

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

*Copy for the  
new merchandise*

EN 71  
Part 1

*ZENTRUM  
PART 1.2.3*

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Key words: Toys, safety requirements, specifications, building codes, mechanical properties, physical properties, tests, packing, marking, technical notices

English version

## Safety of toys Part 1 : Mechanical and physical properties

Sécurité des jouets

Partie 1: Propriétés mécaniques et physiques

Sicherheit von Spielzeug

Teil 1: Mechanische und physikalische Eigenschaften

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Central Secretariat or to any CEN 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 CEN member into its own language and notified to CEN Central Secretariat has the same status as the official versions.

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# CEN

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

Central Secretariat: rue Bréderode 2, B-1000 Brussels

### Brief history

The Commission of the European Communities (CEC) informed in March 1985 the CEN Technical Board (CEN BT) of the activities of the Commission concerning the preparation of a new proposal for an EEC-directive within the field of safety of toys (now published as Council Directive 88/378/EEC of 3 May 1988).

On 1987-02-20 the Commission submitted a draft standardization request to CEN. This request charges CEN with executing the adaptation of the European Standards EN 71 Parts 1 and 2 to the essential safety requirements and general measures forming part of the draft directive on safety of toys.

The draft standardization request was accepted by the CEN Technical Board on 1987-03-19/20. The acceptance was based on the recommendations made by a workshop on toys held in Brussels on 1987-02-04.

The CEN/TC 52 secretariat requested the members of the committee to consider, before 1987-04-01, whether EN 71 Parts 1 and 2 or the corresponding ISO Draft Proposals should form the basis of the carrying into effect of the mandate given by CEC. The enquiry showed that a small majority was in favour of basing the revision on the ISO Draft Proposals. However, the secretariat has estimated

that such a revision would be impossible to carry out without an unreasonable exceeding of the time limit given by CEC.

Consequently, EN 71 Parts 1 and 2 were circulated on 1987-07-15 for enquiry. At the same time CEN/TC 52 established working groups with the tasks of carrying out the revision. They met in October 1987 in Manchester where the first proposals for revisions of EN 71 Parts 1 and 2 were prepared.

The enquiry showed that it would be possible to prepare final drafts for revisions of Parts 1 and 2. The final drafts were prepared on March 13, 14 and 15, 1988, in Stockholm. On March 15, 1988, CEN/TC 52 approved submission of the revised drafts to the CEN Central Secretariat for the formal voting procedure as final draft European Standards.

In accordance with the Common CEN/CENELEC Rules, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## Foreword

This European Standard consists of the following parts:

Part 1: Mechanical and physical properties

Part 2: Flammability properties

Part 3: Migration of certain elements

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 use presupposes certain aptitudes.

Apart from the risks which are inherent in the use of some of the toys and which are self-evident (instability of scooters, sharp needles in a sewing kit, etc), and assuming that the toys are used in the manner intended, they should not present any further risk to children for whom they are intended. Allowance should also be made for normal or reasonably foreseeable use, bearing in mind the normal behaviour of children who do not generally share the same degree of care as the average adult user.

Accidents or incidents 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 that for which it was designed. Great care should be taken therefore when choosing a toy or game; account should be taken of the mental and physical development of the child who will be using it. The requirements of the standard do not release parents and educators from their responsibility of watching over the child while he or she is playing.

The requirements in the standard, which apply to new toys, take account of the fact that toys are subjected to a certain amount of wear and tear in use. Nevertheless, the person in charge should ensure that the child can safely be left with the toy.

This standard does not cover electrical safety aspects of toys.

Legal requirements exist in particular countries.

The principal changes included in this revised Part 1 are that:

- some requirements have been brought up to date
- requirements for expanding materials, toys made of flexible materials, teethers, and aquatic toys have been included
- tests for expanding materials, accessibility, edges, points, seams, folding mechanisms, non-detachable components, rattles and teethers have been included
- some requirements regarding marking and instructions have been included for toys to be assembled, skates and skateboards, aquatic toys, toy caps, toys intended to be strung across a cradle, cot or perambulator and for teething rings
- requirements for fuel using equipment have been deleted.

## 1 Object

This European Standard specifies requirements and describes methods of test to be taken into account in the manufacture of toys for children.

Its aim is to reduce as far as possible those risks which are not evident to users and it does not cover inherent dangers that are obvious to children or the persons in charge of them.

This Part of this European Standard specifies requirements and methods of tests for mechanical and physical properties of toys. It also specifies some requirements for packaging, marking and instructions for use.

## 2 Field of application

The standard applies to toys for children, being any product or material designed or clearly intended for use in play by children of less than 14 years of age. It includes specific requirements for toys intended for children under 36 months.

The standard does not cover the following items which are not considered as toys for the purpose of this standard:

- Christmas decorations
- Detailed scale models for adult collectors
- Equipment intended to be used collectively in playgrounds
- Sports equipment
- Aquatic equipment intended to be used in deep water
- Folk dolls and decorative dolls and other similar articles for adult collectors
- "Professional" toys installed in public places (shopping centres, stations, etc.)
- Puzzles with more than 500 pieces or without picture, intended for specialists
- Air guns and air pistols
- Fireworks, including percussion caps except percussion caps specifically designed for toys
- Slings and catapults
- Sets of darts with metallic points
- Electric ovens, irons or other functional products operated at a nominal voltage exceeding 24 V
- Products containing heating elements intended for use under the supervision of an adult in a teaching context
- Vehicles with combustion engines
- Toy steam engines
- Bicycles, except for those considered to be toys, i.e. those having a saddle that can reach the height of 635 mm
- Video toys that can be connected to a video screen, operated at a nominal voltage exceeding 24 V
- Babies' dummies
- Faithful reproductions of real fire arms
- Fashion jewellery for children.

If a toy is intended to be assembled by a child, the requirements apply to each unit made available to the child and to the assembled toy. (See 6.1.)

If a toy is intended to be assembled by an adult, the requirements apply to the assembled toy. (See 6.1.)

### 3 Requirements

#### 3.1 Materials

Toys shall be so designed and manufactured as to meet the requirements of hygiene and cleanliness in order to avoid any risk of infection, sickness and contamination.

Materials shall in particular be visually clean and visually free from infestation.

##### 3.1.1 Flexible plastics sheeting

Sheets of flexible plastics without any backing (for example, as used for making aprons) of an area greater than 100 mm x 100 mm shall have an average thickness of not less than 0,038 mm, the average value being determined from measurements taken at 10 places on the diagonal of the piece.

The requirement on thickness does not apply for sheets, which makes it possible for the child to breathe through the sheet, and which is unable to form a vacuum and stick to the face of the child. To comply with this requirement any area of maximum dimensions 30 mm x 30 mm shall have a minimum hole area of 1 %.

##### 3.1.2 Wood

Wood shall not display any insect holes and knots shall not be loose.

The surfaces and accessible edges (see 3.2.1.1) of wooden toys shall not have splinters.

##### 3.1.3 Glass

Glass shall not be used in the construction of toys for children under 36 months except that it may be used for glass balls for rattles and solid glass eyes.

Glass may be used in the construction of toys for children over 36 months only where its use is necessary to the function of the toy (for example optical toys), for reinforcement, textile glass and for solid glass marbles.

Scientific kits and scale models may contain small glass vessels. Where such vessels are intended to be exposed to heat, only borosilicate glass shall be used.

Where glass is used, its edges shall be rounded and, if necessary, protected. This does not apply to microscope slides and cover slips.

##### 3.1.4 Stuffing materials

Soft stuffing materials shall not contain any hard or sharp objects, such as metal particles, nails, needles, and splinters of wood, glass or plastics.

Stuffing materials in the form of granules with a maximum dimension of 3 mm or less shall be enclosed in an internal casing which is not itself the outer surface of the toy.

In the case of toys made of flexible materials (such as textiles) which are stuffed with granules with a size of 3 mm or less, when tested in accordance with 4.13, at least one casing shall be able to withstand a tensile force of 70 N at the seams and also at other parts of the covering. It shall be possible to apply this force in any direction.

##### 3.1.5 Expanding materials

Seeds and other expanding materials that have dimensions which increase by more than 5 % of their initial value, when tested in accordance with 4.16, shall not be used.

#### 3.2 Construction

##### 3.2.1 General requirements

###### 3.2.1.1 Edges

The accessible edges of toys as determined in accordance with 4.17 shall comply with (see exceptions below) the following requirements:

- a) accessible metal edges having a thickness of less than 0,5 mm shall either
  - 1) not be sharp edges as determined in accordance with 4.18; or
  - 2) be folded, rolled or spiralled (see figure 1); or
  - 3) be protected by a plastics coating.
- b) accessible edges of metal and plastics shall be free from burr.

Functional cutting edges shall be used only in toys intended for children over 36 months. The potential dangers presented by such edges shall be drawn to the attention of users (see 6.3).

Edges of pieces intended to serve as electrical conductors (e.g. fish plates joining the metal tracks of electric trains) are deemed as functional cutting edges in the sense of the preceding paragraph.

###### 3.2.1.2 Overlap joints

When the clearance, *l* (see figure 2) between the sheet metal and the underlying surface is greater than 0,7 mm, the edge of the sheet metal shall comply with 3.2.1.1.

###### 3.2.1.3 Fastenings

The pointed ends of screws, nails and similar fastenings used in the manufacture of toys shall not be accessible as determined in accordance with 4.17.

Accessible parts of fastenings shall be free from burr.

If a fastening has a head which is intended to be counter-sunk, no part of the head shall protrude above the surface of the finished toy.

These requirements apply before and after any tests specified in this standard for the toy under consideration.

