



# Standard Consumer Safety Specification for Toy Safety<sup>1</sup>

This standard is issued under the fixed designation F 963; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## INTRODUCTION

The purpose of this consumer safety specification is to establish nationally recognized safety requirements for toys. Although this specification will not eliminate the need for the exercise of parental responsibility in selecting toys appropriate to the age of a child, or parental supervision in situations in which children of various ages may have access to the same toys, its application will minimize accidents in the normal, intended use and reasonably foreseeable abuse of the toys covered by this specification. This specification was developed originally as a Voluntary Product Standard under the auspices of the National Bureau of Standards, Department of Commerce, and published in 1976 (PS 72–76). The present revision is intended to update the safety requirements to include the following by reference: published federal mandatory requirements, relevant voluntary standards, certain new requirements for addressing potential hazards, and several technical revisions based on producer experience with the original standard.

### 1. Scope

1.1 This specification<sup>2</sup> relates to possible hazards that may not be recognized readily by the public and that may be encountered in the normal use for which a toy is intended or after reasonably foreseeable abuse. It does not purport to cover every conceivable hazard of a particular toy. This specification does not cover product performance or quality, except as related to safety. Except for the labeling requirements pointing out the functional hazards and age range for which the toy is intended, this specification has no requirements for those aspects of a toy that present an inherent and recognized hazard as part of the function of the toy. Such an example is a sharp point necessary for the function of a needle. The needle is an inherent hazard that is well understood by the purchaser of a toy sewing kit, and this hazard is communicated to the user as part of the normal educational process.

1.2 On the other hand, while a riding toy has inherent hazards associated with its use (for example, falling off onto the sidewalk), the possible hazards associated with its con-

struction (sharp edges, exposed mechanisms, etc.) will be minimized by the application of this specification.

1.3 This specification covers requirements and contains test methods for toys intended for use by children under 14 years of age. Different age limits for various requirements will be found in this specification. These limits reflect the nature of the hazards and expected mental or physical ability, or both, of a child to cope with the hazards.

1.4 Articles not covered by this specification are as follows:

Bicycles

Tricycles

Sling shots and sharp-pointed darts

Playground equipment

Non-powder guns

Kites

Hobby and craft items in which the finished item is not primarily of play value

Model kits in which the finished item is not primarily of play value

Crayons, paints, chalks, and other similar art materials in which the material itself or the finished item is not primarily of play value, except that all art materials, whether or not a component of a toy, must comply to LHAMA, in accordance with 4.30.1-4.30.3.

Sporting goods, camping goods, athletic equipment, musical instruments, and furniture; however, toys that are their counterparts are covered. (It is recognized that there is often a fine line between, for example, a musical instrument or a sporting item and its toy counterpart.

<sup>1</sup> This consumer safety specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.22 on Toy Safety.

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<sup>2</sup> Toy Industry Association, Inc. (TIA) sometimes provides its interpretations of this specification through its counsel as a service to its members and others. The TIA's interpretations are not reviewed or approved by ASTM and should be viewed as TIA's alone.



The intention of the producer or distributor, as well as normal use and reasonably foreseeable abuse, determines whether the item is a toy counterpart.)

Powered models of aircraft, rockets, boats, and land vehicles; however, toys that are their counterparts are covered.

1.5 General guidelines for age labeling toys and toy packaging are contained in Annex A1.

1.6 Information regarding packaging and shipping is contained in Annex A2.

1.7 This consumer safety specification includes the following sections:

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1.8 The values stated first are to be regarded as the standard. The values given in parentheses are for information only.

1.9 The following precautionary statement pertains only to the test methods portion, Section 7, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>3</sup>

- D 374 Test Methods for Thickness of Solid Electrical Insulation
- D 642 Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads
- D 880 Test Method for Impact Testing for Shipping Containers and Systems
- D 999 Methods for Vibration Testing of Shipping Containers
- D 1193 Specification for Reagent Water
- D 2240 Test Method for Rubber Property—Durometer Hardness
- D 3421 Practice for Extraction and Determination of Plasticizer Mixtures from Vinyl Chloride Plastics<sup>4,5</sup>
- D 4236 Practice for Labeling Art Materials for Chronic Health Hazards
- D 5276 Test Method for Drop Test of Loaded Containers by Free Fall
- F 1313 Specification for Volatile *n*-Nitrosamine Levels in Rubber Nipples on Pacifiers
- F 1148 Consumer Safety Performance Specification for Home Playground Equipment

### 2.2 ANSI Standards:<sup>6</sup>

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>4</sup> Withdrawn.

<sup>5</sup> Available from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112.

<sup>6</sup> Electronic copy available from American National Standards Institute website: www.ansi.org; hard copies from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112.

C18.1 American National Standard for Dry Cells and Batteries—Specifications  
 S1.4 Specification for Sound Level Meters  
 Z315.1 Safety Requirements for Tricycles  
 2.3 *Federal Standards*:<sup>7</sup>  
 15 CFR 1150 Marking of Toys, Look-Alike and Imitation Firearms  
 16 CFR 1303 Ban of Lead-Containing Paint and Certain Consumer Products Bearing Lead Containing Paint  
 16 CFR 1500 Hazardous Substances Act Regulations, including the following sections:  
 1500.3 (c) (6) (vi) Definition of “flammable solid”  
 1500.14(b) (8) Labeling of hazardous art materials  
 1500.18 Banned toys and other banned articles intended for use by children  
 1500.19 Misbranded toys and other articles intended for use by children  
 1500.44 Method for determining extremely flammable and flammable solids  
 1500.47 Method for determining the sound pressure level produced by toy caps  
 1500.48 Technical requirements for determining a sharp point in toys and other articles intended for use by children under 8 years of age  
 1500.49 Technical requirements for determining a sharp metal or glass edge in toys and other articles intended for use by children under 8 years of age  
 1500.50-53 Test method for simulating use and abuse of toys and other articles intended for use by children  
 1500.83 Exemptions for small packages, minor hazards, and special circumstances  
 1500.85 Exemptions from classification as banned hazardous substances  
 1500.86 Exemptions from classification as a banned toy or other banned article for use by children  
 16 CFR 1501 Method for Identifying Toys and Other Articles Intended for Use by Children Under 3 Years of Age which Present Choking, Aspiration, or Ingestion Hazards Because of Small Parts  
 16 CFR 1505 Requirements for Electrically Operated Toys or Other Electrically Operated Articles Intended for Use by Children  
 16 CFR 1510 Requirements for Rattles  
 16 CFR 1511 Requirements for Pacifiers  
 16 CFR 1610 Standard for Flammability of Clothing Textiles  
 21 CFR 110 Current Good Manufacturing Practice in Manufacturing, Processing, Packaging, or Holding Human Food  
 21 CFR 170-189 Food for Human Consumption  
 21 CFR 700-740 Requirements for Specific Cosmetic Products  
 21 CFR 73, 74, 81, 82 Color Additives  
 49 CFR 173.100, 109 Definition of Class C Explosives

SS-T-312B Tile, Floor: Asphalt, Rubber, Vinyl, VinylAsbestos<sup>8</sup>  
 2.4 *ISO and IEC Standards*:<sup>9</sup>  
 ISO 7779 Acoustics—Measurement of Airborne Noise Emitted by Computer and Business Equipment  
 ISO 8124-1: 2000 Safety of Toys, Safety Aspects Related to Mechanical and Physical Properties  
 IEC 60086-2 Primary Batteries: Physical and Electrical Specifications

### 3. Terminology

#### 3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *A-weighted sound pressure level ( $L_{pA}$ )*—the sound pressure level obtained by using standardized A-weighting.

3.1.2 *accessible*—(part or component) describing any area of the toy that can be contacted by any portion forward of the collar of the accessibility probe as described in 16 CFR 1500.48 and 16 CFR 1500.49. (See Fig. 1.)

NOTE 1—Dimensions are provided in Fig. 1 for two probes corresponding to two age ranges of children.

3.1.3 *alkaline battery*—a non-rechargeable dry cell battery with an alkaline manganese electrochemistry.

3.1.4 *aquatic toy*—an article, whether inflatable or not, intended to bear the mass of a child and used as an instrument of play in shallow water. This does not include bath toys, beach balls, and United States Coast Guard-approved life saving devices.

3.1.5 *art material*—any substance marketed or represented by the producer or repackager as suitable for use in any phase of the creation of any work of visual or graphic art of any medium. This definition includes items that become a component of the work of art such as paint, canvas, inks, crayons, chalk, solder, brazing rods, flux, paper, clay, stone, thread, cloth, and photographic film. It also includes items that are associated closely with the creation of the final work of art such as brushes, brush cleaners, solvents, ceramic kilns, silk screens, molds, mold making material, and photographic developing chemicals.

