

Electric toys — Safety

ICS 97.200.50; 13.120

National foreword

This British Standard is the UK implementation of EN 62115:2005+A12:2015. It is derived from IEC 62115:2003, incorporating amendments 1:2004 and 2:2010. It supersedes BS EN 62115:2005+A11:2012 which will be withdrawn on 03 June 2017.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags [C] [C]. Where a common modification has been introduced by amendment, the tags carry the number of the amendment. For example, the common modifications introduced by CENELEC amendment A11 are indicated by [C11] [C11].

The start and finish of text introduced or altered by IEC amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by [A1] [A1].

National Annex NA (informative) reproduces CENELEC interpretation sheet 1 (March 2010).

The UK participation in its preparation was entrusted by Technical Committee CPL/61, Safety of household and similar electrical appliances, to Subcommittee CPL/61/21, Toys.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

The publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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Date	Comments
31 July 2010	Addition of CENELEC interpretation sheet 1 (March 2010) in National Annex NA
30 September 2011	Implementation of IEC amendment 2:2010 with CENELEC modifications
30 November 2011	Correction to amendment A2 text in 7.4
31 December 2012	Implementation of CENELEC amendment A11:2012
31 January 2015	Implementation of CENELEC amendment A12:2015

English version

**Electric toys –
Safety**

Jouets électriques –
Sécurité

Elektrische Spielzeuge –
Sicherheit

This European Standard was approved by CENELEC on 2004-12-07. 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, 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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Foreword

During the Copenhagen meeting in May 2003, the CENELEC Technical Committee TC 61 decided to submit the text of the International Standard IEC 62115:2003, prepared by IEC TC 61, to the Unique Acceptance Procedure together with CENELEC common modifications.

The text of the draft common modifications, circulated in March 2004, included the content of the future amendment 1 to IEC 62115:2003. In view of the publication of this amendment in IEC, the relevant common modifications have been deleted and amendment 1:2004 to IEC 62115:2003 has been included in the European Standard which was approved by CENELEC as EN 62115 on 2004-12-07.

This European Standard replaces EN 50088:1996 + A1:1996 + A2:1997 + corrigenda April 2001 + A3:2002.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2006-01-01
- date on which national standards
conflicting with the EN have to be withdrawn (dow) 2008-01-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 88/378/EEC. See Annex ZZ.

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.

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

There are no national deviations from this European Standard.

Annexes ZA and ZZ have been added by CENELEC.

p NOTE In this document, p is used in the margin to indicate instructions for preparing the printed version.

Endorsement notice

The text of the International Standard IEC 62115:2003 + A1:2004 was approved by CENELEC as a European Standard with agreed common modifications.

Foreword to amendment A2

The text of document 61/4051/FDIS, future edition 1 of IEC 62115:2003/A2:2010, prepared by IEC TC 61, Safety of household and similar electrical appliances, was submitted to the IEC-CENELEC parallel vote.

A draft amendment, prepared by the Technical Committee CENELEC TC 61, Safety of household and similar electrical appliances, was submitted to the formal vote.

The combined texts were approved by CENELEC as EN 62115:2005/A2:2011 on 2011-01-02.

The following dates were fixed:

- latest date by which the amendment has to be implemented
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- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2014-01-02

This amendment has been prepared under Mandate M/445 given to CENELEC by the European Commission and the European Free Trade Association to cover Essential Requirements of EC Directive 2009/48/EC. (see Annex ZZ).

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 the associated noun are also in bold.

p NOTE 2 In this document, p is used in the margin to indicate instructions for preparing the printed version.

Annexes ZA and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62115:2003/A2:2010 was approved by CENELEC as a European Standard with agreed common modifications.

Foreword to amendment A11

This document (EN 62115:2005/A11:2012) has been prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented (dop) 2013-06-04
at national level by publication of an identical national
standard or by endorsement
- latest date by which the national standards conflicting with (dow) 2015-06-04
this document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This A11 has been developed to answer the concerns expressed by the European Commission regarding EN 62115:2005 and its links with M/445 and the Toys Directive 2009/48/EC (see D136/061 and BT136/DG8024/DC).

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For the relationship with EU Directive 2009/48/EC, see informative Annexes ZZA and ZZB, which are an integral part of this document.

Clauses, subclauses, notes, tables and figures which are additional to those in IEC 62115:2003 + A1:2004+ A2:2010 are prefixed "Z".

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.

Foreword to amendment A12

This document (EN 62115:2005/A12:2015) has been prepared by CLC/TC 61 "Safety of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented (dop) 2015-07-09
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- latest date by which the national standards conflicting with (dow) 2017-06-03
this document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive 2009/48/EC, see informative Annexes ZZA and ZZB, which are an integral part of this document.

