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Edition 1.2 2011-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electric toys – Safety

Jouets électriques – Sécurité

IEC 62115:2003+A1:2004+A2:2010

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CONTENTS

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

This consolidated version of IEC 62115 consists of the first edition (2003) [documents 61/2263/FDIS and 61/2323/RVD], its amendment 1 (2004) [documents 61/2711/FDIS and 61/2738/RVD] and its amendment 2 (2010) [documents 61/4051/FDIS and 61/4079/RVD].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 1.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

The French version of this standard has not been voted upon.

This bilingual version (2006-01) replaces the English version.

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

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 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

2

The committee has decided that the contents of the base publication and its amendments 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.

2

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

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, 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 a 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 toys. It is assumed that when choosing a 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 toys, especially those risks that are not evident to users. However, it has to be recognized that some 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 toys, it nevertheless takes into account the wear and tear of toys in use.

The fact that a 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 toy.

This standard covers the whole range of electric toys from small button cell operated lights to large sit-on cars powered by lead-acid cells. This results in different requirements and tests according to the type of toy. For some toys, testing can be reduced if particular criteria are met (see Clause 6).

A 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 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.

ELECTRIC TOYS – SAFETY

1 Scope

This International Standard deals with the safety of **toys** that have at least one function dependent on electricity.

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

– **constructional sets**;
– **experimental sets**;
– functional **toys** (models that have a function similar to an appliance or installation used by adults);
2 – **computer toys**;
– toy computers;.

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

Toys using electricity for secondary functions are within the scope of this standard.

NOTE 2 A doll's house having an interior lamp is an example of such a **toy**.

Additional requirements for **toys** incorporating **lasers** and **light-emitting diodes** are given in Annex E.

In order to comply with this standard, electric toys also have to comply with ISO 8124-1, since it covers hazards other than those arising by the use of electricity.

2 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 a **toy** even if supplied with a **toy**.

NOTE 4 If it is intended that a child also plays with the packaging, the latter is considered to be part of the **toy**.

NOTE 5 This standard does not apply to

– toy steam engines;
– scale models for adult collectors;
– folk dolls and decorative dolls and other similar articles for adult collectors;
– sports equipment;
– aquatic equipment intended to be used in deep water;
– equipment intended to be used collectively in playgrounds;
– amusement machines (IEC 60335-2-82);
– professional **toys** installed in public places (shopping centres, stations, etc.);
– products containing heating elements intended for use under the supervision of an adult in a teaching context;
2 – portable luminaries for children (IEC 60598-2-10);
– video and computer games;
– blowers for inflatable activity **toys** (e.g. bouncy castles);
– Christmas decorations.

2 Normative references

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.

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

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

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

IEC 60320-1, *Appliance couplers for household and similar general purposes – Part 1: General requirements*

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

IEC 60335-2-29:2002, *Household and similar electrical appliances – Safety – Part 2-29: Particular requirements for battery chargers*
Amendment 1 (2004)
Amendment 2 (2009)[1]

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 60417-1, *Graphical symbols for use on equipment – Part 1: Overview and application*

2 IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
Amendment 1 (1999)[2]

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

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

IEC 60695-10-2, *Fire hazard testing – Part 10: Guidance and test methods for the minimization of the effects of abnormal heat on electrotechnical products involved in fires – Section 2: Method for testing products made from non-metallic materials for resistance to heat using the ball pressure test*

2 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*

2 IEC 60730-1:2010, *Automatic electrical controls for household and similar use – Part 1: General requirements*

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

IEC 60825-1:1993, *Safety of laser products – Part 1: Equipment classification, requirements and user's guide*
Amendment 1 (1997)
Amendment 2 (2001) including its corrigendum 1 (2002)[3]

2 IEC 60990:1999, *Methods of measurement of touch current and protective conductor current*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

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1 There exists a consolidated edition 4.2 (2010) that includes edition 4 and its Amendments 1 and 2.

