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TOY SAFETY STANDARD

ST 2002

2002.9.1

The Japan Toy Association

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INTRODUCTION

Life of children is a play itself. It is toys or dolls that makes their play more enjoyable and delightful. This may be the reason why toys are often cited as vitamin pills for children.

The kinds of toy are now said to count more than 50,000. In the past, at the present and also in the future, the toys not simply reflect the realities of the world, but also create the world of fantasy with enriched imagination.

The toys must be enjoyable, interesting, strong, safe and useful for the physical and mental development of the children. Above all, safety is the essential factor for the manufacture of toys. In order to improve the safety of toys, the toy industry established "Toy Safety Standard" in cooperation with the government officials, scholars and the representatives of consumers in 1971.

This Toy Safety Standard has been revised to harmonize with the enforcement of PL law later published and has incorporated the requirements of latest international standards such as ISO.

The recent Japanese trend shows that consumer's consciousness for safety is rapidly prevailing, and the toy companies are actively working for the improvement of safety in both design and manufacture stages in order to supply safe products.

There has been no serious accident so far, and we believe that the toy safety policy implemented by the Japan Toy Association has been functioning properly.

In issuing Toy Safety Standard 2002, the focus of revision is on the following two points.

- 1) Incorporation of new requirements of Food Sanitation Law
- 2) Clarification of ambiguities found in Toy Safety Standard 2000 version

With the improvement of consumer life in our country recently, the values of consumers have been greatly diversified, and the new toys not included in the traditional scope of toy are developed and supplied to the markets.

The definition of "toys" has been expanding with the progress of the times. Now, the Japan Toy Association has determined that all the toys, in principle, excluding the items specifically mentioned as out-of-scope items in the Scope section of this Standard, must be tested in accordance with this Standard, and that only the toys that passed the tests are admitted to carry ST Mark.

Although the toys are the vitamin pills for the children, one should not take any pill too much or in wrong manner. We urge parents to take very careful attention and give their children the right toys for their age and in right manner. We hope this standard will provide the parents useful guidance in this matter.

EXPLANATION OF TERMS

hPa (Hecto-Pascal)

Unit for pressure or stress

Pressure of 10^5 dynes / cm^2 . This unit has been used as atmospheric unit since 1992 in place of "millibar".

J (Joule)

Unit for work

Work is defined as the task done when a force of 1N moves an object for the distance of 1 m to the direction of the force applied. Work is cited as J (joule).

That is

Work = Force x Distance an Object Moved

Time is not considered in the Work, and Work is determined by the intensity of force and the distance the force moves an object. If time is considered, the rate of Work is obtained.

Force x Distance an Object Moved = $[\text{kg} \times \text{m}] = \text{J}$

N (Newton)

Unit for force

The second rule of movement in physics specifying the definition of force provides that force is obtained by multiplying mass by acceleration. According to this rule, force, "F", that works on an object having mass, "m", is shown by the following equation when the acceleration working on the object is indicated by "a".

$$F = ma$$

SI units for mass and acceleration are 'kg' and 'm/s' respectively. In SI unit, force is determined as Newton (N) naming after the distinguished physician.

PART 1

MECHANICAL AND PHYSICAL PROPERTIES

1. SCOPE

This part specifies requirements and methods of tests for physical and mechanical properties to be taken into account in the manufacture of toys for children, in order to reduce as far as possible those risks which are not evident to users when the toy is used in the manner intended.

2. FIELD OF APPLICATION

This standard applies to toys for children, 14 years being considered as the end of childhood. It includes specific requirements for toys intended for children under 18 months, for children under 3 years and for children under 10 years (requirements to adhesives, solvents and chemistry sets as regards labeling).

The standard covers all toys including:

- (1) Driven toys
- (2) Scientific toys
- (3) Handicraft toys (e.g. easy-to-build models, sets of tools for woodwork and other crafts) provided they are intended specifically for children
- (4) Toys used in the garden (e.g. swings)
- (5) Toy sports equipment (e.g. sports equipment intended for children under 14 years of age)
- (6) Aquatic toys (see 3 and the list of items not considered as toys)
- (7) Bath toys (see 3)
- (8) Inflatable vinyl toys intended to be used on the surface of water (see 3)
- (9) Christmas articles
- (10) Straps for mobile phones

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

- (1) Celluloid table tennis balls, and a set including such items
- (2) Sports equipment intended to be used collectively at sports grounds or individually for training purposes
- (3) Equipment intended to be used collectively in playgrounds
- (4) Aquatic equipment intended to be used in deep water; boats, airbeds, rafts and similar floating items large enough to support a child
- (5) Compressed gas weapons
- (6) Fireworks
- (7) Internal combustion motor vehicles
- (8) Scale models intended for adult collectors manufactured according to scale in detail and not considered as a toy
- (9) Slings and catapults
- (10) Children's bicycles within the field of application of ISO 8098 (Bicycles, the maximum saddle height of which is less than 635 mm and more than 435 mm, and which are propelled by means of a transmitted drive to the rear wheel, whether fitted with stabilizers or not)
- (11) Video toys/games connected to television sets
- (12) Ride-on toys the seat the height of which exceed 33 cm
- (13) Goggles, snorkels, flippers, arm bands and arm rings, swimming helper in the shape of jacket; boards for beating and surfboards except the inflatable vinyl ones
- (14) Toys that employ liquid or solid fuel
- (15) Toys that employ steam engines
- (16) Metal bats
- (17) Sets of darts with metallic points
- (18) Laser pointer and the like that emit light beams harmful to the health of human body.
- (19) Living thing: A set including a living thing (seeds and the like)
- (20) Foods: Foods enclosed in the package with the toy such as a candy in the candy box with toy prize (only the toys may be tested for ST.Mark)

The standard applies to a toy in the condition in which it is first offered for sale. If a toy is intended to be assembled by a child, the requirements apply to each unit made available to the child. If a toy is intended to be assembled by parents, the requirements apply to the assembled toy.

3. DEFINITIONS

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

- (1) Toy : An object or a number of objects intended as a plaything for a child or children up to the age of 14 years
- (2) Intended : Designed, manufactured, labeled and/or marketed
- (3) Aquatic toy: A toy with a buoyancy of more than 15 N (1.53 kg), whether inflatable or not, intended to be used in shallow water under supervision of parents (excluding an inflatable vinyl toy)
- (4) Bath toy : A toy with a buoyancy of less than or equal to 15 N(1.53 kg), whether inflatable or not, intended to be used in tubs, water basins or in shallow water.
- (5) Inflatable vinyl toys intended to be used on the surface of water:
A toy intended to be used under parental supervision and in places where a child can stand. Tubes, boats, surfboards, floating items and the like, excluding boats 131 cm or more in length, boats having oar locks, and tubes, surfboards and floating items 101 cm or more in length.
- (6) Years (with reference to a specific age):
The age the child has attained but not passed his or her birthday for the age specified. i.e. a child of 35 months is considered as being under 3 years of age, while a child of 37 months of age is considered as being over 3 years of age.
- (7) Burr : A keen ridge turned up and outward on a cut or punched metal plate due to poor shearing
- (8) Flash : A saw-like projection remaining on a cut or punched metal plate due to poor sharing; or a thin ridge of plastic formed in a gap in a mold.

4. REQUIREMENTS

4.1 Materials

4.1.1 Flexible plastics sheeting

Sheets of flexible plastics without any backing (for example, used for making

aprons) of an area greater than 100 mm x 100 mm shall have an average value of 0.038 mm or more when the thickness is measured at 10 points on the diagonal line. The measuring method shall be in accordance with JIS K 7130.

4.1.2 Wood

Wood shall not display any insect holes and no knots shall be loose. Bark may be used only in the manufacture of folklore toys (i.e. for decorative purposes). This requirement does not apply to cork.

The surface of wooden toys shall not be rough to such an extent that risk of injury from splinters may result.

4.1.3 Glass

(1) Glass that may be used for toys for children under 3 years of age

Glass balls for rattles, solid glass eyes, covered miniature bulbs

(2) Glass that can be used for toys for children of 3 years of age and over

Glass may be used where its use is necessary to the function of the toys (for example, optical toys). It may also be used in the construction of glass marbles and glass beads.

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.

4.1.4 Stuffing materials

4.1.4.1 Materials

Stuffing materials shall be new or disinfected and shall not contain any hard and sharp objects, such as metal, nails, needles, splinters of wood, glass, plastics or glass wool. Seeds, grains and materials that will swell shall not be used.

Stuffing materials in the form of granules with a size of 3 mm or less shall be enclosed in an internal casing which is not itself the external covering of the toy. The seams of the internal casing or the external covering shall withstand the force of $70 \pm 2\text{N}$. (The toys shall be tested in accordance with 5.20)

4.1.5 Expanding materials

The expanding materials, which expand with water or heat, shall not increase in its external dimension by more than 5% of its initial value. The external dimension shall not expand more than 5% in any dimension.

4.2 Construction

4.2.1 General requirements

4.2.1.1 Edges

The accessible edges (see clause 5.16) of toys shall be so designed as to reduce risk of injury. This requirement applies both before and after any relevant tests as specified in this part have been carried out. Each of the following means is normally the means to meet the requirement:

(1) for accessible glass edges

- ① when passing the test specified in 5.17, or

(2) for accessible edges of sheet metal

- ① when passing the test specified in 5.17, or
② when folded, rolled or spiraled (see figure 1)

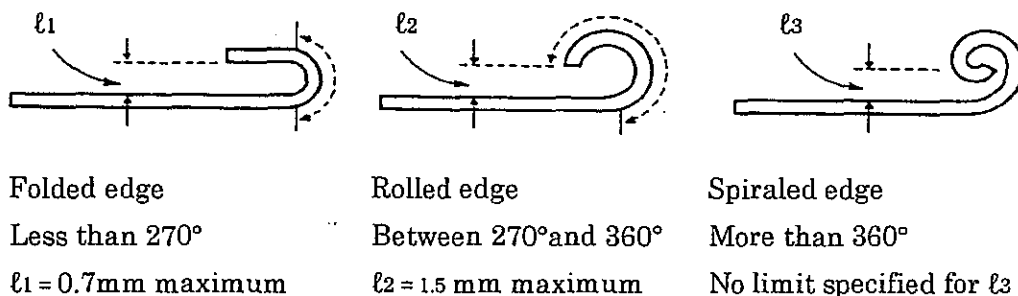


Figure 1

(3) for accessible edges, other than of glass and sheet metal (excluding metal foil), of metal, plastics, etc.

- ① when there is no burr that will cause injury

(4) when above means are difficult to employ, the following requirement shall be met

In respect of material, there shall be no dangerous burr, flash, breakage or sharp edge or corner in portions to which children's fingers are accessible, provided that this does not apply to those aspects of a toy that are inherently necessary for its function.

Portions to which children' fingers are accessible shall be determined by the probe A and the probe B.

Functional cutting edges determined as sharp edges, e.g. according to the test specified in 5.17 are permitted only for toys intended for children over 3 years of age. The potential dangers of using the toy shall be drawn to the attention of users (see clause 7.1.1.1). The sharp portion that is necessary for the functional toys means edge of scissors and the like.

