BRITISH STANDARD

BS EN 62115:2005 +A12:2015

Incorporating corrigenda July 2010 and November 2011

Electric toys — Safety

ICS 97.200.50; 13.120

BSI British Standards

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 It supersedes BS EN 62115:2005+A11:2012 which will be withdrawn on 03 June 2017.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.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 1 August 2005

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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

EUROPEAN STANDARD **EN 62115:2005+A12**

NORME EUROPÉENNE

EUROPÄISCHE NORM January 2015

ICS 97.200.50; 13.120

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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Ref. No. EN 62115:2005 E

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 at national level by publication of an identical national standard or by endorsement (dop) 2012-01-02

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– latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2015-06-04

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 at national level by publication of an identical national standard or by endorsement	(dop)	2015-07-09
– latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2017-06-03

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.

Publication	Year	Title	EN/HD	Year
–	–	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.

[c11] 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 - + A1 + A2	1993 - 1997 2001	Safety of laser products Part 1: Equipment classification, requirements and user's guide	EN 60825-1 + corr. Feb. + A1 + A2 + corr. Apr.	1994[2)] 1995 2002 2001 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. [c11]

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	–	–

⟨C11⟩ 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.* ⟨C11⟩

〈C11〉 ***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";

[C11] – 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".

[C12] 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. [C12]

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. [C11]

⟨C11⟩ 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. ⟨C11⟩

⟨C11⟩ ZZB.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.

ZZB.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.

ZZB.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. ⟨C11⟩

[C11] 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** [C12] *text deleted* [C12]. 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. [C11]

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.

⟨C11⟩ 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. ⟨C11⟩

〈C11〉 **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.Z1)

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. 〈C11〉

ZZB.34 Protection of cords and wires (see Clause 15)

This clause is designed to minimise the hazards associated with cords and wires short-circuiting due to poor protection from moving parts or potential sharp edges. The associated risks are minimised by requiring that casing, wire ways and holes are free from sharp edges and that cords and wires are protected from moving parts. In addition, uninsulated elements, such as heating elements or LED connectors are required to be rigidly held so that the necessary creepage and clearance distances are not reduced.

ZZB.35 Components – Rated values (see 16.1)

This subclause is intended to address the hazards associated with components not having the correct specification or components of the incorrect rating being used in the **toy**.

The risks associated with components being incorrectly specified are addressed by requiring compliance with relevant IEC standards for each component (16.1). Components not complying with the correct standards might not function correctly or safely when used in the **toy**.

The risks associated with components employed in the **toy** being of an incorrect specification are addressed by the requirements of 16.1.1 and 16.1.2. If the component is not marked, not used in accordance with its markings or no IEC standard exists then the component is tested in the **toy** under the conditions specified in this European Standard.

ZZB.36 Components – Prohibited components (see 16.2)

This subclause prohibits the use of **thermal cut-outs** that can be reset by a soldering operation. When such cut outs are reset by soldering, there is a significant risk that the soldering operation will alter the properties of the component and as such allow the **toy** to achieve hazardous high temperatures before the cut–out operates.

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

ZZB.37 Components – Transformers (see 16.3)

Transformers for toys are required to comply with EN 61558-2-7 for linear types or EN 61558-2-7 and EN 61558-2-16 for switch mode types. These requirements provide the necessary protection for transformers for the **toy** and for the user. Transformers not complying with these standards do not provide the necessary additional protection required for use with **toys** (such as those transformers complying with EN 61558-2-6).

ZZB.38 Components – Battery chargers (see 16.4)

This subclause requires that **battery chargers** supplied with a **toy** shall comply with EN 60335-2-29, and if they are **battery chargers** for use by children, they shall comply with EN 60335-2-29:2004, Annex AA. If the **battery charger** is not to be used by a child then this shall be made clear in the information supplied with the **toy** (see 7.4).

Battery chargers not complying with EN 60335-2-29 do not provide the necessary protection required for safe use. **Battery chargers** not complying with the requirements for **battery chargers** for children as given in EN 60335-2-29:2004, Annex AA do not provide the necessary additional protection required for them to be used by children.

ZZB.39 Screws and connections (see Clause 17)

This clause is intended to address the hazards associated with the failure of screws and connections, such as access to live parts, access to moving parts or access to hot surfaces. The risks associated with failure are minimised by

– setting requirements for the integrity of standard connections,

– setting requirements that ensure the continued integrity of screws that are intended to be loosened and tightened by the consumer, and

〈C11〉 – setting further requirements for those connections carrying electrical current.

Screws with a diameter less than 2,8 mm are not tested as compliance for such small screws is checked by the preconditioning tests of 5.15.

ZZB.40 Clearance and creepage distances (see Clause 18)

This requirement is intended to address the hazards associated with accidental short circuit of parts of different polarity. Such hazards include high temperatures or fires.

The risk is minimised by requiring a minimum **creepage distance** and a minimum **clearance**. If the **toy** complies with the tests of Clause 9 with the creepage and **clearances** short circuited, then no minimum values are applicable.

This clause also allows printed circuit boards to have a lower minimum creepage and **clearance** distance if the expected pollution (e.g. dust) degree is suitably low. The degree of pollution in the microenvironment of where the insulation is situated shall be equal to or less than pollution degree 2 as stated in EN 60335-1. Pollution in excess of this degree is considered to present a risk of creating a short circuit.

For products that have internal voltages greater than 24 V, as allowed under 14.15, the creepage and **clearance** distances shall be increased to distances as stated in EN 60335-1.

ZZB.41 Resistance to heat and fire (see Clause 19)

This requirement is intended to address the hazards associated with non-metallic parts melting or catching fire in the event that electrical components fail and cause high temperatures inside the **toy**. This clause also deals with the hazards associated with non-metallic parts softening or distorting, such that casings or insulation no longer provide sufficient protection.

For **toys** that operate at a voltage exceeding 12 V and a current exceeding 3 A, there are requirements to ensure that non-metallic parts do not soften under high temperature operating conditions. If insulation or casings soften, they could no longer provide adequate protection. **Toys** that operate at lower voltage current combinations are considered to present a lower risk of attaining temperatures that could soften or distort non-metallic materials, including accessible insulation.

The clause also has requirements for non-metallic materials to minimise the risk of ignition and spread of flames to neighbouring parts should materials catch fire. Parts of non-metallic material enclosing electric parts are subjected to the glow wire test to determine if they can catch fire. If such parts catch fire under this test, the risk of flame spreading to neighbouring parts is accessed during the needle flame test, which simulates ignition and distinguishing of non-metallic parts.

ZZB.42 Radiation, toxicity and similar hazards (see Clause 20)

This clause contains a general requirement to address any toxicological, radiation or similar hazards from electrical aspects as defined in this European Standard.

ZZB.43 Experimental sets (see Annex A)

This annex addresses **toys** that allow for “experimental play” with simple electrical circuits, such as designing a car, alarm, resistor, switch circuit. Such **toys** cannot comply with some of the requirements set out in the standard, but are designed for older children, and have been used safely for a number of years. The modifications to the main standard made by Annex A allow for **experimental sets** to comply with the standard provided they carry appropriate warnings, detailed instructions for each experiment and information that the **toy** is intended for the correct age group, nominally children of 8 years of age, but older age groups can be specified by the manufacturer. 〈C11〉

[C11] ZZB.44 Automatic controls and switches (see Annex C)

Automatic controls such as **thermostats** and **thermal cut-outs** shall be tested according to the requirements of EN 60730-1:2000 + A1:2004 + A2:2008, Clause 17, the number of cycles of operation stated in the annex are selected from the values in EN 60730-1.

Switches are required to comply with the requirements of EN 61058-1 with the modifications indicated in C.2. The temperature rise requirement of EN 61058-1:2002, Clause 17, has been reduced to add an increased level of safety for children. The temperature rise limits is set higher for this requirement as it is recognised that it is an overuse test.

ZZB.45 Toys incorporating lasers and light-emitting diodes (see Annex E)

Toys that comprise lasers or light-emitting diodes (LEDs) are additionally required to comply with the requirements of Annex E. The requirements are intended to address the risk of damage to the sight of the user under normal, and abuse, conditions. By meeting the requirements of a class 1 device of EN 60825-1:1994, LEDs and lasers are considered to be safe under all viewing conditions.

ZZB.46 Toys with protective electronic circuits (see Annex ZB)

The requirements in this annex ensure that **toys** remain safe when under the influence of electromagnetic phenomena (EMP). EMP is present under normal use conditions because of radio communication etc found in the typical consumer environment (e.g. due to Wi-Fi systems and mobile phones).

Toys with a protective **electronic circuit** are subject to the additional testing of Annex ZB to ensure that they do not malfunction under the influence of electromagnetic phenomena.

Furthermore, **toys** that have an electronic off switch, a “standby mode” or a “sleep mode” that could malfunction in such a way as to cause any unintended operation that might impair safety are also subjected to this test. Examples of **toys** which could malfunction in such a way as to cause an unintended operation that might impair safety are ride-on **toys** which could unexpectedly move, change direction or gain speed, or functional **toys** such as a **toy** sewing machine which could unexpectedly start. **Toys** which operate and do not create a hazard (i.e. a motor runs or a light illuminates) are not considered to be covered by this requirement.

Ride on **toys** and functional **toys** can present unavoidable hazards due to their function. These types of mechanical hazards are covered by EN 71-1. This annex covers the hazard due to unexpected behaviour of the **toy** caused by a malfunction of an electronic control system.

