

**MERCOSUR  
STANDARD**

**NM-300-6:2002**

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**Safety of toys  
Part 6: Safety of electric toys**



**MERCOSUR  
STANDARDIZATION  
ASSOCIATION**



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## **Foreword**

The AMN – MERCOSUR Standardization Association – aims to promote and undertake the actions towards the development and harmonization of standards under the Southern Common Market – MERCOSUR, and is comprised by the National Standardization Agencies of the member countries.

The AMN performs its standards activity by means of the CSM – MERCOSUR Sectorial Committees – Which were set up for clearly defined action fields.

The Draft MERCOSUR Standards, prepared under the CSM, are submitted to national vote through the Standards National Agencies of member countries.

The acceptance as MERCOSUR Standard through MERCOSUR Standardization Association requires consensus approval by its members.

In part 16 of this Standard, a summary of the IEC/CEI 61558-2-7 was made.



## Introduction

During the development of this MERCOSUR Standard it was established that the implementation of its provisions shall be carried out by experienced and appropriately qualified persons.

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 assumes 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. It is assumed that when choosing a toy or a game, appropriate attention is given to factors such as physical and mental development of the child who will be playing with it.

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

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

The fact that a toy complies with this standard does not release parents and other persons in charge of the child from the responsibility of supervising the child.

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. The criteria for the selection of the tests to be applied to the various types of toys are given in item 6, with a guide in Attachment A

In order to be compliant with this Standard, electrical toys must also comply with NM 300-1 to NM to 300-5.

A toy which complies with this Standard will not necessarily be considered as compliant with the safety principles of the Standard if, when examined and tested, it is found to have other features which 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.

The Standard covers the essential requirements of security with regards to the electrical properties indicated in Resolution MERCOSUR No. 54/92<sup>1)</sup> on toy safety.

This standard does not cover the disposal of batteries which contain materials which are hazardous to the environment, governed by existing regulation in each member country.

Attachments B, D, E and F are normative, Attachments A and C are informative.

NOTE – The following types of print fonts are used:

- requirements: in Roman characters;
- specifications of tests: in italic characters;
- notes: in small Roman characters.

The words in bold are defined in Chapter 3.



# Safety of toys —

## Part 6 – Safety of electric toys

### 1 Scope

This part of MERCOSUR Standard covers safety of electric toys. It also applies to electric construction toys and functional electric toys, and shall be applied with Part 1 of this Standard.

Included in this Standard are toys in which electricity is used for functions other than the main function of the toy.

#### NOTES

1 An example of these toys is a doll house with an electric lamp inside.

2 The supply voltage can be obtained from a separate transformer for toys, batteries or cells that may be contained in the toy or a separate battery or cell holder.

Transformers or battery chargers are not considered toys, even having been supplied with them; however, they must comply with requirements at 16.3.

If the packaging in which the toy is sold is intended to be used as a toy or part of the toy, it is considered as a part of the toy.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute requirements of this part of MERCOSUR Standard. The indicated editions were valid at the time of publication of this Standard. As every standard is subject to reviews, parties entering agreements based on this MERCOSUR Standard are encouraged to investigate the possibility of using the most recent editions of the normative documents listed below. Normative Agencies of member countries maintain updated information on latest editions at all times. NM 300-1:2002 - Safety of toys. Part 1: General, mechanical and physical properties

NM 300-3:2002 - Safety of toys. Part 3: Migration of certain elements

NM-IEC 00335-1:1996 - Safety of electrical home appliances and similar appliances. Part 1 - General requirements

IEC 60065:1998- Audio, video and similar electronic apparatus - Safety requirements

IEC 60086-2:2001 - Primary batteries - Part 2: Physical and electrical specifications

IEC 60384-14:1993 - Fixed capacitors for use in electronic equipment - Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains

IEC 60417-1:2000 - Graphical symbols for use on equipment. Part 1: Overview and application

IEC 60529:2001 - Degrees of protection provided by enclosures (IP Code)

IEC 60598-2-10:1987 - Luminaires. Part 2: Particular requirements. Section Ten: Portable child appealing luminaires

IEC 60695-2-1:1991 - Fire Hazard testing

IEC 60695-2-2:1991 - Fire hazard testing - Part 2: test methods - Section 2: Needle-flame test



IEC 60707:1999 - Flammability of solid non-metallic materials when exposed to flame sources - List of test methods

IEC 60730-1:1999 - Automatic electrical controls for household and similar use. Part 1: General requirements

IEC 61058-1:2001 - Switches for appliances - Part 1: General requirements

IEC 61558-2-7:1997 - Safety of power transformers supply units and similar. Part 2: Particular requirements transformers for toys

### 3 Definitions

For the purposes of this part of MERCOSUR Standard, the following definitions apply:

NOTE - Unless specified otherwise, when the terms tension and current intensity are used, they imply their effective values.

#### 3.1

##### **toy**

product designed or clearly intended for use in play by children less than 14 years old

#### 3.2

##### **electric toy**

**toy** having at least one function dependent on electricity

NOTE- Non-electric parts are considered to be parts of the **toy**.

#### 3.3

##### **battery or cell toys**

**toy** which contains or uses one or more batteries or cells as the only source of electrical energy

NOTE - The batteries or cells may be in a **battery holder**.

#### 3.4

##### **Toy with a transformer:**

**toy** which is connected to the supply mains through a **transformer for toys** and using the supply mains as the only source of electric energy.

#### 3.5

##### **dual supply toy**

**toy** which can be operated simultaneously or alternatively as a **battery toy** and a **toy with a transformer**.

#### 3.6

##### **battery holder**

separate compartment for containing batteries or cells.

#### 3.7

##### **safety insulation transformer**

Transformer in which the primary winding is electrically separated from the secondary winding by an insulation equivalent at least to double insulation or reinforced insulation, and which is designed to supply power to an appliance or electrical circuit at safe very low voltage

#### 3.8

##### **Safety transformer for toys**

safety insulation transformer specially designed to supply power to **toys** operating at safety very low voltage not exceeding 24 V.

NOTE - Either AC or DC or both may be delivered by **the transformer**.



**3.9****constructional set**

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

**3.10****experimental set**

collection of electric or electronic components intended to be assembled in various combinations

NOTE 1 - The main objective of an **experimental set** is to facilitate the acquisition of knowledge by experiment and research. It is not intended to create a **toy** or equipment for practical use.

**3.11****functional toy**

**toy** with a **rated voltage** not exceeding 24 V and which is a model of an appliance or installation used by adults

NOTE - A product with a **rated voltage** exceeding 24 V, intended to be used by children under the direct supervision of an adult and which is a model of an appliance or installation and used in the same way, is known as a functional product.

**3.12****portable child appealing luminaire**

a luminaire that in normal use can be moved from one place to another while connected to the supply, and which is constructed to represent a model, character or animal, in such a manner that due to the design and materials used can be considered as a **toy** by the child N(IEC 60598-2-10)

**3.13****scale model for adult collectors**

Detailed scaled down model with or without accessories.

NOTE - **Scale models for adult collectors** are often expensive and sensitive to rough handling. The packaging, instructions and marketing will be different from those directed to **toys**.

**3.14****videogame toy**

consisting of a screen and activating means by which the child can play and interact with the picture shown on the screen

NOTE 1 - All parts necessary for the operation of the **videogame toy**, such as control box, joy stick, key board, monitor and connections, are considered to be part of the **toy**.

NOTE 2 - Separate supply transformers and separate monitors (including TV sets) having **rated voltages** exceeding 24 V are not considered to be part of the **videogame toy**.