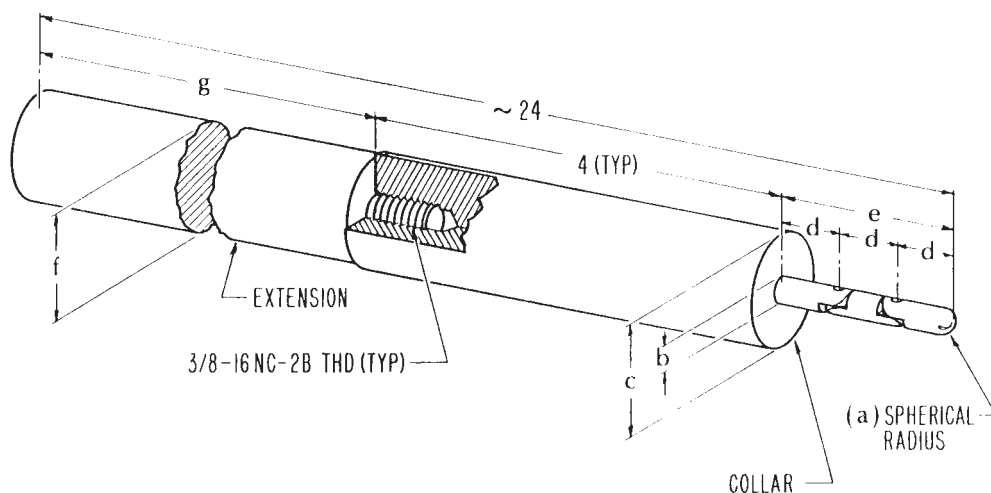
3.1.6 *ball*—any spherical, ovoid, or ellipsoidal object that is designed or intended to be thrown, hit, kicked, rolled, dropped, or bounced. The term “ball” includes any spherical, ovoid, or ellipsoidal object that is attached to a toy or article by means of string, elastic cord, or similar tether. The term “ball” also includes any multisided object formed by connecting planes into a generally spherical ovoid, or ellipsoidal shape that is designated or intended to be used as a ball. The term “ball” does not include dice, or balls permanently enclosed inside pinball machines, mazes, or similar outer containers. A ball is permanently enclosed if, when tested in accordance with 16 CFR 1500.53, it is not removed from the outer container.

3.1.7 *battery-operated toy*—toy having at least one function dependent on electricity and powered by batteries.

<sup>7</sup> Available from U.S. Consumer Product Safety Commission website: [www.cpsc.gov](http://www.cpsc.gov) or U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954; website: [www.gpo.gov](http://www.gpo.gov)

<sup>8</sup> Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

<sup>9</sup> Available from International Organization for Standardization (ISO), 1 rue de Varembé, Case postale 56, CH-1211, Geneva 20, Switzerland.



	a	b	c	d	e	f	g
(CHILDREN 0-36 MONTHS INCL)	PROBE A	110	220	1,020	577	1,731	1 18 9/32
( " 37-96 " " )	PROBE B	170	340	1,510	760	2,280	1 1/2 17 25/32

ALL DIMENSIONS IN INCHES

FIG. 1 Accessibility Probes

3.1.8 *burr*—a roughness that may be found at an edge or joint of a toy or component if the material is not severed or finished cleanly.

3.1.9 *button cell battery*—a battery having a diameter greater than its height.

3.1.10 *C-weighted sound pressure level ( $L_{pC}$ )*—the sound pressure level obtained by using standardized C-weighting.

3.1.11 *close-to-the-ear toy*—a toy that is intended to be used close to the ear. Examples include, but are not limited to, toy telephones.

3.1.12 *collapse*—sudden or unexpected folding of a structure.

3.1.13 *compression spring*—spring which essentially returns to its initial state after compression.

3.1.14 *continuous sound*—any steady-state sound or group of variable sounds greater than one second in duration.

3.1.15 *cord*—a length of slender, flexible material including monofilaments, woven and twisted cord, rope, plastic textile tapes, ribbon, and those fibrous materials commonly called string.

3.1.16 *cosmetics*—any article intended or likely to be rubbed, sprinkled, or sprayed on, introduced onto, or otherwise applied to the human body for cleansing, beautifying, promoting or enhancing attractiveness, or for altering appearance.

3.1.17 *crushing*—injury to part of the body resulting from compression between two rigid surfaces.

3.1.18 *curled edge*—an edge in which the portion of the sheet adjacent to the edge is bent into an arc and forms an angle of less than 90° with the base sheet, as shown in Fig. 2.

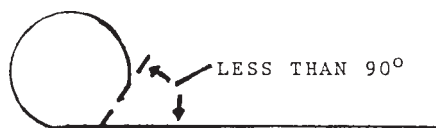


FIG. 2 Curled Edge

3.1.19 *discharge mechanism*—an inanimate system for releasing and propelling a projectile.

3.1.20 *driving mechanism*—assembly of linked parts or components (for example, gears, belts, winding mechanisms), at least one of which moves, powered by a source (for example, electrical or mechanical means) independent of the child.

3.1.21 *edge, hazardous*—an accessible edge that presents an unreasonable risk of injury during the normal use and reasonably foreseeable abuse of a toy. Metal and glass edges on toys intended for children under the age of eight years are defined as potentially hazardous if they fail the sharp edge test described in 16 CFR 1500.49. Edges other than metal and glass are defined as potentially hazardous if they are sharp to the touch under casual handling conditions.

3.1.22 *elastic*—material that will recover its former size and shape essentially and instantaneously after being elongated at least 10 % at a testing speed of not less than 20 in. (510 mm)/min.

3.1.23 *equivalent sound pressure level ( $L_{Aeq}$ )*—the level of a steady-state sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.

3.1.24 *extension spring*—spring which essentially returns to its initial state after tension.

3.1.25 *fastener*—mechanical device which attaches two or more elements together (for example, screws, rivets, and staples).

3.1.26 *feathering*—the beveling of an edge (or decrease in thickness moving toward the edge) caused during the shearing or cutting of material.

3.1.27 *flash*—excess material that escapes between the mating parts of a mold assembly.

3.1.28 *folding mechanism*—an assembly of hinged, pivoted, folding, or sliding members that can produce a crushing, scissoring, pinching, or shearing action during operation.



3.1.29 *fuzz*—bits of fibrous-type material that can be readily removed from toys with a pile surface.

3.1.30 *handheld toy*—a toy intended to be used or operated while being held in the hand. Examples of handheld toys include, but are not limited to, toy tools, small electronic games, stuffed animals, and dolls. Close-to-the-ear toys, rattles, and toys using caps are not included in this definition.

3.1.31 *hazard*—any characteristic of a toy that presents an unreasonable risk of injury or illness during normal use or as a result of reasonably foreseeable abuse.

3.1.32 *helical spring*—spring in the form of a coil.

3.1.33 *hemmed edge*—an edge in which the portion of the sheet adjacent to the edge is folded back on the sheet itself through an angle of approximately 180°, so that the portion of the sheet adjacent to the edge is approximately parallel to the main sheet, as shown in Fig. 3.

3.1.34 *hinge-line clearance*—the distance between the stationary portion of a toy and the movable portion along, or adjacent to, a line projected through the axis of rotation, shown as Dimension A in Fig. 4.

3.1.35 *impulsive sound, explosive-type*—a noise caused by the sudden release of energy characterized by the rapid expansion or bursting of a material (for example, percussion caps). Noises of this type are distinguished by an extremely rapid rise time and very short duration which results in a brief excursion of sound pressure which significantly exceeds the ambient noise.

3.1.36 *impulsive sound, impact-type*—a noise caused by the collision of one mass in motion with a second mass which may either be in motion or at rest. Noises of this type are distinguished by a brief excursion of sound pressure which significantly exceeds the ambient noise. Rise times of impact-type sounds are typically much longer than that of explosive-type sounds. In addition, the duration of impact-type sounds can be substantially longer than that of explosive-type sounds.

3.1.37 *lap joint*—a joint in which an edge overlaps a parallel surface but is not necessarily attached to it mechanically at all points along the length, as in the examples shown in Fig. 5.

3.1.38 *large and bulky toy*—toy that has a projected base area of more than 400 in.<sup>2</sup> (0.26 m<sup>2</sup>) or a volume of more than 3 ft<sup>3</sup> (0.08 m<sup>3</sup>) calculated without regard to minor appendages.

NOTE 2—The base area for toys having permanently attached legs is measured by calculating the area enclosed by straight lines connecting the outermost edge of each leg of the perimeter.

3.1.39 *latex balloon*—any toy or decorative item consisting of a latex bag that is designed to be inflated by air or gas. The term does not include inflatable children’s toys that are used in aquatic activities such as rafts, water wings, swim rings, or other similar items.

3.1.40 *marble*—a sphere made of a hard material, such as glass, agate, marble, or plastic, that is used in various children’s games, generally as a playing piece or marker. The term “marble” does not include a marble permanently enclosed in a

toy or game. A marble is permanently enclosed if, when tested in accordance with 16 CFR 1500.53, it is not removed from the toy or game.

3.1.41 *non-replaceable battery*—an electrochemical device that will not require user accessibility or user replacement for the expected life of the product or devices it is intended to power. Such batteries will not be accessible when tested in accordance with the normal use and, where appropriate, reasonably foreseeable abuse tests of 8.6 through 8.10.

3.1.42 *normal use*—play modes that conform to the instructions accompanying the toy, that have been established by tradition or custom, or that are evident from an examination of the toy.

3.1.43 *packaging*—material accompanying the toy when purchased, but having no intended play function.

3.1.44 *peak sound pressure level ( $L_{Cpk}$ )*—the greatest C-weighted instantaneous sound pressure level within the period of observation.

3.1.45 *pinching*—created when two moving or one moving and one fixed surface come together in such a way that they could entrap and compress flesh, usually resulting in a contusion or laceration.

3.1.46 *point, hazardous*—an accessible point that presents an unreasonable risk of injury during normal use or reasonably foreseeable abuse. Points on toys intended for children under the age of 8 years are potentially hazardous if they fail the sharp point test described in 16 CFR 1500.48.