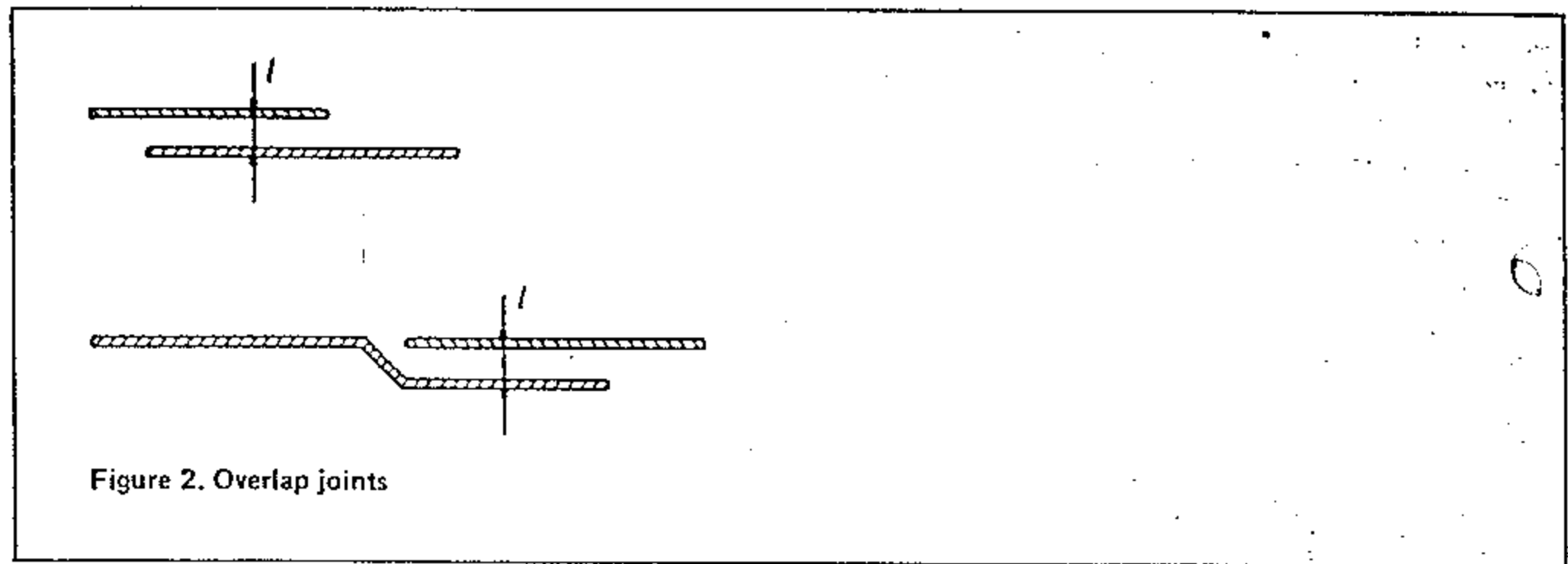
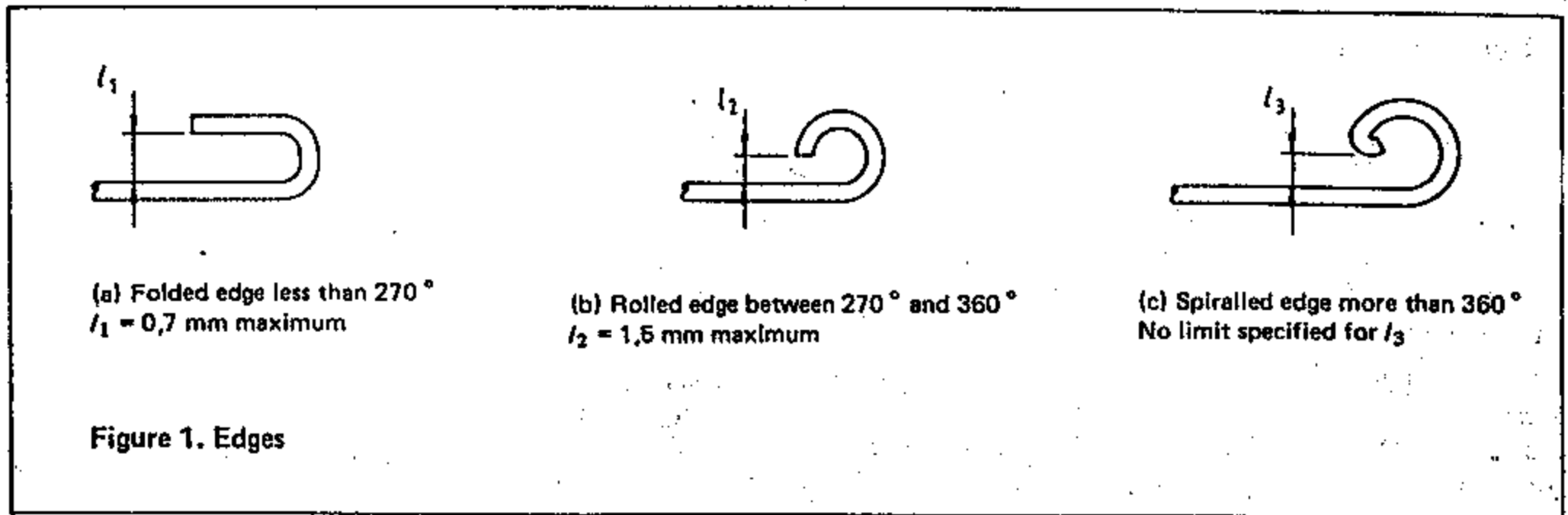
###### 3.2.1.4 Points and wires

The accessible points and wires as determined in accordance with 4.17 shall either:

- 1) not have sharp points as determined in accordance with 4.19; or
- 2) be provided with a protective substance; or
- 3) be rounded, blunted or bent into a ball.

This requirement applies before and after any tests specified in this standard for the toy under consideration.

The requirement does not apply to sharp points which are essential for the functioning or design of toys intended for children over 36 months.



The potential dangers presented by such sharp points shall be drawn to the attention of the users (see 6.3) except for sharp points on wires intended to serve as electrical conductors which are deemed as functional points in the sense of the preceding paragraph.

Wires likely to be bent by the child shall not break when tested in accordance with 4.1.

When a toy contains wires, bars or pegs of metal which have pointed ends but which are not directly accessible (e.g. chiming mechanisms), the casing containing these points shall not be damaged when the toy is tested in accordance with 4.3. If there is no damage after testing in accordance with 4.3 the toy shall be tested in accordance with 4.14 and there shall be no damage.

#### 3.2.1.5 Tubes and similar rigid components

Tubes, bars, levers or other similar rigid components protruding from the body of the toy and which, by their make-up, diameter or length might possibly injure a child falling on the toy when the toy is at rest, shall be protected.

If such protection consists of a separate component, this component shall be tested in accordance with 4.2 and shall not become detached.

#### 3.2.1.6 Folding mechanisms

Toys having sliding or folding parts shall be manufactured in such a manner as to prevent risk of injury through crushing.

Folding mechanisms on collapsible toys, (e.g. toy ironing boards, toy pushchairs), shall be equipped with a safety stop or locking device to prevent unexpected or sudden movement or collapse of the article.

Alternatively, toys shall have clearance to give protection to the fingers, hands or toes against crushing or laceration in the event of sudden collapse of the article. Any such clearance shall admit a 12 mm diameter rod.

When tested in accordance with 4.20.2 after loading there shall be no collapse of the toy nor tilting likely to cause injury due to entrapment.

When toy pushchairs and other similar articles are tested in accordance with 4.20.1 a), the safety stop or locking device shall not fail. There shall be no collapse of the frame.

When folding mechanisms on other collapsible toys are tested in accordance with 4.20.1 b), the safety stop or locking device shall not fail. There shall be no collapse of the frame.

#### 3.2.1.7 Hinges

Toys having two parts joined by means of one or more hinges (toys with a door or a lid) and with a space between the assembled edges, shall be so constructed that this space is less than 5 mm or greater than 12 mm in any position of the door or lid.

This requirement does not apply to any part of the hinge arrangement having a mass of less than 250 g.

### 3.2.1.8 *Driving mechanisms*

Driving mechanisms (such as gears, belts, winding mechanisms, whether driven electrically, by friction or clock-work, but excluding such mechanisms when they form part of a construction toy or a toy covered by 3.2.2.7) forming an integral part of a toy shall be so enclosed that moving parts liable to jam the fingers or otherwise injure a child cannot be touched.

When toys with such mechanisms are tested in accordance with 4.3, the mechanism shall not become accessible as determined in accordance with 4.17.

The shape and dimensions of winder keys or starting handles shall be such that the clear space between the key or the handle and the body of the toy is less than 5 mm or greater than 12 mm.

If starting cords less than 1,5 mm in diameter are used for mechanisms in toys for children under 36 months, the recoil force of the mechanisms shall not exceed 4,5 N.

### 3.2.1.9 *Springs*

Accessible springs as established in accordance with 4.17 shall be protected if, during use of the toy, the spring might trap the fingers of a child or injure it in any other way.

In the case of spiral springs, protection shall be provided if the gap between two consecutive spirals is greater than 3 mm when the spring is at rest.

In the case of tension springs, protection shall be provided if the gap between two consecutive turns is greater than or equal to 3 mm when the spring is subjected to a tensile force of 40 N and the spring returns to its original position after unloading.

In the case of compression springs protection shall be provided if the gap between two consecutive turns is greater than or equal to 3 mm at rest and the spring, when the toy is used, can be subjected to a force of 40 N or more.

## 3.2.2 *Requirements applicable to certain types of toys*

### 3.2.2.1 *Small toys and detachable components*

Toys and detachable components of toys for children under 36 months shall not, whatever their position, fit wholly within the cylinder specified in 4.15.

### 3.2.2.2 *Non-detachable components*

In the case of toys for children under 36 months to which components made from glass, metal, wood or other non-pliable material are attached, either:

- these components shall be so embedded that the child cannot grip them with his teeth or fingers; or
- these components shall be so fixed to the toy that they cannot become detached when tested in accordance with 4.21; or
- if a component becomes detached when tested in accordance with 4.21, it shall not fit wholly within the cylinder specified in 4.15 when tested as described therein, and it shall have no sharp edges or sharp points when tested in accordance with 4.18 and 4.19 respectively.

Soft toys (e.g. stuffed, plush and textile animals, soft-bodied babydolls or character dolls for holding or cuddling and textile dolls with simple features) are considered as toys intended for children under 36 months.

### 3.2.2.3 *Toys intended to be put to the mouth*

Mouth actuated toys that contain either loose objects, such as spheres in a whistle, or inserts, such as reeds in a noisemaker shall not release an object that will fit within the cylinder specified in 4.15 when air is alternately blown and sucked through the mouthpiece at a pressure of 10 kPa. If the air outlet is capable of being inserted into or covered by the mouth, then the procedure shall also be applied to the outlet.