Edges of pieces intended to serve as electrical conductors (e.g. fish plates joining the metal tracks of electric trains) which are determined as sharp edges, e.g. according to the test specified in 5.17, are permitted only for toys intended for children over 3 years.

The potential dangers of using the toy shall also be drawn to the attention of users.

4.2.1.2 Overlap joints

When the clearance (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 4.2.1.1.

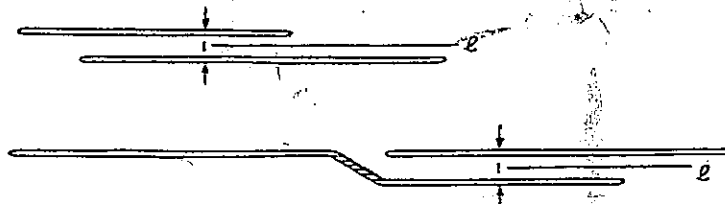


Figure 2

4.2.1.3 Fastenings

The pointed ends (only sharp ones) of screws, nails and similar fastenings used in the manufacture of toys shall not be accessible (see 5.16). This requirement precludes eyelets and rivets. Accessible parts (see 5.16) of fastenings shall be free from burrs.

If a fastening has a head that is intended to be countersunk, no part of the head shall protrude above the surface of the finished toy.

These requirements apply both before and after any relevant tests as specified in this part have been carried out.

4.2.1.4 Points and wires

The accessible points (see 5.16) shall be designed as to reduce risk of injury.

This requirement applies both before and after any relevant tests as specified in this part have been carried out.

Each of the following means is normally the means to meet the above requirement:

(1) for accessible points,

- ① when passing the test specified in clause 5.18
- ② when rounded, blunted or bent into a ball

Points, which are necessary to the design or function of the toy and which are found to be considered as sharp points (needles of sewing machine kits or of compasses and the like), e.g. according to the test specified in clauses 5.18, are permitted only for toys intended for children over 3 years, but the potential dangers by using the toy shall be drawn to the attention of the user (see clause 7.1.1.1).

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 break when the toy is tested in accordance with clause 5.3, followed by a test in accordance with clause 5.14.

Wires likely to be bent by the child shall not break when tested in accordance with clause 5.1.

4.2.1.5 Components protruding from the body of the toy

Tubes, bars, levers or other similar rigid components protruding from the body of the toy shall be protected or designed in order to reduce as far as possible those risks which can be related to a child falling on the toy. If a protection consists of a separate component, this component, when tested in accordance with clause 5.2 shall not become detached.

4.2.1.6 Folding mechanisms

Toys having parts which are mechanically driven (sliding or folding parts) and toys likely to support a mass of 2.5 kg or greater and having sliding or folding parts shall have a safety device to prevent risk of injury through crushing.

A safety device to prevent risk of injury through crushing shall mean the following.

- (1) The toy shall either be equipped with a safety stop or a locking device that has clearance of 12 mm or more under folded condition.
- (2) As for a toy perambulator with folding mechanism.... a load of 50 kg \pm 0.5 kg, or as for the other toys (toy folding ironing board, folding chair and folding table) a load of 25 kg \pm 0.2 kg is applied at its folding position horizontally in its most unfavorable position and stood for five minutes. Before applying the load, folding action shall be repeated ten times.
After removing the load, a safety stop or locking device shall have no defect such as breakage, shall operate properly or the folding mechanism of such toy shall not start motion.
- (3) If the toy can stand in upright position even when the locking device is not used, the toy shall not tilt or the folding mechanism of such toy shall not start motion when a load of 10 kg is applied horizontally in its most unfavorable position.

4.2.1.7 Hinges

Toys having two parts joined by means of one or more hinges (such as 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 the lid portion the weight of which is less than 250 g.

4.2.1.8 Driving mechanisms

Driving mechanisms (such as gears, belts, winding mechanisms, whether driven electrically, by friction or clockwork, but excluding such mechanisms when they form part of a construction toy or a toy covered by 4.2.2.7) forming an integral part of a toy shall be so enclosed that moving parts liable to crush the fingers or otherwise injure a child cannot be touched.

The moving parts which cannot be enclosed (e.g. rolling propellers, screws, etc.) shall be so constructed that they will not cause injury to fingers when they are touched. Portions that will allow a finger to become entrapped in it shall be equipped with stops, racing mechanisms or the like. Tires are excluded from the requirements on clear space, racing mechanisms and all the other requirements of this clause.

When toys with such mechanisms are tested in accordance with clause 5.3, the mechanism shall not become exposed. The shape and dimensions of winder keys

starting handles that rotate when unwinding shall be such that the clear space between the key or the handle and the body of the toy is less than 2 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 3 years, the recoil force of the mechanisms shall not exceed 4.5 N (0.15 kg).

4.2.13 Springs

Springs that support the weight of a child 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 helical 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 (4.1 kg).

4.2.14 Dry cells

Button cells used for the toys shall not be exposed after the relevant tests specified in this standard have been carried out. The other types of dry cells shall be regarded as a part of toy.

The toys incorporating the dry cells of AAA type or smaller, shall be of structure that prevents the dry cells from coming off the toy unless the tools are used.

4.2 Requirements applicable to certain types of toys

4.2.1 Small toys and detachable components

Toys and detachable components of toys for children under 3 years shall not, in any position, fit within the cylinder defined in clause 5.15.

Excluded from this requirement are textile, paper, flexible sheets and parts that cannot be touched by the children under 3 years of age.

4.2.2 Non-detachable components

In the case of toys for children under 3 years to which components made from glass, metal, wood, plastics or other non-pliable material are attached, but excluding air plugs used for inflatable vinyl toys, these components shall either:

(1) be so embedded that the child cannot pull them out with his teeth or fingers,
or

(2) be so fixed to the toy that they cannot become detached when they are
subjected to :

① a force of 50 N (5.1 kg) when the largest accessible dimension is less than
or equal to 6 mm,

② a force of 90 N (9.2 kg) when the largest accessible dimension is greater
than 6 mm, or

(3) shall not, in any position fit within the cylinder defined in clause 5.15.

4.2.2.3 Toys intended to be put to the mouth

Toys intended to be put to the mouth (e.g. whistles) and which contain reeds, balls
and similar components shall not release these components from inside the toys
when air is alternately blown and sucked two times at a pressure of 10 kpa.

4.2.2.4 Cords and elastics on toys intended for children under 18 months of age (see clause 7.1.1.12)

The free length of cords on toys, which include attachments, shall not exceed 300
mm when stretched by a force of 25 ± 2 N.

The length of any loops' periphery of cords shall not exceed 350 mm when the
cords are stretched by a force of 25 ± 2 N.

The cords intended to be fixed across perambulators, cots, etc., shall not exceed
750 mm when stretched by a force of 25 ± 2 N, and their length under these
conditions shall be not more than 40 % longer than their relaxed length.

The cords on toys shall have a thickness of 1.5 mm or more in diameter.

4.2.2.5 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 the toys intended for children under
3 years of age and to be pulled along shall not have a dimension less than 1.5 mm
thick.

4.2.2.6 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.

When the doors, lids and similar devices are closed, ventilation shall be ensured. It shall be possible to open the toy from the inside at any position by pushing it with a force of 5 kg or less. This requirement notably precludes the use of buttons, zips, strings and similar fastenings.

4.2.2.7 Toys intended to bear the weight of a child

4.2.2.7.1 Toys intended to be ridden

Wheeled toys designed to be ridden by children of 10 months of age and over and less than 36 months of age (excluding the vehicles such as tricycles, bicycles, etc. and wheeled toys whose highest portion is 15 cm or less in height) shall be structured to be fully rigid and stable under operating condition while meeting their intended purpose.

(1) "fully rigid" means the state which conforms to the following test requirements.

① Loading Test

(a) When a toy is operated with a load of $50 \text{ kg} \pm 0.5 \text{ kg}$ placed in the seat or any other place to sit on, any portion of the toy shall not break, crack or develop any other harmful deformation which may have a detrimental effect on the use of the toy.

(b) For tread parts (pedals, etc.) and grip parts (handlebars, etc.), when allowed to stand for 10 seconds under load from a $20 \text{ kg} \pm 0.2 \text{ kg}$ weight attached by a string to a point located at two-thirds the distance from the fulcrum of pedals or handlebars (or the tip, for a steering wheel), they shall not break, crack or develop any other harmful deformation which may have a detrimental effect on the use of the toy.

② Drop Test

Toys weighing 1.8 kg or less shall not produce dangerous parts when tested for drop strength in accordance with 5.3.

③ Push handle strength test

When the main toy rearward with a push handle properly fitted in it is secured, inclined rearward at an angle of 15° and when the horizontal bar of the handle is applied a weight of $20 \text{ kg} \pm 0.2 \text{ kg}$ and held in that condition for 10 seconds, the handle and its connection to the main toy assembly shall not develop cracks, breakage or any other harmful deformation which may have a detrimental effect on the use of the toy.

(2) "Structured to be stable" shall mean the following.

In this clause, 'shape or structure that effectively prevent tumbling' means such shapes or structures as comply with the following requirements in fore and rear directions respectively.

- ① The shape and the structure of fore and rear edges shall be such that prevent tumbling of the toy.
- ② When the toy is placed on a horizontal mount with its front part tilted to touch the mount surface, the angle between the toy and the mount surface shall not exceed 20°. Also, when the rear part of the toy is tilted to touch the mount surface, the angle between the toy and the mount surface shall not exceed 15°.
- ③ When the front and the rear parts are tilted respectively to touch the mount surface, the width of portion touching the mount surface in the stable manner shall be 5 cm or more.
- ④ When the front and the rear parts are tilted to touch the mount surface respectively, and a load of 20 kg \pm 0.2 kg is applied on to the holder of fore portion or rear edge of the seat and maintained for 10 seconds, there shall be no buckling, breakage or the like.

When the requirement on the shape and structure that effectively prevent tumbling is met at both fore and rear portions, the pass or fail determination in the following clauses (b), (c), (d) shall be made by regarding the forefront and the rear-end portions of the toy as wheel shafts.

(a) The toy shall have effective device or structure that prevents tumbling of the toy.

When there is no effective device or structure to prevent tumbling, the following requirements have to be met.

As for front part, the angle between the horizontal mount surface and the straight line that originates from the holder, such as a steering wheel (for a round steering wheel, from the center of said wheel) and that passes through the forefront wheel shaft touching the ground at all times and having the same strength as the structure effectively preventing tumbling shall not exceed 83°.

As for rear part, the angle between the horizontal mount surface and the straight line that originates from the rear position of the seat made of

rigid material (if the seat is inclined 5° or more, from the position two-thirds rearward from the base point of such inclination) and that passes through the rear-end wheel shaft touching the ground at all times and having the same strength as the structure effectively preventing tumbling shall not exceed 83°.

- (b) The height of the seat shall not exceed two-thirds of the distance between the front and the rear wheel shafts or shall not exceed 25 cm.