[C12] If the tests of 9.8.2 cause a protective electronic circuit to operate, the tests of the annex are applied while the fault conditions of 9.8.2 are in place, after steady state conditions have been reached. [C12]

Circuits comprising only passive **electronic components** such as positive temperature co-efficient (PTC) resistors, negative temperature co-efficient (NTC) resistors or voltage dependent resistors (VDRs) are exempt from the tests as they are unlikely to malfunction under the influence of EMP. [C11]

[C12] ZZB.47 Toys generating electromagnetic fields (see Annex ZC)

Annex ZC addresses hazards posed by toys emitting electromagnetic fields.

Toys should not emit EMF that pose a hazard to the user or that unduly affect other products. The risk is reduced by compliance with the limit values.

Toys that are electromagnetically benign such as those without motors, inductors or which only comprise passive electronic components are considered to comply with the requirement without testing. Furthermore, toys that operate at low currents (less than 3 A) are considered incapable of generating EMF at levels that could pose a hazard.

The requirements in the addition to Table A.1 (see Annex ZC) were selected from EN 62233:2008, Table A.1, by comparing the values and conditions for similar equipment. [C12]

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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

[C11] This European Standard specifies electrical safety requirements for **toys** that have at least one function dependant on electricity, **toys** being any product designed or clearly intended, whether or not exclusively, for use in play by children of less than 14 years of age. [C11]

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

– **constructional sets**;

– **experimental sets**;

[C11] – functional **toys** (a **toy** which 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); [C11]

[A2] – **computer toys**;

– toy computers; [A2]

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**.

[A1] Additional requirements for **toys** incorporating **lasers** and **light-emitting diodes** are given in Annex E. [A1]

[C11] If it is intended that a child also plays with the packaging, the latter is considered to be part of the **toy**.

This European Standard only covers the electrical safety aspects of **toys**. Non-electrical safety aspects are covered by EN 71 series. For more details, see Annexes ZZA and ZZB. [C11]

[A2] 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**. [A2]

[C11] *Text deleted* [C11]

[C11] This European Standard does not apply to the following **toys**:

- playground equipment intended for public use;
- automatic playing machines, whether coin operated or not, intended for public use;
- **toy** vehicles equipped with combustion engines;
- **toy** steam engines;
- slings and catapults.

Furthermore, it does not cover the following items, which, for the purpose of this European Standard, are not considered **toys**:

- electric decorative robots (EN 50410);
- 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; [C11]

[C11] – 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 **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;

– child-appealing luminaries;

– fashion accessories for children which are not for use in play;

– babies soothers;

– [C12] *text deleted* [C12]

– 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 **toys**, and

– reproductions of real firearms. [C11]

– 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;

[A2] – portable luminaries for children (IEC 60598-2-10);

– video and computer games;

– blowers for inflatable activity **toys** (e.g. bouncy castles); [A2]

– 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.

[C2] EN 71-1, *Safety of toys – Part 1: Mechanical and physical properties* [C2]

[C11] *Text deleted* [C11]

[C11] EN 60068-2-75:1997, *Environmental testing– Part 2-75: Tests– Test Eh: Hammer tests (IEC 60068-2-75:1997)* [C11]

[C11] EN 60730 series, *Automatic electrical controls for household and similar use (IEC 60730 series)*

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

EN 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3)*

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

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

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

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

EN 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 (IEC 61000-4-13)*

EN 61180-1, *High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test and procedure requirements* (IEC 61180-1)

EN 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 (IEC 61558-2-6)*

EN 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 61558-2-16)*

EN 62233:2008 + corr. Aug. 2008, *Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure* (IEC 62233:2005, mod.) [C11]

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*

[C2] *Text deleted* [C2]

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*

〈A2〉 IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
Amendment 1 (1999)[1]

IEC 60695-11-5:2004, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance* 〈A2〉

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*

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

〈C11〉 *Text deleted* 〈C11〉

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

〈A1〉 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)[1] 〈A1〉

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

〈A2〉 IEC 61058-1:2000, *Switches for appliances – Part 1: General requirements*
Amendment 1 (2001)
Amendment 2 (2007)[2] 〈A2〉

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*

〈C〉 *Text deleted* 〈C〉

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

〈A2〉 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)[3]

IEC 60990:1999, *Methods of measurement of touch current and protective conductor current* 〈A2〉

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

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

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

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

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

〈A2〉 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**. 〈A2〉

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.

〈A2〉 3.1.11
computer toy
toy intended to be used together with a computer, console, monitor screen or other audio-video equipment

〈C2〉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. 〈C2〉

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 **to**y 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**〈A2〉

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

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

〈C〉 NOTE Electronic components do not include resistors, capacitors and inductors. 〈C〉

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

〈C11〉 **3.5.Z1**
dangerous malfunction
unintended operation of the appliance that may impair safety

3.5.Z2
protective electronic circuit
electronic circuit that prevents a hazardous situation under abnormal operating conditions

NOTE Parts of the circuit may also be used for functional purposes. 〈C11〉

4 General requirement

〈C〉 **Toys** shall be constructed so that they do not jeopardise the safety and/or health of users or third parties when they are used as intended or in a foreseeable way, bearing in mind the 〈C11〉 [*text deleted*] 〈C11〉 behaviour of children. 〈C〉

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.*

[C11] The interconnection cord set for connection to a computer, console, monitor screen or other audio-video equipment supplied with a **computer toy** is tested with the connector of the interconnection cord set fully inserted in the appliance inlet of the **toy**. The plug-connector at the other end of the interconnection cord is not tested (see 14.Z1).

NOTE The term “interconnection cord set” is defined in EN 60799:1998. [/C11]

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.*

[A2] ***Rechargeable battery toys** that can be operated during charging are tested as **dual supply toys** because the **battery charger** is operating as a **transformer**.* [/A2]

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

NOTE 1 In general a fully charged [A2] rechargeable [/A2] battery or a new alkaline battery is considered to be the most unfavourable battery.

[A2] 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. [/A2]

*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.

__Toys__ having lamps used as heating elements that can be removed without the aid of a __tool__ are tested with lamps of the highest power input that can be fitted, irrespective of any marking.

NOTE 4 The lamps are selected from the types generally available.

5.11 *The tests are carried out in a draught-free location at an ambient temperature of 20 °C ± 5 °C.*

5.12 *__Toys__ having more than one __rated voltage__ are tested at the most unfavourable voltage. __Toys__ for a.c. only are tested with a.c. at rated frequency if marked, and those for a.c./d.c. are tested at the most unfavourable frequency. If the frequency is not marked, the __toy__ is tested with 50 Hz or 60 Hz as appropriate.*

5.13 *__Battery toys__ are also tested with the polarity reversed unless such connections are prevented by the construction.*

5.14 *Batteries are correctly positioned before evaluating the possibility of bridging insulation and before carrying out the short-circuit tests.*

Only one short circuit is applied at a time. Damage caused by a short circuit that does not impair compliance with this standard is repaired before a further short circuit is applied.

〖C2〉 **5.15** *Before starting the tests, the __toy__ is preconditioned by subjecting it to the following tests of EN 71-1, the batteries in position:*

– *Drop test – for __toys__ having a mass less than 4,5 kg including batteries, irrespective of the age group;*

– *Static strength test – for sit-on or stand-on __toys__;*

– *Dynamic strength test – for wheeled ride-on __toys__;*

– *Tension test – for all __toys__; however, the force being 70 N ± 2 N independent of the dimensions and applicable independent of age group;*

– *Tension test for seams and materials – for __toys__ having textile or other flexible materials covering batteries or other electrical parts.*

NOTE Compliance with EN 71-1 is not checked after the preconditioning. However, the security of the battery compartment cover is checked (see 14.6 and 14.7). 〈C2〉

6 Criteria for reduced testing

For some **toys**, it is not necessary to carry out all the tests specified in this standard if the conditions of 6.1 or 6.2 are met. The exemptions of 6.1 are applicable to all **toys**, whereas those of 6.2 are only applicable to **battery toys**.

6.1 **Toys** that comply with the tests of Clause 9 with the insulation between parts of different polarity short-circuited are considered to comply with 〖C〉 Clauses 10, 11.2 and 12 〈C〉, 15 and 18. The short circuit is applied at all places in turn where the insulation is liable to breakdown and can be carried out using a flexible wire.

6.2 〖C11〉 **Battery toys** are considered to comply with Clauses 10, 11 (except 11.1), 12, 15 (except 15.2), 17 (except 17.1 for battery compartments intended to contain button cell batteries), 18 (except the additional distances for **computer toys**) and 19 if

– the accessible insulation between parts of different polarity cannot be bridged by a straight steel pin having a diameter of 0,5 mm and any suitable length over 25 mm, (insulation between parts of different polarity in battery compartments protected by a cover that can only be removed with the aid of a **tool** or by two independent movements applied simultaneously are not considered as accessible for the purposes of this requirement), and

– the total battery voltage does not exceed 2,5 V, measured 1 s after a 1 Ω resistor has been connected between the supply terminals of the **toy**, with any current limiting device short-circuited and without the **toy** being operated. 〈C11〉

7 Marking and instructions

7.1 **Toys** or their packaging shall be marked with

– the name, trade mark or identification mark of the manufacturer or responsible vendor;

– the model or type reference.

When the **toy** is marked, these markings shall be on the main part. When the packaging is not marked and when it is not practical to mark the **toy**, e.g. due to its size, the markings of 7.1.1 to 7.1.3 〚C〛 shall 〚C〛 be contained in the instructions instead.

NOTE 1 In addition, the marking requirements of 〚C〛 EN 71-1 〚C〛 may be applicable.

NOTE 2 Additional markings are allowed, provided they do not give rise to misunderstanding.