Clauses, subclauses, notes, tables and figures which are additional to those in IEC 62115:2003 + A1:2004 + A2:2010 are prefixed "Z".

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.

 Annex ZA
(normative)

**Normative references to international publications
with their corresponding European publications**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
–	–	Safety of toys Part 1: Mechanical and physical properties	EN 71-1	–
IEC 60068-2-75	1997	Environmental testing Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	1997
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	EN 60086-2	–
IEC 60335-1	2010	Household and similar electrical appliances - Safety Part 1: General requirements	EN 60335-1	2012
IEC 60335-2-29 + A1 + A2	2002 2004 2009	Household and similar electrical appliances - Safety Part 2-29: Particular requirements for battery chargers	EN 60335-2-29 + A2	2004 2010
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	EN 60384-14	–
IEC 60417-1 ¹⁾	–	Graphical symbols for use on equipment Part 1: Overview and application	–	–
IEC 60529 – + A1	1989 – 1999	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May + A1	1991 1993 2000
IEC 60695-2-11	–	Fire hazard testing Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	–
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	EN 60695-2-13	–

¹⁾ Superseded by IEC 60417 database. 

 Publication	Year	Title	EN/HD	Year
IEC 60695-10-2	—	Fire hazard testing Part 10-2: Abnormal heat - Ball pressure test	EN 60695-10-2	—
IEC 60695-11-5	2004	Fire hazard testing Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	2005
IEC 60695-11-10	—	Fire hazard testing Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	—
IEC 60730	series	Automatic electrical controls for household and similar use	EN 60730	series
IEC 60738-1	—	Thermistors - Directly heated positive temperature coefficient Part 1: Generic specification	EN 60738-1	—
IEC 60825-1	1993	Safety of laser products	EN 60825-1	1994 ²⁾
-	-	Part 1: Equipment classification, requirements and user's guide	+ corr. Feb.	1995
+ A1	1997		+ A1	2002
+ A2	2001		+ A2	2001
			+ corr. Apr.	2004
IEC 60990	1999	Methods of measurement of touch current and protective conductor current	EN 60990	1999
IEC 61000-4-2	—	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	—
IEC 61000-4-3	—	Electromagnetic compatibility (EMC) Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	—
IEC 61000-4-4	—	Electromagnetic compatibility (EMC) Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	—
IEC 61000-4-5	—	Electromagnetic compatibility (EMC) Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	—
IEC 61000-4-6	—	Electromagnetic compatibility (EMC) Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	—
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004

²⁾ EN 60825-1:1993 and its amendments are superseded by EN 60825-1:2007, which is based on IEC 60825-1:2007 and by EN 62471:2008, which is based on IEC 62471:2006. However, for LEDs in toys a product standard based on ICNIRP Recommendations is in preparation and therefore EN 60825-1:1993 and its amendments will have to be used until this standard for LEDs in toys is implemented. 

 Publication	Year	Title	EN/HD	Year
IEC 61000-4-13	–	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	EN 61000-4-13	–
IEC 61032	1997	Protection of persons and equipment by enclosures - Probes for verification	EN 61032	1998
IEC 61058-1 (mod) + A1 + A2	2000 2001 2007	Switches for appliances Part 1: General requirements	EN 61058-1 + A2	2002 2008
IEC 61180-1	–	High-voltage test techniques for low-voltage equipment Part 1: Definitions, test and procedure requirements	EN 61180-1	–
IEC 61558-2-6	–	Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers	EN 61558-2-6	–
IEC 61558-2-7	–	Safety of power transformers, power supply units and similar Part 2-7: Particular requirements for transformers for toys	EN 61558-2-7	–
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	EN 61558-2-16	–
IEC 62233 (mod)	2005	Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	EN 62233 + corr. Aug.	2008 2008
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 	–	–

Annex ZB (normative)

Toys with protective electronic circuit

If during the tests of 9.8 an **electronic circuit** prevents the hazardous conditions listed in 9.9 or dangerous malfunction, it shall additionally comply with the following requirements. In this case, the **electronic circuit** is considered as a **protective electronic circuit**. For **toys** with a **protective electronic circuit**, the following requirement is therefore applicable in addition to Clause 9.

9.ZB The **toy** shall not malfunction in such a way as to cause an unintended operation that may impair safety or present a dangerous malfunction due to influence from electromagnetic phenomena (EMP).

*Compliance is checked by the test of 9.ZB.1 and 9.ZB.2. **Transformer toys** and **dual-supply toys** incorporating a **protective electronic circuit** are additionally subjected to the tests of 9.ZB.3 to 9.ZB.7, using the supplied or the recommended **transformer for toys**. The tests are carried out under the following conditions.*

*The tests are carried out with the **toy** supplied at **rated voltage** and the **toy** operated in the following modes:*

- *electronic off mode;*
- *stand-by mode;*
- *operating mode.*

NOTE If the **toy** has several modes of operation, the tests are carried out with the **toy** operating in each mode if necessary.