3.1.47 *pom-pom*—lengths or strands of fiber, yarns, or threads clamped or secured and tied in the center, and brushed up to form a spherical shape. Also included are spherical-shaped attachments made of stuffed material.

3.1.48 *principal display panel*—the display panel for a retail package or container, bin, or vending machine that is most likely to be displayed, shown, presented, or examined under normal or customary conditions of display for retail sale.

3.1.49 *projectile*—an object propelled by means of a discharge mechanism capable of storing and releasing energy under the control of the operator.

3.1.50 *projection, hazardous*—a projection that, because of its material or configuration, or both, may present a puncture hazard if a child should fall onto it. Excluded from this definition are puncture hazards to the eyes or mouth, or both, because of the impossibility of eliminating puncture hazards to those areas of the body by product design.

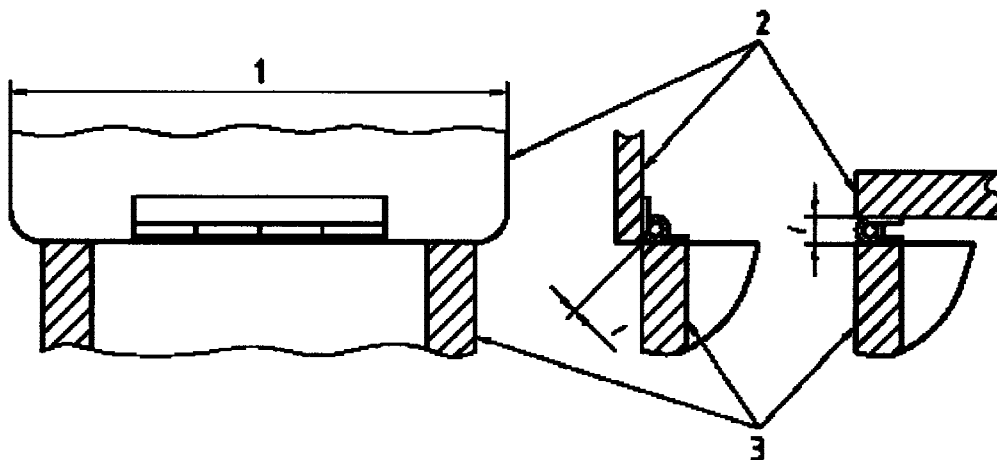
3.1.51 *protective cap or cover*—a component that is attached to a potentially hazardous edge or projection to reduce the possibility of injury.

3.1.52 *protective tip*—a component that is attached to the impacting end of a projectile to minimize injury if it should impact on the body, and also to prevent damage to the projectile upon striking a target, provide a means of attaching the projectile to the target as in the case of suction cups, or prevent damage to inanimate objects.

3.1.53 *reasonably foreseeable abuse*—conditions to which a child may subject a toy that are not normal use conditions, such as deliberate disassembly, dropping, or using the toy for a purpose for which it was not intended. Simulated use and abuse



**FIG. 3 Hemmed Edge**



**Key**

- 1 Hinge line
- 2 Lid
- 3 Box

*l* = Hinge-line clearance

**FIG. 4 Changing Clearance at Hinge Line**



**FIG. 5 Typical Lap Joints**

tests for toys are given in 16 CFR 1500.50, 1500.51, 1500.52, and 1500.53 (excluding the bite test, Paragraph (c), of each section).

3.1.54 *rigid*—any material having a hardness exceeding 70 Shore A scale durometer, as measured by the latest revision of Test Method D 2240.

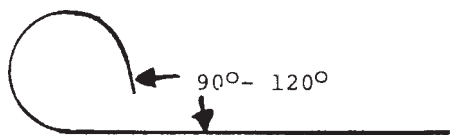
3.1.55 *rolled edge*—an edge in which the portion of the sheet adjacent to the edge is bent into an arc and forms an angle between 90 and 120° with the main sheet, as shown in Fig. 6.

3.1.56 *simulated protective equipment*—toys designed to mimic products that infer some sort of physical protection to the wearer (for example, protective helmets and visors).

3.1.57 *squeeze toy*—a handheld pliable toy, intended for children under the age of 18 months, usually incorporating a noise-making feature activated by forcing air through an opening when flexed or squeezed, and which recovers to its original shape when released.

3.1.58 *soft-filled toy/stuffed toy*—toy, clothed or unclothed, with soft body surfaces and filled with soft materials, allowing compression of the torso readily with the hand.

3.1.59 *splinter*—sharp pointed fragment.



**FIG. 6 Rolled Edge**

3.1.60 *spiral spring*—clockwork-type spring.

3.1.61 *steady-state sound (noise)*—noise in which there are negligibly small fluctuations of sound pressure level within the period of observation.

3.1.62 *tabletop, floor, and crib toy*—toys intended to be played with while attached to or resting on a table top, floor, or crib. Examples of such toys include, but are not limited to, toy vehicles, stacking toys, large and bulky toys, games, and activity toys that attach to crib rails.

3.1.63 *teether*—toy designed for oral use and intended primarily for symptomatic relief of teething discomfort.

3.1.64 *tool*—screwdriver, coin, or other object which may be used to operate a screw, clip, or similar fixing device.

3.1.65 *toy*—any object designed, manufactured, or marketed as a plaything for children under 14 years of age.

**4. Safety Requirements**

4.1 *Material Quality*—Toys may be made from new or reprocessed materials and shall be visually clean and free from infestation. The materials shall be assessed visually by the unaided eye rather than under magnification. If reprocessed materials are used, they must be refined so that the level of hazardous substances conforms to the requirements of 4.3.1.

4.2 *Flammability*—Materials other than textiles (excluding paper) used in toys shall not be flammable, as defined under 16 CFR 1500.3 (c) (6) (vi) under the Federal Hazardous Substances Act (FHSA). For testing purposes, any textile fabrics used in toys should comply with 16 CFR 1610. A test procedure for testing flammability of toys, which is an interpretation of 16 CFR 1500.44, is contained in Annex A4.

4.3 *Toxicology*:

4.3.1 *Hazardous Substances*—Toys or materials used in toys shall conform to the FHSA and to the regulations promulgated under that act. Exemptions to this act for certain types of toys are given in 16 CFR 1500.85. The regulations define limits for substances that are toxic, corrosive, an irritant,

sensitizer or pressure generating, and radioactive, flammable, and combustible materials. Testing references for hazardous substance content are given in 8.2. It should be noted that specific states may have hazardous substances regulations that are more restrictive than the Federal regulations.

**4.3.2 Manufacturing and Packaging of Food**—All food products supplied with toys shall be manufactured and packaged in compliance with 21 CFR 110, which is concerned with the sanitation practices for the manufacture, processing, packaging, or holding of human food.

**4.3.3 Indirect Food Additives**—Toy components intended to be used in contact with food, such as toy cooking utensils, shall conform to the applicable requirements of the Food, Drug and Cosmetic Act (FDCA), specifically 21 CFR 170 through 189.

**4.3.3.1 Toys in Contact with Food**—Toys comprising components intended to be used in contact with food, such as toy cooking utensils and toy tableware shall meet the requirements of 6.7 for instructional literature.

**4.3.3.2 Ceramicware, Lead, and Cadmium Contamination**—Ceramic toy components intended or likely to hold food, such as a porcelain tea set, shall conform to the applicable requirements of the FDCA, Section 402 (a) (2) (c), and FDA Compliance Policy Guides.

**4.3.4 Cosmetics**—Cosmetics shall conform to the requirements of the Federal FDCA as codified in 21 CFR. The regulations applicable to cosmetics are stated in 21 CFR 700 through 740. The color additive regulations applicable to cosmetics are found in 21 CFR 73, 74, 81, and 82.

**4.3.4.1** In addition, cosmetics intended for use by children under 8 years of age shall meet all requirements of this specification and the FHSA regulations, notwithstanding the exclusions of 16 CFR 1500.81 and 1500.3 (b) (4) (ii).

**4.3.4.2** The requirements from the Food and Drug Administration (FDA) will therefore be additive to those existing for children’s products.

**4.3.5 Paint and Similar Surface-Coating Materials**—Paint and other similar surface-coating materials applied to toys shall comply with the lead content provisions of 16 CFR 1303, issued under the Consumer Product Safety Act (CPSA).

**4.3.5.1** The regulation prohibits the use of paints or similar surface-coating materials that contain lead or lead compounds and in which the lead content (calculated as lead metal [Pb]) is in excess of 0.06 % (600 ppm) of the weight of the *total* nonvolatile content of the paint or the weight of the dried paint film.

**4.3.5.2** In addition, surface-coating materials shall not contain compounds of antimony, arsenic, barium, cadmium, chromium, lead, mercury, or selenium, of which the metal content of the *soluble* material is in excess of the levels by weight of the contained solids (including pigments, film solids, and driers) given in Table 1. The analytical results obtained should be adjusted in accordance with the test method in 8.3.4.3 prior

to comparing them to the values in Table 1 to determine conformance. The soluble level shall be determined by dissolving the contained solids (dried film including pigments, film solids, and driers) as specified in 8.3.

**4.3.6 Cosmetics, Liquids, Pastes, Putties, Gels, and Powders**—The purpose of this requirement is to minimize the risk associated with the lack of cleanliness, shelf life, and contamination of cosmetics, liquids, pastes, putties, gels, and powders used in toys (excluding art materials). It sets standards for cleanliness and the ability to withstand extended shelf life or contamination, or both, during use without microbiological degradation.