These requirements apply to toys such as noisemakers that are intended to be repeatedly actuated by blowing or sucking, and do not apply to certain types of inflatable toys that are intended for continuous use in the inflated form.

### 3.2.2.4 *Toys intended to be used in a cradle, cot or perambulator*

Cords of toys for use in cradles, cots and perambulators other than those cords intended to be fixed across a cradle, cot or perambulator shall have a free length of not more than 300 mm and the length of the periphery of any loop shall not exceed 350 mm. These requirements also apply to elastic cords when stretched by a force of 25 N.

Elastic cords intended to be fixed across a cradle, cot or perambulator, when stretched using a force of 25 N, shall not exceed 750 mm in length, and their length under these conditions shall be not more than 40 % longer than their relaxed length.

A warning shall be given (see 6.12).

### 3.2.2.5 *Toys intended to be pulled along by the child*

Cords of toys intended to be pulled along shall not include slip knots or fastenings likely to form a slip knot. In addition, cords of such toys for children under 36 months shall be not less than 1,5 mm thick.

### 3.2.2.6 *Toys which a child can enter*

In the case of toys large enough to contain a child and having a door, lid or similar device, it shall be possible for a child to open the door, lid or similar device, easily from the inside with a force of 50 N. This requirement notably precludes the use of buttons, zips and similar fastenings.

When the doors, lids and similar devices are closed, ventilation shall be ensured.

### 3.2.2.7 *Toys intended to bear the mass of a child*

#### 3.2.2.7.1 *Toys propelled by a child*

Toys propelled by, and intended to bear the mass of, a child (e.g. tricycles, scooters, cars) shall comply with the following requirements:

- the toy, when tested in accordance with 4.4 and 4.5, shall not break and it shall still comply with the relevant requirements of this standard;

- b) the toy, when tested in accordance with 4.6, shall not tip over. This requirement does not apply to toys with two aligned wheels (e.g. scooters, bicycles even when fitted with stabilizers);

## NOTE

Wheels with a spacing of 150 mm or less between the centres of the outermost wheels are considered to be a single wheel.

- c) mechanically or electrically propelled toys with a free wheeling facility or a neutral gear position (i.e. those that move freely on a slope of  $10^\circ$  when loaded as in 4.6) shall have a braking device;

## NOTE

The requirement does not apply to the following:

- 1) toys in which the hands or feet provide the motivating power to the driving wheel or wheel via a direct mechanical transmission (e.g. pedal cars);
- 2) electrically propelled ride-on toys which are propelled at a maximum speed of 1 m/s unloaded, have a seat height below 300 mm and in which the feet are free.

The device shall be such that, when the toy is tested in accordance with 4.7 the toy shall not move.

Electrically propelled ride-on toys shall be operated by means of a switch which cuts off the power automatically when it is released, without tilting the toy.

- d) propelling chains shall have, at the side where the leg of the child brushes the chain (side A), a shield from the crank to the gear wheel and, on the opposite side (side B), a shield around the crank (see figure 3).

It shall not be possible to remove the shield without the use of tools;

- e) any wheels propelled directly by pedals shall be solid, except that slots or holes of a width of 5 mm or less may be made in them;
- f) spaces between wheels and the body or parts of the toy (e.g. mudguards) shall be less than 5 mm or more than 12 mm.

## 3.2.2.7.2 Toys not propelled by a child

Toys not propelled by, but intended to bear the mass of, a child (e.g. rocking horses, garden slides, see-saws), but excluding swings, shall comply with the following requirements:

- a) the toy, when tested in accordance with 4.4, shall not break and it shall still comply with the relevant requirements of this standard;
- b) the toy, when tested in accordance with 4.6, shall not tip over. This requirement does not apply to toys with a device for fixing them to the ground (e.g. garden slides) and toys which for evident reasons cannot be considered as being stable (e.g. big balls and soft toy animals);
- c) if the toy is designed to be used in the open air, means shall be provided to ensure that water that might otherwise accumulate inside the toy is constantly able to drain away.

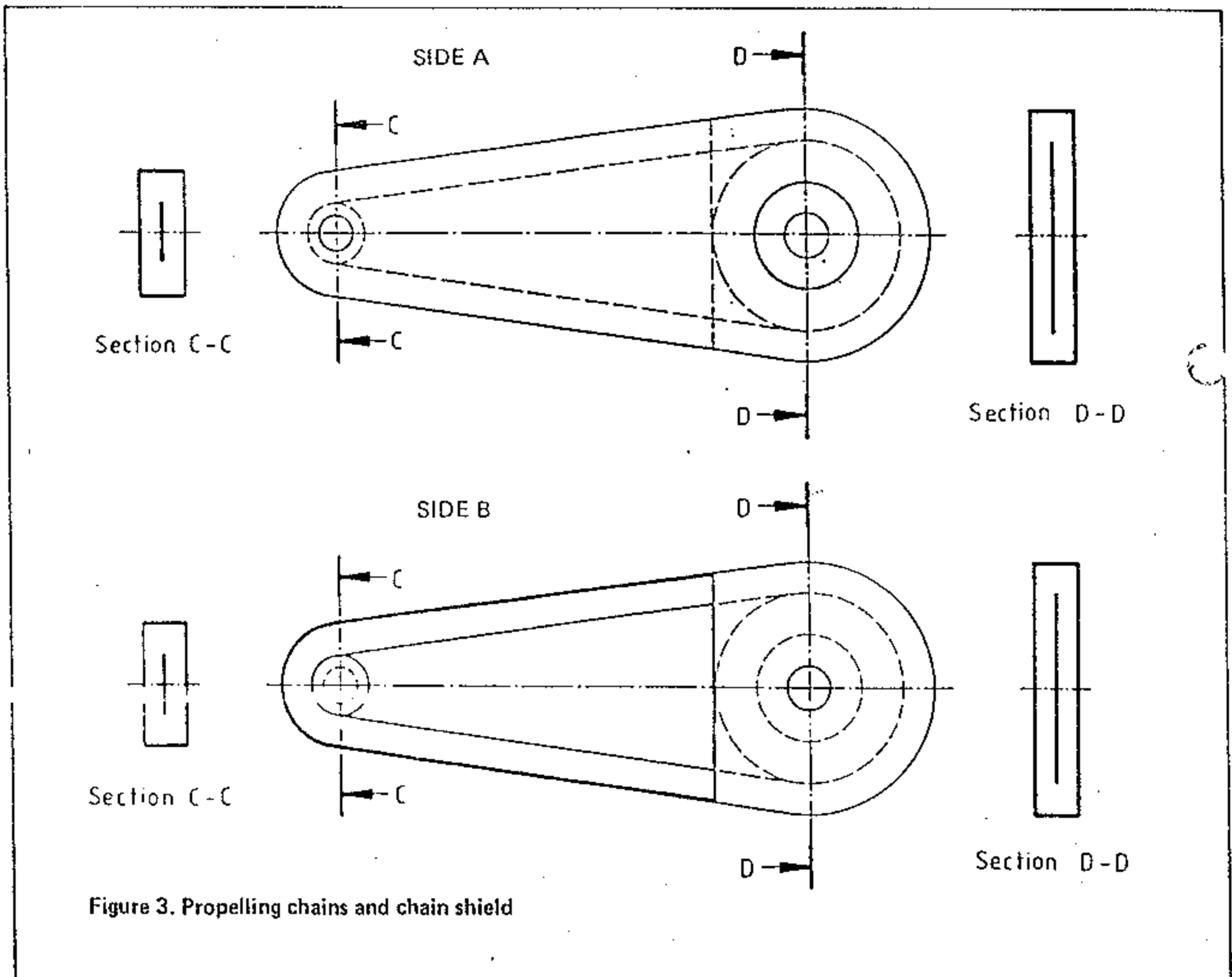


Figure 3. Propelling chains and chain shield

**3.2.2.7.3 Swings**

Swings shall comply with the following requirements:

- a) swings, when tested in accordance with 4.8, shall not break and they shall still comply with the relevant requirements of this standard;
- b) the means of suspension (e.g. ropes, chains) shall have a minimum average diameter of 10 mm. Suspension hooks shall be wound over at least 540°;
- c) when a safety device is provided, it shall be so designed as to prevent the child from falling off the seat;

The following means are considered appropriate:

- a protective bar situated between 200 mm and 300 mm above the seat;
- a device to fasten the child to the seat (e.g. a harness), which is provided with a crotch strap when the swing is intended for children of 36 months or less;

- d) the need to check regularly the suspension system shall be drawn to the attention of users (see 6.4).

**3.2.2.8 Heavy immobile toys**

Immobile toys with a mass greater than 5 kg and intended to rest on the floor but not to bear the mass of a child, when tested in accordance with 4.9, shall not tip over.

**3.2.2.9 Toys containing a heat source**

Toys containing a heat source shall not catch fire during continuous operation.

The rise in temperature of parts that are intended to be touched by the hand, e.g. handles, knobs, controls and grips, shall not exceed the following values when the toy is operated in accordance with 4.10:

- parts of metal: 25 K
- parts of glass, porcelain: 30 K
- parts of plastics, wood: 35 K

The rise in temperature of other accessible parts of the toy as established in accordance with 4.17 shall not exceed the following values:

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

Liquids and gases contained within toys which have a heat source shall not reach temperatures or pressures which are such that their escape from a toy, other than for reasons essential to the proper functioning of the toy, might cause burns, scalds or other physical injury.

**3.2.2.10 Toy projectiles and toys with projectiles****3.2.2.10.1 General requirements**

All rigid projectiles shall have a tip radius of not less than 2 mm.

Resilient materials used as impact surfaces shall not become detached when subjected to a tensile force of 60 N, when tested in accordance with 4.2.

If discharge mechanisms are able to discharge missiles other than those provided with the toy, the potential danger of using the wrong missiles shall be drawn to the attention of users. Any toy capable of discharging a projectile with a kinetic energy greater than 0,08 J shall carry a warning against discharging the missile at point-blank range (see 6.6).

**NOTE**

It is strongly recommended that manufacturers so design toys that they are not able to discharge missiles other than those provided with the toy.

**3.2.2.10.2 Projectile toys for which the kinetic energy is determined by the child**

The points of darts shall not be made of metal; points fitted with magnetic discs are permitted.