*The tests are carried out after the **protective electronic circuit** has operated during the fault conditions of 9.8.2.*

The tests are carried out with surge arresters disconnected, unless they incorporate spark gaps.

Toys incorporating electronic controls complying with the EN 60730 series are not exempt from the tests.

*If the **protective electronic circuit** includes only passive **electronic components** such as positive temperature co-efficient (PTC) resistors, negative temperature co-efficient (NTC) resistors or voltage dependent resistors (VDRs), the tests of Annex ZB are not applied.*

9.ZB.1 The **toy** is subjected to electrostatic discharges in accordance with EN 61000-4-2, test level 4 being applicable. Ten discharges having a positive polarity and ten discharges having a negative polarity are applied at each preselected point.

9.ZB.2 The **toy** is subjected to radiated fields in accordance with EN 61000-4-3, test level 3 being applicable.

NOTE The dwell time for each frequency is to be sufficient to observe a possible malfunction of the **protective electronic circuit**.

9.ZB.3 The **toy** is subjected to fast transient bursts in accordance with EN 61000-4-4. Test level 3 is applicable for signal and control lines. Test level 4 is applicable for the power supply lines. The bursts are applied for 2 min with a positive polarity and for 2 min with a negative polarity.

9.ZB.4 The power supply terminals of the **toy** are subjected to voltage surges in accordance with EN 61000-4-5, five positive impulses and five negative impulses being applied at the selected points. Test level 3 is applicable for the line-to-line coupling mode, a generator having a source impedance of 2 Ω being used. Test level 4 is applicable for the line-to-earth coupling mode, a generator having a source impedance of 12 Ω being used.

For **toys** having surge arresters incorporating spark gaps, the test is repeated at a level that is 95 % of the flashover voltage. 

9.ZB.5 The **toy** is subjected to injected currents in accordance with EN 61000-4-6, test level 3 being applicable. During the test, all frequencies between 0,15 MHz to 80 MHz are covered.

NOTE The dwell time for each frequency is to be sufficient to observe a possible malfunction of the **protective electronic circuit**.

9.ZB.6 The **toy** is subjected to voltage dips and interruptions in accordance with EN 61000-4-11. The durations specified in EN 61000-4-11:2004, Table 1, are applied to each test level, the dips and interruptions being applied at zero crossing of the supply voltage.

9.ZB.7 The **toy** is subjected to mains signals in accordance with EN 61000-4-13, test level class 2 being applicable. **C11**

C12 Annex ZC (normative)

Toys generating Electromagnetic Fields (EMF)

Toys with an integrated field source generating EMF shall comply with EN 62233:2008 with the following modifications.

In EN 62233:2008, Clause A.1 "General", **add** the following:

Toys without a motor, inductor or which only include passive electronic **components**, are considered to comply with this requirement without measurement. The requirements do not apply to parts of toys consuming a current of 3 A or less.

The current is checked by measurement during the tests of EN 62115:2005, 9.3, unless the construction of the toy is such that the current cannot exceed 3 A.

In EN 62233:2008, A.2.3 "Measuring distances and sensor location", **add** the following to Table A.1, before the row for "Tumble dryers":

Toys or parts of toys, intended to be used close to the body	0	All surfaces	Continuously	0,18
Toys or parts of toys, hand-held	15	All surfaces	Continuously	0,18
Toys or parts of toys, other	30	All surfaces	Continuously	0,18

C12

Annex ZZA
(informative)

Coverage of Essential Requirements of the EU Directives

This European standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2009/48/EC that relate to Electrical properties within the scope of the standard.

Compliance with this standard provides one means of conformity with the specified Particular Safety Requirements of the directive given in Annex II, Section IV, Electrical Properties.

The cross-references between the clauses of the standard and the Essential Requirements of the directive are given below and the background and justification for the requirements of the standard is given in Annex ZZB.

Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

EXAMPLE The relevant requirements of EN 71 series.

This European Standard does not confer any presumption of conformity on those particular requirements not listed in Table ZZA.1.

Table ZZA.1

Clause(s)/sub-clause(s) of this European Standard	Particular requirements of Directive 2009/48/EC, Annex II
14.1, 14.15	IV 1.
8, 14.1, 14.2, 14.3, 14.4, 14.10, 14.15, 14.Z1, 15.1, 15.2, 16.3, 16.4, 17.1, 17.2, 18, Annex A 14.1, 15	IV 2.
8, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 10, 14.5, 14.7, 14.9, 14.11, 14.12, 14.13, 16.1, 16.2, 16.3, 16.4, 17.1, 17.2, 18	IV 3.
8, 9.1, 9.2, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 10, 11.1, 11.2, 14.5, 14.8, 14.9, 14.Z1, 16.1, 16.2	IV 4.
8, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 10, 13, 14.5, 14.9, 14.10, 14.11, 14.12, 17.1, 17.2, 19.1, 19.2, Annex B	IV 5.
20, Annex ZC	IV 6.
9.1, 9.8, 9.9, Annex ZB	IV 7.
20, Annex E 20	IV 8.
14.2	IV 9.
NOTE 1 The requirements in Clauses 3, 5 and 7 are to be used in addition to the above clauses and sub-clauses. NOTE 2 Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this European Standard.	