Compliance is checked by inspection.

7.1.1 **Battery toys** with **replaceable batteries** shall be marked with

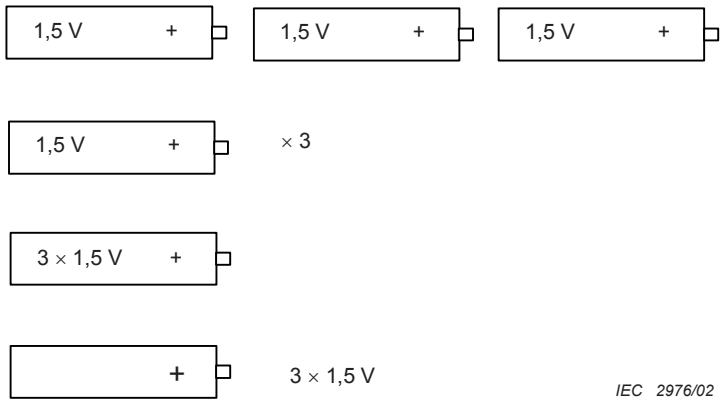
– the nominal battery voltage, in or on the battery compartment;

– the symbol for d.c., if the **toy** has a **battery box**.

If more than one battery is used, the battery compartment shall be marked with the shape of the batteries in proportional size, together with their nominal voltage and polarity.

Compliance is checked by inspection.

NOTE Examples representing three batteries are



7.1.2 **Transformer toys** shall be marked with

– their **rated voltage**, in volts;

– the symbol for a.c. or d.c., as applicable;

– their **rated power input**, in watts or volt-amperes, if greater than 25 W or 25 VA;

– the symbol for **transformer for toys**. This symbol shall also be marked on the packaging.

The marking of **rated voltage** and the symbol for a.c. or d.c. shall be placed adjacent to the terminals. The marking for a.c. or d.c. is not required if the incorrect supply does not impair compliance with this standard.

Compliance is checked by inspection.

7.1.3 Dual-supply toys shall be marked with the marking required for both **battery toys** and **transformer toys**.

Compliance is checked by inspection.

7.2 The identification for **detachable lamps** shall be marked with

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

The marking for power input or current of **detachable lamps** shall be as follows:

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

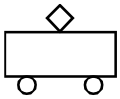
The word “lamp” may be replaced by symbol 5012 of IEC 60417-1.

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 power input is fitted.

Compliance is checked by inspection.

7.3 When symbols are used, they shall be as follows:

	[symbol 5031 of IEC 60417-1]	direct current
	[symbol 5032 of IEC 60417-1]	alternating current
	[symbol 5012 of IEC 60417-1]	lamp
	[symbol 5219 of IEC 60417-1]	safety isolating transformer for toys (symbol for **transformer toys**)

NOTE 1 Additional symbols are allowed, provided they do not give rise to misunderstanding.

NOTE 2 Symbols specified in IEC 60417-1 and ISO 7000 may be used.

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

Compliance is checked by inspection.

7.4 Instructions shall be provided that give details concerning cleaning and maintenance when necessary for the safe operation of the **toy**. They shall state that transformers or battery chargers used with the **toy** are to be regularly examined for damage to the cord, plug, enclosure and other parts, and in the event of such damage, they must not be used until the damage has been repaired.

Toys shall be provided with instructions for assembly if

– they are intended to be assembled by a child;
– these instructions are necessary for safe operation of the **toy**.

If the **toy** is intended to be assembled by an adult, this shall be stated.

[C11] For **transformer toys**, the following age warning shall be visible to consumers at the time of purchase:

"Warning Not suitable for children under 36 months".

A brief indication of the specific hazard calling for this restriction (e.g. misuse of transformer can cause electrical shock) "shall accompany the age warning or appear in the instructions which accompany the **toy**. The text "Not suitable for children under 36 months" may be replaced by the age warning symbol from EN 71-1. This requirement does not apply to **toys** which, on account of their function, dimensions, properties and similar characteristics, are clearly unsuitable for children under 36 months. The term "36 months" may be replaced with the term "3 years". [/C11]

The instructions for **transformer toys** and **toys** with **battery boxes** shall state that the toy is not to be connected to more than the recommended number of power supplies.

Toys having wires without connecting means shall be provided with instructions that state that the wires are not to be inserted into socket-outlets.

[C11] The instructions and markings for **dual-supply toys** shall include the instructions and markings required for both **battery toys** and **transformer toys.** [/C11]

The instructions for **battery toys** with **replaceable batteries** shall contain the substance of the following, as applicable:

– [C] *Text deleted* [/C];
– how to remove and insert the batteries;
– non-rechargeable batteries are not to be recharged;
– rechargeable batteries are only to be charged under adult supervision [A2] (for **toys** supplied with a **battery charger** for use by children, this instruction may be replaced by: 'Batteries are only to be charged by adults or by children at least 8 years old') [/A2]
– rechargeable batteries are to be removed from the toy before being charged;
– different types of batteries or new and used batteries are not to be mixed;
– batteries are to be inserted with the correct polarity;
– exhausted batteries are to be removed from the toy;
– the supply terminals are not to be short-circuited.

The instructions for **transformer toys** shall contain the substance of the following, as applicable:

– the toy is not intended for children under 3 years old;

[C11] – the **toy** shall only be used with a **transformer for toys**;

– the model number or specification of a suitable transformer for use with the **toy**; [C11]

– the transformer is not a toy;

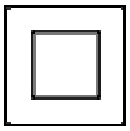
– toys liable to be cleaned with liquids are to be disconnected from the transformer before cleaning

The instructions may be on a leaflet, on the packaging or on the **toy**. If the instructions are marked on the **toy**, they shall be visible from the outside and if the **toy** consists of more than one part, only the main part needs to be marked.

Instructions for **battery toys** intended to be used in water shall state that the **toy** is to be operated in water only when fully assembled in accordance with the instructions.

[C11] For **computer toys** which do not meet the requirement of 14.Z1 b), the instructions shall state the substance of the following:

"The **toy** is only to be connected to Class II equipment bearing the following symbol"



Class II equipment

[symbol 5172 of IEC 60417-1] [C11]

Compliance is checked by inspection.

[C11] **7.Z1** The **accessible parts** of **toys** that are intended for children 3 years and over but less than 8 years which exceed the temperature rise limit for children less than 3 years according to Table Z1 (see 9.9) shall carry the following warning that shall be visible to consumers at the time of purchase:

"Warning Not suitable for children under 36 months"

The text "Not suitable for children under 36 months" may be replaced by the age warning symbol from EN 71-1.

The term "36 months" may be replaced by "3 years".

A brief indication of the specific hazard calling for this restriction (e.g. hot surface) shall accompany the age warning or appear in the instructions which accompany the **toy.**

This requirement does not apply to **toys** which, on account of their function, dimensions, properties and similar characteristics, are clearly unsuitable for children under 36 months.

The **accessible parts** of **toys** that are intended for children 8 years and over, and which exceed the temperature rise limit for children 3 years to less than 8 years according to Table Z1 (see 9.9) shall carry the following warning that shall be visible to consumers at the time of purchase:

"Warning Not suitable for children under 8 years"

A brief indication of the specific hazard calling for this restriction (e.g. hot surface) shall accompany the age warning or appear in the instructions which accompany the **toy.** [C11]

7.5 [C12] When the markings or instructions included in 7.4 are on the packaging only, it shall also be stated that the packaging must be retained since it contains important information. [C12]

Compliance is checked by inspection.

7.6 Instructions and other texts required by this standard shall be written in the official language of the country in which the **toy** is to be sold.

Compliance is checked by inspection.

7.7 The markings on the **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. When the use of other liquids is recommended, the rubbing test is also carried out with the cloth soaked with these liquids. [A2] *The petroleum spirit to be used for the test is aliphatic solvent hexane.* [/A2]

After all 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.

[A2] NOTE In considering the durability of the marking, the effect of normal wear such as frequent cleaning is taken into account. [/A2]

8 Power input

The power input of **transformer toys** [A2] and **dual supply toys** [/A2] shall not exceed the **rated power input** by more than 20 %.

*Compliance is checked by measurement when the power input has stabilized and the **toy** has attained normal operating temperature with*

– *all circuits that can operate simultaneously being in operation;*
– *the **toy** being supplied at **rated voltage**;*
– *the **toy** being operated under **normal operation**.*

NOTE The power input has to be measured to determine if the **rated power input** needs to be marked.

9 Heating and abnormal operation

9.1 [C11] **Toys** shall not attain excessive temperatures in use and shall not malfunction in such a way as to cause any unintended operation that may impair safety. [/C11] They shall be constructed so that the risk of fire, mechanical damage impairing safety or other hazards, as a result of careless use or failure of a component, is obviated as far as is practicable.

[C11] NOTE Z1 Examples of **toys** which could malfunction in such a way as to cause an unintended operation that may impair safety are ride-on **toys** which could unexpectedly move, change direction or gain speed or functional **toys** such as a **toy** sewing machine which could unexpectedly start.

Toys which have an electronic control system shall be designed and manufactured in such a way that they operate safely even if the electronic system starts malfunctioning due to a failure of the system or due to electromagnetic influence from an outside source. [/C11]

***Toys** are subjected to the tests of 9.3 to 9.8 under the conditions specified in 9.2.*

*All **toys** are subjected to the tests of 9.3 to 9.5.*

***Toys** incorporating motors are subjected to the test of 9.6.*

Transformer toys, A2 ***dual supply toys*** /A2 *and* ***toys*** *with* ***battery boxes*** *are subjected to the test of 9.7.*

Toys *incorporating* ***electronic circuits*** *are subjected to the test of 9.8.*

C11 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 Annex ZB. In this case, the **electronic circuit** is considered as a **protective electronic circuit**. **Toys** with an electronic off-mode or stand-by mode shall also comply with Annex ZB, if the **toy** can malfunction in such a way as to cause any unintended operation that may impair safety. /C11

Toys *that only incorporate incandescent lamps having a rated power input not exceeding* 1 W *are not subjected to the tests.*

Unless otherwise specified, compliance with the tests of this clause is checked as described in 9.9.