**3.15****enclosure**

part of a group that provides a degree of protection to specific equipment, against external influences and a degree of specified protection to prevent approach and contact with active parts (under tension), or contact with moving parts or pieces.

**3.16****rated voltage**

voltage designated to the toy by the manufacturer

**3.17****working voltage**

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

NOTE 1 - **Normal operation** includes the change of voltage within the **toy** resulting from the operation of a switch, the failure of a lamp or a similar occurrence.



NOTE 2 - When calculating the **working voltage**, the effect of **transient voltages** is ignored.

### 3.18

#### **rated power input:**

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

### 3.19

#### **rated current:**

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

NOTE - If no current is assigned to the **toy**, the **rated current** for the purpose of this standard is the current measured when the **toy** is operated under **normal operation** at **rated voltage**.

### 3.20

#### **normal operation condition:**

condition under which the **toy**, connected to the recommended power supply, is used as intended considering the typical behavior of children

### 3.21

#### **creepage distance**

shortest path between two conductive parts or between a conductive part and the accessible surface of the **toy**, measured along the surface of the insulating material

### 3.22

#### **clearance**

shortest distance between two conductive parts or between a conductive part and the accessible surface of the **toy**, measured through air

### 3.23

#### **detachable part**

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

NOTE - The parts that are intended to be removed or open or with help of a tool supplied with the toy, whose instructions warn that such tool shall not be used by children, **are not detachable parts**.

### 3.24

#### **tool**

screwdriver, coin or other object which may be used to operate a screw, clip or similar attachment means

### 3.25

#### **accessible part**

Accessible part, or surface according to accessibility test provided in NM 300-1, according to appropriate age group.

### 3.26

#### **thermostat**

temperature sensing device that automatically opens or closes a circuit according to pre established operating temperatures that can be fixed or adjustable, which under **normal operation conditions** keeps the temperature of a **toy** or a part of it within certain limits.

### 3.27

#### **thermal switch**

device which during abnormal operation, limits the temperature of a **toy** or parts of it by automatically opening the circuit or by reducing the current and which is constructed so that its setting cannot be altered by the user

NOTE - A motor thermal protector is an example of a thermal switch.

**3.28****self-resetting thermal switch**

**thermal switch** which automatically restores the current after the relevant part of the **toy** has cooled down sufficiently

**3.29****non self-resetting thermal switch**

**thermal switch** which requires a manual operation for resetting or replacement of a part, in order to restore the current.

**3.30****electronic component**

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

NOTE - Electronic components do not include resistors, capacitors and inductors.

**3.31****electronic circuit**

circuit incorporating at least one **electronic component**

## 4 General requirements

Toys shall be constructed so that, when used, the risk to people or the surroundings is reduced as much as possible, particularly those risks that are not evident to the user.

This applies when the **toy** is used as intended or in a foreseeable way, considering the normal behavior of children.

In general, this principle is attained by fulfilling the appropriate requirements established in this Standard, and by carrying out the specified tests.

## 5 General test conditions

**WARNING.** Tests on **battery or accumulator toys**, e.g. short-circuit tests, can result in explosion or rupture of the batteries or accumulators. Appropriate precautions shall be taken when conducting such tests.

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

**5.2** Unless otherwise specified, the tests are made on a single toy which shall withstand all the relevant tests. However, the tests on items **14**, **15**, **16** and **17** may be made on separate toys. If the **toy** does not operate after the tests on item **9** the subsequent tests are carried out on a separate **toy**.

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

- for different supply voltages;
- for both AC and DC;
- for different speeds.

NOTE 2 - The testing of components may require the submission of additional samples of such 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 shall be the minimum required for evaluation of the corresponding **electronic circuits**.



**5.3** Unless specified in contrary, testing shall be performed in order presented in this Standard.

If it is evident from the construction of the toy that a particular test is not applicable, this test shall not be made.

**5.4** If a toy is intended to be assembled by a child, the requirements apply to each part available 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 moving part of it, in the most unfavorable position. Detachable parts are removed or kept in position, whichever is more unfavorable.

**5.6** Toys provided with controls or switching devices are tested with these controls or devices adjusted to their most unfavorable setting, if the setting can be altered by the user.

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

**5.8 Battery or accumulator toys** intended for use with a **battery holder** are tested with the **battery holder** supplied with the **toy** or with the **battery holder** recommended in the instructions for use.

**Toys with a transformer** are tested with the transformer supplied with the **toy**. If the **toy** is supplied without a transformer, it is tested with an appropriate transformer according to indicated in the **toy**.

**Dual supply toys** are tested with the most unfavorable supply allowed by the construction, the conditions being evaluated for each test.

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

NOTE - In general a fully charged nickel-cadmium battery or a new alkaline battery are considered to be the most unfavorable condition.

The batteries used are those with the voltage and size specified on the toy or in the instructions for use. Similar batteries which are generally available are used if this results in more unfavorable conditions.

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

**5.10** When alternative accessories are made available by the manufacturer, the toy is tested with those accessories which cause the most unfavorable results.

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

If more than one accessory can be used simultaneously, the combination which gives the most unfavorable result is used.

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

NOTE 3 - The accessories may be replaced by an appropriate resistor in order to obtain the most unfavorable conditions.

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

**5.11** The tests are carried out in a draft-free location at an ambient temperature of  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .

**5.12 Toys** having more than one **rated voltage** are tested at the most unfavorable voltage.



**5.13** When testing **battery toys**, reverse polarity due to incorrect insertion of batteries or to inverted connections is taken into account by repeating the test with the polarity reversed if this is not prevented by the construction.

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

Apply only a short-circuit at a time. Damages caused by a short circuit that do not affect compliance with Standard must be repaired before the continuation short circuit trials.

**5.15** Before testing is started, the toy is preconditioned by submitting it to the tests of the following subitems of NM 300-1

- **5.25.2, Drop Test** for toys having a mass less than 5 kg including batteries;
- **4.15.2**, Overload requirement for *sit-on or stand-on toys*;
- **5.25.6.2**, traction test of the seams for soft stuffed toys and pellet filled toys in which the cells, batteries or other electrical parts are covered with textile materials or other flexible materials;
- **5.25.6**, traction test for all toys, independently of age group

NOTE 1 – Compliance with NM 300-1 is verified only after pre conditioning

NOTE 2 - It may be necessary to carry out the tests on a toy which has not been preconditioned only if this results in more unfavorable conditions.

## 6 Selection of tests

**6.1** The toys that comply with the tests of section 9 with the insulation between parts of different polarity in short-circuit do not necessarily have to comply with sections 8, 10, 11, 12, 14.4, 14.5, 14.10, 15 to 18. They are not required to comply with 14.11, unless moving parts need a protection.

### NOTES

1 The short-circuit must be applied at all points where the insulation is subject to flaws.

2 Attachment A of the Standard, shows the selection and sequence of tests.

### **6.2 Battery toys** in which:

- the accessible insulation between parts of different polarity cannot be short circuited by a straight steel wire having a diameter of 0.5 mm and a minimum length of 25 mm, and
- the battery voltage is lower than 2.5V measured 1s after a 1Ω resistor have been connected to the input bornes of the toy, with all current limiting devices short-circuited;
- shall only comply with sections 7, 9.3, 13, 14 and 20. Moreover, components needed to comply with section 9 shall also comply with section 16

### NOTES

1 NM 300-1 remains applicable.

2 The length of steel wire is chosen to detect the possibility of short-circuiting the insulation.

3 Attachment A, shows the selection and sequence of tests.



## 7 Markings and instructions

### 7.1 Toys or their packaging shall be marked with:

- name, country of origin, trade mark or identification mark of the manufacturer, his authorized representative and/or the importer;
- model or type reference.