 Annex ZZB
(informative)

Background and justification for this European Standard

NOTE For correct application of the standard, the normative text takes precedence over the rationale and guidance given in Annex ZZB.

ZZB.1 General

This European Standard seeks as far as possible to apply a hazard approach instead of design restrictions for **toys**. The following definitions should be kept in mind when reading the standard:

- hazard is a potential source of harm;
- risk is the probable rate of occurrence of a hazard causing harm and the degree of severity of the harm;
- harm means physical injury or any other damage to health, including long-term health effects.

For most of the requirements, the hazards addressed are explained in Annex ZZB together with a background and justification.

ZZB.2 Scope (see Clause 1)

The scope of this European Standard has been amended to cover the scope of European Directive 2009/48/EC on the safety of **toys**.

ZZB.3 General conditions for the tests (see Clause 5)

This clause sets a series of standardised conditions under which all tests should be carried out, unless otherwise specified. The conditions are designed to simulate as far as possible normal use conditions as well as instruction on the number of samples to be used and the order in which the tests are to be carried out. Tests are carried out on a single **toy** in the order of clauses specified in the standard unless otherwise stated in this clause. Furthermore, this clause requires that testing be carried out under certain abuse conditions which are foreseeable such as the reversal of the polarity of the primary batteries.

This clause also describes a set of pre-conditioning tests which should be carried out prior to the tests specified in this European Standard. Furthermore, this clause describes the condition in which the **toy** needs to be when the tests are carried out, requiring that the most unfavourable conditions are used for each test.

ZZB.4 Criteria for reduced testing (see Clause 6)

6.1 and 6.2 foresee certain situations where reduced testing is justified.

6.1 allows certain tests on electrical insulation to be disregarded for **toys** that can function safely should the insulation break down.

This subclause requires a test to be carried out where parts of different polarity are short-circuited. If the **toy** can withstand this fault condition and continue to comply with the requirements of the temperature rise tests of Clause 9, the **toy** is considered to have reduced potential to present a hazard should the insulation between parts of different polarity break down. Consequently, the **toy** is then considered to comply automatically with the requirements of the following:

- Clause 10 "Electrical strength at operating temperature";
- 11.2 (resistance to humidity),
- Clause 12 "Electrical strength at room temperature"; 

- Ⓒ11 – Clause 15 "Protection of cords and wires";
- Clause 18 "Clearances and creepage distances".

6.2 allows certain tests associated with short-circuiting to be disregarded for **battery toys** having batteries of limited power and where it is not likely that a short circuit will take place.

Batteries of limited power are those batteries where the total battery voltage does not exceed 2,5 V measured 1 s after a 1 Ω resistor has been connected over the supply terminals of the **toy** in which the battery is inserted. Such **toys** are considered to have lower potential to present a hazard under accidental short-circuit condition and as such are considered to comply with the following:

- Clause 10 "Electrical strength at operating temperature";
- Clause 11 "Moisture resistance" (except 11.1);
- Clause 12 "Electrical strength at room temperature";
- Clause 15 "Protection of cords and wires" (except 15.2);
- Clause 17 "Screws and connectors" (except 17.1);
- Clause 18 "Clearances and creepage distances" (except the additional distances for **computer toys**);
- Clause 19 "Resistance to heat and fire".

Ⓒ12 A short circuit is considered unlikely to take place behind the cover to the battery compartment if the cover can only be removed with the aid of a tool or by two independent movements applied simultaneously. An example of acceptable independent simultaneous movements is a push and a twist movement. Ⓒ12

ZZB.5 Marking and instructions (see Clause 7)

Toys are required to be accompanied by sufficient information to enable their safe operation. This clause contains requirements that **toys** or their packaging are to be marked with the name and address of the manufacturer or responsible vendor to ensure traceability as well as compliance with certain European directives.

There are requirements for the marking of **battery boxes** for **toys**, **transformers for toys** and replaceable bulbs to reduce the possibility of the user employing such components with an incorrect specification.

Furthermore, there are requirements to ensure the instructions of **toys** contain sufficient user information. 7.4 requires that certain instructions for the use of **toys** with replaceable batteries and transformers be included. It should be noted that only the substance of this information is required and some of the statements may not be applicable and may be removed or reworded as appropriate.