The tests of 9.3 and 9.4 are continued until steady conditions are established. During these tests, ***thermal cut-outs*** *shall not operate.* A2 *However, during temperature rise tests of 9.3 and 9.4 on mobile* ***toys*** *such as radio controlled vehicles,* ***self-resetting thermal cut outs*** *are allowed to operate.* /A2

The tests of 9.5 to 9.8 are continued until a ***non-self-resetting thermal cut-out*** *operates or until steady conditions are established. If a heating element or an intentionally weak part becomes permanently open-circuited, the relevant test is repeated on a second sample. This second test shall be terminated in the same mode unless the test is otherwise satisfactorily completed.*

NOTE 1 An intentionally weak part is a part intended to rupture in order to prevent the occurrence of a condition that would impair compliance with this standard. Such a part may be a replaceable component, such as a resistor or a capacitor or a part of a component to be replaced, such as an inaccessible thermal link incorporated in a motor.

NOTE 2 Fuses, **thermal cut-outs**, overcurrent protection devices or similar devices incorporated in the **toy** may be used to provide the necessary protection.

NOTE 3 If more than one of the tests are applicable to the same **toy**, these tests are made consecutively after the **toy** has cooled down to room temperature.

9.2 ***Toys*** *are placed in the most unfavourable position that can occur during play.*

Hand-held ***toys*** *are freely suspended.*

Other ***toys*** *are placed on the floor of a test corner as near to the walls as possible or away from the walls, whichever is more unfavourable. The test corner consists of two walls at right angles and a floor made of dull black-painted plywood having a thickness of approximately 20 mm. They are covered with four layers of bleached cotton gauze having dimensions of 500 mm x 500 mm and a specific mass of 40 g/m^2 ± 8 g/m^2. The gauze is placed on surfaces where high temperatures and charring may be expected.* ***Toys*** *having dimensions not exceeding 500 mm are completely covered with the cotton gauze.*

Battery toys *are supplied at* ***rated voltage****.*

Transformer toys A2 *and* ***dual supply toys*** /A2 *are supplied at 0,94 times or 1,06 times* ***rated voltage****, whichever is more unfavourable.*

The temperature rises are determined by means of fine-wire thermocouples positioned so that they have minimum effect on the temperature of the part under test. A2 *Where thermocouples cannot successfully measure the maximum temperature during the test, thermal paper or other methods to measure temperature rise may be used.* /A2

NOTE Thermocouples having wires with a diameter not exceeding 0,3 mm are considered to be fine-wire thermocouples.

*Mobile **toys** shall be tested in whichever use condition will create the highest temperature rise. 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 *__Toys__ are operated under __normal operation__ and the temperature rises of the various parts are determined.*

__Rechargeable battery toys__ that can operate during recharging are also tested in the charging mode.

NOTE It may be necessary to reset timers on **the battery charger** to establish steady conditions.

9.4 *The test of 9.3 is repeated, the insulation between parts of different polarity, except those in battery compartments, being short circuited in turn if it is accessible after the removal of __detachable parts__, except lamps. However, the short circuit is only applied if it is possible to bridge the insulation by a straight steel pin having a diameter of 0,5 mm and any suitable length over 25 mm, or by a rod having a diameter of 1,0 mm inserted through holes in the enclosure up to a depth of 100 mm. The pin and the rod are hand guided and applied only with sufficient force to hold them in position.*

For products that have to be kept switched on by hand or foot, if the applied short-circuit results in the product not functioning, the switch is released after 30 s.

9.5 *The test of 9.3 is repeated, any control that limits the temperature during the tests of 9.3 and 9.4 being short-circuited. If the __toy__ has more than one control, they are short-circuited in turn.*

If the control consists only of positive temperature co-efficient (PTC) resistors, negative temperature co-efficient (NTC) resistors or voltage dependent resistors (VDRs) they are not short-circuited if they are used within their manufacturers declared specification.

For products that have to be kept switched on by hand or foot, if the applied short-circuit results in the product not functioning, the switch is released after 30 s.

9.6 *The test of 9.3 is repeated with accessible moving parts locked.*

NOTE If the **toy** incorporates more than one motor, the test is carried out by locking moving parts driven by each motor in turn.

The test is terminated after 30 s if the __toy__ has to be kept switched on by hand or foot.

9.7 *__Transformer toys__, __dual supply toys__ and __toys__ with __battery boxes__ are connected to a power supply in addition to that recommended in the instructions for use. The additional power supply is identical to that recommended for the __toy__ and is connected in series or in parallel, whichever is more unfavourable. The __toy__ is then tested as specified in 9.3 and 9.4.*

NOTE The test is only applicable if the connections can be made easily without the aid of a **tool** and by using parts from two identical **toys** or **constructional sets**

9.8 *Compliance for __electronic circuits__ is checked by evaluation of the fault conditions specified in 9.8.2 for all circuits or parts of circuits, unless they comply with the conditions specified in 9.8.1.*

If a conductor of a printed-circuit board becomes open-circuited, the __toy__ is considered to have withstood the particular test, provided that the following two conditions are met:

– *the material of the printed-circuit board withstands the needle-flame test of Annex B;*

– *the **toy** withstands the test of 9.8.2 with the open-circuited conductor bridged.*

NOTE In general, examination of the **toy** and its circuit diagram will reveal the fault conditions that have to be simulated, so that testing can be limited to those cases that may be expected to give the most unfavourable results.

9.8.1 *Fault conditions a) to f) specified in 9.8.2 are not applied to circuits or parts of circuits where both of the following conditions are met:*

– *the **electronic circuit** is a low-power circuit as described below;*

– *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**.*

A low-power circuit is determined as follows; an example is shown in Figure 1.

*The **toy** is supplied at **rated voltage** and a variable resistor adjusted to its maximum resistance is connected between the point to be investigated and the opposite pole of the supply source.*

The resistance is then decreased until the power consumed by the resistor reaches a maximum. Points closest to the supply at which the maximum power delivered to this resistor does not exceed 15 W at the end of 5 s are called low-power points. The part of the circuit farther from the supply source than a low-power point is considered to be a low-power circuit.

NOTE 1 The measurements are made from only one pole of the supply source, preferably the one that gives the fewest low-power points.

NOTE 2 When determining the low-power points, it is recommended to start with points close to the supply source.

9.8.2 *The following fault conditions are considered and, if necessary, applied one at a time, consequential faults being taken into consideration:*

*a) short circuit of **clearances** and **creepage distances** between parts of different polarity, if these distances are less than the values specified in Clause 18, unless the relevant part is adequately encapsulated;*

b) open circuit at the terminals of any component;

c) short circuit of capacitors, unless they comply with IEC 60384-14; A2 *or they are ceramic capacitors used within the manufacturer's specification;* A2

*d) short circuit of any two terminals of an **electronic component**, other than integrated circuits;*

e) failure of triacs in the diode mode;

*f) failure of an integrated circuit. In this case the possible hazardous situations of the **toy** are assessed to ensure that safety does not rely on the correct functioning of such a component. All possible output signals are considered under fault conditions within the integrated circuit. If it can be shown that a particular output signal is unlikely to occur, then the relevant fault is not considered.*

NOTE 1 Components such as thyristors and triacs are not subjected to fault condition f).

NOTE 2 Microprocessors are tested as integrated circuits.

A2 *In addition, each low-power circuit is short-circuited by connecting the low-power point to the pole of the supply from which the measurements were made. If this short circuit cause a hazardous condition, the short circuit is removed and the tests of a) to f) applied to the relevant low-power circuits.* A2

*For simulation of the fault conditions, the **toy** is operated under the conditions specified in 9.2 but supplied at **rated voltage**.* A2 *For products that have to be kept switched on by hand or foot, if the applied fault-condition results in the product not functioning, the switch is released after 30 s.* A2

*If the **toy** incorporates an electronic circuit that operates to ensure compliance with 9.5 to 9.7, the relevant test is repeated with a single fault simulated, as indicated in a) to f) above.*

Fault condition f) is applied to encapsulated and similar components if the circuit cannot be assessed by other methods.

PTC resistors are not short-circuited if they are used within the manufacturer's specification. However, PTC-S thermistors are short-circuited unless they comply with IEC 60738-1.

C11 **9.9** *During the tests, the temperature rises of **accessible parts** are monitored continuously.*

The temperature rise of the surface of handles, knobs and other parts that are likely to be touched by hand shall not exceed the following values:

– *25 K, for parts of metal;*

– *30 K, for parts of glass or porcelain;*

– *35 K, for parts of plastic or wood.*

*The temperature rise of other **accessible parts** of the **toy** shall not exceed the values specified in Table Z1.*

*The temperature rise of battery surfaces and other parts inside the battery compartment, where batteries are inside a battery compartment with a cover, which can only be opened by the use of a **tool** or by at least two independent movements applied simultaneously, shall not exceed 45 K.*

Table Z1 – Temperature rise limits for other accessible parts

Toy intended for	*Metal (uncoated) surface*	*metal with coating thickness greater than 50 µm*	*metal with coating thickness greater than 100 µm*	*metal with coating thickness greater than 150 µm*	*Ceramics, glass & stone surfaces*	*Plastic, wood and other surfaces*
Children < 3 years	*29 K*	*29 K*	*29 K*	*30 K*	*39 K*	*44 K*
Children 3 years to < 8 years	*33 K*	*36 K*	*39 K*	*41 K*	*46 K*	*50 K*
Children 8 years and above	*36 K*	*43 K*	*48 K*	*53 K*	*50 K*	*55 K*

NOTE 1 The limits for metal (uncoated) surfaces apply to batteries with coated metal surfaces

NOTE 2 The temperature of the terminals of switches is measured if the switch is tested in accordance with Annex C.

