test for seams and materials – for **electric toys** having textile or other flexible materials covering batteries or other electrical parts.

NOTE Compliance with ISO 8124-1 is not checked after the preconditioning. The pre-conditions are conducted in order to determine the influence on the requirements and tests of this standard.

5.3 Assembly

If an **electric toy** is intended to be assembled by a child, the requirements apply to each part accessible to the child and to the assembled **electric toy**. If an **electric toy** is intended to be assembled by an adult, the requirements apply to the assembled **electric toy**.

5.4 Movable parts

Tests are carried out with the **electric toy** or any **movable part** of it placed in the most unfavourable position when the **electric toy** is played with as intended or in any foreseeable way.

NOTE This does not cover **moving parts** which are addressed by 9.6.

5.5 Detachable parts

Detachable parts shall be removed or left in place whichever gives the most unfavourable conditions.

Detachable cords supplied with the **electric toy** are considered to be part of the **electric toy** and are tested with it. The **interconnection cord set** for connection to a computer, console, monitor screen or other audio-video equipment supplied with an **electric toy** is tested with the connector of the **interconnection cord set** fully inserted in the appliance inlet of the **electric toy**. The plug-connector at the other end of the cord is not tested (see 13.9).

5.6 Settings

Electric toys provided with controls or switching devices are tested with these controls or devices adjusted to their most unfavourable setting, if the setting can be altered by the user.

5.7 Selection of power supplies

5.7.1 General

Electric toys having one or more type of supply shall be tested using each type of supply or any combination of those supplies, whichever creates the most unfavourable condition.

Protection in the **power supply** (e.g. over current-protection or over-temperature protection) shall be disabled unless the **power supply** is specifically designed for the **electric toy** and cannot be replaced by other power supplies.

Electric toys having more than one **rated voltage** or a range of **rated voltages** are tested at the most unfavourable voltage.

Electric toys using an AC input only are tested with AC at rated frequency. Those using AC and DC are tested at the most unfavourable frequency or supply condition. If no rated frequency of the supply is marked on the **electric toy**, the **electric toy** is tested with 50 Hz or 60 Hz, whichever is more unfavourable.

For **electric toys** using **transformers**, **power supplies** or **battery chargers**, the tests shall be carried out with the **transformer**, **power supply** or **battery charger** both connected and disconnected.

5.7.2 Electric toys that are used with batteries

Unless otherwise specified in the tests, **electric toys** that are used with batteries are tested using new alkaline primary batteries. If the manufacturer specifies a different battery technology, chemistry or type the tests shall be repeated with the specified battery in addition to the battery required for the test.

Toys with batteries that cannot be replaced are tested with the batteries supplied.

Toys with batteries that are specially designed for the **toy** are tested with the battery that is supplied or that is recommended in the instructions.

Primary batteries used are those with the voltage and size specified on the **toy** or in the instructions and shall comply with the relevant parts of the IEC 60086 series IEC. Secondary batteries used for testing shall comply with IEC 62133. Tests are carried out with secondary batteries fully charged.

Batteries manufactured by a leading brand manufacturer will usually have the best performance and shall be used for testing.

The tests shall also be carried out with one or more batteries reversed unless this is prevented by the construction, physically or by preventing an electrical connection.

5.7.3 Toys using battery boxes

Toys intended for use with a **battery box** are tested with the **battery box** supplied with the **toy** or with the **battery box** recommended in the instructions.

5.7.4 Electric toys using transformers and power supplies

Electric toys using a **transformer** or a **power supply** are tested with the **transformer** or **power supply** supplied with the **electric toy**. If the **electric toy** is supplied without a **transformer** or **power supply**, it is tested with the **transformer** or **power supply** recommended in the instructions.

5.7.5 Electric toys using rechargeable batteries

Electric toys that are used with rechargeable batteries that can be operated during charging shall be tested according to 5.7.4 or with the batteries fully charged, whichever is more unfavourable for each test.

5.7.6 Electric toys using other power supplies

***Electric toys** using a USB connection for a **power supply** shall be supplied at 5 V.*

NOTE 1 See 13.9 for products that can be connected to a USB port of a computer or other equipment.

***Electric toys** with other supplies such as solar power, kinetic or wind up supplies are tested under the supply conditions that give the most unfavourable testing conditions.*

NOTE 2 In general, the maximum power available will be the most unfavourable condition, e.g. the maximum supply available from a solar cell, a wind up generator fully wound.