Surface temperature limits are different for different age groups due to reaction time. **Toys** that attain surface temperatures that are unsuitable for children of certain ages require a warning visible at point of sale to indicate that the **toy** is not suitable for these children. This is required in 7.8.

Certain symbols may be used to replace instructional text but, where used, they shall comply with IEC 60417-1 and shall not conflict with the symbols of this European Standard. All warnings and instructions are required to be written in the official language of the country of which the **toy** is sold to ensure users can understand the instructions. When important information appears on the packaging or instructions, the consumers' attention is drawn to the importance of retaining this information. When placed on the **toy**, markings need to be durable and comply with the test of 7.7. Ⓒ11

ZZB.6 Power input (see Clause 8)

This clause is intended to determine if the transformer supplied with the **transformer toy** corresponds to the rated power of the **toy**. This is important, as the **rated power input** is the value which is used in the subsequent tests. This requirement is also intended to address the hazards associated with the situation where a **transformer toy** will draw more power than the supplied or recommended transformer is able to deliver.

ZZB.7 Heating and abnormal operation (see Clause 9)

The tests of Clause 9 are intended to address the hazards associated with **toys** becoming excessively hot or operating in an unexpected way. This clause requires that **toys** do not reach temperatures which might pose a risk of causing burns to the skin, do not catch fire, cause battery leakage or present other similar hazardous conditions. It also requires that **toys** do not operate in a hazardous unintended way and that **toys** are adequately protected should a malfunction impair safety. The test conditions simulate normal use as well as most likely foreseeable conditions.

ZZB.8 Heating and abnormal operation – Operation under normal conditions (see 9.1, 9.2 & 9.3)

9.1 explains which tests are to be applied to each type of **toy**.

9.2 explains how the **toy** shall be positioned and what supply voltage is to be used during the tests of 9.3. **Toys** that are mobile, such as **toy** cars or ride-on **toys** are tested in the most onerous use condition to create the highest temperature rise as can be expected owing to the normal behaviour of children. For such **toys**, when **non-self-resetting thermal cut-outs** operate, they are re-set a maximum of three times. **Toys** with **self-resetting thermal cut-outs** are tested until steady-state conditions are established.

9.3 requires that the **toy** is operated under normal conditions and that the **toy** shall not exceed the temperature limits or present other related hazards as described in 9.9.

ZZB.9 Heating and abnormal operation – Short circuit test (see 9.4)

The tests of 9.4 assess the **toy** when subjected to an accidental short circuit.

The test attempts to short circuit parts of different polarity by using a straight steel pin of diameter 0,5 mm and any suitable length or by inserting a rod with a diameter of 1,0 mm through the casing of the **toy**, up to a depth of 100 mm. The dimensions of the pin are representative of the antenna of a typical radio controlled **toy**. The dimensions of the rod are representative of an 'unfolded paper clip' and other similar pins which may be found around the home.

Should it be possible to short circuit the **toy** in this fashion, the **toy** shall not exceed the temperature limits or present other related hazards as described in 9.9.

ZZB.10 Heating and abnormal operation – Temperature limiting devices (see 9.5)

This requirement is designed to simulate the failure of temperature limiting devices by applying a short circuit across such components. In the event that a **toy** contains more than one such device, each device is short-circuited in turn as it is unlikely that two components will fail at the same time.

When the fault condition is in place, the **toy** shall not exceed the temperature limits or present other related hazards as described in 9.9.

ZZB.11 Heating and abnormal operation – Moving parts (see 9.6)

This requirement is designed to simulate the fault of moving parts, such as the wheels of a **toy** car being locked. The test is carried out until steady-state conditions are reached except for those **toys** where a switch needs to be operated by the user in order to activate the moving parts. For such **toys**, the test is carried out for 30 s as it is considered that children will not hold the switch for longer periods if the **toy** does not operate.

When the fault is in place, the **toy** shall not exceed the temperature limits or present other related hazards as described in 9.9. 

ZB.12 Heating and abnormal operation – Transformer and dual-supply toys (see 9.7)

This requirement is designed to simulate the abuse condition whereby the **toy** is modified to be connected to a power supply additional to that recommended by the instructions for use. This is to minimise the hazards presented when **toys** are deliberately connected to an additional power supply in order to make them operate differently, for example, connecting two power supplies to speed up a **toy** train. The test is only applied where the modification is easily made by the child from parts used from another identical **toy**, without using other components or **tools**.

When this condition is in place, the **toy** shall not exceed the temperature limits or present other related hazards as described in 9.9.

ZB.13 Heating and abnormal operation – Electronic components (see 9.8)

This requirement is designed to simulate the failure of **electronic components** in order to minimise the risk of hazardous conditions being presented should an **electronic component** or its connections fail.