Also, the seat shall be located between the front and rear wheel shafts.

(If no seat is provided in the toy i.e., the toy takes the form of a bus, streetcar, etc., the place when the user takes seat shall be explicitly marked on the toy assembly or otherwise indicated in the instructions)

- (c) The holder, such as a handle (for a round steering wheel, the center of said wheel) shall be located between the front and rear wheel shafts.
- (d) The push handle, including the holders, shall be positioned between the front and rear wheel shafts and shall be 38 cm or more but 51 cm or less in height. The spacing between said push holder and the raised portion of the front part, such as a handle, shall be 17 cm or more.

4.2.2.7.2 Toys (with and without pedals) propelled by a child.

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

- (1) The toy, when tested in accordance with clauses 5.4 and 5.5, shall not break and it shall still comply with the relevant requirements of this standard.
- (2) The toy, when tested in accordance with clause 5.6, shall not tip over.
This requirement does not apply to toys with two aligned wheels (e.g. scooters, bicycles even when fitted with stabilizers)
- (3) Mechanically propelled (e.g., chain driven) toys with a free wheeling facility shall have a braking device. The device shall be such that, when the toy is tested in accordance with clause 5.7, the toy shall not move
- (4) Bicycles shall be provided with a chain and chain wheel shield as shown in fig. 3
As for other chain-driven toys, the chain wheel shall also be shielded in such a way that they are not accessible (see 5.16).
- (5) The shield shall be constructed so that a child cannot remove it without the use of tools
- (6) All wheels propelled directly by pedals shall be solid (does not concern the tire), except that slots or holes of a width of 5 mm or less may be made in them

- (7) Spaces between wheels/pedal arms and the body or parts of the toy (e.g. mudguards and chain shields) shall be more than 12 mm.

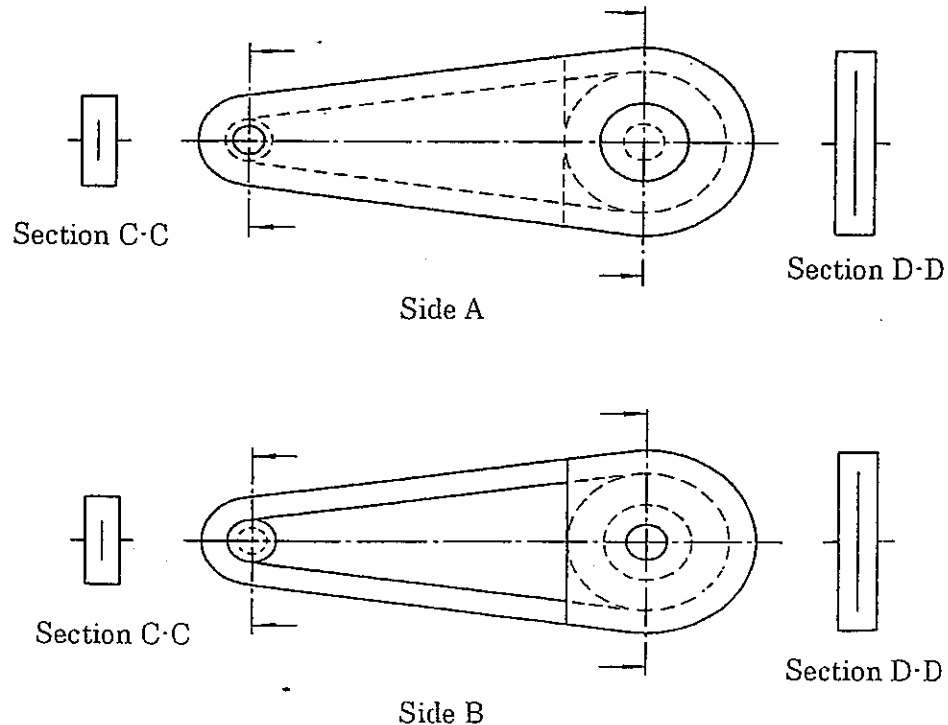


Figure 3

4.2.2.7.3 Toys not propelled by a child

Toys not propelled by, but intended to bear the weight of a child (e.g. rocking horses, garden slides, see-saws and baby gyms) shall comply with the following requirements. This requirement precludes swings, stuffed animals, inflatable vinyl toys intended to be used indoors and the like.

(1) The toy, when tested in accordance with clause 5.4, shall not break and it shall still comply with the relevant requirements of this standard.

(2) The toy, when tested in accordance with clause 5.6, shall not tip over.

This requirement does not apply to toys with a device for fixing them to the ground (for example, garden slides).

(3) 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.

4.2.2.7.4 Swings

Swings shall comply with the following requirements:

- (1) Swings, when tested in accordance with clause 5.8, shall not break and they shall still comply with the relevant requirements of this standard.
- (2) The means of suspension (e.g. ropes, chains) shall have a minimum average diameter of 10 mm. Open suspension hooks shall be wound over at least 540°
- (3) 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 appropriate ones:

- ① a protective bar situated between 200 mm and 300 mm above the seat enclosing the user, or
 - ② a device to fasten the child to the seat, e.g. a harness
- (4) The need to check regularly the suspension system shall be drawn to the attention of users and the toy shall be accompanied by assembly instructions (see clause 7.2.3)

4.2.2.8 Heavy immobile toys

Immobile toys of mass in excess of 5 kg and intended to rest on the floor but not to bear the weight of a child, when tested in accordance with clause 5.9, shall not tip over.

4.2.2.9 Toys containing a heat source

- (1) Toys containing a heat source shall not catch fire when tested in accordance with 5.10 and when operated under maximum output.
- (2) The rise in temperature of parts that are intended to be touched by the hand, for example handles, knobs, controls, grips, etc., shall not exceed the following values when the toy is operated in accordance with clause 5.10:

| | |
|--------------------|------|
| ① metal | 25 K |
| ② glass, porcelain | 30 K |
| ③ plastics, wood | 35 K |

- (3) The rise in temperature of other accessible parts of the toy shall not exceed the following values:

| | |
|-------------------|------|
| ① metal | 45 K |
| ② other materials | 55 K |

The above requirement applies to the toys which fulfill the same functions as the corresponding model for domestic use (so called functional toys) and which contain a heat source (for example irons, hot plates, cookers, etc.), excepting for functional heated surface. For functional heated surfaces, no values are set for their rise in temperature; however, the toy shall comply with the requirements applicable to the product of which the toy is a model.

The toys shall be labeled with the certification marks that attest the conformance of the toy with the public standards, if any (e.g. Electrical Appliance and Material Safety Law).

The potential dangers presented by functional toys shall be drawn to the attention of users (see clause 7.1.1.2).

4.2.2.9.1 Toys having igniting, fuming or heating parts

Toys having igniting, fuming or heating parts shall not emit offensive odor, nor cause flames on a sheet of thin paper (JIS-P-4500-1959) touched with such parts.

The igniting, fuming or heating parts mean mainly smoke from fire arms and railway toys, excluding beacons and those employing home A.C. electric sources.

"Offensive odor" is one which most people consider to be offensive, though it depends on individual differences, provided that odor emitted from inflammable, paralysing or corrosive materials is defined as an offensive odor even though weak.

"Touched with heating parts" means a situation in which an exterior of the heating parts is covered with a sheet of thin paper (class No.1).

4.2.2.9.2 Electric toys

- (1) Toys employing lamp wires and designated under the Electrical Appliance and Material Safety Law shall comply with the requirements of such regulations.
- (2) Toys employing other electric sources shall be free from the risk of an electric shocks.
- (3) The products designated under the Electrical Appliance and Material Safety Law
- (4) Shock-causing toys shall be attached with an instruction or the like so that they do not injure the human body.

4.2.2.10 Projectiles

4.2.2.10.1 General

Projectiles, and projectile toys shall conform to the following requirements.

- (1) All rigid projectiles shall have a tip radius of not less than 2mm. Provided, however, this requirement does not apply to the toys to which discharge mechanisms are attached as appendices such as in transformer robots, and kinetic energy of which is not more than 0.01 J.
- (2) Resilient materials used as impact surfaces shall not become detached when stretched with a force of 60 ± 2 N

4.2.2.10.2 Projectile toys without stored energy

Projectile toys without stored energy shall conform to the following requirements.

- (1) Projectiles in the form of darts shall have blunted points or points that are protected by a resilient material (e.g. rubber) having an impact area of at least 3 cm². Points shall not be made of metal; except that darts fitted with magnetic metal discs are permitted if the disc has a minimum area of 3 cm².
- (2) Helicopter rotors and single propellers, intended to be powered into vertical or nearly vertical free flight by a spring mechanism or similar device, shall have a ring around the perimeter in order to reduce the risk of injuries.

4.2.2.10.3 Projectile toys with stored energy

Projectiles propelled from a discharge mechanism shall conform to the following requirements:

- (1) The maximum kinetic energy of projectiles, when tested as specified below shall not exceed:
 - ① 0.080 J for rigid projectiles without resilient impact surfaces;
 - ② 0.5 J for resilient projectiles or projectiles with resilient impact surfaces (e.g. rubber);
 - ③ 0.02 J for toys to which a discharge mechanism is attached as appendices such as transformer robots
- (2) For the projectiles in the form of arrows whose maximum kinetic energy exceeds 0.08 J, their impact surfaces shall be protected by a resilient material (e.g. rubber). The maximum kinetic energy per unit area of the resilient impact surface shall not exceed 0.16 J/cm².

Test Methods

Operate the toy and measure the kinetic energy of the projectile. Repeat four times to take five measurements in total and calculate the average value.

The kinetic energy shall be determined by discharging a projectile upward direction and making calculation basing on the height the projectile reaches.

$$0.5 J = 0.050986 \text{ kgm}$$

$$0.08 J = 8.1578 \times 10^{-3} \text{ kgm}$$

$$0.02 J = 2.0394 \times 10^{-3} \text{ kgm}$$

4.2.2.11 Non-projectile imitation weapons

Non-projectile imitation weapons (e.g. jackknives, survival knives) shall not have any functional edges or functional points which are found to be considered as sharp edges or points, e.g. according to the test methods in clauses 5.17 or 5.18.

4.2.2.12 Imitation protective equipment

In the case of imitation protective equipment (e.g. eye-protectors, driving masks). transparent materials, when tested in accordance with clause 5.12, shall not crack.

In view of the fact that imitation protective helmets (e.g. motorcycle helmets, industrial safety helmets) and imitations of eye-protectors offer no protection, the potential dangers by using the toy shall be drawn to the attention of users.

Even if imitation protective equipment does offer protection, it shall be marked not proper for use as protective equipment when the manufacturer applies for permission to use ST Mark for this product.

4.2.2.13 Toys designed to produce sound when shaken (e.g. chime rattle) and toys incorporating wires, metal rods and metal nails that are inaccessible but have sharp points and ends.

When the toy is intended for children under 3 years and when tested first in accordance with clause 5.3 and then clause 5.14, the casing shall not break.