5.8 Accessories and parts

*When accessories are made available by the manufacturer, the **electric toy** is tested with those accessories that give the most unfavourable results. Such parts do not need to have an electrical function to be considered for the testing.*

NOTE 1 An example of an electrical accessory would be headlights for **electric toy** cars, lights or rails.

NOTE 2 An example of a non-electrical accessory would be an additional trailer for a ride-on-electric toy with no electrical function as this would increase the load on the motor.

If accessories can be used simultaneously, the combination that gives the most unfavourable result is used.

An accessory may be replaced by a simulated load for the tests.

*Lamps that can be accessed and removed without the aid of a **tool** are tested with lamps of the highest wattage that can be fitted, irrespective of any marking.*

NOTE 3 The lamps are selected from the types generally available.

6 Criteria for reduced testing

6.1 General

For some **electric toys** it is not necessary to carry out all of the tests. **Electric toys** able to meet the following clauses are considered to comply with the clauses mentioned without further testing.

6.2 Short-circuit resistance

For **electric toys** that comply with the tests of Clause 9, except 9.6 and 9.8, with any insulation between parts of different polarity short-circuited in turn 13.3, 13.7 and Clauses 8, 9 except 9.6 and 9.8, 10, 11, 17 and 18 are not applicable. The short circuit may be applied by a flexible wire or any other suitable means.

6.3 Low power electric toys

Electric toys that meet both of the following criteria are considered to comply with the requirements of Clauses 9, 10 and 18 if they

- a) are supplied by a power source supplying less than 15 W;
- b) have an over temperature or over current protection where the **clearance** between conductive parts of different polarity is at least 3,8 mm for any part of the circuit between the power source and the protection.

When a short-circuit is applied to any part of the circuit after the protection, the **electric toy** shall comply with 9.10.

A power source is considered as supplying less than 15 W when measured as follows:

A variable resistor adjusted to its maximum resistance is connected between the poles of the power source.

The resistance is then decreased until the power consumed by the resistor reaches a maximum. If the maximum power delivered to this resistor does not exceed 15 W at the end of 5 s, the power source can be considered to be supplying less than 15 W.

6.4 Battery circuits

Circuits where the only power source comprises three batteries or less that are of the following designations:

- R44/LR44
- R41/LR41
- LR1130
- LR54

are considered to comply with the requirements of Clause 9, 10, 11, 17 and 18.

7 Marking and instructions

7.1 General

Instructions and other text required by this standard shall be written in an official language of the country in which the appliance is to be sold.

Additional markings other than those provided in this clause may be used provided they do not give rise to misunderstanding.

7.2 Markings on electric toys

7.2.1 Identification

Electric toys shall be marked with the

- name, trade mark or identification mark of the manufacturer or responsible vendor;
- model or type reference.

The markings shall be on the main part of the **electric toy**. However, where the size or nature of the **electric toy** does not allow it, the required information shall be provided on the packaging or in a document accompanying the **electric toy**.

If a symbol is used, its meaning shall be explained in the instructions.

Compliance is checked by inspection.

7.2.2 Electric toys with replaceable batteries

Electric toys with **replaceable batteries** shall be marked with the nominal battery voltage, in or on the battery compartment or other suitable place on the **electric toy**, close to the batteries.

NOTE It is acceptable to place this marking on the battery compartment cover.

Electric toys with a **battery box** shall be marked with the symbol for DC (symbol IEC 60417-5031 (2002-10)) shown in 7.2.6 at a suitable location close to the battery.

box connector unless connection to other **battery boxes** or power sources is prevented by design.

The **electric toy** shall be marked with the shape of the batteries, together with the nominal voltage and polarity. The positive terminal shall be indicated by symbol IEC 60417-5005 (2002-10).

Compliance is checked by inspection.

Examples representing the markings of an **electric toy** with three batteries are shown in Figure 1.