These markings shall be on the main part of the toy. When it is not practical to mark the **toy**, e.g. due to its size, these markings and the markings required on **7.1.1**, **7.1.2** and **7.1.3** may be contained in the instructions or on the packaging.

The verification is attained by visual examination.

NOTE - The NM 300-1 may require complementary markings

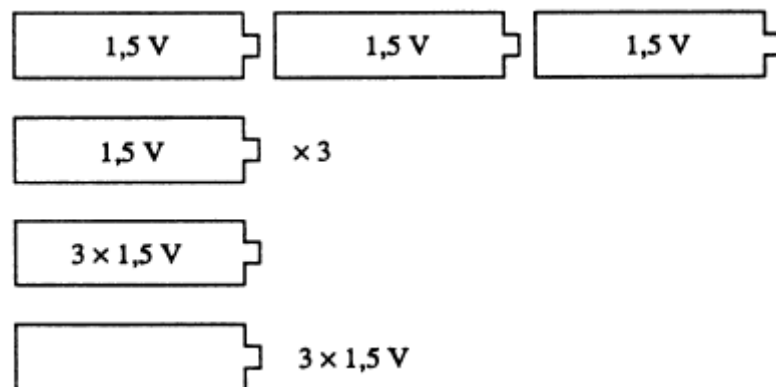
#### 7.1.1 Battery or accumulator toys shall be marked with the following indications:

- nominal battery or accumulator voltage, in or on the battery compartment, or on the accumulator;
- symbol for DC, if the **toy** has a **battery holder**.

If more than one battery is used, the polarity and the way the batteries or accumulators are accommodated shall be indicated in actual or proportional magnitude. This shall be marked on or in the battery compartment, along with the nominal tension marking.

The verification is attained by visual examination

NOTE – The following figures are examples of representations of three batteries or accumulators



#### 7.1.2 Toys with a transformer shall be marked with the

- **rated voltage**, in volts;
- symbol for direct current or alternating current, as applicable;
- **rated power input**, in watts or VA, if greater than 25 W or 25 VA;
- symbol for **transformer for toys**. This symbol shall also be on the packaging.

The **rated voltage marking** and the symbol for nature of current shall be placed adjacent to the terminals. This marking is not required if a wrong supply does not impair compliance with the standard.



The verification is attained by visual examination


**7.1.3 Dual supply toys** shall bear the markings required for **battery toys** and **toys with a transformer**

NOTE 1 - **Toys** consisting of more than one part are only required to be marked on the main part.

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

The verification is attained by visual examination

**7.2 Toys** incorporating **detachable lamps** shall be marked with one of the following:

Light bulbs ....W or  max..W

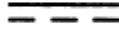


The identification shall be visible after placing the bulb.

The identification is not required if:

- The warming measured during the performance of the tests set out in section 9 with any bulb normally available, does not exceed specified limits;
- The toy has only incandescent bulbs whose nominal power is not greater than 1W.

The verification is attained by visual examination

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

V	volts
A	amperes
Hz	hertz
W	watts
 or d.c	direct current
 or a.c	alternating current
	symbol for transformer for toys

NOTE 1 - Multiple or submultiple units are also allowed.

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

NOTE 3 - Symbols specified in IEC 60417-1 may be used.

The verification is attained by visual examination

**7.4** Instructions shall be provided giving details concerning cleaning and maintenance when necessary for a 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 that, in the event of such damage, the toy must not be used with this transformer or battery charger until the damage has been repaired.

**Toys** intended to be assembled shall be provided with instructions concerning their 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.

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

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

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

- how to remove and insert the batteries;
- non-rechargeable batteries are not to be recharged;
- rechargeable batteries are to be removed from the toy before being charged in case they are removable;
- rechargeable batteries are only to be charged under adult supervision, in case they are removable;
- different types of batteries or new and used batteries are not to be mixed;
- only batteries of the same or equivalent type as recommended are to be used;
- 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.

Instructions for **toys with a transformer** shall include fundamentally and as much as possible, the following:

- the **toy** is not intended for children less than 3 years old;
- the **toy** must only be used with the recommended transformer;
- the transformer is not a **toy**;
- **toys that can** be cleaned with liquids are to be disconnected from the transformer before cleaning.

Instructions may be marked on the **toy** as long as they are visible from the outside, on the packaging, on a leaflet or similar means provided with the **toy**.

The verification is attained by visual examination

**7.5** When markings or instructions are shown on the packaging, the packaging shall state that it has to be kept since it contains important information.

The verification is attained by visual examination

**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.



The verification is attained by visual examination

**7.7** The markings on the **toy** required by this standard 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.

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.

NOTE 1 - In considering the durability of the marking, the effect of normal wear such as frequent cleaning is taken into account.

NOTE 2 - The petroleum spirit to be used for the test is aliphatic hexane solvent having a maximum aromatics content of 0,1 % by volume, a kauri-butanol value of 29, an initial boiling point of approximately 65 °C, a dry point of approximately 69 °C and a specific mass of approximately 0.66 kg/l.

## 8 Power

The power of **toys with a transformer** at **rated voltage** and at normal operating temperature shall not exceed the **rated power** by more than 20 % if the **rated power** exceeds 25 W or 25 VA.

Compliance is checked by measurement when the power input has stabilized,

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

## 9 Heating and abnormal operation

**9.1** **Toys** shall not attain excessive temperatures in use. 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 avoided as far as is practicable.

Compliance is checked under the conditions specified in **9.2** by the following tests:

- all toys, **9.3**, **9.4** and **9.5**;
- **toys** incorporating a motor, **9.6**;
- **toys with a transformer** and toys with **battery holders**, **9.7**;
- **toys** incorporating electronic circuits, **9.8**.

During and after the tests, **9.9** applies.

The tests in **9.3** and **9.4** are continued until steady conditions are established. During these tests, **thermal switches** shall not operate.

The tests of **9.5**, **9.6**, **9.7** and **9.8** are continued until a **non-self-resetting thermal switch** operates or until steady conditions are established. If a heating element or an intentionally weak part permanently opens a circuit, the relevant test is repeated on a second toy. 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 fail in order to prevent the occurrence of a condition which 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 fuse incorporated in a motor.

NOTE 2 - Fuses, **thermal switches**, maximum current relays 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.

NOTE 4 - This item does not apply to incandescent bulbs of less than 1 W.

**9.2 Toys** are placed in the most unfavorable position which can occur during play.

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

Other **toys** are tested as follows:

- **toys** are placed on the floor of the test area as near to the walls as possible or away from them, whichever is more unfavorable. 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;
- **toys** having no dimension exceeding 500 mm are covered completely by four layers of bleached cotton gauze having a specific mass of approximately 40 g/m<sup>2</sup>;
- **toys** having a dimension exceeding 500 mm are tested with four layers of the cotton gauze having dimensions of 500 mm × 500 mm, placed on surfaces where high temperatures and charring of the cotton gauze may be expected.

Battery toys are supplied at rated voltage.

**Toys with a transformer** are supplied at 0,94 times or 1,06 times **rated voltage**, whichever is more unfavorable.

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.

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

**9.3 Toys** are operated under **normal operation** and the temperature rises of the various parts are determined.

**9.4** The test of **9.3** is repeated, the insulation between parts of different polarity which is accessible after removing or opening **detachable parts** being short-circuited. However, the short-circuit is only applied if it is possible to bridge the insulation by a straight steel wire having a diameter of 0,5 mm and a minimum length of 25 mm.

NOTE - The length of the wire is chosen to detect the possibility of short-circuiting insulation.

**9.5** The test of **9.3** is repeated with any control which limits the temperature during the tests of **9.3** and **9.4** short-circuited.