**4.3.6.1** Water used in the manufacturing and filling of toys shall be prepared according to the bacteriological standards for USP Purified Water. (**Warning**—The various methods for producing purified water each present different potentials for contaminating the final product. Purified water produced by distillation is sterile, provided that the production equipment is suitable and sterile. On the other hand, ion-exchange columns and reverse osmosis units require special attention in that they afford sites for microorganisms to foul the system and contaminate the effluent. Frequent monitoring may thus be called for, particularly with the use of these units following periods of shutdown of more than a few hours.)

**4.3.6.2** The formulations of these products used in toys shall be such that they are not subject to microbial degradation during shelf life or reasonably foreseeable use.

**4.3.6.3** The cleanliness of these products used in toys and their ingredients shall be determined in accordance with 8.4.1. Formulations used to prevent microbial degradation shall be evaluated in accordance with 8.4.2.

**4.3.6.4** Formulations of cosmetics shall be evaluated for potential microbiological degradation in accordance with 8.4.2.

**4.3.7 Stuffing Materials**—Loose fillers for stuffed toys shall be free of objectionable matter originating from insect, bird, rodent, or other animal infestation and of contaminants, such as splinters and metal chips to the extent possible in good manufacturing practice. The test methods that shall be used to determine objectionable material are in Chapter 16 of *Official Methods of Analysis of the Association of Official Analytical Chemists*.<sup>10</sup> In addition, fiber filling, whether natural or synthetic, should meet the requirements of Title 34, Chapter 47, Section 47.317, “Tolerances of the Commonwealth of Pennsylvania Regulation for Stuffed Toys.”

**4.3.8 DEHP (DOP)**—Pacifiers, rattles, and teethers shall not intentionally contain DI (2-ethylhexyl) phthalate (also known as dioctyl phthalate). To prevent trace amounts of DEHP (DOP) from affecting analysis, up to 3 % of total solid content will be accepted in the result, when tested in accordance with Practice D 3421.

**4.4 Electrical/Thermal Energy**—Toys operating from nominal 120-V branch circuits shall conform to 16 CFR 1505, issued under the FHSA.

**4.5 Sound-Producing Toys**—These requirements are intended to minimize the possibility of hearing damage that

**TABLE 1 Maximum Soluble Migrated Element in ppm (mg/kg) Toy Material**

Antimony, (Sb)	Arsenic, (As)	Barium, (Ba)	Cadmium, (Cd)	Chromium, (Cr)	Lead, (Pb)	Mercury, (Hg)	Selenium, (Se)
60	25	1000	75	60	90	60	500

<sup>10</sup> “Extraneous Materials: Isolation,” *Official Methods of Analysis of the Association of Official Analytical Chemists*, 15 ed., Chapter 16, 1990.

might be caused by toys that are designed to produce sound. When tested in accordance with 8.20, the toy shall conform to the requirements stated in this section. These requirements are applicable before and after testing in accordance with 8.5 through 8.10. These requirements do not apply to: (1) sounds produced by mouth-actuated toys where the sound pressure level is determined by the blowing action of the child; (2) child-actuated sounds such as those produced by drums and bells where the sound pressure level is determined by the muscular action of the child; (3) tape players, CD players, and other similar electronic toys where the sound output is dependent on the content of removable media (for example, tape, CD, record, game cartridge); (4) toys that are connected to or interfaced with external devices (for example, televisions, computers) where the sound pressure level is determined by the external device; (5) squeeze toys; (6) sound emitted from earphones/headphones; and (7) sounds produced by toys with wheels as a result of their wheels making contact with the ground, floor, and so forth.

4.5.1 *Handheld, Tabletop, Floor, and Crib Toys*—Toys in this classification shall not produce continuous sound with an equivalent sound pressure level ( $L_{Aeq}$ ) that exceeds 90 dB when measured from a distance of 25 cm (9.8 in.).

4.5.2 *Close-to-the-ear Toys*—Toys in this classification shall not produce continuous sound with an equivalent sound pressure level ( $L_{Aeq}$ ) that exceeds 70 dB when measured from a distance of 25 cm (9.8 in.).

4.5.3 *All Toys with Impact-type Impulsive Sounds*—Toys shall not produce an impact-type peak sound pressure level ( $L_{Cpk}$ ) in excess of 120 dB when measured from a distance of 25 cm (9.8 in.). This requirement also applies to rattles and all recorded impulsive sounds, such as those produced by video games, regardless of what was recorded (explosion or impact).

4.5.4 *All Toys with Explosive-type Impulsive Sounds Except Percussion Caps*—Toys shall not produce an explosive-type peak sound pressure level ( $L_{Cpk}$ ) in excess of 138 dB when measured from a distance of 25 cm (9.8 in.).

4.5.5 *Percussion Caps*—Toy caps must comply with 16 CFR 1500.47 and 16 CFR 1500.86.

4.6 *Small Objects*—These requirements are intended to minimize the hazards from ingestion or inhalation to children under 36 months of age created by small objects.

4.6.1 Toys that are intended for children under 36 months of age are subject to the requirements of 16 CFR 1501. Criteria for determining which toys are subject to these requirements are provided, in part, in 16 CFR 1500.50 and 1501 and also in Annex A1 of this specification. The requirements of 16 CFR 1501 state, in part, that no toy (including removable, liberated components, or fragments of toys) shall be small enough without being compressed to fit entirely within a cylinder of the specified dimensions as shown in Fig. 7. For the purposes of this specification, fragments of toys include, but are not limited to, pieces of flash, slivers of plastics, pieces of foam, or fine bits or shavings. Pieces of paper, fabric, yarn, fuzz, elastic, and string are excluded from this requirement.

4.6.1.1 The requirements are applicable before and after use and abuse testing in accordance with Section 8 to determine the accessibility of small objects such as small toys or components

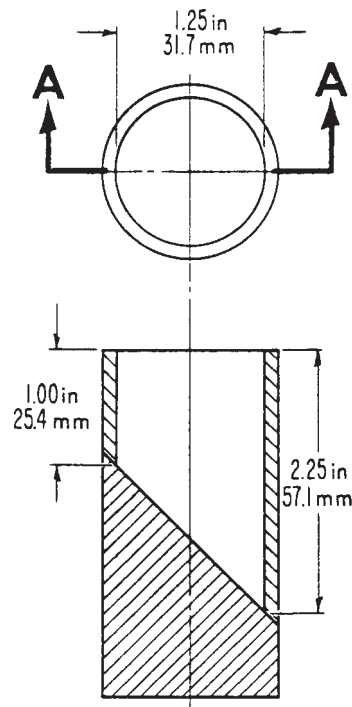


FIG. 7 Small Parts Cylinder

of toys including eyes, squeakers, or knobs, or pieces that break off or are removed from toys.

4.6.1.2 The following articles are exempt from the requirements: balloons; books and other paper articles; writing materials (crayons, chalk, pencils, and pens); phonograph records and compact discs (CDs); modeling clay and similar products; and fingerpaints, watercolors, and other paint sets. A listing of exempt articles is provided in 16 CFR 1501.3.

4.6.1.3 Toys that are intended to be assembled by an adult and contain potentially hazardous small objects in the unassembled state shall be labeled in accordance with 5.8.

4.6.2 *Mouth-Actuated Toys*—This requirement relates to toys, such as noisemakers, that are intended to be actuated repeatedly by blowing or sucking. Mouth-actuated toys that contain 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 small parts test cylinder, as shown in Fig. 7, when air is alternately blown and sucked rapidly through the mouthpiece, according to the procedure described in 8.13. The procedure of 8.13 shall also be applied to the outlet if the air outlet is capable of being inserted into or covered by the mouth.

4.6.2.1 Small objects contained in an inflatable toy shall not be liberated during inflation or deflation.

4.6.3 Toys and games that are intended for use by children who are at least three years old (36 months) but less than six years of age (72 months) are subject to the requirements of 16 CFR 1500.19. With the exception of products such as paper punch-out games and similar items, any toy or game that is intended for use by children who are at least three years old (36 months) but less than six years of age (72 months) and includes a small part is subject to the labeling requirements in accordance with 5.11.2.



4.7 *Accessible Edges*—Toys shall not have accessible, potentially hazardous sharp edges. Toys that are intended to be assembled by an adult, and may contain unprotected potentially hazardous sharp edges in the unassembled state, shall be labeled in accordance with 5.8.

4.7.1 Potentially hazardous sharp metal and glass edges are defined in 16 CFR 1500.49. Toys intended for use by children under 8 years of age are subject to this requirement before or after use and abuse testing, or both, as specified in 8.5-8.10. An illustration of a sharp edge tester is shown in Fig. 8.

4.7.2 Toys containing potentially hazardous edges that are a necessary part of the function of a toy shall carry cautionary labeling as specified in 5.10 if the toy is intended for use by children from 48 to 96 months. Toys intended for children aged less than 48 months shall not have accessible hazardous functional sharp edges.

4.7.3 *Metal Toys*—Accessible metal edges, including holes and slots, shall be free of hazardous burrs and feathering, or shall be hemmed, rolled, or curled, or shall be covered with a permanently affixed device or finish.

NOTE 3—Regardless of the manner in which edges are finished, they are subject to the sharp edge technical requirements as described in 4.7.1. If a device is used to protect an edge, it shall not become detached after being tested in accordance with the appropriate procedures described in 8.5-8.10.

4.7.4 *Molded Toys*—Accessible edges, corners, or mold parting areas of molded toys should be free of hazardous edges produced by burrs and flash or so protected that hazardous edges are not exposed.