4.2.2.14 Kites and other flying toys

Strings longer than 1.8 m for kites and other flying toys shall have an electric resistance of more than $10^8 \Omega\text{cm}$. Metallic materials must not be used.

The potential danger of flying a kite near to overhead power lines shall be drawn to the attention of users (see clause 7.1.1.5).

4.2.2.15 Aquatic toys

The potential danger of using aquatic toys shall be drawn to the attention of users (see clause 7.1.1.6).

4.2.2.16 Inflatable vinyl toys

Inflatable vinyl toys shall be classified into the following two categories by their use purpose.

(1) Inflatable vinyl toys intended to be used on the surface of water:

The toys falling under this category are the toys that are intended to be used under the supervision of guardians in water where the child can stand. The examples are tubes, boats, surfboards, floating items and the like. The floating items include stick-shaped items, disk-shaped items, beach balls and inflatable tetrapods with ropes or handles attached, inflatable fish and aquatic animals having a length of 70 cm or more and Water-chairs. This requirement does not apply to the boats 131 cm or more in length, boats having oar locks, and tubes, surfboards and floating items 101 cm or more in length.

(2) Inflatable vinyl toys intended to be used on the land

The toys falling under this category are the toys that are intended to be used on the land. The examples are beach balls, vinyl pools, dolls, animals, punching bags and other indoor playthings such as houses.

4.2.2.16.1 Inflatable vinyl toys intended to be used on the surface of water

(1) The minimum capacity of the inflatable vinyl toys intended to be used on the surface of water shall be 5 liters or more. Inflatable vinyl toys having a portion of 76 cm or more in length before inflation shall have at least two (2) independent air chambers. In case the largest air chamber is damaged, the remaining air chambers shall have the necessary capacity for floating the passenger limit; provided, however, that the capacity necessary for floating one person is construed to be 5 liters.

The number of air chambers shall be visually inspected.

The capacity of air chamber shall be measured using a gas meter when it is infiltrated to its working pressure (Note 1) while viewing manometer.

(2) The materials used for air chambers shall have smaller values than ones below.

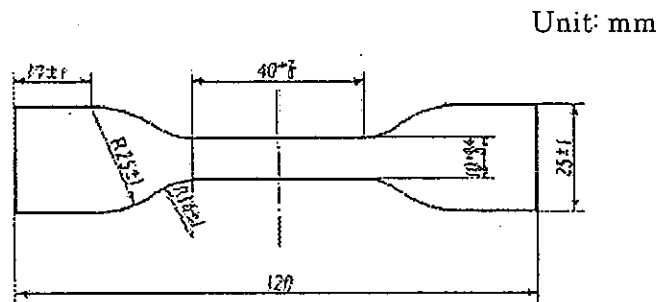
| The length of longest portion | Nominal thickness of material (mm) | Tensile cutting load applied for material (kg) |
|-------------------------------|------------------------------------|--|
| Less than 76 cm | 0.25 or more | 3.5 or more |
| 76 cm or more | 0.30 or more | 4.5 or more |

The dimensions of a toy shall be measured in unuse condition between the both ends of the longest inflatable portion (welded line).

The nominal thickness of material shall be determined by averaging the measurements of three values obtained at any three points of the product using a dial-gauge (having a flat circular measurement surface 5 ± 0.01 mm in diameter calibrated at 0.01 mm with an applied load of 80 g).

The tensile cutting load for material shall be applied in accordance with the test method in 9.3. of JIS K 6732 (1996) Poly (vinyl chloride) Films for Agriculture, and as shown in the figure below.

Three test specimen shall be cut from any areas and from any directions on the product.



(3) Individual air chambers shall not burst, separate at the joint portion, etc., when the air pressure stipulated for each maximum circumference of air chambers listed below is applied and tested in accordance with the testing procedures separately specified.

| Maximum circumferences (Note 3) of air chambers (cm) | Air Pressure for Pressure Test (Note 2) Mercurial Column (mm/Hg) |
|---|---|
| less than 20 | 85 |
| 20 or more / less than 40 | 75 |
| 40 or more / less than 70 | 60 |
| 70 or more / less than 100 | 50 |
| 100 or more / less than 130 | 40 |
| 130 or more | 35 |

The maximum circumference of air chambers is measured along the direction in which the maximum tensile force is applied to the material, and air pressure is measured with a mercury manometer. Testing temperature shall be $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$.

Apply the prescribed air pressure and plug tightly; then, check for bursting, separation at the joint portion, etc., after a lapse of 30 minutes.

(4) The air plug assembly shall be of a double construction consisting of a plug and a valve with the plug being linked to the air plug assembly.

The linking portion between an air plug assembly and a plug shall not tear when a 5 kg weight is applied for 10 seconds.

(5) For vinyl toys to which a rope is attached, the rope and the attaching portion shall bear a tensile force of 7 kg or more.

For vinyl toys to which a rope is attached, the attaching portion shall not be cut when a $7\text{ N} \pm 1\text{ N}$ weight is applied for 10 seconds in not-inflated condition.

(6) Boat-type floats and swimming rings with openings in its base portion for children's legs shall be constructed as described below.

(a) Size of the opening for children's legs:

The size of the opening for one leg shall be 35 cm or more in perimeter.

(b) Perimeter of the opening:

For the protection of children's skin, the perimeter of the opening shall be trimmed with lining, beading or the like.

(c) Stable configuration:

The construction of the toy shall be such that it prevents the toy from overturning. The construction that prevents the toy from overturning

shall be such construction that the ratio of the widths of front and rear portions of the tube is up to 55:45.

(d) Handle:

When a handle is attached to the toy, it shall be of soft moulding.

(e) Attaching method of seating portion and thickness of material:

In order to support the weight of children, the seating portion with openings in it shall be attached to the float body or ring by double pressing.

The material used for the seating portion shall be 0.3 mm or more in thickness and its tension cutting load shall be 4.5 kg or more.

(f) Cautionary labeling and labeling of capacity:

The cautionary labeling shall be in accordance with 7.1.1.9. The capacity shall be labeled as "For use by children of () persons"

(g) In addition to the above requirements, the toy shall conform to the requirements specified in 4.2.2.16.1.

Note 1: Working pressure is as follows:

$$\text{Air Pressure for pressure test (mm/Hg)} \times 0.65 = \text{Working pressure (mm/Hg)}$$

Note 2: Air Pressure for pressure test is determined with the maximum circumferences of air chambers.

Note 3: The maximum circumferences shall be measured at the maximum length normal to the joint portion with the toy inflated with the pressure of 25 mmHg. The test is conducted in the order of numbers assigned to air chambers. If the numbers are not assigned to air chambers, test on the air chambers may be performed in any order.

4.2.2.16.2 Inflatable vinyl toys intended to be used on the land

(1) Beach balls

The material used for beach balls shall have the thickness specified in the following table (except the ones which are 101 cm or longer and are attached a handle or a rope; or the ones manufactured for the shop decoration and for business use).

| Longest portion of product | Nominal thickness of material (mm) |
|----------------------------|------------------------------------|
| 75 cm or less | 0.20 mm or more |
| 76 cm to 100 cm | 0.25 mm or more |
| 101 cm or more | 0.28 mm or more |

- (a) The methods of measuring dimensions and nominal thickness of materials shall comply with 4.2.2.16.1 (2).
- (b) Cautionary labeling and method of labeling: The cautionary labeling and the method of putting the labeling shall be in accordance with 7.1.1.9.
- (c) The beach balls to which a rope or a handle is attached shall be interpreted as the inflatable vinyl toys intended to be used on the surface of water ,and the requirement of 4.2.2.16.1 shall apply to these products.

(2) Vinyl pools

The material used for vinyl pools 60 cm or longer in length shall conform to the numerical values specified in the following table. (The requirements for the pools not to be inflated are under consideration.)

| | |
|---|---|
| Nominal thickness of material at the side surface ----- 0.23 mm or more | |
| Nominal thickness of material at the bottom | |
| Bottom of single layer | 0.25 mm or more |
| Bottom with cushioning material in it | 0.28 mm or more when measured with both upper and bottom materials together |
| Bottom with two layers pressed together | 0.28 mm or more when measured with both upper and bottom materials together |

The strength of attachment of a drain plug shall be 70 ± 2 N or more.

- (a) Nominal thickness of materials shall be measured in accordance with 4.2.2.16.1. (2) The attachment strength of a drain plug shall be measured in accordance with 4.2.2.16.1. (5).
- (b) Dimensions and cautionary labeling - The method of putting cautionary labeling and the labeling of dimensions shall be in accordance with 7.1.1.9. The dimensions shall be measured by the following way.
 - (i) The diameter shall be measured from one end to the other end of the bottom with a starting point as the weld portion which adheres the bottom with the side surface.

The height shall be measured, under the uninflated condition, from the adhered line, up to which air is filled, to the top of the product.

- (ii) Labeling of handling instruction: The handling instruction and the method of putting the label shall be in accordance with 7.1.1.9.

4.2.2.17 Toys intended to be used by children under 18 months of age

Toys intended to be used by children under 18 months of age shall be of such a construction that their components or attachments cannot be removed or swallowed.

This requirement applies to the following toys having mass of less than 0.5 kg.

- Rattle shaped toys and squeeze toys
- Pacifiers, teething rings and their components
- Hand-held activity toys
- Building blocks and their components
- Removable components of toys for a playpen, perambulator, etc.
- Removable components of baby gyms
- Legs of baby gyms This requirement applies regardless of the mass of the baby gym.

(1) The strings used for the toys shall conform to the requirement of 4.2.2.4.

(2) The toys intended to be used by children under 18 months of age shall conform to the following test requirements.

(a) Clearance test

When a test equipment specified in 5.19 is placed on a horizontal plane and a toy or a component of a toy is applied in any orientation to said opening, it shall not contact the base surface of the test equipment by its own weight or when not compressed. (Excluded from this requirement are textile parts, paper parts and parts that cannot be touched directly by the hands of children under 18 months of age.)

(b) Drop test

When a toy is tested in accordance with 5.3 (1), it shall not break or crack, or some portions of the toy shall not be removed to produce possible dangerous portions or portions that fail to pass the clearance test.

(c) Pressure test (Fig. 4)

Any area on the surface of a toy that is accessible to a child and inaccessible to flat-surface contact during the drop test shall not break, crack or be otherwise deformed to produce possible dangerous portions, or portions which fail to pass the clearance test when it is subjected to a pressure of 9 kg with a metallic bar with a 29 mm dia and a 0.8 mm R edge.