NOTE 3 For coatings less than 50 µm the values for uncoated surfaces are used.

C11

C11 *During the tests,*

– *sealing compound shall not flow out;*

– *the **toy** shall not emit flames or molten metal;*

– *dangerous substances shall not be produced, such as poisonous or ignitable gas, in hazardous amounts;*

– *vapour shall not accumulate in the **toy**;*

– *enclosures shall not deform to such an extent that compliance with this European Standard is impaired;*

– *batteries shall not leak hazardous substances or erupt;*

– *materials, including the cotton gauze, shall not char.*

*After the tests, the **toy** shall not be damaged to such an extent that compliance with this European Standard is impaired.*

***Toys** having **accessible parts** with temperature rises exceeding the values in Table Z1 for children less than 3 years or for children between 3 years and 8 years shall have a warning together with the appropriate age indication, 3 years or 8 years (see 7.Z1).* C11

10 Electric strength at operating temperature

The electrical insulation of the **toy** at operating temperature shall be adequate.

Compliance is checked by the following test.

*The **toy** is operated as specified in 9.3 and 9.4. One terminal of all components connected across the supply is disconnected and the insulation between parts of different polarity is then subjected for 1 min to a voltage of substantially sinusoidal waveform having a frequency of 50 Hz or 60 Hz and a value of 250 V.*

No breakdown shall occur.

11 Moisture resistance

11.1 Battery toys intended to be used in water and **toys** likely to be cleaned with liquid shall have an enclosure providing the appropriate protection.

NOTE 1 **Toys** intended to be used to imitate the preparation of food are examples of **toys** likely to be cleaned with liquid.

*Compliance for **toys** likely to be cleaned with liquid is checked by the test of subclause 14.2.4 of IEC 60529, **detachable parts** having been removed.*

*Excess water is then removed from the enclosure. The **toy** shall withstand the electric strength test of Clause 12 and inspection shall show that there is no trace of water on insulation that could result in a reduction of **creepage distances** and **clearances** below the values specified in Clause 18.*

*Compliance for **battery toys** intended to be used in water is checked by the following test, **detachable parts** being removed if this is more unfavourable.*

*The **toy** is immersed in water containing approximately 1 % NaCl, all parts of the **toy** being at least 150 mm below the surface. The **toy** is positioned in the most unfavourable orientation and operated for 15 min. There shall be no overpressure within the enclosure due to entrapped gas.*

NOTE 2 Entrapped gas can result from an electrochemical reaction within the battery or between other electric parts of the **toy**.

NOTE 3 Gas pressure can be limited by an overpressure valve, by a gas absorber or in battery compartments by providing a suitable aperture.

*The **toy** is then taken out of the water, positioned to allow excess water to drain, and the enclosure is wiped dry. The **toy** shall withstand the electric strength test of Clause 12.*

11.2 Toys shall be resistant to humidity.

Compliance is checked by the following test.

***Detachable parts** are removed and subjected, if necessary, to the humidity test with the main part.*

*The humidity test is carried out for 48 h in a humidity cabinet containing air with a relative humidity of (93 ± 3) %. The temperature of the air is maintained within 1 K of any convenient value t between 20 °C and 30°C. Before being placed in the humidity cabinet, the **toy** is brought to a temperature of $t\ ^{+4}_{-0}$ °C.*

*The **toy** shall then withstand the test of Clause 12 in the humidity cabinet or in the room in which the **toy** was brought to the prescribed temperature after reassembly of those parts that may have been removed.*

NOTE 1 In most cases, the **toy** may be brought to the specified temperature by keeping it at this temperature for at least 4 h before the humidity test.

NOTE 2 A relative humidity of (93 ± 3) % can be obtained by placing, in the humidity cabinet, a saturated solution of Na_2SO_4 or KNO_3 in water, the container having a sufficiently large contact surface with the air.

NOTE 3 The specified conditions may be achieved by ensuring a constant circulation of the air within a thermally insulated cabinet.

12 Electric strength at room temperature

The electric insulation of the **toy** at room temperature shall be adequate.

Compliance is checked by the following test.

One terminal of all components connected across the supply is disconnected and the insulation between parts of different polarity is subjected for 1 min to a voltage of substantially sinusoidal waveform having a frequency of 50 Hz or 60 Hz and a value of 250 V.

No breakdown shall occur.

13 Mechanical strength

Enclosures shall have adequate mechanical strength.

Compliance is checked by applying test Ehb of IEC 60068-2-75.

*The **toy** is rigidly supported and six blows are applied to every point of the enclosure that is likely to be weak with an impact energy of 0,7 J.*

*The **toy** shall not be damaged to such an extent that compliance with this standard is impaired.*

If there is doubt as to whether a defect has occurred by the application of preceding blows, this defect is neglected and a group of six blows is applied to the same place on a new sample that shall then withstand the test.

NOTE 1 Examples of enclosures that are subjected to the test are

– enclosures of compartments for non-sealed batteries containing a liquid;

– enclosures covering insulation between parts of different polarity, unless the **toy** complies with the test of 9.4 even if the enclosure is non-detachable;

– enclosures covering moving parts that may present a hazard.

NOTE 2 Lamps are not subjected to the test.

NOTE 3 Minor damage that does not reduce **clearances** and **creepage distances** below the values specified in Clause 18, or does not adversely affect the protection against moisture, is neglected.

NOTE 4 Cracks not visible to the naked eye are ignored.

14 Construction

14.1 [C11] **Toys** shall be **battery toys transformer toys** or **dual-supply toys**. Their nominal supply voltage shall not exceed 24 V. [C11]

[A2]The **working voltage** between any two **accessible parts** of the **toy** shall not exceed 24 V when the **toy** is supplied at **rated voltage**. [A2]

NOTE The **working voltage** takes into account the failure of a filament lamp.

Compliance is checked by inspection and by measurement.

14.2 The [A2] **battery charger** and the [A2] transformer of **transformer toys** shall not be an integral part of the **toy**.

Controls for the **toy** shall not be incorporated in the transformer. [C] *Text deleted* [C]

Compliance is checked by inspection.

14.3 Transformer toys [A2] and **dual supply toys** [A2] shall not be intended for use in water.

Compliance is checked by inspection.

14.4 Transformer toys [A2] and **dual supply toys** [A2] shall not be intended for use by children under 3 years old.

Compliance is checked by inspection.

14.5 Non-self-resetting thermal cut-outs, necessary for compliance with this standard, shall only be resettable with the aid of a **tool**.

Compliance is checked by inspection and by a manual test.

14.6 Button cells and batteries designated R1 shall not be accessible without the aid of a **tool** unless the cover of their compartment can only be opened after at least two independent movements have been applied simultaneously.

Compliance is checked by inspection and by manual test.

NOTE Batteries are specified in IEC 60086-2.

14.7 The batteries of **toys** intended for children under 3 years old shall not be removable without the aid of a **tool** unless the security of the battery compartment cover is adequate.

Compliance is checked by inspection and by the following test.

An attempt is made to gain access to the battery compartment by manual means. It shall not be possible to open the cover unless at least two independent movements have to be applied simultaneously.

*The **toy** is placed on a horizontal steel surface. A cylindrical metallic mass of 1 kg, having a diameter of 80 mm, is dropped from a height of 100 mm so that its flat face falls onto the **toy**. The battery compartment shall not become open.*

The battery compartment shall not have become open as a result of the preconditioning of 5.15.

14.8 Rechargeable batteries shall not leak when the **toy** is placed in any position. The electrolyte shall not become accessible even if a **tool** has to be used to remove covers or similar parts.

Compliance is checked by inspection.

14.9 Toys shall not be supplied by batteries connected in parallel unless a mixture of used and new batteries, or the reverse insertion of batteries, does not impair compliance with this standard.

Compliance is checked by inspection or by a review of the circuit diagram.

14.10 ⟦A2⟩ Plugs and socket-outlets of **toys** shall not be 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 supply mains. ⟨A2⟩

⟦C12⟩ *text deleted* ⟨C12⟩

⟦C12⟩ Connectors (jack plugs, USB plugs, RCA phono plugs etc.) 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. ⟨C12⟩

Toys intended for children under 3 years old shall not use cords and wires without connectors.

Compliance is checked by inspection and by manual test.

14.11 Non-detachable parts that prevent contact with moving parts or hot surfaces, or access to locations where explosion or fire could be initiated, shall be fixed in a reliable manner and shall withstand the mechanical stress occurring during normal use.

Compliance is checked by applying the following pull force:

– *50 N, if the longest accessible dimension of the part does not exceed 6 mm;*
– *90 N, for other parts.*

The force is gradually applied during a period of 5 s and maintained for a further 10 s.

The part shall not become detached.