4.7.5 *Exposed Bolts or Threaded Rods*—If the ends of bolts or threaded rods are accessible, the thread shall be free of exposed, hazardous sharp edges and burrs, or the ends shall be covered by smooth finish caps so that hazardous sharp edges and burrs will not be exposed. Any caps that are used shall be subjected to the compression test noted in 8.10, regardless of whether the cap is accessible to flat-surface contact during the appropriate impact test(s) described in 8.7. Protective caps shall also be subjected to the tension test in 8.9 and the torque test in 8.8.

4.8 *Projections*—This requirement relates to potentially hazardous projections in toys intended for use by children

under 8 years of age. This requirement is intended to minimize possible puncture hazards to the skin that might be caused should a child fall on a rigid projection, such as unprotected ends of axles, actuating levers, and decorative features. Due to the extremely sensitive nature of the eyes and interior of the mouth, this requirement will not, nor is it intended to, provide protection to those areas of the body. If a projection appears to present a potential skin puncture hazard, the projection shall be protected by suitable means, such as by turning back the end of a wire or by affixing a smoothly finished protective cap or cover, which effectively increases the surface area for potential contact with the skin. The toy shall meet this requirement both before and after testing in accordance with 8.5-8.10. Toys intended to be repeatedly assembled and taken apart shall have the individual pieces and fully assembled articles, as shown on packaging graphics, instructions or other advertising, evaluated separately. The requirements for the assembled toy do not apply to toys where the assembling makes up a significant part of the play value of the toy. Since this requirement relates to hazards arising from a child falling onto a toy, only vertical or nearly vertical projections are required to be evaluated. The toy shall be tested in its most onerous position. Corners of structures do not fall under this category.

4.9 *Accessible Points*—Toys shall not have accessible, potentially hazardous sharp points that may occur because of the following: configuration of the toy; assembly devices such as wires, pins, nails, and staples that are fastened poorly; poorly sheared sheet metal; burrs on screws; and splintered wood. Toys that are intended to be assembled by an adult and may contain potentially hazardous sharp points in the unassembled state shall be labeled in accordance with 5.8.

4.9.1 Potentially hazardous sharp points are defined by 16 CFR 1500.48. Toys intended for use by children under 8 years of age are subject to this requirement before or after use and abuse testing, or both, as specified in 8.5-8.10. An illustration of a sharp-point tester is shown in Fig. 9.

4.9.2 Toys in which an accessible, potentially hazardous sharp point is a necessary function of the toy, such as a needle in a sewing kit, shall carry cautionary labeling as specified in 5.10, if the toy is intended for children from 48 to 96 months

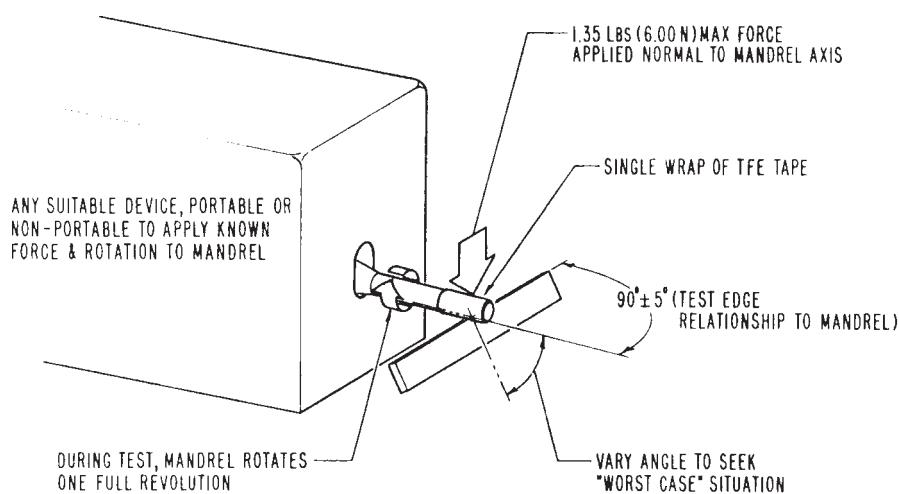


FIG. 8 Principle of Sharp Edge Test

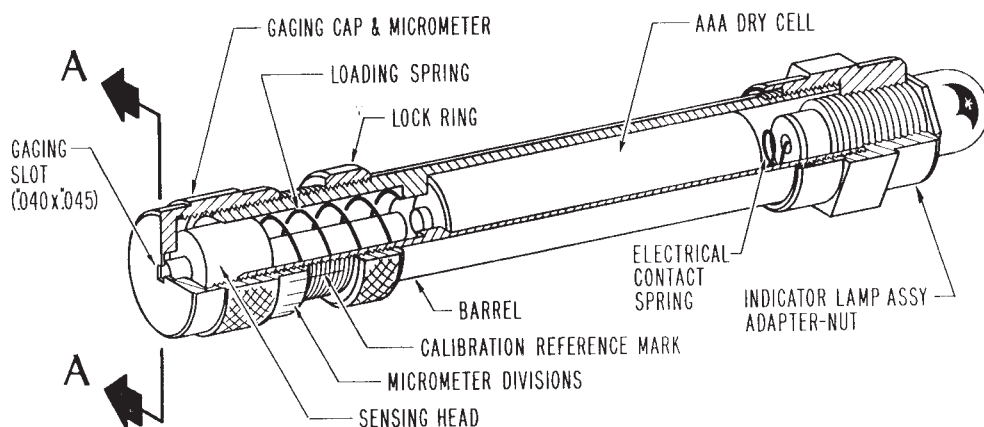
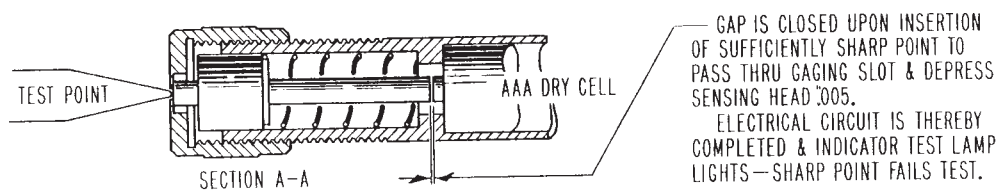


FIG. 9 Sharp Point Tester

old. Toys intended for children less than 48 months old shall not have accessible hazardous functional points.

4.9.3 *Wood*—The accessible surfaces and edges of wood used in toys shall be free of splinters, both before and after being tested in accordance with the appropriate procedures described in 8.5-8.10.

4.10 *Wires or Rods*—Wires or rods used in the interior of toys shall have their ends finished to avoid potentially hazardous points and burrs, shall be turned back, or shall be covered with smoothly finished protective caps or covers, if they can become accessible after use or reasonably foreseeable abuse. Metal wires or other metal materials used for stiffening or for retention of form in toys shall not fracture to produce a hazardous point, edge, or projection hazard when tested in accordance with 8.12, if the component can be bent through a 60° arc by the applicable maximum force. When applied perpendicularly to the major axis of the component at a point  $2 \pm 0.05$  in. ( $50 \pm 1.3$  mm) from the intersection of the component with the main body of the toy or at the end of the component if the component is less than 2 in. (50 mm) long, the maximum force shall be as follows (within a tolerance of  $\pm 0.5$  lb ( $\pm 0.02$  kg)):

10 lbf (45 N)	toys intended for use by children 18 months of age or less
15 lbf (67 N)	toys intended for use by children over 18 but not over 96 months of age

The ends of spokes on toy umbrellas shall be protected. If the protection is removed when tested according to 8.9 (tension test) the ends of the spokes shall be free from sharp edges and sharp points when tested in accordance with 4.7.1 (sharp edge test) and 4.9.1 (sharp point test). Furthermore, if the protective components are removed by the tension test, the spokes shall have a minimum diameter of 0.08 in. (2 mm) and the ends shall be smooth, rounded, and approximately spherical with no burrs.

4.11 *Nails and Fasteners*—Nails and fasteners shall not present a point, edge, ingestion, or projection hazard. Points of nails or fasteners shall not protrude so as to be accessible. Additional requirements for nails and fasteners used as axles are given in 4.17.

4.12 *Packaging Film*—This requirement is intended to minimize the possibility of asphyxiation hazards that might be caused by thin packaging films. Flexible plastic film bags and flexible plastic sheets used as packaging materials for shelf packages or used with toys shall be at least 0.00150 in. (0.03810 mm) in nominal thickness, but the actual thickness shall never be less than 0.00125 in. (0.03175 mm). The thickness shall be determined using the test method in 8.22. This requirement does not apply to the following:

4.12.1 Shrink film in the form of an over wrap that would normally be destroyed when the package is opened by a consumer.

4.12.2 Bags or plastic film with a minor dimension of 3.94 in. (100 mm) or less. Bag dimensions shall be measured while in the form of a bag, not cut open into a single thickness sheet.

4.13 *Folding Mechanisms and Hinges*—These requirements are intended to eliminate possible crushing, laceration, or pinching hazards that might occur in folding mechanisms and hinges of toys intended to support the weight of a child. Toys shall meet the requirements specified in 4.13.1 and 4.13.2 after they are tested in accordance with 8.5-8.10. Requirements for toy chests are contained in 4.27.

4.13.1 *Folding Mechanisms*—Toy furniture and other toys in which a folding mechanism, arm, or bracing is intended to support a child shall have a safety stop or locking device to prevent unexpected or sudden movement or collapse of the article, or have adequate clearance to provide protection for the

fingers, hands, and toes from crushing, laceration or pinching hazards in the event of sudden movement or collapse of the article.