Projectiles in the form of air-planes and arrows (for example for spring loaded guns and pistols, cross-bows and pea-shooters) shall not be made of metal. Their ends shall be blunted. The impact surface(s) of such projectiles shall be protected by a resilient material (e.g. rubber) having an impact cross sectional area of at least 3 cm<sup>2</sup>.

**3.2.2.10.3 Projectile toys for which the kinetic energy is determined by the toy**

The mean kinetic energy of the projectile, when tested in accordance with 4.11, shall not exceed:

- 0,08 J for rigid projectiles without resilient impact surfaces
- 0,5 J for resilient projectiles or projectiles with resilient impact surfaces (e.g. rubber).

In addition, arrows (for example for spring loaded guns, pistols and cross-bows) shall not be made of metal and their ends shall be blunted.

In the case of arrows whose mean kinetic energy exceeds 0,08 J their impact surface(s) shall be protected by a resilient material (e.g. rubber). The mean kinetic energy per unit area of the resilient impact surface shall not exceed 0,16 J/cm<sup>2</sup> when tested in accordance with 4.11.

**3.2.2.11 Non-projectile imitation weapons**

Non-projectile imitation weapons (e.g. knives, swords, axes) shall not have any functional edges or functional points.

**3.2.2.12 Imitation protective equipment**

In the case of imitation protective equipment (e.g. eye-protectors, diving masks), when tested in accordance with 4.12, transparent materials shall not crack.

Imitation protective helmets (e.g. motorcycle helmets, industrial safety helmets) and imitations of eye-protectors shall carry a marking to draw attention to the fact that they offer no protection (see 6.7).

**3.2.2.13 Rattles and teethers**

When the rattle is tested first in accordance with 4.3 and then 4.14, the casing shall not break.

When liquid filled teethers are tested in accordance with 4.23, there shall be no leakage of the contents nor any splitting, cracking or other damage causing or which could lead to leakage of contents. Liquid filled teethers shall be marked (see 6.13).

When tested in accordance with 4.22 no part of the rattle and teether shall protrude past the base of the templates A and B.

**3.2.2.14 Kites and other flying toys**

Strings for kites and other flying toys shall be made of non-metallic material.

The potential danger of flying a kite near to overhead power lines shall be drawn to the attention of users (see 6.8).



### 3.2.2.15 Aquatic toys

The term aquatic toys includes articles, whether inflatable or not, intended to be used by children, as instruments of play and generally under the supervision of adults, in shallow water. Bath toys are not considered as aquatic toys.

Arm bands for swimming are considered as aquatic toys except when they have at least two air chambers (for each arm band) and if the pair of arm bands give a buoyancy (equal to the Archimedian pressure when the article is completely submerged) greater than or equal to 30 N.

Inflatable aquatic toys shall have non-return valves.

The potential danger of using aquatic toys shall be drawn to the attention of the user (see 6.10).

## 4 Methods of test

Unless otherwise specified in clause 3, check compliance with the requirements of this standard by visual inspection and measurement of distances, gaps, pull forces, etc. as appropriate.

### 4.1 Flexibility of wires (see 3.2.1.4)

Grip the wire firmly by two metal cylinders each of diameter 10 mm. Bend the wire from the upright to one side through  $60^\circ$  and then bend in the opposite direction through  $120^\circ$  and finally return to the initial position (one cycle). Repeat the test 30 times at a rate of one cycle per second, with a rest of 20 s after each 10 cycles.

Examine whether the wire breaks.

### 4.2 Reaction of protective components to traction (see 3.2.1.5)

Subject the part to be tested to a tensile force determined by the mass of the toy or 60 N, whichever is greater.

Examine whether the part becomes detached from the toy.

### 4.3 Drop strength (see 3.2.1.4, 3.2.1.8 and 3.2.2.13)

Hold the toy in its normal position of use (if this can be determined) and drop it five times through a height of  $850 \text{ mm} \pm 50 \text{ mm}$  on to a 4 mm thick steel plate, which has a 2 mm thick coating of Shore A hardness  $75 \pm 5$  and which is placed on a non-flexible horizontal surface.

Examine whether the mechanism has become exposed or, for rattles, whether the casing has been damaged.

### 4.4 Static strength (see 3.2.2.7.1 and 3.2.2.7.2)

Load the toy, on its standing or sitting surface, with a mass of 50 kg for 5 min.

Remove the load and examine whether any part of the toy is broken and whether the toy still complies with the relevant requirements of this standard.

### 4.5 Dynamic strength (see 3.2.2.7.1)

Load the toy with a mass of 50 kg, the centre of gravity of which is 150 mm above the surface on which the child sits or 400 mm above the surface on which the child stands.

Attach the load so that the forces act at the positions corresponding to normal use of the toy. Drive the toy three times against a 50 mm high non-resilient step at a speed of 2 m/s.

Remove the load and examine whether any part of the toy is broken and whether the toy still complies with the relevant requirements of this standard.

### 4.6 Stability (see 3.2.2.7.1 and 3.2.2.7.2)

Load the toy as in 4.5 and stand it in the most unfavourable position on a plane inclined at  $10^\circ$ .

Examine whether the toy tips over.

### 4.7 Braking (see 3.2.2.7.1)

Load the toy as in 4.5 and stand it on a plane inclined at  $10^\circ$  with its longitudinal axis parallel to the incline.

Apply a force of 50 N to the control of the braking device.

Examine whether the toy moves.

If the brake is operated by a handle, apply the force of 50 N at right angles to the axis of the handle, at the middle of the handle.

If the brake is operated by a pedal, apply the force of 50 N in the operating direction producing the brake.

If the vehicle has several brakes, test each brake separately.

### 4.8 Strength of swings (see 3.2.2.7.3)

Load the toy for 1 h on its standing or sitting surface, uniformly by a mass of 200 kg. Reduce this mass to 66 kg for swings intended for use on frames with suspension points less than 120 cm above base level and which have a safety device to prevent the child falling from the seat.

Remove the load and examine whether any part of the toy is broken and whether the toy still complies with the relevant requirements of this standard.

### 4.9 Stability of heavy toys (see 3.2.2.8)

Stand the toy in the most unfavourable position on a plane inclined at  $5^\circ$ . Adjust any moving parts so as to produce the most unfavourable position for stability.

Examine whether the toy tips over.

### 4.10 Temperature rises (see 3.2.2.9)

In an ambient temperature of  $(25 \pm 3)^\circ\text{C}$ , operate the toy in accordance with the instructions for use at the maximum input, until equilibrium temperature is reached.

Measure the temperature of the accessible parts and calculate the temperature rises.

Examine whether the toy ignites.

### 4.11 Projectiles (see 3.2.2.10)

Determine the mass of the projectile.

Measure the projectile velocity by releasing it five times at the timing or other proving device, at a distance from the device such that its velocity has reached a maximum.

Calculate the energy to an accuracy of  $\pm 0,005 \text{ J}$  using the mean value of the velocity.

### 4.12 Imitation protective equipment (see 3.2.2.12)

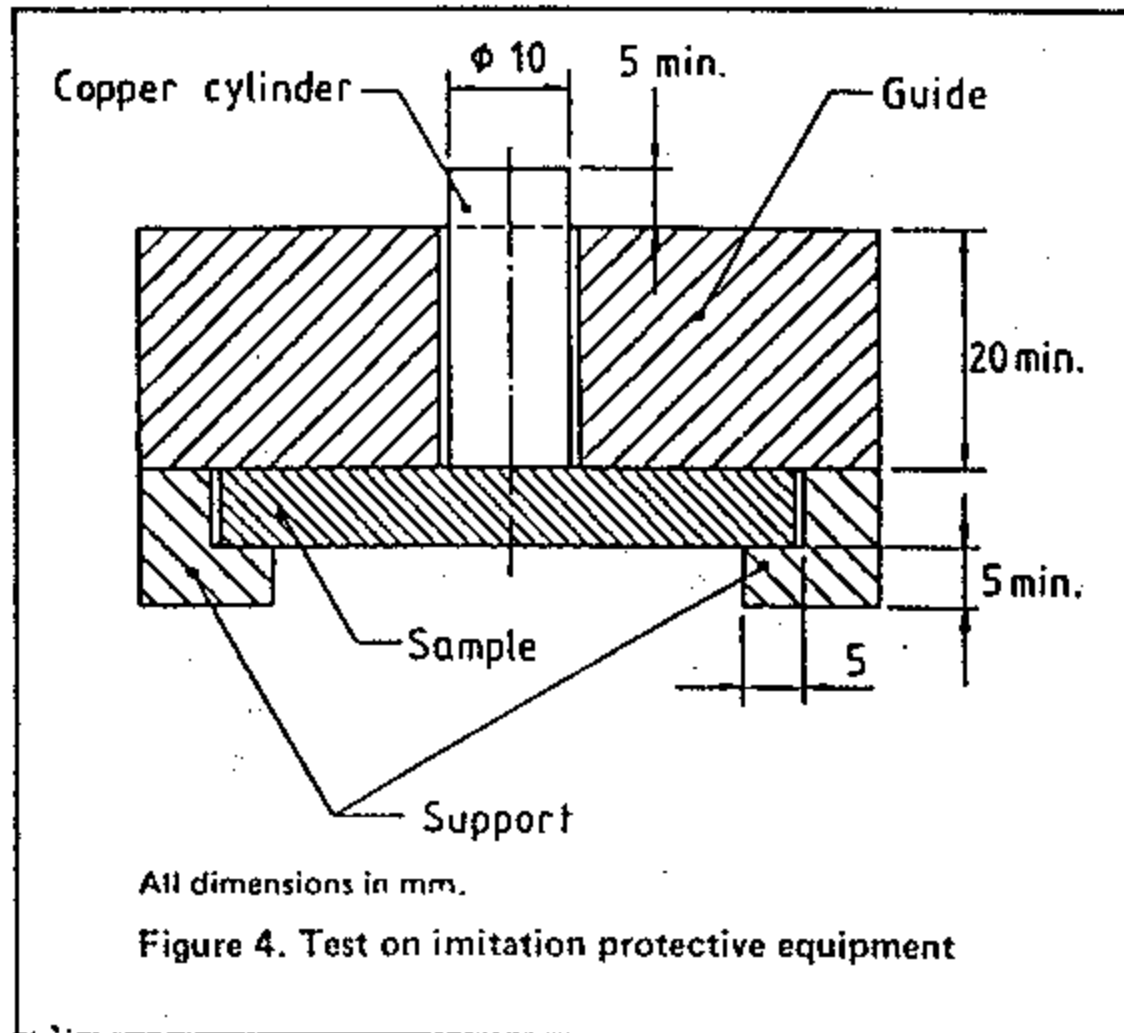
Separate the transparent material from the toy. Place the material in the apparatus as shown in figure 4, so that it is supported all along its periphery. The support shall be made of rigid material adapted to the sample.