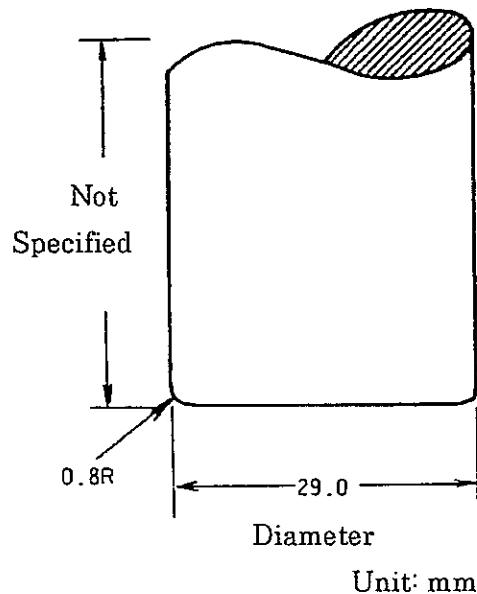


Figure 4

(d) Torque test (Fig. 5)

After subjected to the drop test, a toy with a projection that a child can grasp with at least the thumb and forefinger or the teeth shall not break, crack or be otherwise deformed to produce possible dangerous portions and portions which fail to pass the clearance test when it is moved clockwise until a rotation of 180 degree from the original position has been attained or when it is applied a torque of 2.3 kg · cm for a period of 10 seconds then returned to the original position, this procedure being repeated once again in the reverse direction.

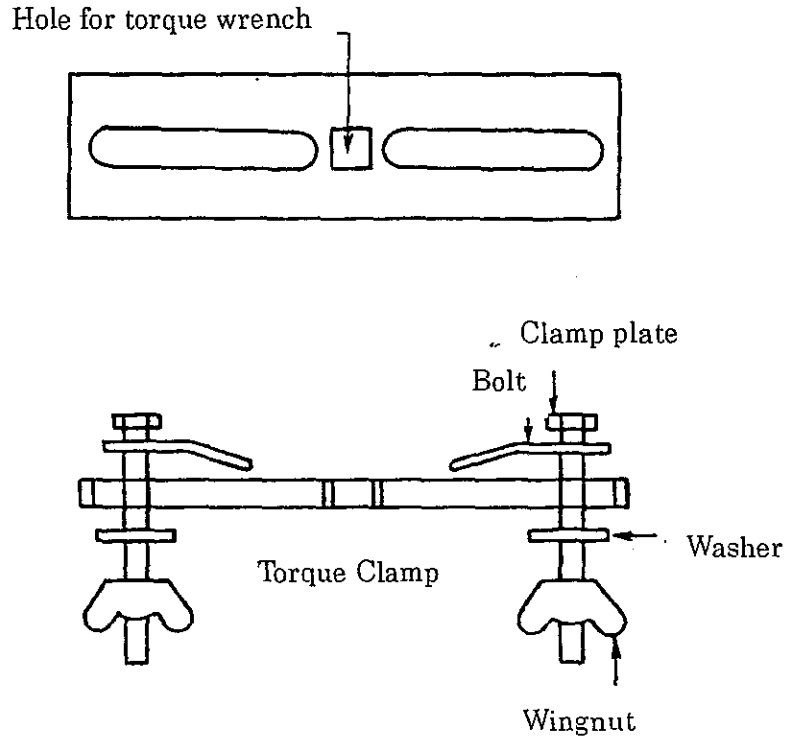


Figure 5

(e) Tension test

The toy sample that has been subjected to the torque test shall not break, crack or be otherwise deformed to produce possible dangerous portions and portions which fail to pass the clearance test when it is additionally applied a force of 50 N (5.1 kg) to the components of 6 mm or less or a force of 90 N (9.2 kg) to the components exceeding 6 mm for 10 seconds (the time to reach the specified force is 5 seconds). Provided, however, the toy shall be subjected to the test of 5.20 if the textile parts contain solid objects.

(f) Bite test (Fig. 6)

Any portion of a toy that has an external dimension of 3.2 cm or less and a design configuration that would permit a child to insert a portion into the mouth for a penetration of at least 0.6 cm shall not be bitten off or

broken when applied a test load of 11 kg for 10 seconds by a biting test equipment separately specified.

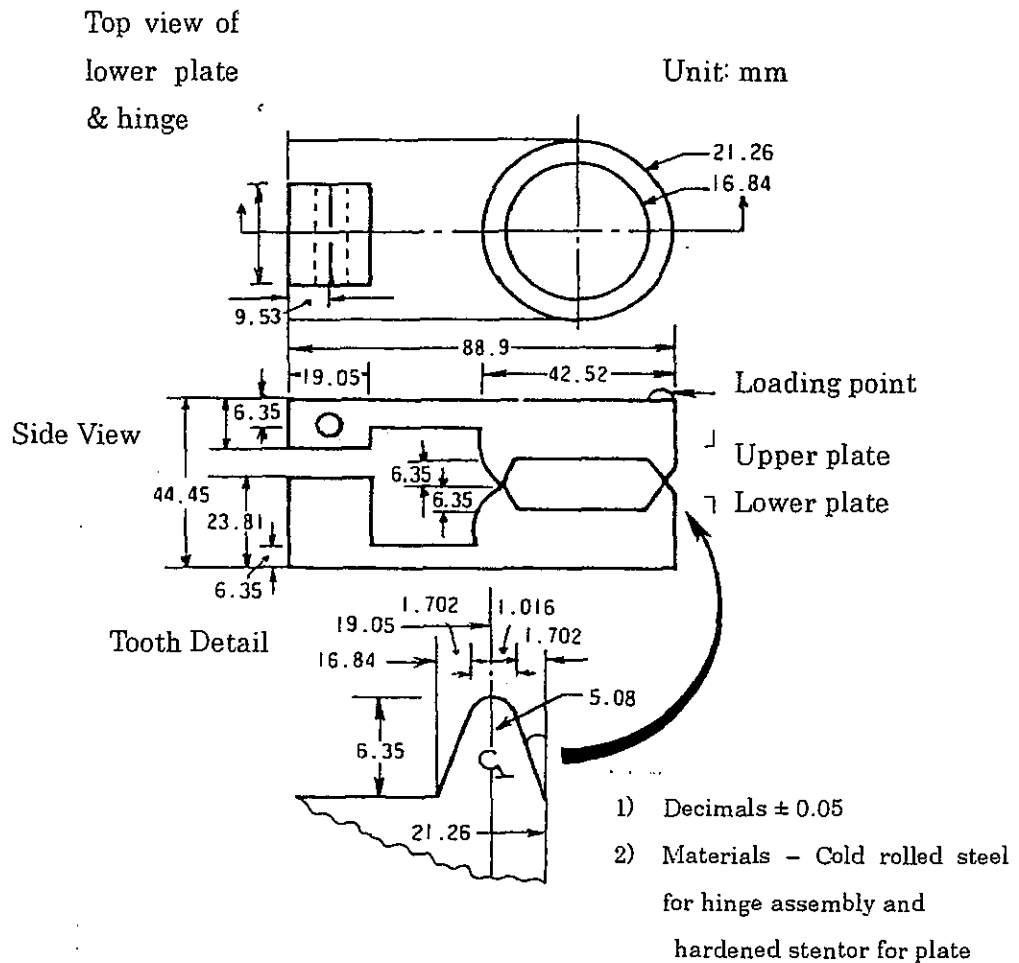


Figure 6

(g) Swing test

Any handle attached to a toy shall not break or crack when the toy is swung to left and right directions 10 times at a rate of two cycles per second by holding the base of the handle.

(h) Seam Strength Test for Textile Toys

The seam and the material of the toys shall not break when tested in accordance with 5.20.

4.2.2.18 Noise Level of Sound Producing Toys

Toys shall not produce impulsive noises with an instantaneous sound pressure level exceeding 138 dB ($20 \mu \text{N/m}^2$) when measured at any position 25 cm from the surface of the toy.

Toys shall be tested in accordance with the test method specified in 5.21.

4.2.2.19 Large Toys

Large toys are such toys that have an area of 0.258 m^2 or more or a volume of more than 0.08 m^3 . Such toys shall not produce dangerous portions after they are subjected to the test specified in 5.22.

5. METHOD OF TEST

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

5.1 Flexibility of wires (see 4.2.1.4)

Grip the wire firmly by two metal cylinders each of diameter 10 mm. Bend the wire from the upright to one side through 60° with the following force.

- 44.1 N (4.5 kg) for the toys intended for children of under 18 months, and
- 66.7 N (6.8 kg) for the toys intended for children of 18 months or over.

Then bend in the opposite direction with the same forces through 120° . (The wires which cannot be bent with these forces need not be bent.) 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.

5.2 Reaction of protective components to traction (see clause 4.2.1.5)

Apply the tensile force determined by the size of the toy or 60 N, whichever is greater, to the test component. Examine whether the component becomes detached from the toy.

The toys labeled as being intended for the children under 3 years of age shall be applied a following test force.

- The components of 6 mm or less --- a force of $50\text{N} \pm 2\text{N}$ for 10 seconds; and
 - The components exceeding 6 mm --- a force of $90\text{N} \pm 2\text{N}$ for 10 seconds
- The specified force shall be applied in 5 seconds.

As for the protective components of toys labeled as being intended for the children of 3 years of age or more, apply a load of $60\text{N} \pm 2\text{N}$ or the weight of the toy, whichever is greater. (See 4.2.1.5. for the interpretation of protective components.)

5.3 Drop strength (see clauses 4.2.1.8, 4.2.2.13 and 4.2.2.17)

(1) Toys intended to be used by children under 18 months of age

Toys specified under the clause 4.2.2.17 and weigh less than 0.5 kg shall be dropped ten times from any orientation through a height of 130 ± 5 cm onto a 3 mm thickness of vinyl composition tile (semi-rigid CT), specified under JIS A5705 Floorcovering - PVC (1998), over at least a 64 mm thickness of concrete.

- If the batteries are necessary for the operation of the toy, the toy shall be tested with the designated batteries inserted.
- If the toy is equipped with a mechanism, examine whether the mechanism is exposed after the testing.
- If the toy incorporates inaccessible metal wires, bars, or pegs, examine whether the outer casing breaks after the testing.

(2) Toys intended to be used by children under 18 months of age excepting above toys

Toys shall be dropped five times from any orientation through a height of 85 ± 5 cm onto a 3 mm thickness of vinyl composition tile (semi-rigid CT), specified under JIS A5705 Floorcovering - PVC (1998), over at least a 64 mm thickness of concrete.

- If the batteries are necessary for the operation of the toy, the toy shall be tested with the designated batteries inserted.
- If the toy is equipped with a mechanism, examine whether the mechanism is exposed after the testing.
- If the toy incorporates inaccessible metal wires, bars, or pegs, examine whether the outer casing breaks after the testing
- The toys weighing more than 1.4 kg shall not be tested.

(3) Toys intended to be used by children 18 months of age or more

Toys shall be dropped five times from any orientation through a height of 85 ± 5

cm onto a 3 mm thickness of vinyl composition tile (semi-rigid CPD specified under JIS A5705 Floorcovering - PVC (1998), over at least a 64 mm thickness of concrete.

- If the batteries are necessary for the operation of the toy, the toy shall be tested with the designated batteries inserted.
- If the toy is equipped with a mechanism, examine whether the mechanism is exposed after the testing.
- If the toy incorporates inaccessible metal wires, bars, or pegs, examine whether the outer casing breaks after the testing.
- The toys weighing more than 4.5 kg shall not be tested.