4.13.2 *Hinge-Line Clearance*—Toys having a gap or clearance along the hinge line between a stationary portion and a moveable portion that weighs more than ½ lb (0.2 kg) shall be so constructed that, if the accessible gap at the hinge line will admit a 3/16-in. (5-mm) diameter rod, it will also admit a ½-in. (13-mm) diameter rod at all positions of the hinge.

4.14 *Cords and Elastics*—These requirements are intended to minimize entanglement and strangulation hazards that might be caused by accessible cords and elastics. These requirements are applicable before and after use and abuse testing in accordance with 8.5-8.10.

4.14.1 *Cords and Elastics in Toys*—Cords or elastics included with or attached to toys intended for children less than 18 months of age (excluding pull toys, see 4.14.1) shall be less than 12 in. (300 mm) long when measured to the maximum length in a free state and under a load of 5 lb (2.25 kg). If cords/elastics or multiple cords/elastics can tangle or form a loop in connection with any part of the toy, including beads or other attachments on the ends of cords/elastics, the loop shall not permit the passage of the head probe (Fig. 10) when tested

in accordance with 8.23. Specifically, the loop shall not allow the head probe to be inserted so deep that it admits the base of the probe. The configuration of the loop shall be determined by using all components that make up the loop. For example, the configuration of the loop for the product illustrated in Fig. 11 is comprised of Cord 1, Cord 2, and the toy part.

4.14.1.1 *Self Retracting Pull Cords*—Accessible cords used in cord-activated mechanisms in toys intended for use by children under 18 months of age, except monofilament-type cords 1/16 in. (2 mm) or less in diameter, shall not retract more than ¼ in. (6 mm) when a weight of 2 lb (0.9 kg) is attached to the fully extended cord with the cord held vertical and the toy held firmly in the most favorable position for retraction. Monofilament cords, 1/16 in. (2 mm) or less in diameter, shall not retract under a load of 1 lb (0.45 kg) when tested in the manner described above.

4.14.2 *Pull Toys*—Cords and elastics greater than 12 in. (300 mm) long for pull toys intended for children under 36 months of age shall not be provided with beads or other attachments that could tangle to form a loop.

4.14.3 *Strings and Lines for Flying Devices*—Kite strings and handheld lines over 6 ft (1.8 m) long, attached to flying devices intended for use as playthings, shall have an electric

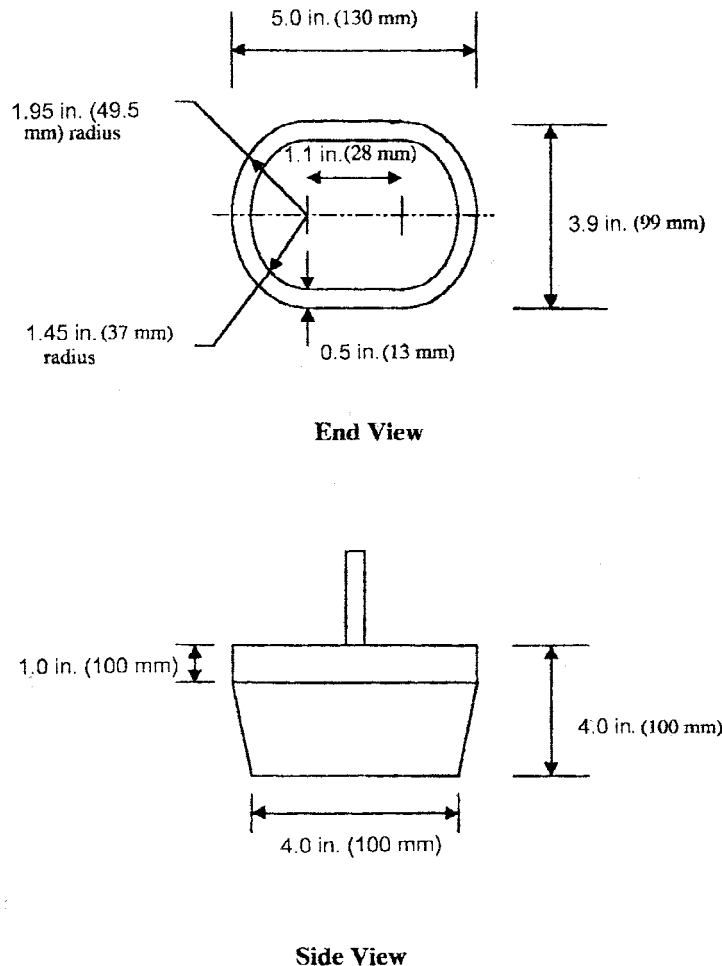


FIG. 10 Head Probe for Cords and Elastics

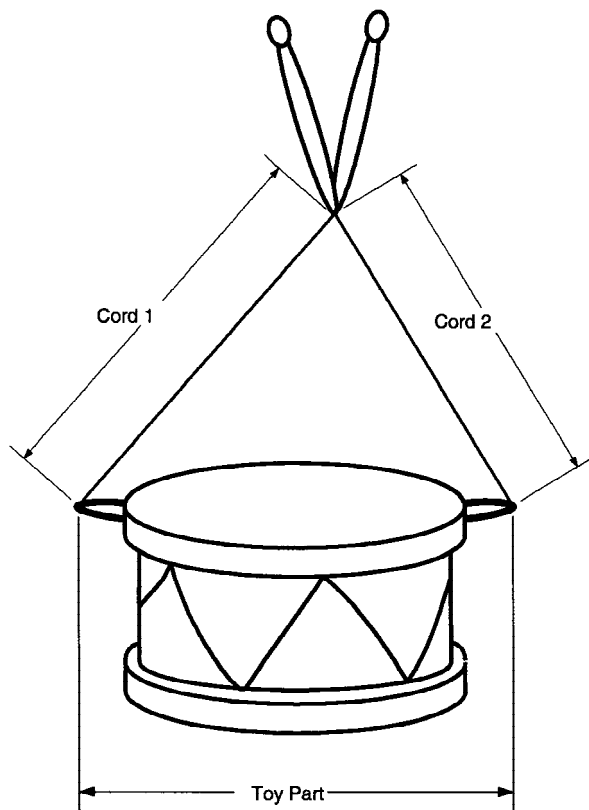


FIG. 11 Loop Example

resistivity of more than  $10^8 \Omega \cdot \text{cm}$  when tested at a relative humidity of not less than 45 % and a temperature of not greater than 75°F (24°C), when measured by a high-voltage, resistance breakdown meter.

4.14.4 *Cords on Toy Bags Intended for Children Up to 18 Months*—Toy bags made of impermeable material with an opening perimeter greater than 14 in. (360 mm) shall not have a drawstring or cord as a means of closing.

4.15 *Stability and Over-Load Requirements:*

4.15.1 *Stability of Ride-On Toys and Seats*—These requirements are intended to minimize unexpected hazards that could be caused by a toy that can tip easily. They take into account the use of the child’s legs as stabilizing means and recognize that a child learns instinctively to compensate for inclined positions. The requirements listed in 4.15.2 and 4.15.3 shall apply to the following classes of toys intended for use by children aged 60 months or less: ride-on toys, with three or more load bearing wheels, such as wagons; ride-on, action-type toys such as hobby horses; and stationary toys with seats, such as play furniture. Ride-on toys of spherical, cylindrical, or other shape that do not normally have a stable base are not covered by these requirements. The toy shall conform to these requirements after it is tested in accordance with 8.5-8.10.

4.15.2 *Sideways Stability Requirements*—These requirements recognize two types of possible stability hazards: those associated with ride-on toys or seats in which the feet can provide stabilization, and those situations in which the feet are restricted by an enclosing structure.

4.15.2.1 *Sideways Stability, Feet Available for Stabilization*—There shall be no sideways stability test for

those ride-on toys or seats in which the height of the seat from the ground is one third, or less than one third, of the height indicated in Table 2 at the lowest age of the age range for which the ride-on toy or seat is intended, and in which the legs of the child are unrestricted in their sideways motion and thus are available for stabilization. (The values given in Table 2 represent the lower of the following two numbers: (1) the fifth percentile group of boys at each age from 1 up to and including 5 years; and (2) the fifth percentile group of girls at each age from 1 up to and including 5 years.) For those ride-on toys, or seats in which the height of the seat from the ground is greater than one third of the height indicated in Table 2 at the lowest age of the age range for which the ride-on toy or seat is intended, and in which the legs of the child are unrestricted in their sideways motion and thus are available for stabilization, the toy shall not tip when tested in accordance with 8.16. When the lowest age of the intended age range falls between two ages listed in Table 2, the lower of the two shall be chosen.

4.15.2.2 *Sideways Stability, Feet Unavailable for Stabilization*—If the sideways motion of the feet or legs, or

TABLE 2 Height of Fifth Percentile Children (Values Given for Boys or Girls, Whichever is Lower)

Age, years	Height, in. (cm)
1	27 (69.8)
2	29 (74.4)
3	33 (85.1)
4	37 (93.8)
5	40 (100.5)



both, is restricted, such as by the enclosed sides of a toy automobile, the ride-on toy or seat shall not tip when tested as specified in 8.16, except that the surface shall be inclined 15° to the horizontal.