Carry out the test at a temperature of  $(20 \pm 3)^\circ\text{C}$ . Drop, in free fall, a mass of 1 kg through a distance of 100 mm onto the top of the cylinder. Examine whether the material is cracked.

### 4.13 Tensile strength of seams (see 3.1.4)

#### 4.13.1 Principle

The seam is subjected to a tensile force.



#### 4.13.2 Apparatus

A tensile testing machine or a dead-weight arrangement with means to measure a force up to 70 N with an accuracy of  $\pm 2$  N.

Clamps with jaws to which are attached 19 mm diameter washers.

Means to connect the clamps to the force source.

#### 4.13.3 Procedure

Attach the clamps to the cover material such that the outside of the 19 mm washer is close to but at least 13 mm from the sewing thread.

Apply a force of 70 N gradually over 5 s and maintain for 10 s.

Examine whether there are broken threads in the seam or separation of the cover material adjacent to the seam.

Do not perform this test if the material adjacent to the seam cannot be grasped sufficiently for full clamping by the 19 mm washer jaws.

Instead, perform the test on an arm, leg or other appendage of the toy.

#### 4.14 Strength of toys (see 3.2.1.4 and 3.2.2.13)

Place the toy on a plane, horizontal steel surface and drop a metallic mass of 1 kg, distributed over an area of 50 cm<sup>2</sup>, through a distance of 100 mm on to the toy.

Examine whether the casing has broken.

#### 4.15 Small toys and detachable components (see 3.2.2.1 and 3.2.2.2)

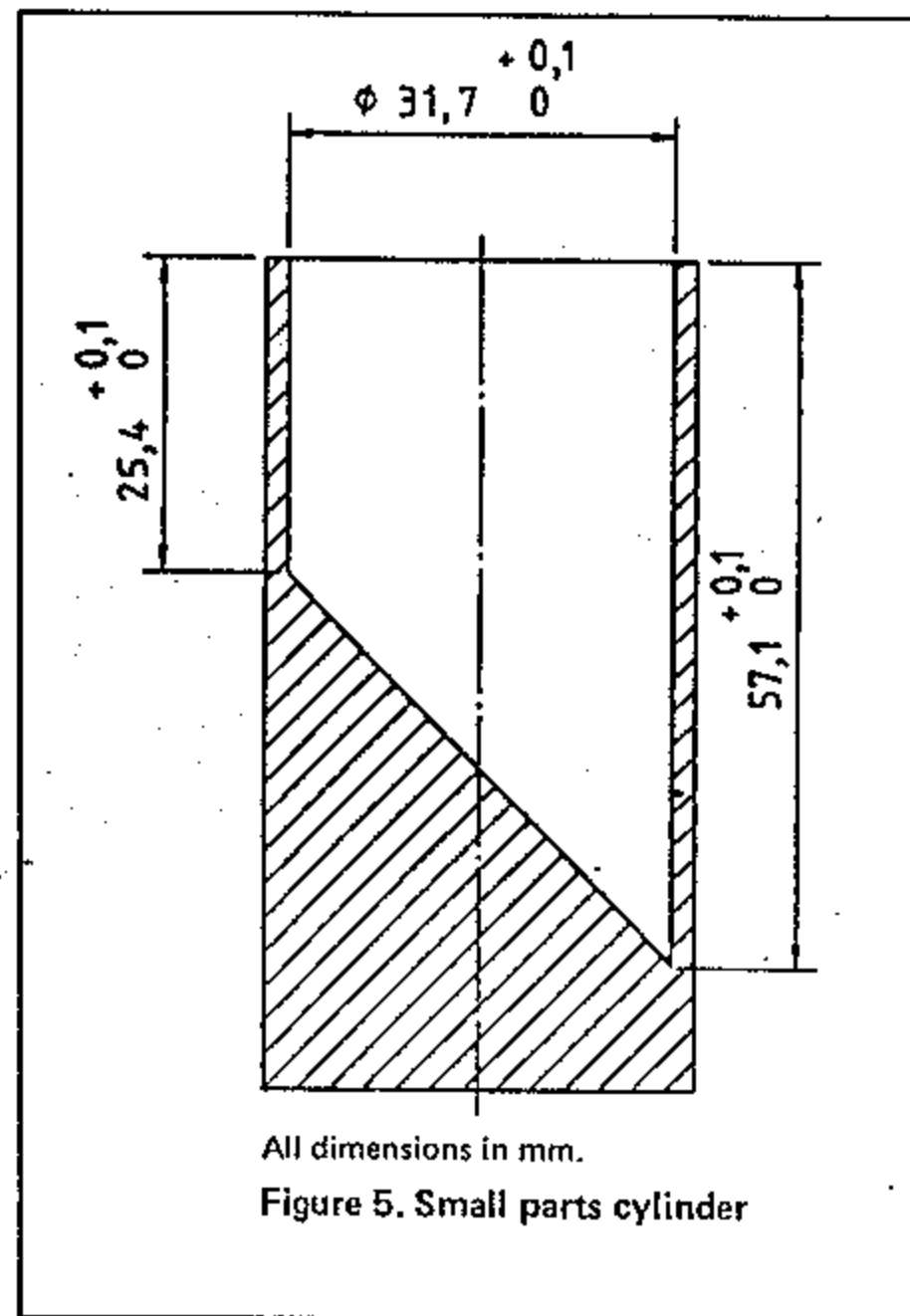
Place the toy or detachable component, without compressing, in a cylinder having dimensions as indicated in figure 5.

Examine whether the toy or detachable component fits wholly within the cylinder.

#### 4.16 Expanding materials (see 3.1.5)

Measure the dimensions of the materials. Place the materials in water at a temperature of  $(20 \pm 3)$  °C for 24 h, and re-measure the dimensions.

#### 4.17 Accessibility of a part or component of a toy (see 3.2.1.1, 3.2.1.3 and 3.2.1.4)



#### 4.17.1 Principle

An articulated probe is manoeuvred to the part or component being tested. If the probe contacts the part or component, that part or component is considered to be accessible.

#### 4.17.2 Apparatus

4.17.2.1 *Articulated accessibility probes* as specified in table 1 and illustrated in figure 6 and manufactured from rigid material. The tolerance on the dimensions shall be  $\pm 0,125$  mm.

#### 4.17.3 Procedure

Remove all components on the toy that are designed to be removed without the use of a tool.

##### NOTE

Where a tool is intended to be used in conjunction with the toy, then all the components on the toy that are capable of being removed by that tool should be removed.

Manoeuvre as follows the appropriate articulated accessibility probe in any convenient attitude, towards the part or component of the toy being tested; if necessary, the probe may be pivoted at any of its joints in the attempt to contact the part or component of the toy.

##### NOTE

Where the part is a sharp point that lies adjacent to a plane surface, such that the gap between the point and the surface is 0,5 mm or less, the point is considered to be inaccessible and the procedure specified in b) need not be carried out.

- For any hole, recess, or other opening having a minor dimension (see note 1) smaller than the collar diameter of the appropriate probe, insert the probe such that the total insertion depth for accessibility is up to the collar;

##### NOTE 1

The minor dimension of an opening is the diameter of the largest sphere that will pass through the opening.

## NOTE 2

Each probe joint may be rotated up to 90° to simulate knuckle movement.

- b) For any hole, recess, or other opening having a minor dimension larger than the collar diameter of probe A but less than 187 mm when probe A is used, or a minor dimension larger than the collar diameter of probe B but less than 230 mm when probe B is used, determine the total insertion depth for accessibility by inserting the appropriate probe, with the extension shown in figure 8 in any direction for up to 2,25 times the minor dimension of the hole, recess, or opening, measured from any point in the plane of the opening;

## NOTE

Each probe joint may be rotated up to 90° to simulate knuckle movement.

- c) For any hold, recess, or other opening having a minor dimension of 187 mm or larger when probe A is used, or a minor dimension of 230 mm or larger when probe B is used, the total insertion depth for accessibility is unrestricted unless the other holes, recesses, or openings within the original hole, recess, or opening are encountered that have dimensions complying with a) or b) of this clause; in such instances follow the procedure in a) or b) as appropriate. If both probes are to be used, a minor dimension that is 187 mm or larger shall determine the unrestricted access.

## 4.17.4 Interpretation of results

A part or component of a toy is deemed to be accessible if it can be contacted by any portion, forward of the collar, of the accessibility probe.

## 4.18 Edges (see 3.2.1.1 and 3.2.2.2)

## 4.18.1 Principle

A self-adhesive tape is attached to a mandrel which is then rotated for a single 360° revolution along the accessible edge being tested. The tape is then examined for the length of cut.

## 4.18.2 Apparatus (see figure 7)

## 4.18.2.1 Mandrel, made of steel

The test surface of the mandrel shall be free of scratches, nicks, or burr and shall have a surface roughness  $R_a$  not greater than 0,40  $\mu\text{m}$  when measured in accordance with ISO 4287-2:1984. This surface shall have a Rockwell C scale hardness of not less than 40 as measured in accordance with ISO 6508:1986.

## 4.18.2.2 Device for rotating the mandrel and applying a force to it

The device shall be capable of rotating the mandrel at a constant tangential velocity of  $(23 \pm 4)$  mm/s during the central 75% of its 360° travel, starting and stopping of the mandrel being smooth. Portable or non-portable and of any suitable design it shall be capable of applying any force up to 6 N to the mandrel, normal to the mandrel's axis.