This test does not apply to those circuits that meet the definition of a low power circuit and where the protection against fire hazard or dangerous malfunction in other parts of the **toy** does not rely on the correct functioning of the **electronic circuit**. Low power circuits are assessed by following the steps of 9.8.1. A low power point is a point where the power across the variable resistor specified is less than 15 W, measured after 5 s. Components that are further away from the power supply than the measured low power point are considered to be part of a low power circuit and do not require testing according to 9.8.2. Low power circuits are considered unlikely to present a significant hazard should a fault occur.

For those circuits which are not a low power circuit, the fault conditions are applied to each **electronic component** in turn as specified in 9.8.2.

When each fault condition is in place, the **toy** shall not exceed the temperature limits or present other related hazards as described in 9.9.

ZB.14 Heating and abnormal operation – Temperature rises (see 9.9)

This requirement addresses the hazards associated with high temperatures by setting the temperature rise limits for the **accessible parts** of **toys**. The limits have been drawn up in accordance with CENELEC Guide 29 and IEC Guide 117. The guidance gives details of the reaction time of children, stating that those children below the age of 2 year have a slower reaction time and thus a lower temperature threshold is specified. To align with the age limits in European Directive 2009/48/EC, these values calculated for children of 2 years of age and under have been applied for children of 3 years of age and under. This subclause specifies further limits for children aged 8 years and older which are also calculated from the guidance documents.

The guide includes limits for different types of materials due to the differing thermal conductivity properties of materials. For ease of testing, the limit values are presented as temperature rises based on the absolute temperatures given in the guide and calculated from the highest allowed ambient temperature.

In addition, there are lower temperature rise limits for those parts of **toys** which are intended to be handled such as control knobs or switches.

For the assessment of fault conditions, the temperature rise limits for **normal operation** apply as it is considered unlikely that children will recognise such faults when the **toy** is in use.

This subclause further requires that hazardous conditions associated with high temperatures shall not occur during the tests of Clause 9; such as: sealing compounds shall not flow out, batteries shall not leak, the **toy** shall not emit flames, vapour shall not accumulate in the **toy** and dangerous substances shall not become accessible as well as requiring compliance with the rest of this European Standard. 

Ⓒ11 ZZB.15 Electric strength at operating temperature (see Clause 10)

This clause addresses the hazards associated with weak insulation between parts of different polarity, such as high temperatures or fires caused by a short circuit, by assessing the adequacy of the **toy's** insulation at normal operational temperature. The **toy** is operated until steady-state temperature conditions are reached and then the insulation of the **toy** is assessed by applying a voltage of 250 V at a frequency of 50 Hz with a substantially sinusoidal waveform on to the insulation between parts of different polarity, for a period of one minute. This can be achieved by applying the test voltage across the supply terminals of the **toy** with one terminal of each component across the supply, disconnected. Whilst under test the components are disconnected from the circuitry such that only the insulation between different polarities is tested.

The insulation shall not break down under this condition.

ZZB.16 Moisture resistance – Toys intended to be used in water or cleaned with liquid (see 11.1)

This subclause addresses the hazards associated with water ingress in **toys** such as high temperatures caused by short circuits.

The first part of this subclause deals with **toys** likely to be cleaned with water or other liquids. Such **toys** are subjected to the tests of EN 60529:1991, 14.2.4, to assess the **toys** resistance to water ingress.

The second part of this subclause deals with **toys** intended to be used in water, such as a motorized bath **toy** ~~Ⓒ12 text deleted~~ Ⓒ12. For these **toys**, the tests of 11.1 require that the **toy** is immersed in a salt water solution and operated for 15 min. The test requires that the **toy** is held at a depth of 150 mm to provide a standardised water pressure and the salt content of the water is intended to provide reproducible water conductivity. These requirements have been developed from similar requirements in EN 60529.

In each case, the insulation of the **toy** is then assessed by applying a voltage of 250 V at a frequency of 50 Hz with a substantially sinusoidal waveform on to one terminal of each component, as specified in Clause 12. The insulation shall not break down under this condition.

ZZB.17 Moisture resistance – Humidity resistance (see 11.2)

This subclause addresses the hazards associated with variations in ambient humidity. Changes in humidity can cause water droplets to form on electrical components and bridge insulation between parts of different polarity. Furthermore, environments of high humidity can cause expansion in materials, components and electrical insulation which can affect the safe operation of the **toy**.

Toys that are not unduly affected by moisture, are subjected to the tests of 11.2. The **toy** is first conditioned at high humidity for 48 h and then the insulation of the **toy** is then assessed by applying a voltage of 250 V at a frequency of 50 Hz with a substantially sinusoidal waveform on to one terminal of each component, as specified in Clause 12.

The insulation shall not break down under this condition and the **toy** shall comply with the proceeding clauses of the standard as specified in 5.3.