**4.15.3 Fore and Aft Stability**—This requirement relates to the stability of ride-on toys or seats in the forward direction with respect to the rider, where the rider cannot easily use the legs for stabilization, and in the backward direction with respect to the rider regardless of whether legs are available for stabilization. All ride-on toys or seats falling within the scope of 4.15 shall not tip forward or backward when the toy, which shall be loaded with a simulated child’s weight, is tested both facing down and up the slope using the test method of 8.16, except that the surface shall be inclined 15° to the horizontal. The stability of ride-on toys is to be tested not only with the steering wheels in a forward position, but also at an angle of 45° to the left and to the right of the forward position.

**4.15.4 Stability of Stationary Floor Toys**—This requirement is intended to minimize hazards that might be caused by a toy that tips when a door, drawer, or other movable portion is extended to its fullest travel. Stationary floor toys of greater than 30 in. (760 mm) in height and weighing more than 10 lb (4.5 kg) shall not tip when placed on a 10° incline with all movable portions extended to their fullest travel and facing in the direction of the downslope side. The toy shall conform to this requirement after it is tested in accordance with 8.5-8.10.

**4.15.5 Overload Requirements for Ride-On Toys and Seats**—This requirement is intended to minimize unexpected hazards that could be caused by a toy that is not capable of withstanding an overload. All ride-on toys, toys intended for use as seats, or toys designed to support all or part of the weight of the child shall support a load applied to the seat, or to other such intended load-bearing components, without collapsing to produce a hazardous condition. (Examples of hazardous conditions if collapse occurs would include the following: exposure of hazardous edges, or points, projections, crushing or pinching hazards, and power-driven mechanisms.) This load shall be three times the weight indicated in Table 3 at the highest age of the age range for which the toy is intended. The toy shall conform to this requirement after being tested in accordance with 8.5 through 8.10. The test for overload requirements shall be conducted so that it will be

consistent with the advertised weight capacity if that figure is higher than the minimum weight capacity in accordance with Table 3. When the highest age of the intended age range falls between two ages listed in Table 3, the higher of the two shall be chosen.

**4.16 Confined Spaces**—The purpose of these requirements is to minimize the possible entrapment of children in toys that form enclosures, such as toy refrigerators, and to prevent possible suffocation in head-enclosing toys such as space helmets. Toys shall meet the requirements listed in 4.16.1-4.16.3 after the toys are tested in accordance with 8.5-8.10. See 4.27 for requirements for toy chests.

**4.16.1 Ventilation**—The purpose of these requirements is to minimize the possible entrapment of children in toys that form enclosures, such as toy refrigerators, and to prevent possible suffocation in head-enclosing toys such as space helmets. Any toy made of impermeable material and having a door or lid, which encloses a continuous volume greater than 1.1 ft<sup>3</sup> (0.03 m<sup>3</sup>) and in which all integral dimensions are 6 in. (150 mm) or more, shall provide one of the following unobstructed ventilation areas:

**4.16.1.1** A minimum of two openings each having a total area of at least 1 in.<sup>2</sup> (650 mm<sup>2</sup>) placed at least 6 in. (150 mm) apart (see Fig. 12(a)).

**4.16.1.2** One opening that is the equivalent of the two 1.0-in.<sup>2</sup> (650-mm<sup>2</sup>) openings expanded to include the separation area provided this leaves opening areas of 1.0 in.<sup>2</sup> (650 mm) on either side of a 6-in. (150-mm) spacing (see Fig. 12(b)). The ventilation openings shall be unobstructed when the toy is placed on the floor in any position and adjacent to two vertical plane surfaces meeting at a 90° angle, so as to simulate the corner of a room. If a permanent partition or bars (two or more), which effectively limit the continuous space by making the largest internal dimension less than 6 in. are used to subdivide a continuous space, the ventilation area shall not be required.

**4.16.2 Closures**—Closures (such as lids, covers, and doors) to enclosures falling within the scope of 4.16.1 shall not be fitted with automatic locking devices. Closures shall be of a type that can be opened with a force of 10 lbf (45 N) or less when treated as follows:

**4.16.2.1** With the closure in a closed position, apply the force in an outward direction to the inside of the closure perpendicular to the plane of the closure and anywhere within 1 in. (25 mm) from the geometric center of the closure. The force measurement shall be made by means of a force gage with a calibrated accuracy within ±0.3 lb (0.1 kg) when measuring a force of 10 lb (45 N). The dial of the gage shall be graduated with its finest division not exceeding 0.2 lb (0.9 N), and the full-scale range shall not exceed 30 lb (130 N).

**4.16.3 Toys that Enclose the Head**—Toys that enclose the head, such as space helmets, which are made of impermeable material, shall provide means for breathing by the incorporation of unobstructed ventilation areas. The ventilation areas shall consist of a minimum of two holes, with a total of at least 2 in.<sup>2</sup> (1300 mm<sup>2</sup>) of ventilation and at least 6 in. (150 mm) between holes.

**TABLE 3 Weight of 95th Percentile Children (Values Given for Boys or Girls, Whichever is Higher)**

Age, years	Weight, lb (kg)
1	28 (12.6)
2	29 (13.2)
3	42 (18.9)
4	43 (19.7)
5	50 (22.6)
6	59 (26.6)
7	69 (31.2)
8	81 (37.0)
9	89 (40.4)
10	105 (47.9)
11	121 (55.0)
12	120 (54.7)
13	140 (63.6)
14	153 (69.6)

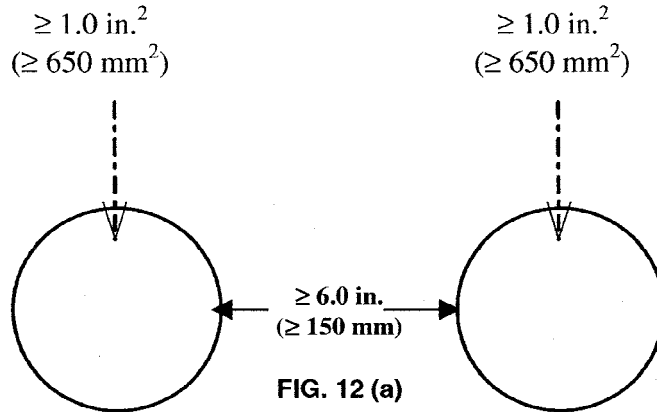


FIG. 12 (a)

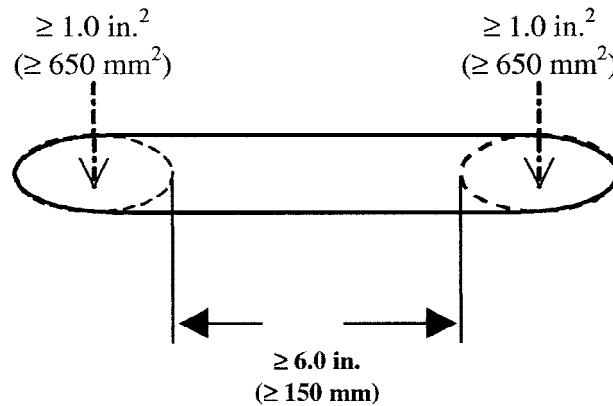


FIG. 12 (b)

FIG. 12

4.17 *Wheels, Tires, and Axles*—These requirements are intended to eliminate the possibility of ingestion hazards (as described in 4.6) that might be caused by small wheels or tires that separate during normal use or reasonably foreseeable abuse, as well as laceration or puncture hazards from projecting axles, either on the toy or on wheel assemblies that may be removed from the toy during abuse. The requirements shall apply to transportation wheels on both preassembled and knocked-down toys intended for children aged 96 months or less, except for ingestion hazards from small wheels and axles, which apply to toys intended for children under 36 months of age, as covered in 4.6. In the case of knocked-down toys, the toy shall be tested in the form that it would be assembled by the purchaser, using simple household tools or special tools provided by the manufacturer, if any, or both. After being subjected to the use and abuse tests of 8.5-8.11, wheels, tires, or axles shall not present a laceration, puncture, or ingestion hazard as defined in 3.1.40 and 4.6.1, respectively.

4.18 *Holes, Clearance, and Accessibility of Mechanisms*—These requirements are intended to eliminate possible hazards that may be caused by changing clearances. Toys shall meet these requirements after they are tested in accordance with 8.5-8.10. The different pinch clearance requirements listed in

4.18.1-4.18.6 reflect the different modes of entrapment or pinching that may be encountered.

4.18.1 *Accessible Clearances for Moveable Segments*—This requirement concerns clearances between movable segments on toys intended for children under 96 months only, where the potential for pinching or crushing fingers or other appendages exists. It includes, but is not limited to, wheels and rigid-wheel wells, fenders, or the radial clearance between the wheels and chassis of ride-on toys, or the driven wheels and other parts of toys powered by electrical, spring, or inertial energy. If such accessible clearances admit a  $\frac{3}{16}$ -in. (5-mm) diameter rod, they shall also admit a  $\frac{1}{2}$ -in. (13-mm) diameter rod in order to prevent the trapping of fingers.

4.18.2 *Circular Holes in Rigid Materials*—This requirement is intended to prevent finger entrapment (which may cut off blood circulation) in accessible holes in sheet metal and other rigid material in toys intended for children aged 60 months or less. (Noncircular holes are believed to present no significant hazard of cutting off blood circulation in entrapped fingers.) If an accessible, circular hole in any rigid material less than 0.062 in. (1.58 mm) in thickness can admit a  $\frac{1}{4}$ -in. (6-mm) diameter rod to a depth of  $\frac{3}{8}$  in. (10 mm) or greater, it shall also admit a  $\frac{1}{2}$ -in. (13-mm) diameter rod.