5.4 Static strength (see clauses 4.2.2.7.2 and 4.2.2.7.3)

Load the toy, on its standing or sitting surface, if any, with a mass of $50 \text{ kg} \pm 0.5 \text{ kg}$ for 5 min. The toys which support part of the body such as baby gyms shall be applied a load of $25 \text{ kg} \pm 0.2 \text{ kg}$ at its supporting portion 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.

5.5 Dynamic strength

Load the toy with a mass of 50 kg, the center 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.

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.

5.6 Stability (see clauses 4.2.2.7.2 and 4.2.2.7.3)

Load the toy as in 5.5 and stand it in any position on a plane inclined at 10° .

Examine whether the toy tips over.

5.7 Braking (see clause 4.2.2.7.2)

Load the toy as in 5.5 and stand it on a plane inclined at $10^\circ \pm 1^\circ$ with its longitudinal axis parallel to the incline. Apply a force of $50 \text{ N} \pm 2 \text{ N}$ to the control of the braking device.

Examine whether the toy moves.

If the brake is operated by a handle exert the force of 50 N at right angles to the

axis of the handle, at the middle of the normal gripping surface.

If the brake is operated by a pedal, apply the force of $30 \text{ N} \pm 2 \text{ N}$ in the operating direction producing the brake.

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

5.8 Strength of swings (see clause 4.2.2.7.4)

Load the toy for 1 hour on its standing or sitting surface, uniformly by a mass of 200 kg. Reduce this mass to $66 \text{ kg} \pm 3 \text{ kg}$ 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.

5.9 Stability of heavy toys (see clause 4.2.2.8)

Stand the toy in any position on a plane inclined at 5° . Adjust any moving parts so as to produce the most unfavorable position for stability.

Examine whether the toy tips over.

5.10 Temperature rises (see clause 4.2.2.9.)

In an ambient temperature of $20 \pm 5^\circ\text{C}$, operate the toy in accordance with the instructions for use or, in the case of an electric toy, operate the toy with maximum output, until equilibrium temperature is reached.

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

5.11 Projectiles (see clause 4.2.2.10)

Operate the toy and measure the kinetic energy of the projectile. Repeat four times to make five measurements in total and calculate the average value.

The kinetic energy shall be determined by discharging a projectile upward direction and making calculation basing on the height the projectile reaches.

$$0.5 \text{ J} = 0.050986 \text{ kg} \cdot \text{m}$$

$$0.08 \text{ J} = 8.1578 \times 10^{-3} \text{ kg} \cdot \text{m}$$

$$0.02 = 2.0394 \times 10^{-3} \text{ kg} \cdot \text{m}$$

$$\text{Reference : } 1 \text{ J} = 0.101972 \text{ kg} \cdot \text{m}$$

5.12 Imitation protective equipment (see clause 4.2.2.12)

Separate the transparent material from the toy. When separation is undesirable, test the toy itself. Place the material in the apparatus as shown in figure 7, so that it is supported all along its periphery. The support shall be made of rigid material adapted to the sample.

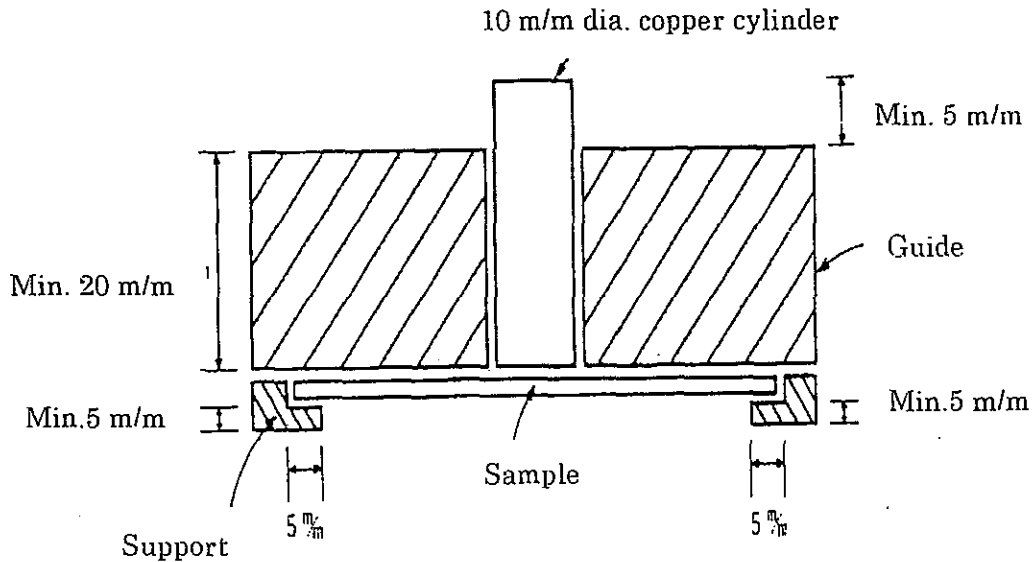


Figure 7

Carry out the test at a temperature of $23 \pm 2^\circ\text{C}$. Drop, in free fall, a mass of 1 kg through a distance of 100 mm on to the top of the cylinder. Examine whether the material is cracked.

5.13 Expanding materials (See 4.1.5)

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

Mechanical Strength

Remove the item using a pair of tongs. If the item cannot be removed because of insufficient mechanical strength then it is considered to pass this test.

5.14 Rattles and toys containing not accessible metal wires, bars or pegs with pointed or sharp ends

Impact strength of the toys (see clauses 4.2.1.4 and 4.2.2.13) shall be determined

by the compression test with a load of 14 kg applied over 5 seconds through a disc of ϕ 28.5 and then maintained for additional 10 seconds. Examine whether the casing has broken.

5.15 Small toys and detachable components (see clause 4.2.2.1)

Place the toy (or detachable components), without compressing, in a cylinder having dimensions as indicated in figure 8.

Examine whether the toy fits within the cylinder.

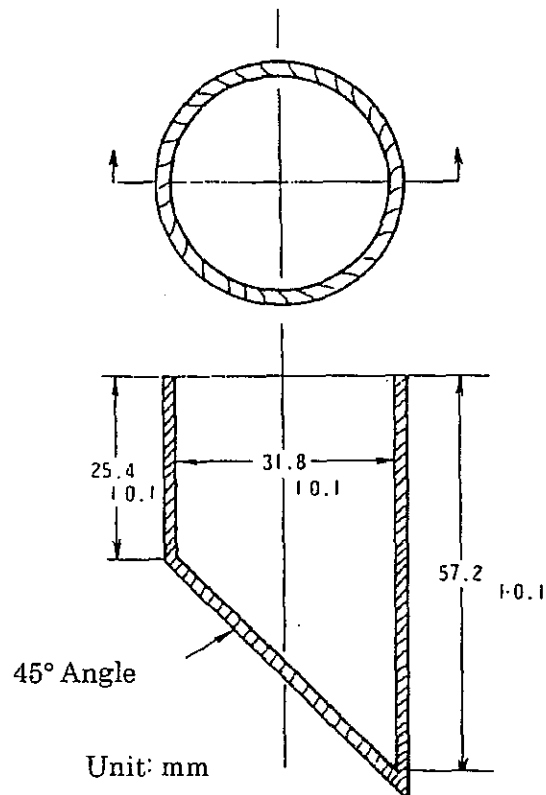


Figure 8

5.16 Accessibility of a part or component of a toy (see clauses 4.2.1.1 and 4.2.1.4)

5.16.1 Principle

A specified articulated probe is maneuvered to the part of component being tested. If the probe contacts the part or component, that part or component is considered as being accessible.

5.16.2 Apparatus

The test probes shall be made of rigid material and be as specified in figure 9 and table 1.

The tolerance on the dimensions specified in figure 9 and table 1 shall be ± 0.125 mm.

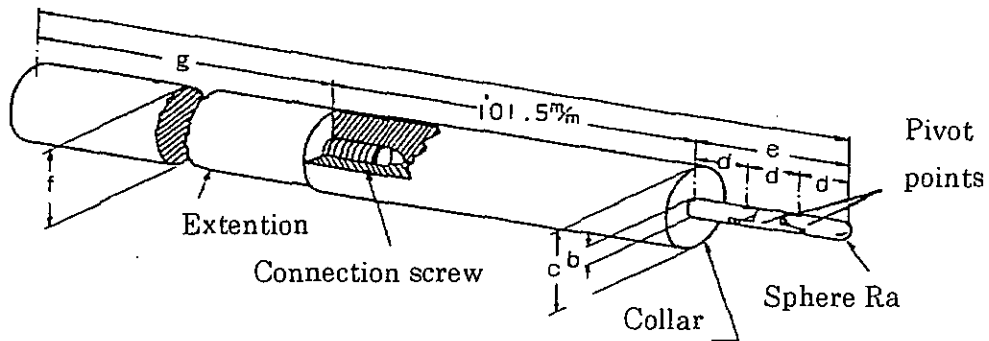


Figure 9

Table 1 Dimensions of Accessibility Probes

Toys intended for a child aged less than 3 years of age : A

Toys intended for a child aged more than 3 years but less than 14 years of age : B

Toys intended for a child of age spanning both the above age groups : A and B (both probes to be used)

Dimensions, mm

| | a | b | c | d | e | f | g |
|---|-----|-----|------|------|------|------|-------|
| A | 2.8 | 5.6 | 25.9 | 14.7 | 44.0 | 25.4 | 464.3 |
| B | 4.3 | 8.6 | 38.4 | 19.3 | 57.9 | 38.1 | 451.6 |

5.16.3 Procedure

The procedure shall be carried out as follows:

- (1) 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.

- (2) Except as exempted in (3) below, maneuver as follows the appropriate articulated accessibility probe as specified in figure 9 and table 1, in any convenient attitude, toward the part or component of the toy which is being examined for accessibility; if necessary, the probe may be pivoted at any of its joints in the attempt to contact the part or component of the toy:
 - (a) For any hole, recess, or opening having a minor dimension (the minor dimension of an opening is the diameter of the largest sphere that will pass through the opening) smaller than the collar diameter of the appropriate probe, the total insertion depth for accessibility shall be up to the collar on the appropriate probe. Each probe joint may be rotated up to 90 degrees to simulate knuckle movement.
 - (b) For any hole, recess, or 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, the total insertion depth for accessibility shall be determined by inserting the appropriate probe with the extension shown in figure 9 in any direction up to 2.25 times the minor dimension of the hole, recess, or opening, measured from any point in the plane of the opening. Each probe joint may be rotated up to 90 degrees to simulate knuckle movement.
 - (c) For any hole, recess, or 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 to her holes, recesses, or openings within the original hole, recess or opening are encountered that have dimensions specified in (a) or (b) above. In such instances, the appropriate procedure of (a) or (b) shall be followed. If both probes are to be used, a minor dimension that is 187 mm or larger shall determine the unrestricted access.

- (3) Where the part being tested 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, that point shall be considered as not accessible and the procedure specified in (2) need not be carried out.

5.16.4 Interpretation of results

A part or component of a toy shall be considered as being accessible if it can be contacted by any portion, forward of the collar, of the accessibility probe.