14.12 A2 It shall not be possible to charge rechargeable batteries when they are in the **toy** unless

– for **toys** having a mass not exceeding 5 kg, it is not possible
  - to replace the rechargeable batteries by primary batteries without breaking the **toy**;
  - to charge separate batteries or other **toys** from the **toy**;
  - to make a connection of incorrect polarity when recharging the batteries;
  - to operate the **toy** during charging unless it complies with the requirements for a **dual supply toy**;
– for other **toys**,
  - the battery is fixed in the **toy**;
  - connecting means are provided that prevent connection to standardised primary batteries and ensure correct polarity during insertion and charging of the rechargeable batteries;
  - it is not possible to operate the **toy** during charging.

Compliance is checked by inspection and the tests of this standard. A2

14.13 **Toys** shall not incorporate series motors having a power input exceeding 20 W.

*Compliance is checked by measurement, the **toy** being supplied at **rated voltage** and operated under **normal operation**.*

14.14 **Toys** shall not contain asbestos.

Compliance is checked by inspection.

A2 **14.15** Internal parts of a **toy** having a voltage exceeding 24 V shall not lead to any risk of harmful electric shock.

*Compliance is checked by inspection and measurement. Protective parts or parts preventing access to live parts are removed, even if the **toy** has to be damaged.*

The quantity of electricity and energy in the discharge is measured using a resistor having a nominal non-inductive resistance of 100 Ω. The current is measured using the circuit in Figure 4 of IEC 60990. In all conditions of test, the following values shall be met: A2

[A2] – *the **working voltage** between any two parts of the **toy** shall not exceed 5 KV when the **toy** is supplied at **rated voltage**;*

– *the maximum current from a circuit with a generated voltage exceeding 24 V shall be less than 0,5 mA;*

– *the maximum energy from a circuit with a generated voltage exceeding 24 V shall be less than 2 mJ;*

– *the discharge shall not exceed 45 µC.*

14.16 Battery toys for children where the intended fixed position of the battery compartment can be above a child shall have a battery compartment that prevents battery electrolyte leakage from the **toy**.

NOTE Cot mobiles are an example of a **toy** where the fixed position of the battery compartment can be above the child.

Compliance is checked by the following test.

*All batteries are removed from the **toy**. The **toy** is placed in its normal orientation and the battery compartment is filled with the quantity of water specified in Table 2, the water being at a temperature of 21 °C ± 1 °C.*

*The **toy's** casing may be broken to gain access to the closed battery compartment in order to add water but any damage shall not affect the result of the test.*

*After adding the water, the compartment is closed in accordance with the manufacturer's instructions taking care to avoid losing any water from the **toy** before the test is started. The **toy** is left in position for a period of 5 min. During the test, water shall not leak from the **toy**.*

Table 2 – Quantity of water per battery

Battery type	***Quantity of water*** *ml*
LR03/R03 (AAA)	*0,25*
LR6/R6 (AA)	*0,5*
LR14/R14 (C)	*1,0*
LR20/R20 (D)	*2,0*
6LR61/6R61 (9V)	*0,75*
Button cells	*0,1*

[A2]

[C11] **14.Z1 Computer toys** shall be safe when connected to a computer, console, monitor screen or other audio-video equipment, even in case of a fault in the equipment it is connected to. **Computer toys** shall therefore comply with one of the following conditions:

a) the **computer toy** shall include an instruction to advise that the **toy** shall only be connected to equipment of Class II (see 7.4); or

b) conductive parts of **computer toys** electrically connected to a computer, console, monitor screen or other audio-video equipment shall not be accessible in the **toy** and the insulation between such parts and **accessible parts** shall have a thickness of at least 1 mm and an adequate electric strength.

Compliance with condition a) is checked by inspection.

Compliance with condition b) is checked by the following test. [C11]

*The test is carried out with the **toy** in the fully assembled condition with battery compartment covers in place, unless it is necessary that the covers be removed for the correct use of the **toy**. The connectors of the interconnection cord are fully inserted in the relevant appliance inlets of the **toy**. The plug-connector at the other end of the cord for connecting to the equipment is not tested. Further connections from the **toy** to other parts of the **toy** are not connected.*

*The **toy** is operated under **normal operation** according to 9.3.*

*The **toy** is then disconnected from the supply and the insulation is immediately subjected to a voltage of 1 500 V having a frequency of 50 Hz or 60 Hz for 1 min, in accordance with EN 61180-1.*

The high-voltage source used for the test is to be capable of supplying a short circuit current I_s between the output terminals after the output voltage has been adjusted to the appropriate test voltage. The overload release of the circuit is not to be operated by any current below the tripping current I_r. The value of I_s is 200 mA and the value of I_r is 100 mA.

*The test voltage is applied between conductive parts intended to be connected to a computer, console, monitor screen or other audio-video equipment and **accessible parts**, non-metallic parts being covered with metal foil. The metal foil is placed on and following the surface but is not pushed down into recesses or appliance inlets. The above mentioned connector inserted into the appliance-inlets are also covered by metal foil.*

No breakdown shall occur during the test.

NOTE Z1 Care should be taken to avoid overstressing the components of **electronic circuits.**

NOTE Z2 The maximum voltage which is considered to be transferred to the **toy** from the equipment is 230 V.

NOTE Z3 Glow discharges without drop in voltage are neglected.

*For **computer toys** complying with 14.Z1 b), the distances as stated in Clause 18 shall be fulfilled.*

15 Protection of cords and wires

15.1 Wireways shall be smooth and free from sharp edges.

Cords and wires shall be protected so that they do not come into contact with burrs, cooling fins or similar edges that may cause damage to their insulation.

Holes in metal through which cords and wires pass shall have smooth well-rounded surfaces or be provided with bushings.

Cords and wires shall be effectively prevented from coming into contact with moving parts.

Compliance is checked by inspection.

15.2 Bare wiring and heating elements shall be rigid and fixed so that during normal use **clearances** and **creepage distances** cannot be reduced below the values specified in Clause 18.

Compliance is checked by inspection and by measurement.

16 Components

16.1 Components shall comply with the safety requirements specified in the relevant IEC standards as far as they reasonably apply.

Compliance is checked by inspection and by the tests of 16.1.1 and 16.1.2.

NOTE Compliance with the IEC standard for the relevant component does not necessarily ensure compliance with the requirements of this standard.

16.1.1 *Switches and automatic controls carrying a current exceeding 3 A during the tests of 9.3 and 9.4 shall comply with Annex C. However, if they have been separately tested and found to comply with IEC 61058-1 or IEC 60730-1 respectively under the conditions occurring in the **toy** and for the number of cycles specified in Annex C, they may be used without further tests.*

NOTE There are no specific requirements for switches and automatic controls carrying a current up to 3 A.

16.1.2 *If components are marked with their operating characteristics, the conditions under which they are used in the **toy** shall be in accordance with these markings, unless otherwise specified.*

The testing of components that have to comply with other standards is, in general, carried out separately, according to the relevant standard.

*If the component is used within the limits of its marking, it is tested in accordance with the conditions occurring in the **toy**, the number of samples being that required by the relevant standard.*

*When no IEC standard exists for the relevant component, when the component is not marked or is not used in accordance with its marking, it is tested under the conditions occurring in the **toy**. The number of samples is, in general, that required by a similar specification.*

16.2 **Toys** shall not be fitted with

– **thermal cut-outs** that can be reset by a soldering operation;
– mercury switches.

Compliance is checked by inspection.

〈C11〉**16.3** **Transformers for toys** shall comply with EN 61558-2-7 for linear types or EN 61558-2-7 and EN 61558–2-16 for switch mode types.

Compliance is checked by inspection (verification of test certificates) or by testing according to the relevant standard(s).

NOTE The transformer is tested separately from the **toy**. 〈C11〉

〈A2〉**16.4** **Battery chargers** supplied with a **toy** shall comply with IEC 60335-2-29 and if they are **battery chargers** for use by children they shall comply with annex AA of that standard. 〈A2〉

〈C11〉 *Compliance is checked by inspection (verification of test certificates) or by testing according to the relevant standard(s).*

NOTE The **battery charger** is tested separately from the **toy**. 〈C11〉

17 Screws and connections

17.1 Fixings, the failure of which may impair compliance with this standard and electrical connections shall withstand the mechanical stresses occurring during play.

Screws used for these purposes shall not be of metal that is soft or liable to creep, such as zinc or aluminium. If they are of insulating material they shall have a nominal diameter of at least 3 mm and they shall not be used for any electrical connection.

Screws used for electrical connections shall screw into metal.

Compliance is checked by inspection and by the following test.

Screws and nuts are tested if they are used for electrical connections or are likely to be tightened by the user.

The screws or nuts are tightened and loosened without jerking

– *10 times, for screws in engagement with a thread of insulating material;*
– *5 times, for nuts and other screws.*

Screws in engagement with a thread of insulating material are completely removed and re-inserted each time.

The test is carried out using a suitable screwdriver, spanner or key and by applying a torque as shown in Table 1.

Column I is applicable for metal screws without heads if the screw does not protrude from the hole when tightened.

Column II is applicable for other metal screws and for nuts and screws of insulating material.

Table 1 – Torque for testing screws and nuts

Nominal diameter of screw (outer thread diameter) *mm*	***Torque*** *Nm*	
	I	***II***
〚C〛 2,8[a] 〚C〛	*0,2*	*0,4*
>2,8 and ≤3,0	*0,25*	*0,5*
>3,0 and ≤3,2	*0,3*	*0,6*
>3,2 and ≤3,6	*0,4*	*0,8*
>3,6 and ≤4,1	*0,7*	*1,2*
>4,1 and ≤4,7	*0,8*	*1,8*
>4,7 and ≤5,3	*0,8*	*2,0*
>5,3	-	*2,5*
〚C〛 [a] Screws having a diameter less than 2,8 mm are not tested 〚C〛		

No damage impairing the further use of the fixings or electrical connections shall occur.