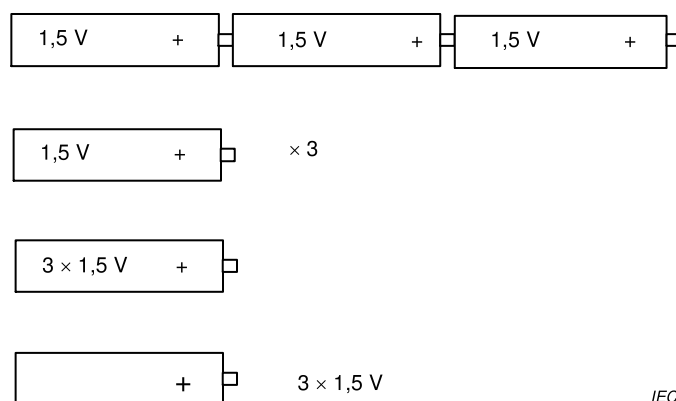


Figure 1 – Examples of battery compartment markings

7.2.3 Transformer toys and power supply toys

Electric toys supplied by a **transformer** or a **power supply** shall be marked with

- their **rated voltage**, in volts;
- the symbol for alternating current (AC) (symbol IEC 60417-5032 (2002-10)) or direct current (DC) (symbol IEC 60417-5031 (2002-10)), as applicable;
- their **rated power input**, in watts or volt-amperes, if the power input is greater than 25 W or 25 VA when measured in accordance with Clause 8, using the recommended transformer;
- the symbol for **safety isolating transformer for toys** (symbol IEC 60417-5219 (2006-12)). This symbol shall also be marked on the packaging.

The marking of **rated voltage** and the symbol for AC or DC shall be placed adjacent to the power input connection of the **electric toy** so that it is visible. The marking for AC or DC is not required if the incorrect supply does not impair compliance with this standard.

Electric toys intended to be supplied from a **power supply** for the purposes of recharging the battery shall be marked with symbol IEC 60417-6181 (2016-01) and its type reference along with symbol ISO 7000-0790 or with the substance of the following:

"Use only with <model designation> <supply>"

Compliance is checked by inspection.

7.2.4 Electric toys with more than one power supply

Electric toys that are supplied by both batteries and a **transformer** or a **power supply** shall be marked in accordance with both 7.2.2 and 7.2.3.

Compliance is checked by inspection.

7.2.5 Electric toys with detachable lamps

The identification for detachable lamps shall be marked with

- the **rated voltage** and type number, or
- the maximum **rated power input**, or
- the maximum **rated current**.

The marking for rated wattage or current of detachable lamps shall be as follows:

lamp max ... W or lamp max ... A

The word “lamp” may be replaced by symbol IEC 60417-5012 (2002-10).

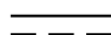
The marking shall be visible when replacing the lamp.

This marking is not required if the temperature rises measured during the tests of Clause 9 do not exceed the limits when a lamp having the highest rated wattage is fitted.

Compliance is checked by inspection.

7.2.6 Symbols

When symbols are used, they shall be as follows:

	[symbol IEC 60417- 5031 (2002-10)]	direct current
	[symbol IEC 60417- 5032 (2002-10)]	alternating current
	[symbol IEC 60417- 5172 (2003-02)]	class II equipment
	[symbol IEC 60417- 5012 (2002-10)]	lamp

NOTE The rated wattage of the lamp may be indicated in association with this symbol.

	[symbol ISO 7000-0790 (2004-01)]	read operator's manual
	[symbol IEC 60417-5180 (2003-02)]	Class III appliance



[symbol IEC 60417-5219 (2006-12)]

Safety isolating transformer for toys



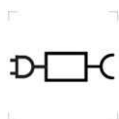
[symbol IEC 60417-5005 (2002-10)]

Positive polarity symbol



[symbol IEC 60417-5006 (2002-10)]

Negative polarity symbol



[symbol IEC 60417-6181 (2016-01)]

Separate supply unit



[symbol ISO 7010 W001]

Warning: Contains coin battery

The symbol for class II equipment shall be placed so that it will be obvious that it is a part of the technical information and is unlikely to be confused with any other marking.

Additional symbols may be used but they shall not give rise to misunderstanding.

Units of physical quantities and their symbols shall be those of the international standardized system (SI).

Compliance is checked by inspection.

7.2.7 Durability

The markings on an **electric toy** shall be legible and durable.

Compliance is checked by inspection and by rubbing the marking by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirit. The petroleum spirit to be used for the test is aliphatic solvent hexane.

After the tests of this standard, the marking shall be legible, it shall not be easily possible to remove marking plates and they shall show no curling.

NOTE In considering the durability of the marking, the effect of normal wear such as frequent cleaning is taken into account.

7.3 Instructions and markings on packaging

7.3.1 General

Instructions shall be provided that give details concerning cleaning and maintenance when necessary for the safe use and operation of the **electric toy**.

Instructions for use shall be provided with the appliance so that the **electric toy** can be played with safely.