5.17 Sharp metal and glass edges (see clause 4.2.1.1)

5.17.1 Principle

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

5.17.2 Apparatus

The following apparatus is required:

- (1) A mandrel made of steel. The test surface of the mandrel shall be free of scratches, nicks, or burrs and shall have a surface roughness R_a not greater than $0.40 \mu\text{m}$ according to ISO/R 468. The test surface shall have a hardness not less than 40 as measured on the Rockwell "C" scale, as determined pursuant to ISO/R 80.

The rotation of the mandrel shall produce a constant tangential velocity of 25 ± 2 mm per second during the centre 75 per cent of its rotation and shall have a smooth start and stop.

- (2) The tape shall be pressure-sensitive polytetrafluorethylene (PTFE) high temperature electrical insulation tape (Note. 1) as described in Military Specification MIL-I-23594B (Note. 2). The thickness of the polytetrafluorethylene 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. While conducting sharp edge tests the temperature of the tape shall be maintained between $23 \pm 2^\circ\text{C}$.

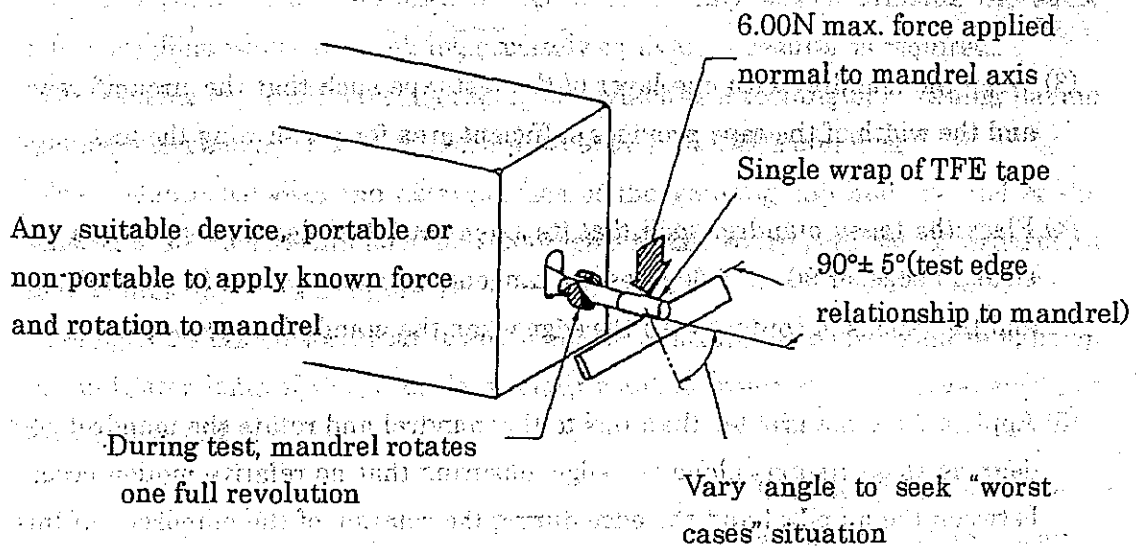


Figure 10

(Note 1) Details on suitable commercially available tape can be obtained from the Secretariat of ISO/TC 181 (DS) or from the ISO Central Secretariat.

(Note 2) Copies are available from Naval Publications and Forms Center, 5801 Tabor Ave. Philadelphia, Pa. 19120.

5.17.3 Procedure

The procedure shall be carried out as follows:

- (1) Ascertain that the edge to be tested is accessible by the method described in 5.16.
- (2) Support the toy in a manner such that the accessible edge to be tested does not bend or move when the force of the mandrel is applied. Ensure that the support is not less than 15 mm from the edge to be tested.

Part of the toy may need to be removed or disassembled to allow the sharp edge testing device to test the accessible edge. Such removal or disassembly of the toy may affect the rigidity of the edge in question, and in such case, the

sharp edge test shall be performed with the edge supported so that its stiffness approximates the edge stiffness in the assembled toy.

- (3) Wrap the mandrel with one layer of the test tape such that the circumference and the width of the tape provides sufficient area for performing the test.
- (4) Place the taped mandrel such that its axis is at 90 ± 5 degrees to the line of a straight edge, or 90 ± 5 degrees to a tangent at the test point of a curved edge, and the tape is in contact with the edge when the mandrel is rotated.
- (5) Apply a force not greater than 6 N to the mandrel and rotate the mandrel 360 degrees about its axis along 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.
- (6) Remove the tape from the mandrel without enlarging any cut in the tape or causing any score in the tape to become a cut.
- (7) Measure the length of tape that is cut. This measurement shall include any intermittent cuts.
- (8) Measure the length of tape which has contacted the edge during the test.
- (9) Calculate the percentage length of the tape which has been cut during the test.
- (10) Repeat the procedure in (1) to (9) for all other edges on the toy.

5.17.4 Interpretation of results

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

5.18 Sharp Points (see clause 4.2.1.4)

5.18.1 Principle

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

5.18.2 Apparatus

A sharp point tester as shown in figure 11, or any device utilizing the same reference dimensions and yielding precisely equivalent results, is required.

The gauging cap shall have a gauging slot which is a rectangular opening having dimensions measuring 1.02 ± 0.02 mm wide by 1.15 ± 0.02 mm long.

The distance between the external face of the gauging cap and the end of the sensing head which is intended to be contacted by the sharp point being tested shall be 0.38 mm, as shown in figure 11.

The spring shall be such that it would enable a hazardous sharp point to light up the indicator lamp if the hazardous sharp point is inserted into the gauging slot with a force of 2 N.

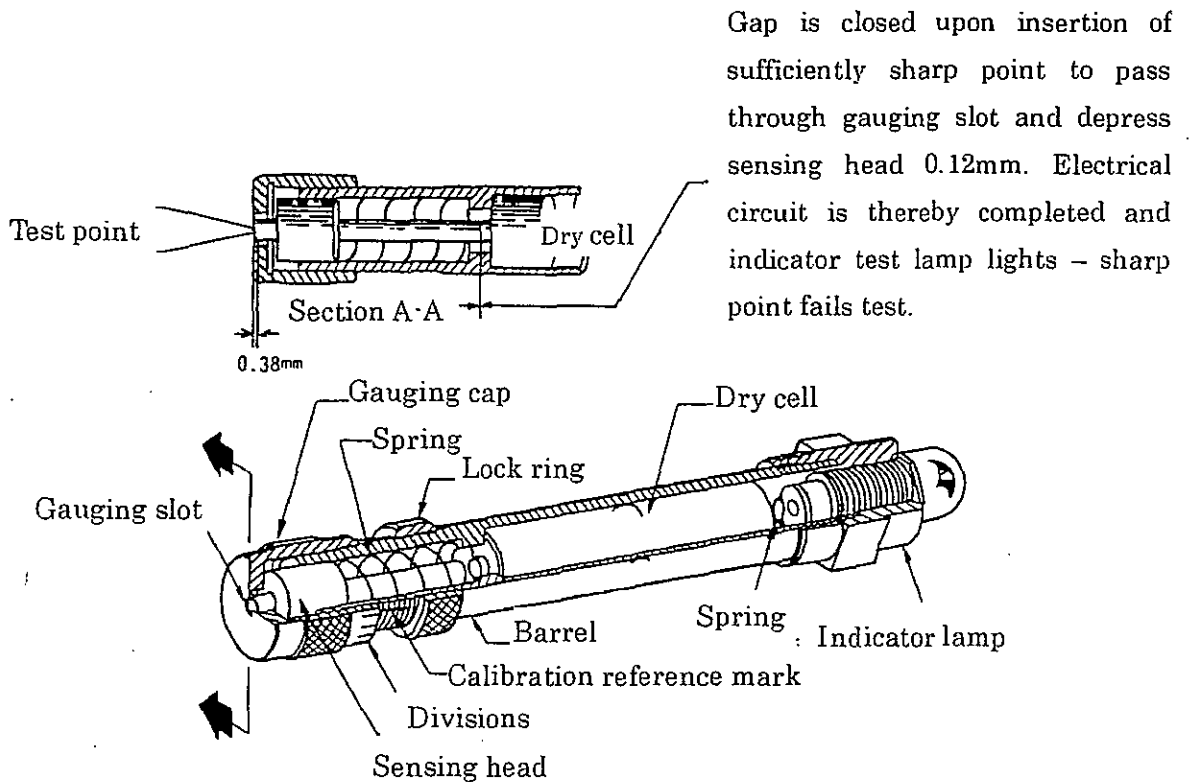


Figure 11

5.18.3 Procedure

The procedure shall be carried out as follows:

- (1) Ascertain that the point to be tested is accessible by the method described in 5.16.

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

Part of the toy may need to be removed or disassembled to allow the sharp point tester to test the point. Such removal or disassembly of the toy could affect the rigidity of the point in question. The sharp point test shall be done with the point supported so that its stiffness approximates the point stiffness in the assembled toy.

(3) Adjust the sharp point tester by loosening the lock 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 11. 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 until it fits firmly against the cap.

(4) Insert the test point, in a direction judged to be most rigid for 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.

(5) Observe whether or not the indicator lamp lights up.

(6) Repeat the procedure in (1) to (4) for all other accessible points on the toy.

5.18.4 Interpretation of results

The depth of penetration of the test point determines sharpness, such that if the test point penetrates a distance of 0.51 ± 0.02 mm or more into the gauging slot, causing the indicator lamp to light, and the test point maintains its original shape while under a force of at least 4.5 N, the test point is deemed to be a hazardous sharp point.

5.19 Geometric form (see clauses 4.2.2.17)

Figure 12 applies to the toy circular or oval in shape when observed from one direction.

Position and clamp the test gauge shown in figure 12 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 that would most likely permit the entry of the toy through the slot in the test gauge. 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 part the base of the gauge.

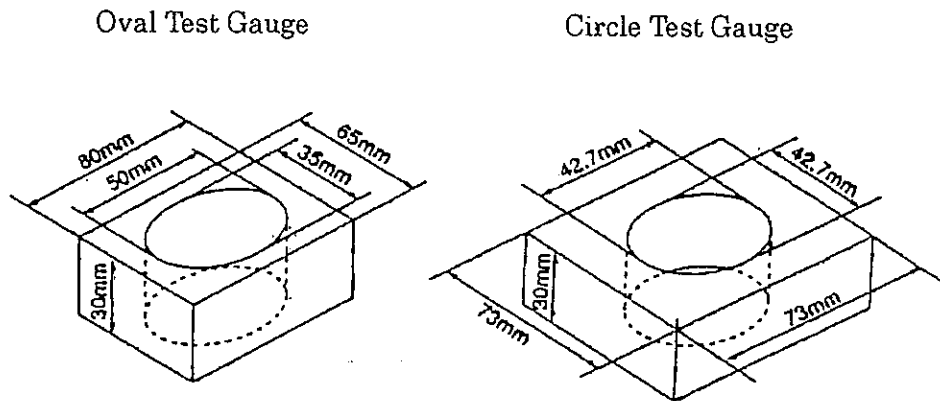


Figure 12

5.20 Seam strength of textile toys (incorporating non-flexible objects inside) intended for children less than 18 months of age

A clamp having jaws to which are attached 19 mm diameter washers is used for the test. Attach the clamps to the seams at the positions most heavily strained and equally apart from the seam stitching thread. The edge of washers and the seams shall be at least 13 mm apart.