2 There exists a consolidated edition 2.1 (2001) that includes edition 2 and its Amendment 1.

3 There exists a consolidated edition 1.2 (2001) that includes edition 1 and its amendments 1 and 2.

2 IEC 61058-1:2000, *Switches for appliances – Part 1: General requirements*
Amendment 1 (2001)
Amendment 2 (2007)[4]

IEC 61558-2-7, *Safety of power transformers, power supply units and similar – Part 2: Particular requirements for transformers for toys*

ISO 7000, *Graphical symbols for use on equipment – Index and synopsis*

2 ISO 8124-1:2009, *Safety of toys – Part 1: Safety aspects related to mechanical and physical properties*

ISO 8124-3, *Safety of toys – Part 3: Migration of certain elements*

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

3 Definitions

For the purpose of this standard, the following definitions apply.

NOTE When the terms “voltage” and “current” are used, they imply r.m.s. values unless otherwise specified.

3.1.1
toy
product intended for use by children under 14 years old for playing purposes

3.1.2
battery toy
toy that contains or uses one or more batteries as the only source of electrical energy

NOTE The batteries may be in a **battery box**.

3.1.3
transformer toy
toy that is connected to the supply mains through a **transformer for toys** and using the supply mains as the only source of electrical energy

3.1.4
dual-supply toy
toy that can be operated as a **battery toy** and either simultaneously or alternatively as a **transformer toy**

3.1.5
battery box
separate compartment for containing the batteries that is detachable from the **toy**

3.1.6
replaceable battery
battery that can be replaced without breaking the **toy**

3.1.7
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

4 There exists a consolidated edition 3.2 (2008) that includes edition 4 and its Amendments 1 and 2.

3.1.8
transformer for toys
safety isolating transformer specially designed to supply **toys** operating at safety extra-low voltage not exceeding 24 V

NOTE 1 The transformer may supply a.c. or d.c., or both.

NOTE 2 **Transformers for toys** are hereinafter also referred to as **transformers**.

3.1.9
constructional set
collection of electric, electronic or mechanical parts intended to be assembled as various **toys**

3.1.10
experimental set
collection of electric, electronic or mechanical components intended to be assembled in various combinations to demonstrate physical phenomena or other functions by children.

NOTE The assembly is not intended to create a **toy** or product for practical use.

3.1.11
computer toy
toy intended to be used together with a computer, console, monitor screen or other audio-video equipment

NOTE 1 **Computer toys** have play value either as

- **toys** when not connected to a computer or screen such as steering wheels, video guns and toy keyboards; or
- **toys** when connected to a computer, console, monitor screen or other audio-video equipment.

NOTE 2 Joysticks and other peripherals without play value in themselves are not considered to be a part of the **computer toy**.

NOTE 3 Separate computers, screens, consoles and similar equipment, which the **toy** can connect to and that have a **rated voltage** exceeding 24 V, are not considered to be part of the **computer toy**.

3.1.12
battery charger
appliance supplied by mains voltage, the only purpose being to recharge the batteries for a **toy**

NOTE If the batteries can be charged in the **toy**, and if the **toy** can still be operated while the batteries are being charged, the **battery charger** is also considered to be a **transformer** and the **toy** is considered to be a **dual supply toy**.

3.1.13
rechargeable battery toy
toy provided with rechargeable batteries in which the batteries are charged through a connection to the **battery charger** without removing the batteries from the **toy**

3.1.14
functional insulation
insulation between conductive parts of different potential that is necessary only for the proper functioning of the **toy**

3.2.1
rated voltage
voltage assigned to the **toy** by the manufacturer

3.2.2
working voltage
maximum voltage to which the part under consideration is subjected when the **toy** is supplied at its **rated voltage** and operating under **normal operation**

NOTE 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.

3.2.3
rated power input
power input assigned to the **toy** by the manufacturer

3.2.4
rated current
current assigned to the **toy** by the manufacturer

NOTE If no current is assigned to the **toy**, the **rated current** is the current measured when the **toy** is supplied at **rated voltage** and operated under **normal operation**.

3.2.5
normal operation
condition under which the **toy** is played with as intended or in a foreseeable way when it is energized.

Sit-on **toys** and stand-on **toys** are loaded with

– 25 kg, if intended for children up to 3 years old;

– 50 kg, if intended for older children

2 For all rechargeable **battery toys**, normal operation includes charging and overcharging.

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**

3.4.1
detachable part
part that can be removed without the aid of a **tool**, a part that can be removed by a **tool** supplied with the **toy**, or a part that is removed in accordance with the instructions for use even if a **tool** is needed for removal

NOTE A part that can be opened is considered to be a part that can be removed.