ZZB.18 Electrical strength at room temperature (see Clause 12)

This clause addresses the hazards associated with weak insulation between parts of different polarity, such as high temperatures or fires caused by a short circuit, by assessing the adequacy of the **toy's** insulation at room temperature. The **toy** is assessed by applying a voltage of 250 V at a frequency of 50 Hz with a substantially sinusoidal waveform on to one terminal of each component, for a period of one minute. Whilst under test, the components are disconnected from the circuitry such that only the insulation between different polarities is tested.

The insulation shall not break down under this condition. Ⓒ11

ZZB.19 Mechanical strength (see Clause 13)

This requirement is intended to address the hazards associated with children accessing hazardous elements such as electrical parts, moving parts or parts with high temperatures. The abuse test is carried out using the spring hammer (Test Ehb) of EN 60068-2-75:1997, Clause 5. If the enclosure of the **toy** is weak, it could break during foreseeable use and thus allow children access to hazardous elements.

ZZB.20 Construction – High voltage (see 14.1)

This subclause is intended to address the hazards associated with **toys** being supplied with a source of electricity that could cause electric shock, burns, fire or other hazardous conditions.

This subclause is intended to address the Particular Safety Requirement of Annex II, Section IV, paragraph 1 of Toy Safety Directive 2009/48/EC. The requirement states that **toys** shall not be supplied with a voltage greater than 24 V and that voltages internal to the **toy** shall not pose a hazard should they be greater than 24 V.

It should be noted that both fully charged batteries that are nominally 24 V and **transformers for toys** rated 24 V that present voltages higher than 24 V in the no load condition are considered to comply with this subclause.

Internal voltages higher than 24 V and inaccessible to the user are allowed and shall comply with 14.15.

ZZB.21 Construction – Transformer toys (see 14.2, 14.3 & 14.4)

These requirements are intended to address the hazards associated with children playing with, and using, parts carrying mains voltage such as **transformers for toys**, supply cord sets and mains sockets.

Exposure to potential hazards of this nature are reduced by requiring that transformers are not an integral part of the **toy** (14.2) and by requiring that **transformers for toys** are not intended for children under the age of 3 years (14.4).

To reduce the risk of harmful electric shock, 14.3 requires that **transformer toys** are not intended for use in water, to minimize the risks of parts carrying mains voltage coming into direct contact with water.

These requirements also apply to **toys** supplied by batteries and transformers (**dual-supply toys**).

ZZB.22 Construction – Thermal cut-outs (see 14.5)

This requirement is intended to address the hazards associated with children resetting or replacing “cut-out” components, before **toys** have sufficiently cooled, **normal operation** has been achieved or necessary repairs have been carried out. This risk is minimized by requiring that non-self-resetting thermal cut outs cannot be reset without the aid of a **tool**, and thus it is expected that any resetting or replacement be carried out by an adult.

ZZB.23 Construction – Batteries and button cells (see 14.6 & 14.7)

This requirement is intended to reduce the risks associated with children swallowing button cells and batteries.

The risk is minimised by requiring that the battery cover can only be removed with the aid of a **tool** or by carrying out two, independent movements, applied simultaneously, thus limiting the child’s access to the button cell or battery. The actions that constitute two independent simultaneous movements applied by the user do not constitute actions due to gravity or the weight of the **toy**.

For batteries, the requirement applies to **toys** intended for children under the age of 3 years. For button cells and R1 batteries, the requirement applies to children of all ages.

Furthermore, 14.7 requires that battery compartment covers have sufficient strength by requiring them to withstand an impact from a 1 kg mass when dropped from a height of 100 mm. 

ZZB.24 Construction – Electrolyte leakage, rechargeable batteries (see 14.8)

This requirement is intended to address the hazards associated with electrolyte leakage. Children are unlikely to recognise the hazard associated with leaking electrolyte. Therefore, batteries are required not to leak electrolyte when the **toy** is placed in any position.

ZZB.25 Construction – Battery connection (see 14.9)

This subclause is intended to address the hazards associated with cells providing a “reverse charge” to other cells which may cause overheating, leakage or eruption.

This subclause minimises these potential hazards by requiring that batteries do not have parallel configurations. A parallel configuration of batteries may only be used if it can be shown that using mixtures of old and new batteries or inserting batteries with the polarity reversed does not impair compliance with the rest of this European Standard.

ZZB.26 Construction – Interchangeability of connectors (see 14.10)

This requirement is intended to address the hazard associated with children inserting plugs, connectors and wires into mains sockets.

The risk is reduced by requiring that plugs and socket-outlets of **toys** are not interchangeable with plugs and socket-outlets listed in IEC 60083. This requirement is not applicable to plugs

- which are too large to be introduced into the mains socket outlets, or
- that are too small so they can only be loosely inserted and do not stay firmly in place in the socket outlet aperture while in contact with the mains supply as such plugs pose a reduced risk.