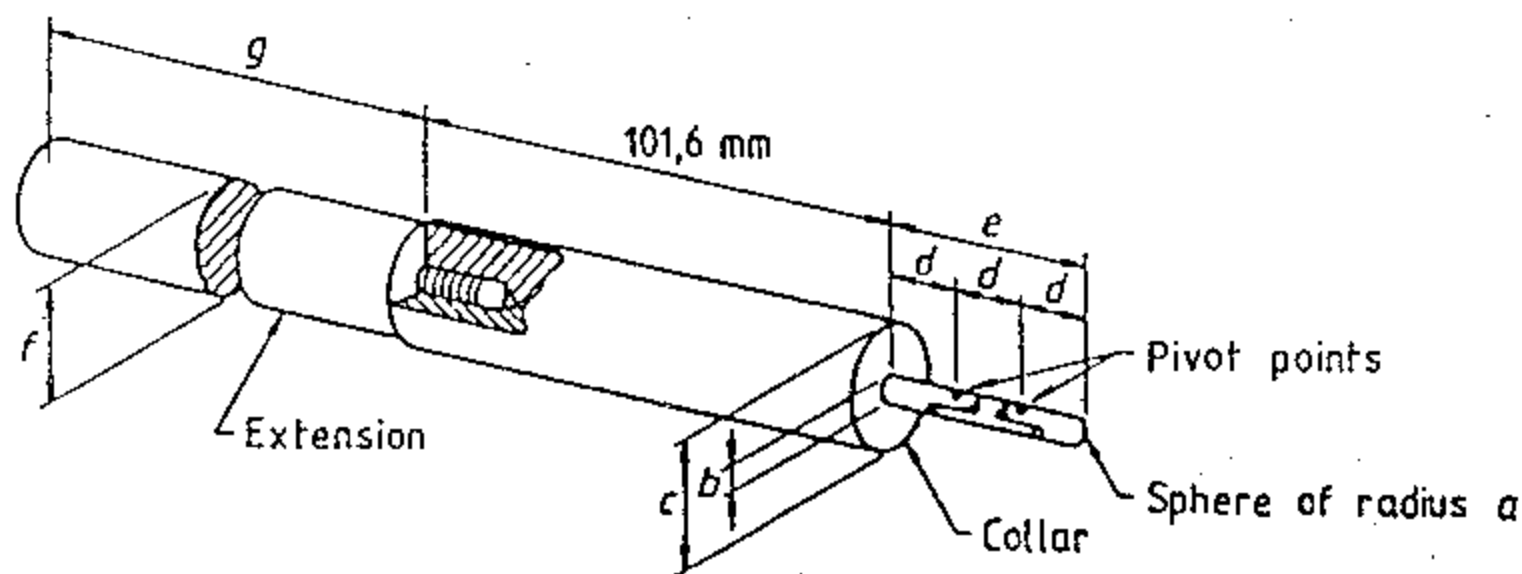
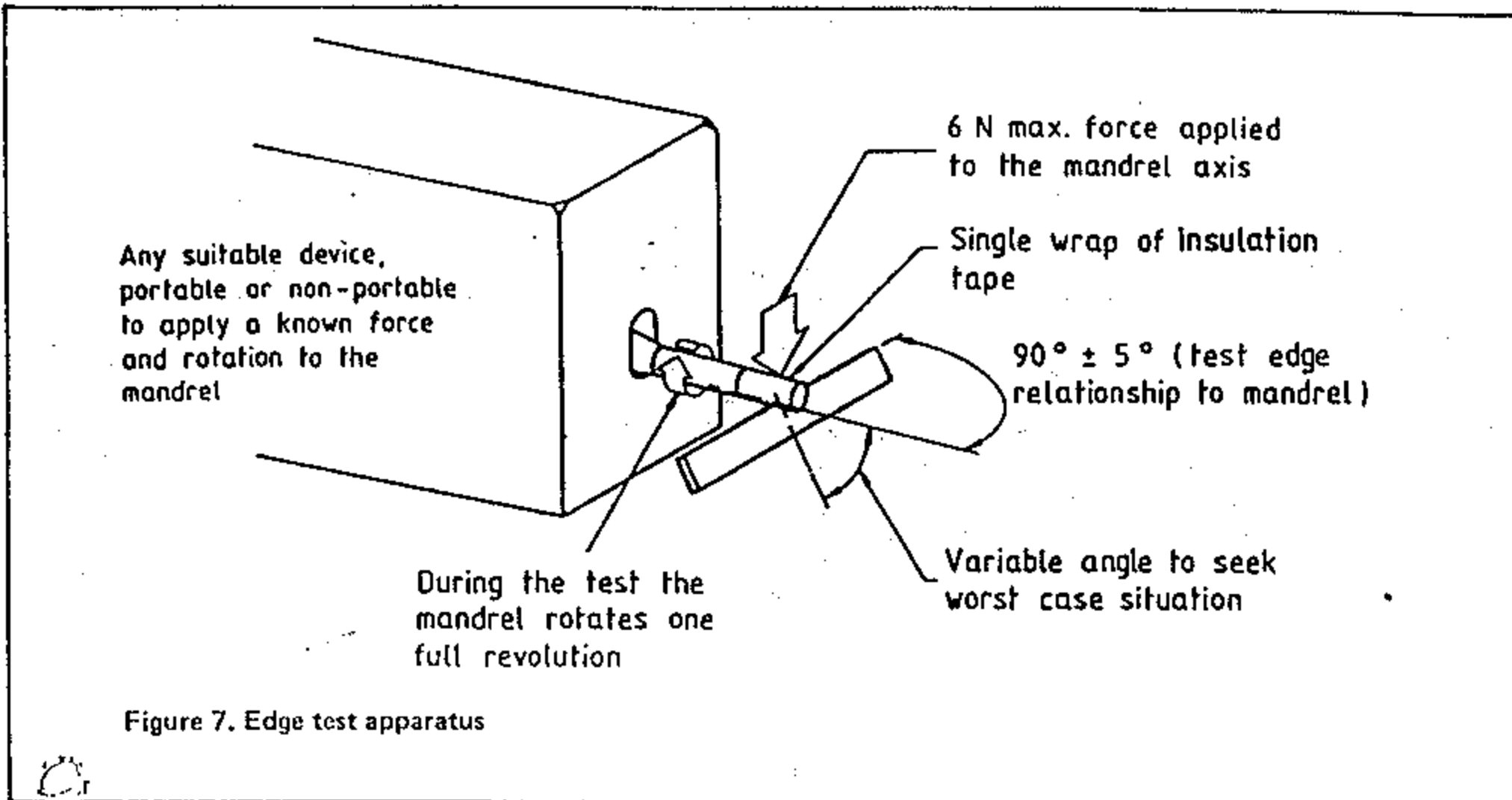


Figure 6. Accessibility probe

Age	Probe	Dimensions, mm						
		a	b	c	d	e	f	g
Toys intended for a child of less than 36 months	A	2,8	5,6	25,9	14,7	44,0	25,4	464,3
Toys intended for a child of more than 36 months and less than 14 years	B	4,3	8,6	38,4	19,3	57,9	38,1	451,6
Toys intended for children of both age groups	A and B (both probes shall be used)	according to the above specification						



**4.18.2.3 Pressure-sensitive polytetrafluoroethylene (PTFE) high temperature electrical insulation tape**

The thickness of the polytetrafluoroethylene backing shall be between 0,066 mm and 0,090 mm. The adhesive shall be pressure-sensitive silicone polymer with a nominal thickness of 0,08 mm. The width of the tape shall not be less than 6 mm. During the tests the temperature of the tape shall be maintained at  $(23 \pm 2)^\circ\text{C}$ .

**4.18.3 Procedure**

Ascertain that the edge to be tested is accessible by the method described in 4.17.

Support the toy in such a manner that the accessible edge to be tested does not bend or move when the force of the mandrel (4.18.2.2) is applied. Ensure that the support is not less than 15 mm from the edge to be tested.

If part of the toy has to be removed or disassembled in order to test a particular edge, and as a result, the rigidity of the edge under test is affected, then support this edge so that its stiffness approximates to the edge stiffness in the assembled toy.

Wrap the mandrel with one layer of the tape (4.18.2.3) to provide sufficient area for performing the test.

Place the taped mandrel such that its axis is at  $90^\circ \pm 5^\circ$  to the line of a straight edge, or  $90^\circ \pm 5^\circ$  to a tangent at the test point of a curved edge, and the tape is in contact with the sharpest part of the edge (i.e. the worst case situation) when the mandrel is rotated (see figure 7).

Apply a force of 6 N to the mandrel and rotate the mandrel  $360^\circ$  about its axis against the edge, ensuring that no relative motion occurs between the mandrel and the edge during the rotation of the mandrel. If this procedure causes the edge to bend, apply the maximum force that will not cause the edge to bend.

Remove the tape from the mandrel without enlarging any cut in the tape or causing any score in the tape to become a cut. Measure the length of tape that is cut, which shall include any intermittent cuts. Measure the length of tape which has contacted the edge during the test.

Calculate the percentage length of the tape which has been cut during the test.

**4.18.4 Interpretation of results**

If 50 % of the line of contact of the tape with the edge is completely cut, the edge is deemed to be a sharp edge.

**4.19 Points (see 3.2.1.4 and 3.2.2.2)**

**4.19.1 Principle**

A point tester is applied to an accessible sharp point and it is observed whether or not the point being tested penetrates a specified distance into the sharp point tester.

**4.19.2 Apparatus**

**4.19.2.1 Point tester (for example as shown in figure 8)**

A rectangular opening measuring  $1,02 \text{ mm} \pm 0,02 \text{ mm}$  wide by  $1,15 \text{ mm} \pm 0,02 \text{ mm}$  long in the end of the slotted cap establishes two reference dimensions. The sensing head is recessed 0,38 mm below the end cap. There is a distance of 0,12 mm between it and a return spring having a force of 2,5 N.

**4.19.3 Procedure**

Ascertain that the point to be tested is accessible by the method described in 4.17.

Support the toy to be tested in such a manner that the point does not move during the test. In most cases it will not be necessary to support the point directly; however, if it is necessary, support at not less than 6 mm from the point to be tested.

If part of the toy has to be removed or disassembled in order to test a particular point, and, as a result, the rigidity of the point being tested, is affected, then support the point so that its stiffness approximates to the point stiffness in the assembled toy.

Adjust the point tester (4.19.2.1) by loosening the locking ring and rotating it so that it moves toward the indicator lamp assembly a sufficient distance to expose the calibration reference mark on the barrel. Rotate the gauging cap clockwise until the indicator lamp lights. Rotate the cap counter-clockwise until the sensing head moves a distance of 0,12 mm from making contact with the dry cell, as shown in figure 8.