Positive temperature coefficient resistors (PTC's), negative temperature coefficient resistors (NTC's) and voltage dependent resistors (VDR's) are not short-circuited if they are used within their manufacturer's declared specification.

NOTE - If the toy comes with more than one control device, the test is repeated short-circuiting a device at a time.



**9.6** For **toys** incorporating a motor, the test in **9.3** is repeated with accessible moving parts locked.

NOTE - If the **toy** incorporates more than one motor, the test is made separately for each motor.

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

**9.7 Toys with a transformer** and toys with **battery holders** are connected to a power source in addition to those recommended in the instructions. The additional power source is identical to that of the **toy** and is connected in series or in parallel, whichever is more unfavorable. The **toy** is then tested as 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 passed the particular test, provided that the two following conditions are met:

- The material of printed circuit must meet flame test established in Section 20.1 of IEC 60065;
- the **toy passes** the test on **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 which have to be simulated, so that testing can be limited to those cases which may be expected to produce the most unfavorable results.

**9.8.1** Fault conditions a) to f) specified in **9.8.2** are not applicable to circuits or parts of circuits where both 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. Sequential faults are taken into consideration.

a) Short-circuit of **creepage distances** and **clearances** between active parts of different polarity, if these distances are less than the values specified in item **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. or section 14.2 of the IEC 60065;
- 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 as fault conditions within the integrated circuit. If it can be shown that a particular output signal is unlikely to occur, then the relevant faults are 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.

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.

For simulation of the fault conditions, the **toy** is operated under the conditions specified in **9.2**, supplied at **rated voltage**.

If the **toy** incorporates an **electronic circuit** which operates to ensure compliance with **9.5**, **9.6** and **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.

Positive temperature coefficient resistors (PTC's), negative temperature coefficient resistors (NTC's) and voltage dependent resistors (VDR's) are not short-circuited if they are used within their manufacturer's declared specification.

**9.9** During the tests, the temperature rises of **accessible parts, such as handles, buttons, knobs and similar parts** are monitored continuously and shall not exceed the following values:

- parts of metal 25 K;
- parts of glass or porcelain 30 K;
- parts of plastics or wood 35 K.

The temperature rise of other accessible parts of the toy shall not exceed the following values:

- parts of metal 45 K;
- parts made of other materials: 55 K

NOTE 1 - The surface of batteries is considered to be metal.

Additionally, the conditions described below shall be considered:

- filling material shall not melt;
- the toy shall not emit flames or molten metal;
- poisonous or ignitable gas in hazardous amounts or any other dangerous substance shall not be produced;



- vapor shall not accumulate in the toy;
- enclosures shall not deform to such an extent that compliance with this standard is impaired;
- batteries shall not leak hazardous substances or erupt;
- materials, including the cotton gauze, shall not burn.

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

## 10 Dielectric 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 connected components across the supply is disconnected and immediately afterwards the insulation between parts of different polarity is subjected for 1 min to a voltage of substantially sinusoidal waveform having a frequency between 50 or 60 Hz and a value of 220 V. No breakdown shall occur.

There dielectric rupture shall be produced.. In the case of a toy powered by more than one set of batteries, the test shall be repeated with each set.

## 11 Moisture resistance

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

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

Compliance is verified by testing the item 14.2.7 of the IEC 60529 in which the toy is immersed in water containing about 1% NaCl, with the removable parts detached from the toy.

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

**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  $(93 \pm 2) \%$ . The temperature of the air is maintained within 1 K of any convenient  $t$  value between 20 °C

and 30 °C. Before being placed in the humidity cabinet, the toy is brought to a temperature of  $t \pm 4^\circ\text{C}$ .

The toy shall then withstand the test of item **12** in the humidity cabinet or in the room in which the toy was brought to the prescribed temperature after reassembly of detachable parts which 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  $(93 \pm 2) \%$  can be obtained by placing, in the humidity cabinet, a saturated solution of  $\text{Na}_2\text{SO}_4$  or  $\text{KNO}_3$  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 Dielectric 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 between 50 and 60 Hz and a value of 220 V.

No dielectric rupture shall occur.

## 13 Mechanical strength

The enclosure of the toy, tested as the described in the notes below, must have a mechanical strength such that in the case of damage, will not present risks.

The test procedure consists of applying six (6) strikes to the enclosure of toys by means of an impact test apparatus, with a strike tip made of polyamide with Rockwell HHR hardness of 100, and 10 mm tip radius.

The **toy** is rigidly supported and six strikes are applied to every point of the enclosure that is likely to be weak with an impact energy of  $0.7 \text{ J} \pm 0.05 \text{ J}$ .

The **toy** shall show no damage which could impair compliance with this standard.

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

NOTE 1 - Examples of enclosures which are subjected to the test are:

- enclosures of compartments for non-sealed batteries containing a liquid;
- enclosures covering insulation between parts of different polarity, if the test on **9.4** is not applicable when the insulation is short-circuited;
- enclosures covering moving parts which may present a hazard.

NOTE 2 - Enclosures covering small batteries are not subjected to the test but are covered NM 300-1, part 1

NOTE 3 – light bulbs lamps are not subject to testing. The requirement of NM 300-1 regarding sharp corners does not apply to glass of broken light bulbs.

NOTE 4 - Minor damage which does not reduce creepage distances and clearances below the values specified in item 18 or does not adversely affect the protection against moisture, is neglected.

NOTE 5 - Cracks not visible to the naked eye are ignored.



## 14 Construction

**14.1 Toys** shall be constructed to be powered by a **transformer for toys** or by batteries or accumulators having a nominal voltage not exceeding 24 V. They may be constructed in such a way to be supplied simultaneously or alternatively by both sources, in which case the supply voltage shall not exceed 24 V.

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

Compliance is checked by inspection and by measurement.

**14.2** The transformer of **toys with a transformer** shall not be an integral part of the **toy**.

Controls for the **toy** shall not be incorporated in the transformer.

Compliance is checked by inspection.

**14.3 Toys** intended to be used in water shall not be **toys with a transformer**.

Compliance is checked by inspection.

**14.4 Toys** intended for children less than 3 years old shall not be **toys with a transformer**.

Compliance is checked by inspection.

**14.5** The resetting of **non-self-resetting thermal switches** necessary for compliance with this standard shall require the aid of a **tool**.

Compliance is checked by inspection and by a manual test.

**14.6** Button cells and type R1 batteries shall not be accessible without the aid of a **tool**, unless the cover of their compartment can only be opened after at least two simultaneous and independent movements.

Compliance is checked by inspection and by the relevant tests.

NOTE - Batteries are specified in EN 60086-2.

**14.7** The batteries or accumulators for **toys** intended for children less than 3 years old shall not be accessible without the aid of a **tool** unless:

- the cover of the battery compartment can only be opened after at least two independent simultaneous movements, and
- the battery or accumulator compartment does not open when the **toy** is submitted to the tests of the following subitems NM 300-1:
  - 5.25.2 impact test ;
  - 5.25.6.2 traction test for seams.

Compliance is checked by inspection and by the relevant tests.

**14.8** Rechargeable batteries in **toys** shall not leak or fall off regardless of toy 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 powered** by batteries connected in parallel are not allowed, unless it is obvious from the construction or from the circuit diagram that a mix up of batteries or accumulators or its placement in inverted positions will not compromise compliance with this Standard.

Compliance is checked by inspection.

**14.10** The output plugs and sockets shall not be interchangeable with input plugs and sockets, or with connectors or input devices, according to the standards in force in each country.

Wires without connecting means are not allowed for **toys** intended for children less than 3 years old .

Compliance is checked by inspection and, if necessary, by attempting to introduce the plug into a power outlet without appreciable force. Electric contact shall not be established.