Therefore, connectors of certain dimensions (with a diameter or diagonal measurement between 3,75 mm and 5,25 mm and length greater than 7 mm) are considered to fail this requirement.

Furthermore, **toys** intended for children under the age of 3 years shall not include wires or cords without end connectors in order to avoid them being inserted into the mains socket outlets.

ZZB.27 Construction – Protection of moving parts and hot surfaces (see 14.11)

This subclause is intended to reduce the risks associated with children gaining access to moving parts, hot surfaces or locations where explosion or fire can be initiated. Non-**detachable parts** which prevent access to such parts are required to withstand the tension test as specified. This test is equivalent to the tension test of EN 71-1.

ZZB.28 Construction – Recharging of batteries (see 14.12)

This subclause is intended to address the hazards associated with children charging rechargeable batteries inside the **toy**. Such hazards include recharging of primary batteries and charging of batteries that are not intended to be used with the **toy** which could lead to overheating, leakage or eruption. It also addresses the hazards of children playing with **toys** that are normally able to move freely while the **toy** is connected to the mains via a **battery charger**, which could lead to electric shock. This subclause also addresses additional hazards associated with the charging of batteries in heavy **toys**.

The risk of injury due to charging of primary batteries is reduced by requiring either that they cannot be charged from or inserted in the **toy**. Furthermore, **toys** may not charge batteries separately from the **toy** or provide power to other **toys**.

If rechargeable batteries are used, they shall be designed such that the battery polarity cannot be reversed when inserted in the **toy**.

The exposure to the hazards associated with playing with **toys** that are normally portable while plugged into the mains is minimised by ensuring such **toys** having a mass not exceeding 5 kg cannot be operated while the **toy** is being charged unless the **toy** meets the requirement for **dual-supply toys**. This means that the **toy** cannot be played with while the battery is charging. 

11 **Toys** that are heavier than 5 kg are permitted to have batteries recharged while in the **toy** to prevent users from removing heavy batteries, typically filled with acid in order to recharge them. Such **toys** typically include ride on **toys**, are at greater risk of causing damage to a mains socket outlet if operated while being charged.

ZZB.29 Construction – Series motors (see 14.13)

This subclause is intended to address the hazards associated with the use of series motors. The speed of series motors can only be controlled by the load. Series motors that do not have the appropriate load can reach excessive speeds. Since the load on **toy** motors is likely to be dependent on the actions of the child, the use of series motors has been limited to **toys** where the power input does not exceed 20 W.

ZZB.30 Construction – Asbestos (see 14.14)

This subclause forbids the use of asbestos in **toys** as it is restricted by various legislation.

ZZB.31 Construction – internal voltages (see 14.15)

This subclause is intended to address the risks associated with **toys** that have internal voltages exceeding 24 V. Voltages exceeding 24 V that are internal to the **toy** are required to be inaccessible to the user. In addition, the combination of current and voltage shall not cause harmful electric shock as stated in the requirements. The potential to cause harmful electric shock is minimised by requiring that the maximum current be less than 0,5 mA, the maximum energy be less than 2 mJ and the discharge does not exceed 45 µC. These limitations on the energy delivered are taken from the household appliance requirements of EN 60335-1 and are considered to minimise any electric shock hazard.

ZZB.32 Construction – Electrolyte leakage of batteries (see 14.16)

This subclause is intended to address the risks associated with electrolyte leakage which could cause burns. The risk is minimised by requiring that **toys** that have a battery compartment with a fixed position that is above a child be designed such that liquids are prevented from leaking from the battery compartment. Portable **toys** are not covered by this requirement.

This requirement applies to **toys** where the leakage of electrolyte is liable to cause burns, such as cot **toys** or baby gyms where the battery compartment is positioned directly above the child's play or sleeping position. Therefore it does not apply for example to cot **toys** where the battery compartment is positioned away from the child or to **toys** where the child is not directly under the **toy** for extended periods, for example, helicopter **toys** suspended from a ceiling. In these cases, it is considered unlikely that children will be exposed to the electrolyte.

ZZB.33 Computer toys (see 14.21)

Toys which are intended for connecting to a computer, console, monitor screen or other of audio-video equipment, need to have adequate protection in the event of a fault occurring in the connected equipment.

It is noted that Class I equipment rely on the earth connection for protection of users from hazardous voltages (mains). It has also been noted by the IEC and CLC that products or parts, which are gripped by the hand, and which are connected to class I appliances, require at least the same protection that might be expected in that appliance.

This subclause therefore sets requirements for insulation and for creepage and clearances in order to ensure that **computer toys** have adequate protection for users in the event of voltages up to 230 V being transferred to the **toy** under a single fault condition.

If **toys** are connected to a Class II appliance, no further protection is required for the **toy**. Therefore, an instruction to users explaining that **toys** are only to be connected to Class II equipment would minimise this risk. **11**