**NOTE**

Where the gauging cap includes micrometer markings, the distance may be readily achieved by rotating the cap counter-clockwise until the appropriate micrometer marking corresponds with the calibration reference mark. Lock the gauging cap in this position by rotating the locking ring until it fits firmly against the cap.

Insert the point in the direction which confers the greatest rigidity on the point, into the cap slot and apply a force of 4,5 N to depress the spring as far as possible without shaving the point on the edges of the slot or extruding the point through the slot.

Observe whether or not the indicator lamp lights up.

**4.19.4 Interpretation of results**

If the point being tested penetrates a distance of 0,50 mm or more into the gauging slot, causing the indicator lamp to light, and the point under test maintains its original shape while under a force of 4,5 N, the test point is deemed to be a sharp point.

**4.20 Folding mechanisms (see 3.2.1.6)**

**4.20.1** For the purpose of this test a mass used shall be as follows:

- a) 50 kg for toy pushchairs and other similar articles;  
or
- b) 25 kg, repeated 5 times for other collapsible toys.

Place the toy on a horizontal surface in the locked position. Load the toy so that the mass is borne by the frame in the least favourable position with respect to the folding parts. Leave for 5 min. Remove the load and examine whether there is any failure of safety stop/locking device or collapse of frame.

**4.20.2** Place the toy on a horizontal surface. Examine whether the toy can maintain an erect or partially erect position without employing the locking device. If so, load the appropriate surface with a mass of 10 kg.

Examine whether the toy has collapsed or tilted.

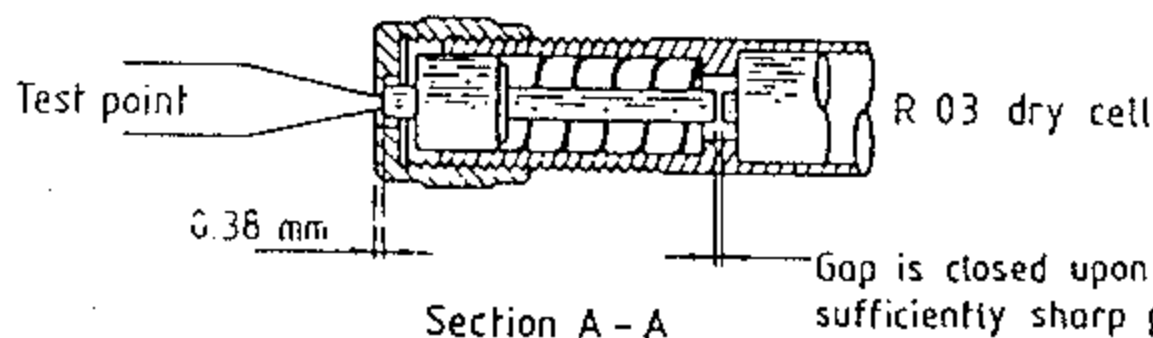
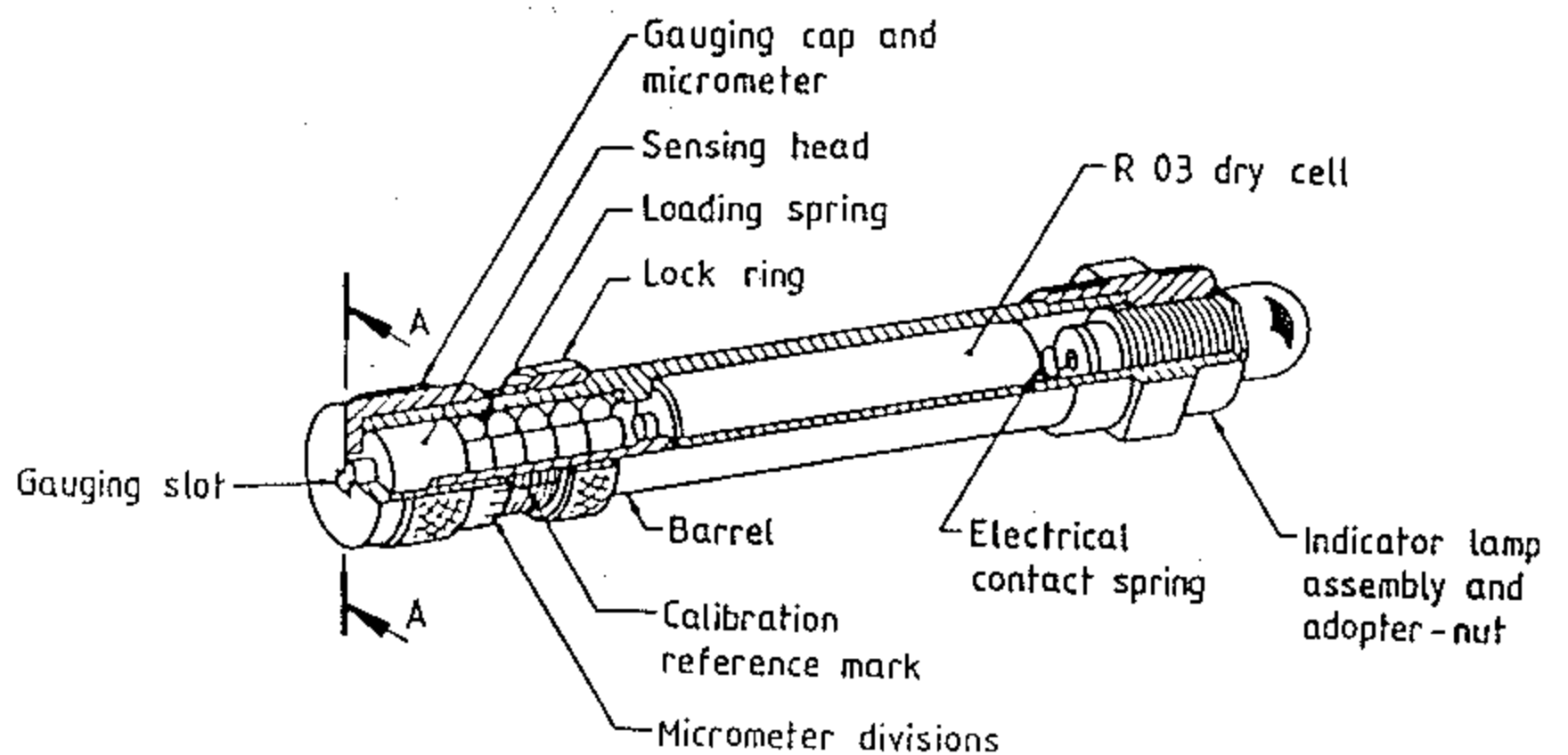
**4.21 Non-detachable components (see 3.2.2.2)****4.21.1 Principle**

The component tested is subjected to a tensile force related to the size of the component.

**4.21.2 Apparatus**

A tensile testing machine or a dead-weight arrangement with means to apply forces up to 90 N with an accuracy of  $\pm 2$  N.

Clamps and straps.



Gap is closed upon insertion of sufficiently sharp point to pass through gauging slot and depress sensing head 0,12 mm. Electrical circuit is thereby completed and indicator test lamp lights - sharp point fails test

All dimensions in mm.

Figure 8. Sharp point tester

**4.21.3 Procedure**

Fasten the toy in the test apparatus and apply a tensile force to the component to be tested by means of a clamp or by other means.

Apply a force of:

- 50 N when the largest accessible dimension is less than or equal to 6 mm;
- 90 N when the largest accessible dimension is greater than 6 mm.

Apply the force gradually over 5 s and maintain for 10 s.

Examine whether the component has become detached.

**4.22 Geometric form of infant rattles and teethers (see 3.2.2.13)**

Position and clamp the test template A shown in figure 9 so that the axis of the slot is substantially vertical and the slot is unobstructed at its top and bottom openings.

Orientate the toy to be tested in a position which would most likely permit the entry of the toy through the slot in the test template. Place the toy in the slot so that the force on the toy is only the force due to its mass.

Observe whether the toy passes through the slot or whether any part of the toy protrudes past the base of the template.

Repeat the procedure for rattles with nearly spherical, hemispherical or circular flared ends using test template B shown in figure 10.

**4.23 Leakage of teethers (see 3.2.2.13)**

Transmit a force of 5 N to any part of the external surface of the article through a steel needle of tip radius 0,5 mm at temperatures of  $(5 \pm 1)^\circ\text{C}$  and  $(37 \pm 1)^\circ\text{C}$  or within 30 s of removing the toy from conditioning at those temperatures. Apply the force gradually over 5 s and maintain for 5 s.

Examine whether any leakage of the content or any splitting, cracking or other damage causing or which could lead to leakage of contents has occurred.

**5 Packaging**

Bags made of flexible plastics which are used for packaging and which have an opening perimeter of greater than 380 mm, shall have an average sheet thickness of not less than 0,038 mm, and their means of closing shall not be a drawstring or cord. The average thickness shall be determined from measurements taken at 10 places on the diagonal of a sample sheet.