**14.11** Non-detachable parts preventing contact with moving parts or hot surfaces, or preventing access to locations where explosion or fire could be initiated, shall be appropriately attached and shall withstand the mechanical stress occurring during play.

Compliance is checked by the following test.

The following tensile force is applied to the part:

- 50 N, if the longest accessible dimension is not more than 6 mm;
- 90 N, if the longest accessible dimension is greater than 6 mm.

The force is applied gradually over 5 s and maintained for a further 10 s.

The part shall not become detached.

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

However, charging is allowed under the following conditions:

- for **toys** having a mass less than 5 kg, and it is not possible
  - to remove the battery without breaking the **toy**;
  - to charge other batteries from the **toy**;
- for **toys** having a mass exceeding 5 kg,
  - the battery is fixed in the **toy**;
  - connecting means are provided which ensure correct polarity when charging;
  - it is not possible to operate the **toy** during charging.

Compliance is checked by inspection.

**14.13** Motors in series having a combined power input exceeding 20 W shall not be used.

Compliance is checked by inspection.

**14.14 14.14 Toys** shall not contain asbestos.

Compliance is checked by inspection.



## 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, which may cause damage to their insulation.

Holes in metal through which cords and wires pass shall have smooth well-rounded edge surfaces or be fitted 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 attached so that, during play, **creepage distances** and **clearances** cannot be reduced below the values specified in table 24.

Compliance is checked by inspection and by measurement.

## 16 Components

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

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

**16.1.1** Switches and automatic controls carrying a current exceeding 3 A during the tests on **9.3** and **9.4** shall comply with Attachment B. 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 Attachment B, they may be used without further tests.

NOTE - There are no specific requirements for switches and automatic controls carrying a current not exceeding 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 which 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 markings, 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 harmonized standard exists for the relevant component, when the component is not marked or is not used in accordance with its markings, it is tested under the conditions occurring in the toy. Generally, the number of samples is that required by a similar specification. If a national standard exists, the component can be tested according to that standard.

**16.2 Toys** shall not be fitted with:

- **thermal switches** which can be reset by a soldering operation;
- mercury switches.

Compliance is checked by inspection.

**16.3 Transformers for toys** shall comply with IEC 61558-2-7, whose applicable requirements are indicated bellow.



Compliance is checked by inspection.

**16.3.1** The primary and secondary windings are to be separated by an insulating barrier and the construction shall be such that there is no possibility of any link between these windings, direct or indirectly, through other metal parts.

**16.3.2** In particular, precautions must be taken to avoid:

- a) displacement of primary windings and secondary windings or its windings;
- b) displacement of internal wiring or the wires for external connections; displacement of parts of windings or internal circuits in the event of disruption or loosening of wires adjacent to the connections;
- c) that wires, screws, washers and similar attachments holding any part of the insulation separating the input circuit and output circuits, including the windings, become loose or slackened.

**16.3.3** The primary winding and each secondary winding shall be wound in such a way that each winding is accommodated adjacent to the next winding in each winding layer.

**16.3.4** Some examples of such construction according to these requirements are: as specifications for windings of this section are:

- a) windings on separate spools, in insulating appropriate material;
- b) winding on a single spool, with a wall of separation of appropriate insulating material, provided that the spool and the wall of separation are pressed or molded into a single piece, or that the walls of separation have a sheath or intermediate coverage on the junction between the spool and the wall of separation;
- c) concentric windings that:
  - Are insulated from the core of the transformer by means of a spool or three layers of insulation;
  - The primary and the secondary windings are insulated from each other by three layers of insulating material.

**16.3.4.1** When juxtaposed, two of these layers of insulating material must comply with the dielectric rigidity test for reinforced insulation; the tension is applied to the external surfaces of the juxtaposed layers.

**16.3.5** All windings shall have the extreme layers held in place by adequate means, such as sheets of insulating material, or by a liquid material that hardens with the application of heat and which, when soft, penetrates totally in the spaces between the extreme windings, sealing them completely.

## NOTES

1 It is recognized that two independent fixing means will not come loose at the same time.

2 The transformer shall be tested separately from the toy.

## 17 Screws and connections

**17.1** Fixings whose failure may impair the compliance with this Standard and electric connections shall withstand the mechanical tension occurring during play.

Screws used for these purposes shall not be of soft metals which are subject to deformation such as zinc or aluminum. If they are made of insulating material, they shall have a nominal diameter of at least 3 mm and they shall not be used for any electric connection.



Screws transmitting electrical contact by pressure shall screw into metal.

Compliance is checked by inspection and by the following tests:

Screws and nuts transmitting contact by pressure or which are likely to be tightened by the user are tested as follows, if their failure could impair compliance with this Standard.

The screws or nuts are tightened and loosened without jerking

- 10 times for screws threading into insulating material;
- 5 times for nuts and other screws.

Screws threading into insulating material are completely removed and re-inserted each time.

The test is made with a suitable screwdriver, or appropriate tool by applying torque as shown on 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, 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
2,8 <sup>a</sup>	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

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

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

**17.2** Electric connections carrying a current exceeding 0.5 A, shall be made so that contact pressure is not transmitted through insulating material which is likely to contract 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 likely to contract or to distort.

## 18 Creepage distances and clearances

**Creepage distances** and **clearances** between parts of different polarity shall not be less than the values in millimeters shown on Table 2.

Compliance is checked by measurement.



Table 2 — Minimum creepage distances and clearances (in millimetres)

Distances between parts of different polarity	Creepage distance <sup>c</sup>	Clearance <sup>a,c</sup>
— if protected against deposition of dirt <sup>b</sup>	1,0	1,0
— if not protected against deposition of dirt	2,0	1,5
— if lacquered or enamelled windings	1,0	1,0

<sup>a</sup> The clearances specified do not apply to the air gap between the contacts of automatic controls, switches of micro-gap construction and similar devices or to the air gap between the current-carrying members of such devices where the clearance varies with the movement of the contacts.

<sup>b</sup> In general, the interior of a toy having a reasonably dust-proof enclosure is considered to be protected against deposition of dirt, provided the toy does not generate dust within itself; hermetic sealing is not required.

<sup>c</sup> For conductive patterns on printed circuit boards, except at their edges, the values in the table may be reduced to  
 — 0,2 mm, if protected against the deposition of dirt;  
 — 0,5 mm, if not protected against the deposition of dirt.

## 19 Resistance to heat and fire

NOTE 1 - This item refers to insulating materials which support or directly enclose electric parts.

NOTE 2 - Attachment C shows the selection and sequence of the tests of this item.

**19.1** In **toys** having a **working voltage** exceeding 12 V and a current exceeding 3 A, parts of non metallic material enclosing electric parts and parts of insulating material supporting electric parts shall be sufficiently resistant to heat.

NOTE 1 - The voltage and current are measured during the test indicated on **9.3**.

NOTE 2 - The test is not carried out on parts whose deterioration is not likely to compromise the compliance with this Standard.

NOTE 3 - Toys with very low currents and working voltages are not considered to generate sufficient heat to create a hazard.

Compliance is checked by subjecting the relevant part to the ball-pressure test made by means of the apparatus shown on Figure 2.

Before starting the test, the part is maintained for 24 h in an atmosphere having a temperature between 15 °C and 35 °C and a relative humidity between 45 % and 75 %.

The part is supported so that its upper surface is horizontal and the spherical part of the apparatus is pressed against this surface with a force of 20 N. The thickness of the part under test shall be at least 2.5 mm.

NOTE 4 - If necessary, the required thickness may be obtained by using two or more sections of the part.