NOTE The shape of the blade of the test screwdriver is to fit the head of the screw.

17.2 Electrical connections carrying a current exceeding 0,5 A shall be constructed so that contact pressure is not transmitted through insulating material that is liable to shrink or to distort unless there is sufficient resiliency in the metallic parts to compensate for any possible shrinkage or distortion of the insulating material.

Compliance is checked by inspection.

NOTE Ceramic material is not considered liable to shrink or to distort.

18 Clearances and creepage distances

A2 **Clearances and creepage distances** of **functional insulation** shall not be less than 0,5 mm except when the **toy** meets the requirements of Clause 9 with this distance short circuited.

However, for **functional insulation** on printed circuit boards, except at their edges, this distance may be reduced to 0,2 mm provided that the degree of pollution in the microenvironment in which the insulation is located is unlikely to exceed pollution degree 2 during normal use of the **toy**.

Internal parts of **toys** that comply with subclause 14.15 and have a voltage exceeding 24 V shall have **clearance** and **creepage distances** for **functional insulation** equal to or greater than the values in Table 18 of IEC 60335-1 for pollution degree 2 except when the **toy** meets Clause 9 with this distance short circuited.

For guidance, the pollution degrees as defined in IEC 60335-1 are as follows:

C11 For **computer toys** intended to be electrically connected to a computer, console, monitor screen or other audio-video equipment, both creepage and clearance distances between **accessible parts** and conductive parts shall be at least 1,5 mm (see 14.Z1 b)). C11

Degrees of pollution in the microenvironment:

For the purpose of evaluating **creepage distances**, the following four degrees of pollution in the microenvironment are established

– pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence;
– pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected;
– pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected;
– pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow.

NOTE Pollution degree 4 is not applicable to appliances. A2

19 Resistance to heat and fire

19.1 External parts of non-metallic material enclosing electric parts, and parts of insulating material supporting electric parts, shall be sufficiently resistant to heat if the **toy** has a **working voltage** exceeding 12 V and a current exceeding 3 A.

NOTE 1 The voltage and current are measured during the test of 9.3.

NOTE 2 **Toys** having a lower **working voltage** or current are not considered to generate sufficient heat to create a hazard.

Compliance is checked by subjecting the relevant part to the ball pressure test of IEC 60695-10-2.

The test is carried out at a temperature of 40 °C ± 2 °C plus the maximum temperature rise determined during the tests of Clause 9 but it shall be at least 75 °C ± 2 °C.

NOTE 3 The test is only carried out on parts that could deteriorate to the extent that compliance with this standard is impaired.

NOTE 4 For coil formers, only those parts that support or retain terminals in position are subjected to the test.

NOTE 5 The test is not carried out on parts of ceramic material.

NOTE 6 The sequence of tests for resistance to heat is shown in Annex D.

19.2 Parts of non-metallic material enclosing electric parts, and parts of insulating material supporting electric parts, shall be resistant to ignition and spread of fire.

This requirement does not apply to decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate from inside the **toy**.

Compliance is checked by the tests of 19.2.1and 19.2.2.

*The tests are carried out on parts of non-metallic material that have been removed from the **toy**. When the glow-wire test is carried out, they are placed in the same orientation as they would be in normal use.*

These tests are not carried out on the insulation of cords and wires.

NOTE The sequence of tests for resistance to fire is shown in Annex D.

19.2.1 *Parts of non-metallic material are subjected to the glow-wire test of IEC 60695-2-11, which is carried out at 550 °C.*

The glow-wire test is not carried out on parts of material classified at least HB40 according to IEC 60695-11-10, provided that the test sample was no thicker than the relevant part.

Parts for which the glow-wire test cannot be carried out, such as those made of soft or foamy material, shall meet the requirements specified in ISO 9772 for category HBF material, the test sample being no thicker than the relevant part.

19.2.2 *Parts of insulating material supporting connections carrying a current exceeding 3A and having a **working voltage** exceeding 12 V, and parts of insulating material within a distance of 3 mm of such connections, are subjected to the glow-wire test of IEC 60695-2-11 at a temperature of 650 °C. However, the glow-wire test is not carried out on parts of material classified as having a glow-wire ignition temperature according to IEC 60695-2-13 of at least 675 °C, provided that the test sample was no thicker than the relevant part.*

NOTE 1 Contacts in components such as switch contacts are considered to be connections.

NOTE 2 The tip of the glow-wire is applied to the part in the vicinity of the connection.

Parts that withstand the glow-wire test of IEC 60695-2-11, but which, during the test, produce a flame that persists for longer than 2 s, are further tested as follows. Parts above the connection within the envelope of a vertical cylinder having a diameter of 20 mm and a height of 50 mm are subjected to the needle-flame test of Annex B. However, parts shielded by a barrier that meets the needle-flame test of Annex B are not tested.

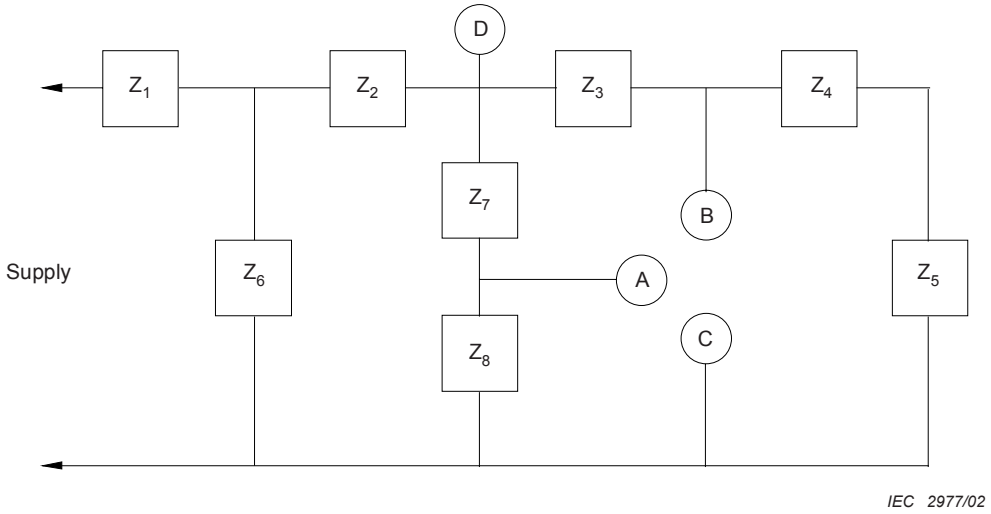
The needle-flame test is not carried out on parts of material classified as V-0 or V-1 according to IEC 60695-11-10, provided that the test sample was no thicker than the relevant part.

20 [A1] Radiation, toxicity and similar hazards [A1]

[C11] **Toys** shall not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use.

Toys incorporating lasers and or light emitting diodes (LED) shall comply with Annex E. [C11]

[C12] **Toys** with an integrated field source shall comply with Annex ZC. [C12]



D is a point farthest from the supply source where the maximum power delivered to external load exceeds 15 W.

A and B are points closest to the supply source where the maximum power delivered to external load does not exceed 15 W. These are low-power points.

Points A and B are separately short-circuited to C.

The fault conditions a) to f) specified in 9.8.2 are applied individually to Z_1, Z_2, Z_3, Z_6 and Z_7 where applicable.

Figure 1 – Example of an electronic circuit with low-power points

Annex A
(normative)

Experimental sets

The following modifications to this standard are applicable to all components of **experimental sets** supplied together or separately.

5 General conditions for the tests

5.10 *Addition:*

The tests are carried out with the experiments described in the instructions that result in the most unfavourable condition.

5.15 Not applicable

7 Marking and instructions

7.1 *Addition:*

The substance of the following shall be indicated on the packaging:

– WARNING: Only for use by children aged 8 years and older;

NOTE An age higher than 8 years may be stated.

– instructions for parents are included and have to be observed.

7.4 *Addition:*

The instructions for parents shall state the minimum age of the child for whom the set is intended.

Detailed information shall be given in the instructions on how to set up and perform each experiment. The instructions shall point out possible hazards and give technical information concerning the electrical parts, their behaviour and how to handle them properly. All hazards that can be expected during an experiment, such as those resulting from the short-circuiting of batteries or the wrong connection of capacitors, shall be described in detail.

NOTE The instructions should be written so that they are understandable by the age group for which the experimental set is intended.

Instructions for children and for parents may be given separately. If the instructions are given in one leaflet, the section addressed to parents shall be given first.

The instructions shall include a warning against manipulation of protective devices such as current-limiting devices. They shall describe the consequential dangers, such as overheating of cords, eruption of batteries and excessive heating.

8 Power input

Not applicable.

9 Heating and abnormal operation

9.4 Not applicable.

9.6 Not applicable.

9.9 *Addition:*

The temperature rise of surfaces, other than those of handles, knobs, buttons and similar parts, can exceed the limits if an appropriate warning is given in the instructions.

11 Moisture resistance

Not applicable.

12 Electric strength at room temperature

Not applicable.

13 Mechanical strength

Not applicable.

14 Construction

14.1 *Addition:*

The current shall not exceed 5 A and the power input shall not exceed 50 VA. However these values may be exceeded during a period not exceeding 10 s.

Compliance is checked by measurement during the tests.

15 Protection of cords and wires

Not applicable.

Annex B
(normative)

Needle-flame test

A2 The needle-flame test is carried out in accordance with IEC 60695-11-5 with the following modifications.

7 Severities

Replacement:

The duration of application of the test flame is 30 s ± 1 s.