The requirement for thickness does not apply to the following:

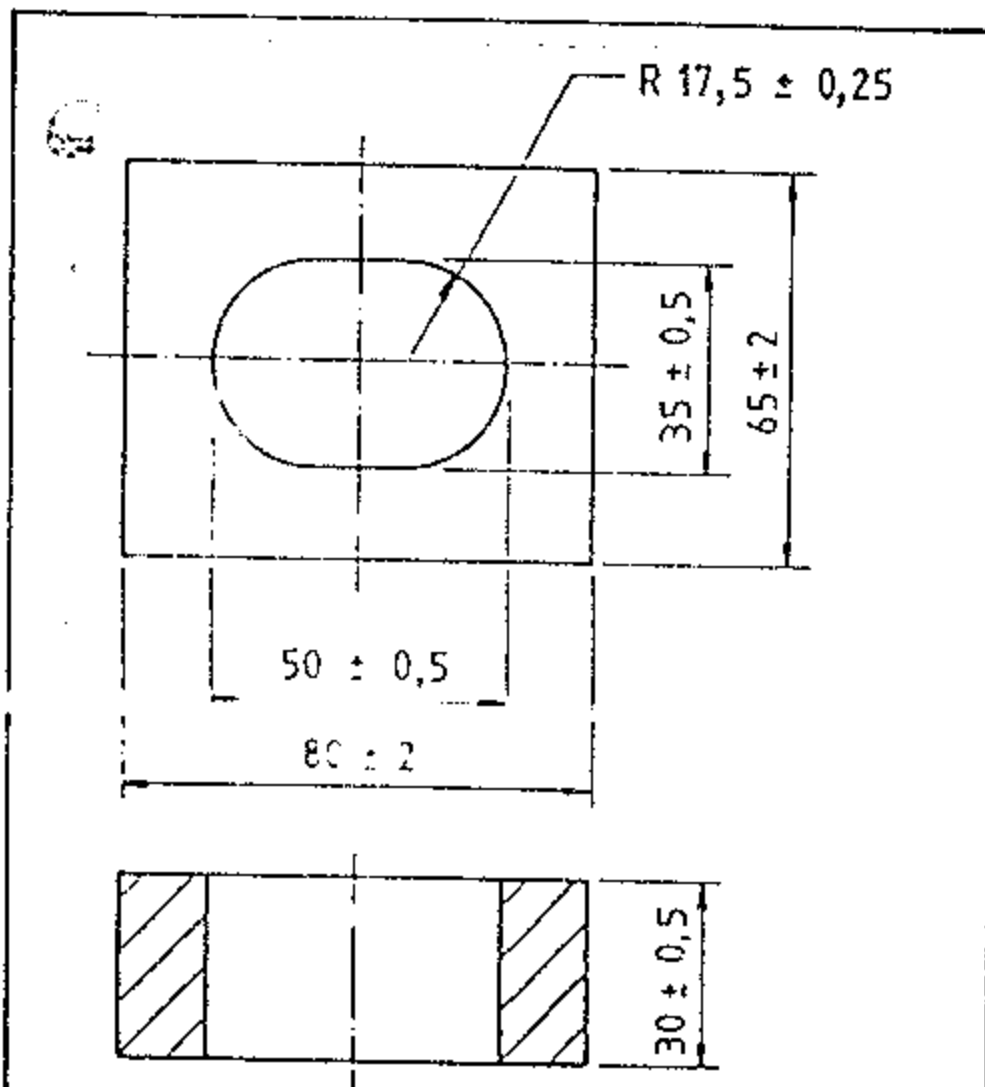
- a) shrunk-on film packaging, which is normally destroyed when the packaging is opened by the user.
- b) bags made of perforated film, which makes it possible for the child to breathe through the film, and which is unable to form a vacuum, and stick to the face of the child. To comply with this requirement any area of maximum dimensions 30 mm x 30 mm shall have a minimum hole area of 1 %.

**6 Marking and instructions for use**

The requirements for marking specified in 6.1 to 6.13 shall be made either on the toy itself, its packaging or a leaflet accompanying the toy unless otherwise stated in the following subclauses.

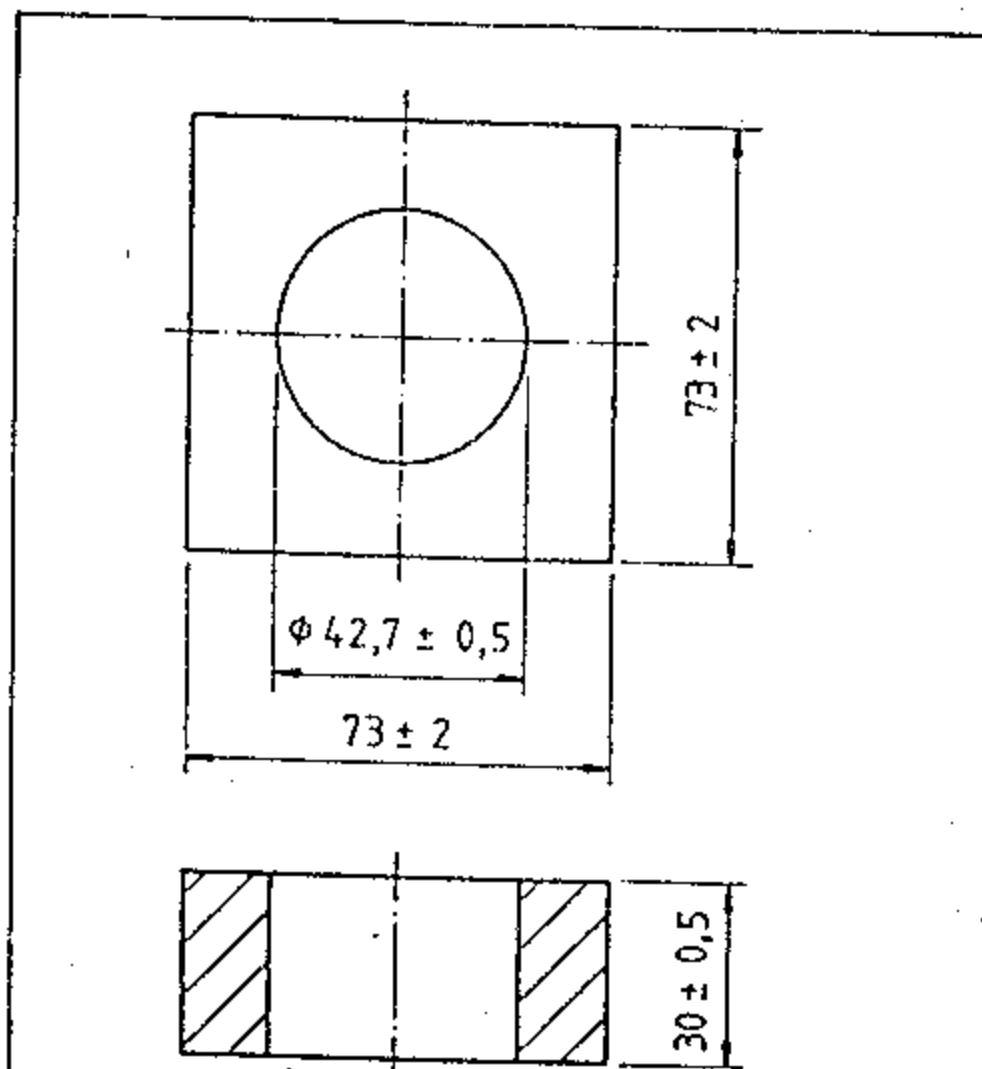
**6.1** Toys shall bear the name and/or trade name and/or mark and address of the manufacturer or his authorized representative or the importer in a visible, easily legible and indelible form. Where the specified particulars are not affixed to the toy, the consumer's attention shall be drawn to the advisability of keeping them.

The particulars may be abbreviated provided that the abbreviation enables the manufacturer, his authorized representative or the importer to be identified.



All dimensions in mm.

Figure 9. Test template A



All dimensions in mm.

Figure 10. Test template B

Toys shall be accompanied by appropriate legible warnings in order to reduce inherent risks in their use. Particular attention shall be paid to toys which should not be given to children under 36 months.

Toys intended to be assembled shall be accompanied by detailed assembly instructions. If the toy is intended to be assembled by an adult this shall be clearly stated.

6.2 Toys which might be dangerous for children under 36 months of age shall bear a warning, for example:

"Not suitable for children under 36 months"

or

"Not suitable for children under three years"

together with a brief indication, which may also appear in the instructions for use, of the specific risks calling for this restriction.

This provision does not apply to toys which, on account of their function, dimensions, characteristics, properties or other cogent grounds, are manifestly unsuitable for children under 36 months.

6.3 In the case of toys that incorporate functional sharp points or cutting edges (see 3.2.1.1 and 3.2.1.4) attention shall be drawn to the potential hazards of such points and edges in the instructions for use accompanying the toy.

6.4 Slides, suspended swings and rings, trapezes, ropes and similar toys attached to a crossbeam (see 3.2.2.7.3) shall be accompanied by instructions drawing attention to the need to carry out checks and maintenance of the main parts (suspensions, fixings, anchorages, etc) at intervals, and pointing out that if these checks are not carried out the toy may cause a fall or overturn. Wherever practical the instructions shall be fixed to the toy.

Instructions shall also be given as to correct mounting of the toy, indicating those parts which can present dangers if it is incorrectly mounted.

6.5 Functional toys shall when appropriate bear the warning:

"Warning! use under the direct supervision of an adult".

In addition, these toys shall be accompanied by directions giving working instructions as well as the precautions to be taken by the user, with the warning that failure to take these precautions would expose the user to the hazards — to be pointed out — normally associated with the appliance or product of which the toy is a scale model or an imitation. It should also be indicated that the toy shall be kept out of the reach of very young children.

**NOTE**

"Functional toys" means toys which fulfil the same function as, and are often scale models of, certain products, appliances or installations intended for adults.

6.6 Toys with projectiles (see 3.2.2.10) shall be accompanied by instructions for use which shall draw attention to the hazards of using missiles other than those supplied by or recommended by the manufacturer, and to the danger of firing the projectiles at point blank range.

6.7 Imitation protective equipment (see 3.2.2.12) shall bear the following warning as applicable:

"Warning! Does not provide protection in the event of an accident".

or

"Warning! Does not provide protection against ultraviolet light".

6.8 Kites and other flying toys (see 3.2.2.14) shall bear the following warning:

"Warning! Do not use near overhead power lines".

6.9 Skates and skateboards for children offered for sale as toys shall bear the warning:

"Warning! Protective equipment should be worn".

Moreover the instructions for use shall contain a reminder that the toy shall be used with caution, since it requires great skill, so as to avoid falls or collisions causing injury to the user and third parties. Some indication shall also be given as to recommended protective equipment (helmets, gloves, knee-pads, elbow-pads, etc.)

6.10 Aquatic toys (see 3.2.2.15) shall bear the following warning:

"Warning! Only to be used in water in which the child is within its depth and under supervision".

This warning shall be durable and in a colour which contrasts with the body of the toy. The minimum height of letters shall be 3 mm. In the case of inflatable toys this marking shall be no more than 100 mm from one of the valves.

6.11 Toy caps shall bear the following warning:

"Warning! Do not fire near eyes or ears. Do not carry caps loose in a pocket".

6.12 Toys intended to be strung across a cradle, cot, or perambulator (see 3.2.2.4) by means of strings, cords, elastics or straps shall bear the following warning:

"Caution! To prevent possible entanglement injury remove toy when baby begins to push up on hands and knees".

6.13 Liquid filled teethers shall bear the following marking:

"Cool only in a domestic refrigerator, do not place in the freezer compartment".