The test is made in a heating cabinet at a temperature of 40 °C ± 2 °C plus the maximum temperature rise determined during the tests but it shall be at least 75 °C ± 2 °C.

Before the test is started, the test apparatus is brought to the temperature determined above.

After 1 h the apparatus is removed and the part is immediately immersed in cold water so that it is cooled to approximately room temperature within 10 s. The diameter of the impression shall not exceed 2 mm.

NOTE 5 - For coils, only those parts which support or retain terminals in position are subjected to the test.

NOTE 6 - The test is not made on parts of ceramic material.

**19.2** Parts of non metallic material shall be resistant to ignition and spread of fire.

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



Compliance is checked by flammability test on **19.2.1**, **19.2.2** and **19.2.3**.

**19.2.1** Separately molded samples of the relevant parts are subjected to the Attachment D combustion test, or the corresponding parts of the toy are submitted to the glow wire test on Attachment D at a temperature of 550 °C.

**19.2.2** Parts of insulating material supporting connections bearing a current exceeding 3 A and a working voltage exceeding 12 V are subjected to the glow wire test on Attachment E at a temperature of 650 °C. The test is also carried out on parts in contact with, or in close proximity to, the connection.

NOTE 1 - The test is not carried out on parts supporting welded connections.

NOTE 2 - "In close proximity" is considered to be a distance not exceeding 3 mm.

During the performance of the glow wire test, the height and duration of flames are measured.

In addition, for parts which pass the glow wire test but ignite, surrounding parts are subjected to the needle flame test of Attachment F for the measured duration of the flame if

- they are positioned within a distance equal to the height of the flame and
- they are likely to be reached by the flame.

However, parts shielded by a separate barrier which meets the needle-flame test are not submitted to the test.

The needle-flame test is not carried out on parts which are made of material classified as FV-0 or FV-1 according to IEC 60707. The material sample submitted to the test on the harmonized European document IEC 60707 shall be no thicker than the relevant part.

NOTE 3 - Parts likely to be reached by the flame are considered to be those within the envelope of a vertical cylinder having a radius of 10 mm and a height equal to the height of the flame, positioned above the point of application of the glow wire.

**19.2.3** If the parts do not withstand the test on **19.2.2** the needle-flame test of Attachment F is made on all other parts of non metallic material which are within a distance of 50 mm.

However, parts shielded by a separate barrier which meets the needle-flame test are not tested.

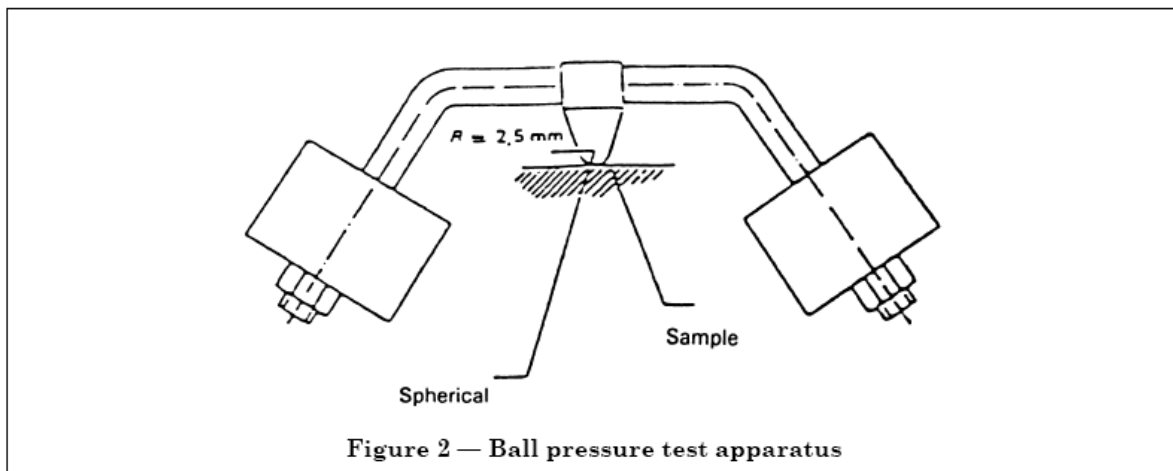
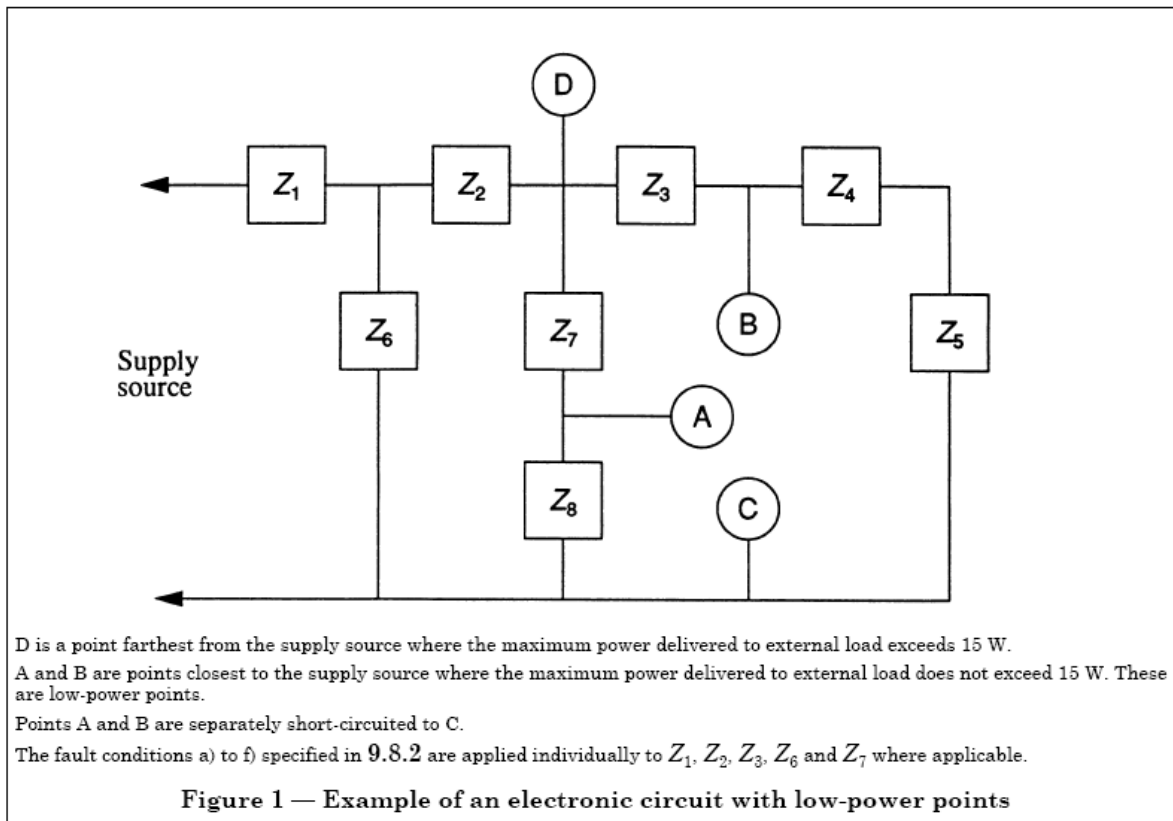
The needle-flame test is not carried out on parts which are made of material classified as FV-0 or FV-1 according to the harmonized European document IEC 60707. The sample of material submitted to the test on IEC 60707 shall be no thicker than the relevant part.

## **20 Toxicity and similar hazards**

**Toys** shall not present a toxic or similar hazard.

Compliance is checked by applying NM 300-3

NOTE - NM 300-3 is not applicable to batteries and accumulators.