9 Test procedure

9.1 Position of test specimen

Modification:

The specimen is arranged so that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1.

9.2 Application of needle-flame

Modification:

The first paragraph does not apply.

Addition:

If possible, the flame is applied at least 10 mm from a corner.

9.3 Number of test specimens

Replacement:

The test is carried out on one specimen. If the specimen does not withstand the test, the test may be repeated on two additional specimens, both of which shall then withstand the test.

11 Evaluation of test results

Addition:

The duration of burning (t_b) shall not exceed 30 s. However, for printed circuit boards, the duration of burning shall not exceed 15 s. A2

Annex C
(normative)

Automatic controls and switches

C.1 Automatic controls that are tested with the **toy** shall comply with this standard and with subclauses 11.3.5 to 11.3.8 and Clause 17 of IEC 60730-1 as type 1 controls.

*The tests according to IEC 60730-1 are carried out under the conditions occurring in the **toy**.*

For the tests of Clause 17 of IEC 60730-1, the number of cycles of operation are

– *thermostats* 3 000
– *self-resetting thermal cut-outs* 300
– *non-self-resetting thermal cut-outs* 10

NOTE 1 The tests of Clauses 12, 13 and 14 are not carried out before making the test of Clause 17 of IEC 60730.

NOTE 2 Automatic controls may be tested separately from the **toy**.

C.2 Switches that are tested with the **toy** shall comply with this standard and with the following clauses of IEC 61058-1, as modified below.

*The tests of IEC 61058-1 are carried out under the conditions occurring in the **toy**.*

Before being tested, switches are operated 20 times without load.

8 Marking and documentation

Switches are not required to be marked. However, a switch that can be tested separately from the appliance shall be marked with the manufacturer's name or trade mark and the type reference.

13 Mechanism

NOTE The tests may be carried out on a separate sample.

15 Insulation resistance and dielectric strength

Subclause 15.1 is not applicable.

Subclause 15.2 is not applicable.

Subclause 15.3 is applicable for full disconnection and micro-disconnection.

NOTE This test is carried out immediately after the humidity test of 11.2 of this standard.

17 Endurance

Compliance is checked on three separate appliances or switches.

For 17.2.4.4, the number of cycles of actuation declared according to 7.1.4 is 3 000.

Subclause 17.2.5.2 is not applicable.

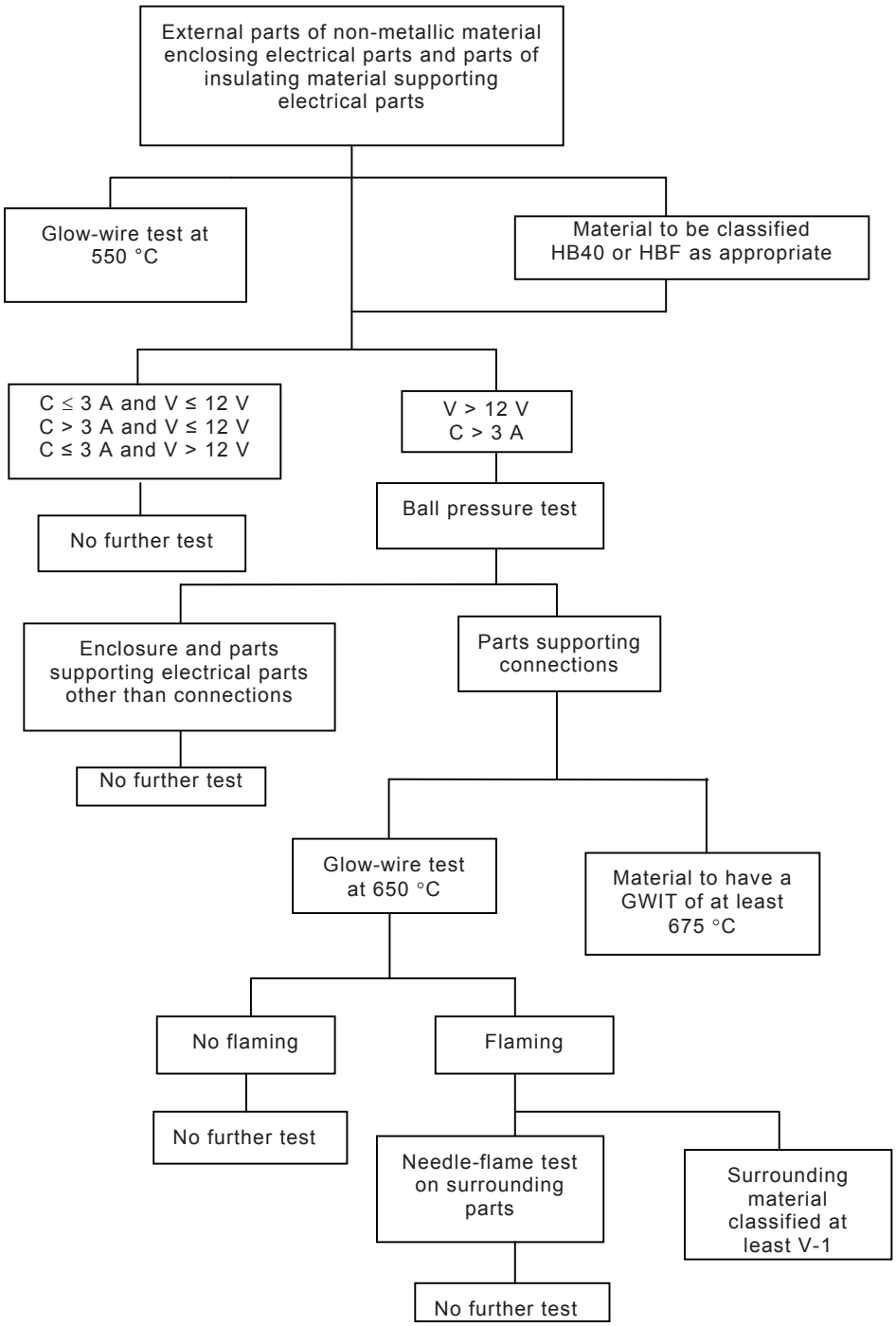
At the end of the tests, the temperature rise of the terminals shall not have increased by more than 30 K above the temperature rise measured in Clause 9 of this standard.

20 Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies

This clause is applicable to **clearances** and **creepage distances** for **functional insulation**, across full disconnection and micro-disconnection, as stated in Table 24.

Annex D
(informative)

Sequence of the tests of Clause 19



[A1] Annex E
(normative)

Toys incorporating lasers and light-emitting diodes

The following modifications to this standard are applicable for **toys** incorporating **lasers** and **light-emitting diodes**.

3 Definitions

3.6
laser
device that can be made to produce or amplify electromagnetic radiation in the wavelength range from 180 nm to 1 mm, primarily by the process of controlled stimulated emission

3.7
light-emitting diode (LED)
semiconductor PN junction device that can be made to produce electromagnetic radiation by radiative recombination in the semiconductor in the wavelength range from 180 nm to 1 mm

NOTE The optical radiation is produced primarily by the process of spontaneous emission, but some stimulated emission may be present.

5 General conditions for the tests

5.2 The tests of this annex may be carried out on separate **toys** after the preconditioning of 5.15.

20 Radiation, toxicity and similar hazards

Toys shall not emit harmful radiation.

Lasers and **light-emitting diodes** in **toys** shall meet the requirements for Class 1 **lasers** in accordance with IEC 60825-1.

NOTE 101 Class 1 lasers do not include Class 1M lasers.

*Compliance is checked by inspection and by measuring the radiation under the conditions specified in IEC 60825-1, the **toy** being supplied at **rated voltage**. The measurement is also made with parts such as lenses, reflectors or filters, which could affect the focusing of the **laser** or **light-emitting diode**, removed, even if the **toy** has to be damaged. This measurement is carried out even if the relevant parts of the encapsulation, lenses, reflectors or filters are broken off during the preconditioning of 5.15. The fault conditions listed in 9.8.2 of this standard are taken into account when testing low-power circuits.*

NOTE 102 To avoid testing an **LED** in the **toy** under different abnormal conditions, the highest current of the **LED** is measured or calculated under the most unfavourable abnormal conditions and used to determine the light emission from data supplied for the **LED**. [A1]

National Annex (informative)

CENELEC Interpretation Sheet 1, March 2010

EN 62115/IS1

Interpretation Sheet 1

EN 62115:2005

English version

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Foreword

This Interpretation Sheet to the European Standard EN 62115:2005 was prepared by the Technical Committee CENELEC TC 61, Safety of household and similar appliances, during the meeting in Malaga, June 2006, document CLC/TC 61(SEC)1567. The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC on 2009-11-25.

Clause 18, Clearances and creepage distances

Interpretation:

For functional insulation on PCB, except at their edges, 0,2 mm is allowed if protected against the deposition of dirt.

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March 2010

Bibliography

IEC 60335-2-82, *Household and similar electrical appliances – Safety – Part 2-82: Particular requirements for amusement machines and personal service machines*

IEC 60598-2-10, *Luminaires – Part 2: Particular requirements – Section Ten: Portable child-appealing luminaires*

〚C11〛 [*Text deleted*] 〈C11〉

〚C11〛 EN 50410, *Household and similar electrical appliances – Safety – Particular requirements for decorative robots*

EN 60799:1998, *Electrical accessories – Cord sets and interconnection cord sets (IEC 60799:1998)*

CLC Guide 29, *Temperatures of hot surfaces likely to be touched – Guidance document for Technical Committees and manufacturers*

IEC Guide 117, *Electrotechnical equipment – Temperatures of touchable hot surfaces* 〈C11〉

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