Apply a force of 90 ± 2 N between two clamps and maintain for 10 seconds. Observe whether the seams or the material break. (The time to reach the force shall be within 5 seconds)

If it is not possible to grasp the material with 19 mm diameter washers, this requirement shall not apply.

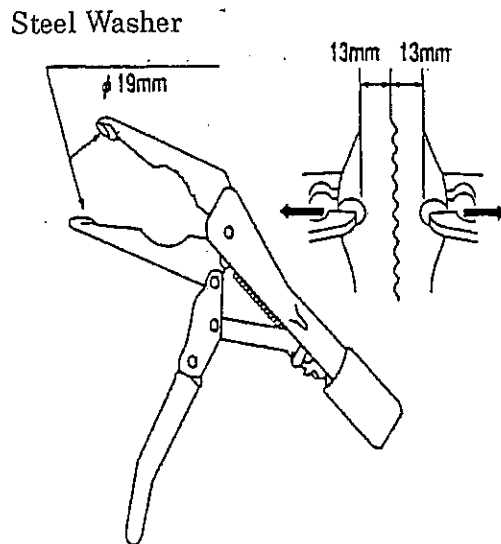


Figure 13

5.21 Test for sound-producing toys (See clause 4.2.2.18)

When determining sound levels, both the toy and the test equipment shall be at least 1 m from any wall, ceiling, or other large obstruction. The sound level shall not exceed 138 dB.

5.22 Tip over test (See clauses 4.2.2.19 and 5.3)

The large toys (4.2.2.19) shall not be subjected to the drop test of 5.3, but they shall be tipped over according to the following procedure:

A toy that has (1) a projected base area of 0.258 m^2 or more or (2) a volume of more than 0.08 m^3 calculated by the major dimensions without regard to minor appendages, or both shall be tested for impact by tipping it over three times, one of which is in the worst attitude by pushing the sample slowly past its center of balance. The base area for toys having permanently attached legs shall be measured by calculating the area enclosed by straight lines connecting the outermost edge of each leg of the perimeter.

The impact medium shall be a 3 mm thickness of vinyl composition tile (semi-rigid CT), specified under JIS A5705 Floorcovering · PVC (1998), over at least a 64 mm thickness of concrete.

5.23 Other strength

Every portion of toys shall be composed of sufficiently strong material and shall not form a dangerous shape or cause injury when broken.

(1) Toys having "sufficient strength" shall mean the following:

- (a) As for badminton rackets and golf clubs (excluding metal bats), the tensile force shall be 50 kg for wooden and metal products and 20 kg for plastic products.
- (b) As for roller skates (limited to those having a wearing portion with a maximum length of less than 18 cm), they shall comply with the following strength test:
 - ① Tension test of 25 kg against a belt.
 - ② Load test of 100 kg in the vertical direction onto the upper surface of a plate.

(2) "When broken" means the results of the following strength tests:

- (a) The condition that a toy breaks or cracks when dropped naturally in normal use condition five times through a height of 85 ± 5 cm onto a 3 mm thickness of vinyl composition tile (semi-rigid CT) over at least a 64 mm thickness of concrete.
- (b) For cloth articles, the condition that the sewn-up portion or a joining seam separates when the sewn-up portion, etc. is held between a thumb and a forefinger and pulled at 1 cm intervals along a joining portion.

6. PACKAGING

In the case of bags made of flexible plastics used for packaging, or necessary for the use of toys and with an opening perimeter greater than 380 mm and in which the sum of the combined depth and fully extended opening perimeter is 580 mm or more, the plastics shall have a minimum average thickness of 0.038 mm.

The means for closing the bag shall not be a drawstring or cord. Provided, however, if there is no suffocation danger, the package is regarded as conforming to the requirement even if it has drawstring or cord. The thickness shall be determined in accordance with JIS K 7130. This requirement for thickness does not apply to shrunk-on film packaging which is normally destroyed when the package is opened by the user.

7. LABELLING

The lettering required in 7.2.1 shall be at least 1.0 mm in height (Note. 1) and any other lettering required in any part of this standard shall be at least 1.5 mm in height (Note. 1), easily legible and indelible, and shall be in contrast with the background of the labeling.

Toys which are unable to comply with the above requirement and part of this standard because of their inherent functions shall carry a clear cautionary labeling such as "Handle with care" or "Dangerous if abused" and shall be provided with an instruction for use which is sufficient for preventing danger.

Either labeling "Be careful" or "Dangerous" shall be used depending on the content of provision with which toys are unable to comply, the probability of occurrence of abuse and the degree of danger when abused.

"Clear labeling" means a labeling attached to a body of toy or a package at a position easy to find and contiguous to the ST Mark and having a size equal to or more than that of the ST Mark, a letter with a height of at least 10 mm and color contrast to the ground color.

(Note.1) The height stated shall be the height of CAPITAL LETTERS corresponding to the height of some small letters, e.g. the letter 'K'.

7.1 Cautionary Labeling

7.1.1 Toys

Where a toy has any details which are either essential for the function of the toy like e.g. sharp points which may include a hazard or where a toy has a design in which an inherent hazard may be present, e.g. in imitation protective equipment, the toy, its package or its instruction for use shall be labeled with the word

"Caution!" followed by a cautionary statement describing the hazard (see separate PL-Guidelines on Cautionary Labeling).

7.1.1.1 Toys incorporating sharp points or edges

Toys incorporating accessible points or edges (see clause 5.16) which are determined as sharp points or sharp edges (see clauses 4.1.3, 4.2.1.1, 4.2.1.4, and 4.2.2.11), shall be accompanied by instructions for use including a cautionary statement drawing attention to the hazards associated with the use of the toy (see separate PL-Guidelines on Cautionary Labeling).

7.1.1.2 Functional toys

Functional toys (see clause 4.2.2.9) shall be accompanied by instructions for use which shall include a cautionary statement drawing attention to the fact that the toys are for use only under direct supervision of parents. In addition, the toy or its packaging shall carry similar cautionary statement. (see separate PL-Guidelines on Cautionary Labeling)

7.1.1.3 Toys with projectiles

Toys with projectiles (see clause 4.2.2.10) shall be accompanied by instructions for use which includes a cautionary statement drawing 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 or at people (see separate PL-Guidelines on Cautionary Labeling).

7.1.1.4 Imitation protective equipment

Imitation protective equipment (such as crash helmets, see clause 4.2.2.12) shall bear a cautionary statement describing the hazard (see separate PL-Guidelines on Cautionary Labeling).

7.1.1.5 Kites and other flying toys

Kites and other flying toys (see clause 4.2.2.14) shall bear a cautionary statement describing the hazard (see separate PL-Guidelines on Cautionary Labeling).

7.1.1.6 Aquatic toys

Aquatic toys (see clause 4.2.2.15) shall be labeled by referring to the cautionary statements on the use and handling of the toys (see clause 7.1.1.9).

7.1.1.7 Chemical toys

The packaging of chemical toys shall be labeled with cautionary statement relating to the hazards caused by the use and abuse of such toys.

7.1.1.8 Adhesives and solvents

As regards adhesives and solvents, the attention of the users shall be drawn to the hazards and safety instructions.

7.1.1.9 Inflatable vinyl toys

Inflatable vinyl toys specified in 4.2.2.16 shall be labeled in the following manner. (see attached Guidelines on PL-Cautionary Labeling for Inflatable Vinyl Toys)

7.1.1.10 Pull toys not intended to be ridden

Pull toys, etc., not intended for riding but having a portion which is more than 15 cm in height shall bear warning statement which prohibits riding.

7.1.1.11 Toys intended to be ridden

Toys designed to be ridden by children shall bear the following warning information on the main assembly or the package.

- (1) Applicable ages
- (2) Not to use on a slope
- (3) Not to push the push handle with children seated on the toy
- (4) Precaution in using the toy on stairways, verandahs and other places where the toy is likely to be tumbled, and outdoors
- (5) Not to bring the toy close to fire or other places subjected to high temperature
- (6) Not to leave the toy exposed to rain

7.1.1.12 Cords and Elastics on toys intended for children under 18 months of age (see clause 4.2.2.4)

If the cords or elastics are attached to the toys intended for children under 18 months of age, and it is necessary to remove such cords or elastics when the children begin to touch them while, for example, standing up by holding something, the toys shall be labeled to that effect on the toy itself or on its package by way of cautionary statement.

7.2 Informative Labeling

7.2.1 Identification

Each toy or its packaging or a leaflet accompanying the toy shall be labeled with the name or trade mark which identifies the manufacturer, importer or organization responsible for marketing the toy.

These particulars may be abbreviated in so far as the abbreviations make it possible in a general and evident manner to identify the manufacturer, importer or organization responsible for marketing the toy.

7.2.2 Age grades

All toys shall be labeled of the intended age grades of the toy on their package. The toys without the age labeling shall be considered as the toys intended for all age groups.

In the case of toys which might be dangerous for children under 36 months (in terms of the requirements of this standard applicable to that age), the toys shall bear the labeling such as the followings on the toy or on their package.

- (1) Intended for children of 3 years or over; or
- (2) The clear statement that the toy is intended for children of 3 years or over

[example] Not suitable for children under 3 years of age

This product is intended for children of ---- years or over, and is not suitable for the children under the intended age group.

The chemical toys shall be considered as being intended for the children of 10 years or over and its packaging shall be labeled the marking such as the following.

'Intended for children of 10 years or over'

In the case that adhesives and solvents contain any substances that might by their nature and/or their quantity hazardous to the health of users, the toy shall be regarded as being intended for children of 10 years or over and it shall be labeled the marking such as the following:

'Intended for children of 10 years or over'

7.2.3 Swings

Swings (see clause 4.2.2.7.4) shall be accompanied by assembly instructions and by instructions that shall draw attention to the necessity of checking the suspension system regularly.

7.2.4 Chemical toys

See clause 7.2.2

7.2.5 Adhesives and solvents

See clause 7.2.2

7.2.6 Dry cells

Draw attention to the danger of ingesting button cells, and how to dispose of various dry cells.

7.2.7 Labeling of public standards certification

The products that are manufactured in accordance with the laws such as Household Goods Quality Labeling Law shall be labeled of its certification mark on their package or in the instruction manual.

7.2.8 Other information

More detailed information than those stated in 7.2 shall be given on the toy, its packaging or in an instruction for use.

The toys that the infants cannot touch directly with their hands such as merry-go-rounds (see 4.2.2.1) shall be labeled either on the toy or on its package.

The toys that the infants cannot touch directly may not be subjected to the tests mentioned under 4.2.2 if the toys are labeled.

With regard to the cautionary statement, see separate PL-Guidelines on cautionary labeling.