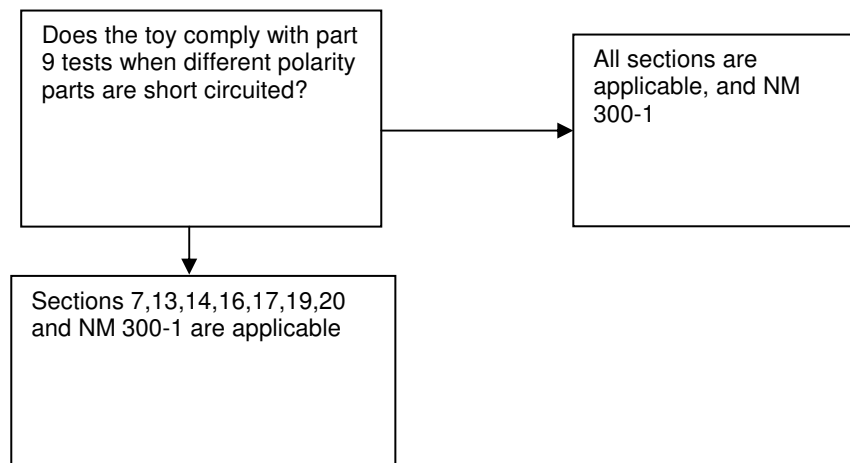


## Attachment A (informative)

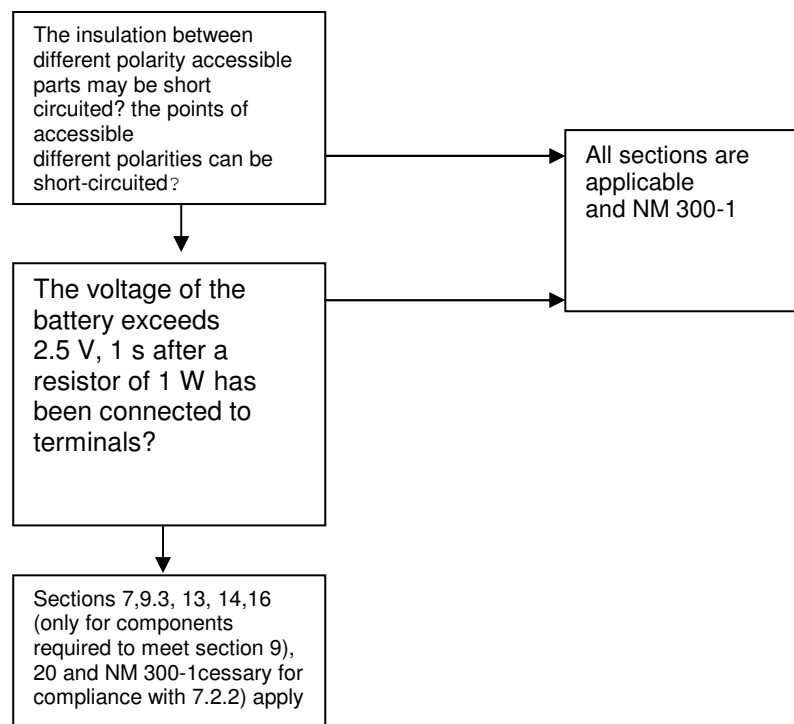
### Test selection

For some toys, the tests are reduced. The criterion for the applicability of tests on 6.1 and 6.2 is shown below:

Applicable to all toys (6.1):



Applicable to toys with battery or accumulator (6.2):





## Attachment B (normative)

### Endurance of thermal controls, maximum current relays and switches

Thermal controls, maximum current relays and switches shall withstand the electrical, thermal and mechanical stresses that occur during play.

Compliance is checked by subjecting three samples to the tests of items **B.1** to **B.3** under the following conditions:

The components may be tested in the toy or separately, whichever is more convenient, but under the conditions occurring in the toy.

During the tests, no sustained arcing shall occur.

After the tests, the samples shall show no damage impairing their further use, electrical connections shall not have worked loose and the test samples shall withstand an electric strength test as specified in item **12**, the test voltage for the insulation between the contacts being, however, twice the voltage applied when the **toy** is operated at **rated voltage**.

NOTE 1 - The switching frequency of the component may be increased above the normal switching frequency inherent to the **toy**, provided that no greater risk of failure of the test samples is induced.

NOTE 2 - If it is not possible to test the component separately, it will be necessary to submit three samples of the **toy** in which the component is used.

**B.1** Thermostats are cycled thermally, 3 000 times (3 000 breaks and 3 000 closures) under the conditions occurring in the toy when it is operated as indicated in **9.3**.

**B.2** Thermal switches and maximum current relays are checked by operating the toy under the conditions in **9.5**.

Self-resetting thermal switches and maximum current relays are cycled 200 times; non self-resetting thermal switches and maximum current relays are cycled ten times.

NOTE - Forced cooling and resting periods may be introduced to prevent damage to the **toy**.

**B.3** Switches are checked as follows:

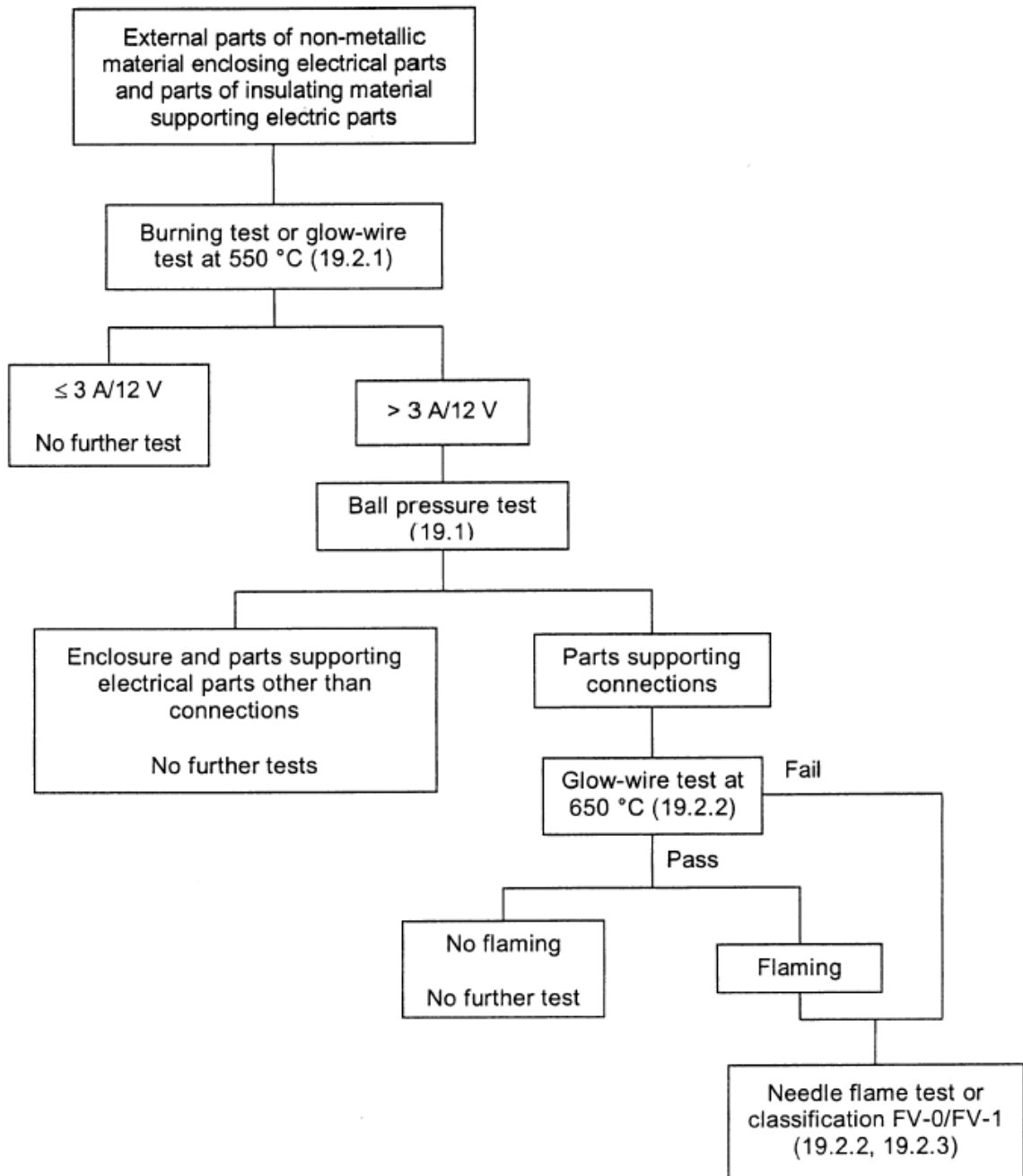
The **toy** is operated under the conditions in **9.3** until steady conditions are established. The switches are then operated for 3 000 cycles (3 000 openings and 3 000 breaks) at a speed of approximately 20°/s for rotary action and 60 mm/s for linear actions and at a uniform rate of 15 operations per minute.