3.4.2
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 Both probes are relevant for **toys** intended for children spanning the two age groups.

3.4.3
tool
screwdriver, coin or other object that may be used to operate a screw, clip or similar fixing means

3.5.1
thermostat
temperature-sensing device, the operating temperature of which may be either fixed or adjustable and which during **normal operation** keeps the temperature of the controlled part between certain limits by automatically opening and closing a circuit

3.5.2
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

3.5.3
self-resetting thermal cut-out
thermal cut-out that automatically restores the current after the relevant part of the **toy** has cooled down sufficiently

3.5.4
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

3.5.5
electronic component
part in which conduction is achieved principally by electrons moving through a vacuum, gas or semiconductor

3.5.6
electronic circuit
circuit incorporating at least one **electronic component**

4 General requirement

Toys shall be constructed so that the risks to persons or surroundings are reduced as far as possible when the **toy** is used as intended or in a foreseeable way.

In general, this principle is achieved by fulfilling the relevant requirements specified in this standard and compliance is checked by carrying out all the relevant tests.

5 General conditions for the tests

Unless otherwise specified, tests are carried out in accordance with this clause.

NOTE Some tests on **battery toys** can result in rupture or explosion of the batteries. Adequate precautions should be taken when conducting such tests.

5.1 *Tests according to this standard are type tests.*

5.2 *The tests are carried out on a single sample that shall withstand all the relevant tests. However, the tests of Clauses 14 to 17 may be made on separate samples. If the **toy** does not operate after the tests of Clause 9, the subsequent tests are carried out on a separate sample.*

NOTE 1 Additional samples may be required if the **toy** is constructed

– for different supply voltages;
– for both a.c. and d.c.;
– for different speeds.

NOTE 2 The testing of components may require the submission of additional samples of these components.

NOTE 3 The cumulative stress resulting from successive tests on **electronic circuits** is to be avoided. It may be necessary to replace components or to use additional samples. The number of additional samples should be kept to a minimum by an evaluation of the relevant **electronic circuits**.

5.3 *The tests are carried out in the order of the clauses.*

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

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

5.5 *The tests are carried out with the **toy** or any movable part of it placed in the most unfavourable position when the **toy** is used as intended or in any foreseeable way. Battery compartment covers are opened or removed. Other **detachable parts** are removed or kept in position, whichever is more unfavourable.*

5.6 ***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 ***Detachable cords** supplied with the **toy** are considered to be part of the **toy** and are tested with it.*

5.8 ***Battery 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.*

***Transformer toys** are tested with the transformer supplied with the **toy**. If the **toy** is supplied without a transformer, it is tested with a transformer recommended in the instructions.*

***Dual-supply toys** are tested with the most unfavourable supply allowed by the construction, the type of supply being evaluated for each test.*

2 ***Rechargeable battery toys** that can be operated during charging are tested as **dual supply toys** because the **battery charger** is operating as a **transformer**.*

5.9 ***Battery toys** are tested using new non-rechargeable batteries or fully charged rechargeable batteries, whichever is more unfavourable.*

2 NOTE 1 In general a fully charged rechargeable battery or a new alkaline battery is considered to be the most unfavourable battery. However, for each test, the battery with the highest current, voltage or capacity that creates the most onerous condition is considered to be the most unfavourable battery.

*The batteries used are those with the voltage and size specified on the **toy** or in the instructions. Similar batteries that are generally available are used if this results in more unfavourable conditions.*

NOTE 2 Lithium batteries are not used unless their use is recommended in the instructions.

NOTE 3 If the toy fails to withstand a test and this could be due to a defective battery, the test is repeated with a new set of batteries.

5.10 *When alternative accessories are made available by the manufacturer, the **toy** is tested with those accessories that give the most unfavourable results.*

NOTE 1 Examples of accessories are lamps, motors and rails.

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

NOTE 2 Accessories may be selected from more than one set.

NOTE 3 An accessory may be replaced by a simulated load for the tests.