At the end of the test, the temperature rise of the terminals shall not be greater than 30 K.



## Attachment C (informative)

### Selection and sequence for heat and fire resistance tests





## **Attachment D** (normative)

### **Combustion test**

The combustion test is made in accordance with IEC 60707.

For the purpose of this Standard, method FH: Flame-Horizontal specimen, is used.

For the evaluation of the test results, category FH3 applies, the maximum combustion rate being 40 mm/min.

If more than one specimen does not withstand the test, the material is rejected.

If one specimen does not withstand the test, the test is repeated on another set of five specimens, all of which shall then withstand the test.



## **Attachment E** (normative)

### **Incandescent wire test**

The incandescent wire test is made in accordance with IEC 60695-2-1.

For the purposes of this standard, the following applies:

#### **4 Description of the set of instruments**

The last paragraph before the note is replaced by:

In cases where burning or glowing particles might fall from the specimen onto an external surface underneath the specimen, the test is made with a piece of white pine wood board, approximately 10 mm thick and covered with a single layer of tissue paper, positioned at a distance of  $200 \text{ mm} \pm 5 \text{ mm}$  below the place where the test flame is applied to the specimen. If the toy as a whole is tested, it is placed in its normal position of use above the pine wood board which is covered with a single layer of tissue paper. Before starting the test, the board is conditioned as described in item 7 for the specimen.

#### **5 Degrees of severity**

The duration of application of the incandescent wire end against the specimen is  $30 \text{ s} \pm 1 \text{ s}$ .

#### **10 Observations and measures**

The item c) does not apply.



## **Attachment F** (normative)

### **Needle-flame test**

The needle-flame test is made in accordance with IEC 60695-2-2.

For the purposes of this standard, the following applies:

#### **4 Description of the set of instruments**

The sixth paragraph is replaced by:

In cases where burning or glowing particles might fall from the specimen onto an external surface underneath the specimen, the test is made with a piece of white pine wood board, approximately 10 mm thick and covered with a single layer of tissue paper, positioned at a distance of  $200 \text{ mm} \pm 5 \text{ mm}$  below the place where the test flame is applied to the specimen. If the toy as a whole is tested, it is placed in its normal position of use above the pine wood board which is covered with a single layer of tissue paper. Before starting the test, the board is conditioned as described in item 6 for the specimen.

#### **5 Degrees of severity**

The duration of application of the test flame is  $30 \text{ s} \pm 1 \text{ S}$ .

#### **8 Test procedure**

**8.4** In the first paragraph the words “or from any source of ignition accidentally applied” do not apply.

Replace the last two paragraphs by:

At the beginning of the test, the test flame is applied in such a way that at least the tip of the flame is in contact with the surface of the specimen.

During the application of the test flame the burner is not to be moved. The test flame is removed immediately after the specified period has elapsed. For examples of test positions, see Figure 1.

Replace Attachment 8.5 by:

The test is made on only one specimen. If the specimen does not withstand the test, the test is repeated on two further specimens, both of which shall then withstand the test.

#### **10 Assessment of the test results**

Add:

When a layer of tissue paper is used, there is to be no ignition of the tissue paper or scorching of the white pine wood board, a slight discoloration of the white pine wood board being neglected.



## **Attachment G** (informative)

### **References**

For the study supporting this Standard, the following documents were consulted:

**AENOR - ASOCIACION ESPAÑOLA DE NORMALIZACION Y CERTIFICACION**  
UNE-EN 50088:1996. Seguridad de los juguetes eléctricos.

**BSI - BRITISH STANDARDS INSTITUTION**  
BS-EN 50088:1996. Safety of electric toys.

*The present document was translated into English and revised by independent translators.*



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**ICS 97.190; 97.200.50**

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## **Synthesis of the study phase**

### **MERCOSUR Standard project 04:00-01-6**

#### **Safety of toys. Part 3: Safety of electric toys**

## **1 INTRODUCTION**

This part of this MERCOSUR Standard concerns the safety of electric toys. It also applies to electric erection sets and functional electric toys, and shall be applied with part 1 of this Standard.

This Standard also applies to toys in which electricity is used for functions other than the principal function

This MERCOSUR Standard was developed by CSM 04 - Sectoral Mercosur Committee for Toys.

The base text for the MERCOSUR Standard 04:00-01-4 draft was prepared by (IRAM) in Argentina

## **2 SPECIALIZED COMMITTEE**

This Standard was prepared by CSM 04 – Toys, and the Technical Secretary of CSM 04 was performed by IRAM.

The active members that participated in the preparation of this document were:

ABNT – Associação Brasileira de Normas Técnicas

INTN – Instituto Nacional de Tecnología y Normalización

IRAM – Instituto Argentino de Normalización

UNIT – Instituto Uruguayo de Normas Técnicas

## **3 PREVIOUS HISTORY**

### **AENOR- ASOCIACIÓN ESPAÑOLA DE NORMALIZACIÓN Y CERTIFICACIÓN**

UNE-EN 71-3:1997 Seguridad de los juguetes. Parte 3: Migración de ciertos elementos.

### **BSI- BRITISH STANDARDS INSTITUTION**

BS-EN 50088:1996. Safety of electric toys.

## **4 CONSIDERATIONS**



The base text for the MERCOSUR Standard 04:00-01-6 was prepared by Argentina, based on the EN 50088: 1996, in the UNE and BS versions.

It was submitted to the standardization agencies of the MERCOSUR member countries on September 17, 2001, for analysis by the Study Committees.

The draft was discussed in the technical meeting carried out in Buenos Ayres from October 29th to October 31<sup>st</sup>, 2001, in which form changes were made, and approved as a MERCOSUR Standard Draft.

It was submitted to vote in the CSM 04 in the period of 01/01/2002 to 03/31/2002.

During the voting period, approving vote was received from IRAM (Argentina) with observations regarding form, which were accepted and incorporated to the draft. Approving vote was received from ABNT (Brazil) without observations, while UNIT (Uruguay) and INTN (Paraguay) refrained from voting.

Thus, the Draft was approved as Proposed MERCOSUR Standard.

The Draft was sent to AMN, according to the established in the MERCOSUR Standard Elaboration Procedures, for edition and approval as MERCOSUR Standard NM 300-6, in November, 2002.