4.18.3 *Chains and Belts*—These requirements are to prevent finger crushing through entrapment between links of supporting chains or between chains and sprockets or pulleys and belts.

4.18.3.1 *Supporting Chains*—Chains in toys that support the weight of a child, such as hanging seats or similar indoor devices, intended for children 36 months or less in age, shall be shielded if the chain is accessible and if a 0.19-in. (5-mm) diameter rod can be inserted between two links, as in Fig. 13, with the chain in slack configuration.

4.18.3.2 *Chains or Belts for Ride-On Toys*—Power transmission chains and belts in ride-on toys shall be shielded.

4.18.4 *Inaccessibility of Mechanisms*—Clockwork, battery-operated, inertial, or other power-driven mechanisms in toys intended for children aged 60 months or less shall not have any accessible part of the mechanism present a pinch or laceration hazard. (For circular holes, also see the requirement under 4.18.2.)

4.18.5 *Winding Keys*—This requirement is to prevent the pinching or laceration of fingers by entrapment between the key and body of the toy. It applies to toys intended for children under 36 months of age that use winding keys that rotate as the mechanism unwinds. This requirement applies to keys with flat plates attached to the stem and that protrude from a rigid surface; the requirement does not apply to those circular knobs to which the torque is applied. If the clearance between the flukes of the key and body of the toy will admit a 0.25-in. (6-mm) diameter rod, it shall also admit a 0.5-in. (13-mm) diameter rod at all positions of the key. For keys covered by this requirement, there shall be no opening in the flukes of the key that can admit a 0.19-in. (5-mm) diameter rod.

4.18.6 *Coil Springs*—These requirements are intended to prevent the pinching or crushing of fingers or toes by toys containing springs. Coil springs (either compression or extension) that form part of a component that carries the weight of a child shall be shielded so as to prevent access during use or reasonably foreseeable abuse unless either of the following occurs:

4.18.6.1 A 0.12-in. (3-mm) diameter rod cannot be inserted freely; or

4.18.6.2 A 0.25-in. (6-mm) diameter rod can be inserted freely between the adjacent coils at all points in the action cycle when the spring is subjected first to a weight of 3 lb (1.4 kg) and then to a weight of 70 lb (32 kg).

4.19 *Simulated Protective Devices* (such as helmets, hats, and goggles)—These requirements are intended to minimize hazards that might be caused, for example, by goggles or space helmets if the material from which they are constructed fails; or by toys that simulate protective devices such as football helmets and pads, if the wearer uses the article as a real protective device rather than as a toy. The toy shall conform to the requirements listed in 4.19.1 and 4.19.2 after testing in accordance with 8.7.4 and 8.8 through 8.10.

4.19.1 *Eye Protection*—All rigid toys that cover the face, such as goggles, space helmets, or face shields, shall be constructed of impact-resistant material that will not have sharp edges, sharp points, or loose parts that could enter the eye before or after being tested in accordance with 8.5-8.10. This applies to items with cutout eye holes as well as items that cover the eyes.

4.19.2 Toys that simulate safety protective devices (examples include, but are not limited to, construction helmets and sports helmets) and their packages shall be labeled clearly in accordance with 5.9 to warn the purchaser that they are not safety protective devices.

4.20 *Pacifiers*—Infant pacifiers shall conform to the safety requirements as specified in 16 CFR 1511. Illustrations of the pacifier test fixture are shown in Fig. 14.

4.20.1 Pacifiers with rubber nipples shall conform to the nitrosamine levels as specified in Specification F 1313. This specification states that a test sample of nipples, drawn from a standard production lot, shall not contain more than 10 ppb in each of three aliquots of any one nitrosamine. In addition, the total nitrosamines of the sample shall not exceed 20 ppb.

4.20.2 Toy pacifiers attached to, or sold with, toys intended for children under 36 months of age shall comply with the requirements outlined in 4.6.1 of this specification (small objects), and either conform to the requirements of 16 CFR 1511 or have a nipple length no longer than 0.63 in. (16 mm). This measurement shall be taken from the nipple side of the shield to the end of the nipple.

4.21 *Projectile Toys*—These requirements relate to certain, but not all, potential, unexpected hazards that might be caused by projectile firing toys and by the firing of improvised projectiles from such toys. Certain well-recognized hazards that are inherent in traditional toys such as slingshots and darts are not covered by these requirements. The discharge mechanism as well as the projectile shall conform to the requirements specified in this section after testing in accordance with the appropriate test methods described in 8.5-8.10 and 8.15.

4.21.1 These requirements apply to toys that are intended to launch projectiles into free flight by means of a discharge mechanism in which the kinetic energy of the projectile is determined by the toy and not by the user.

4.21.1.1 No projectile intended to be fired from a toy shall have any sharp edges, sharp points, or small parts that would fit within the cylinder shown in Fig. 7.

4.21.1.2 No rigid projectile fired from a toy shall have a tip radius less than 0.08 in. (2 mm).

4.21.1.3 Any rigid projectile fired from a toy that has a kinetic energy that exceeds 0.08 J (as determined by 8.15.1) shall have an impact surface(s) of a resilient material.

4.21.1.4 Any protective tip shall either (1) not be detached from the projectile when subjected to the torque and tension tests described in 8.8 and 8.9, or (2) if the protective tip does become detached during the test at less than the specified

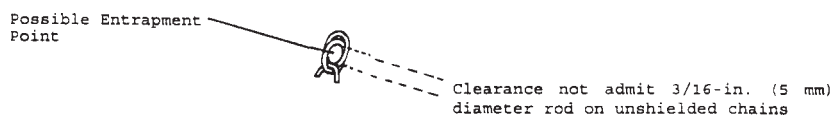


FIG. 13 Clearance for Chain Links

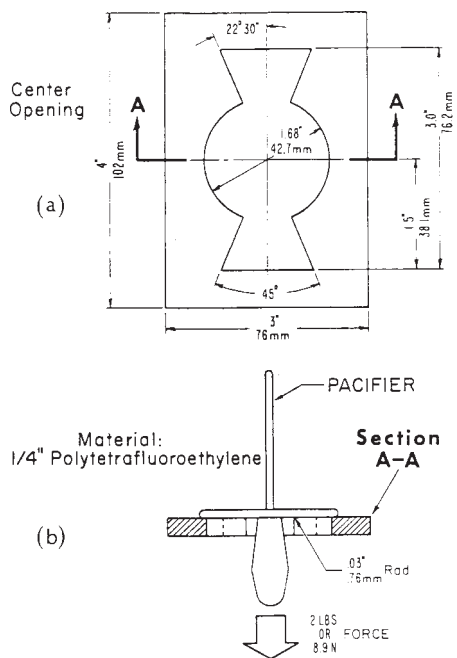


FIG. 14 Pacifier Test Fixture

torque or tension, or both, the projectile shall not be able to be launched from the provided launcher. Additionally, the protective tip shall not produce or reveal hazardous points or edges when fired into a solid object, in accordance with the test methods described in 8.15.4.

4.21.1.5 The aforementioned requirements shall not apply to any discharge mechanism incapable of storing energy independent of the user, or intended to propel a ground-based vehicular toy along a track or other surface, or when the projectile is inaccessible to a child when it leaves the discharge mechanism, for example, bagatelle or pinball machines.

4.21.2 *Discharge Mechanisms*—Discharge mechanisms shall be unable to discharge potentially hazardous improvised projectiles such as pencils or pebbles without modification by the user.

4.21.3 Any arrow shall have a protective tip that complies with 4.21.1.4.

4.22 *Teethers and Teething Toys*—These requirements are intended to address a potential impaction hazard associated with teethers. These requirements are applicable before and after use and abuse testing in accordance with Section 8.

4.22.1 Teethers and teething toys shall conform to the dimensional requirements for infant rattles as specified in 16 CFR 1510. Illustrations of a rattle test fixture are shown in Fig. 15. A teether shall meet this requirement when tested under the force only of its own weight and in a noncompressed state.

4.22.2 In addition, teethers and teething toys incorporating nearly spherical, hemispherical, or circular flared ends shall be designed so that such ends are not capable of entering and penetrating to the full depth of the cavity in the supplemental test fixture shown in Fig. 16. A teether shall meet this requirement when tested under the force only of its own weight and in a noncompressed state.

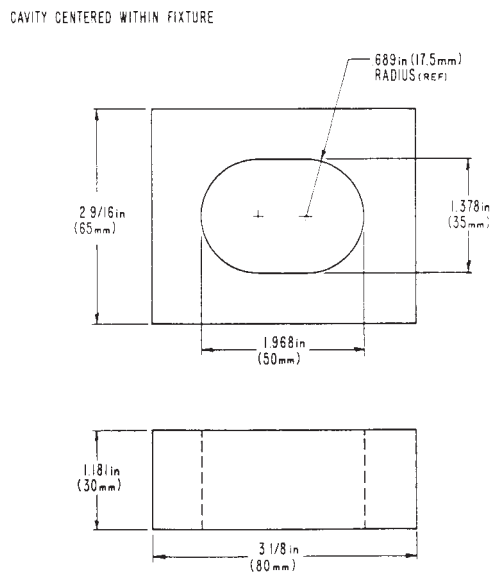


FIG. 15 Rattle Test Fixture

4.22.3 *Exclusion*—The requirements of 4.22.1 and 4.22.2 shall not apply to teething toys that are composed of liquid-filled beads that are attached to form a ring or beads that are threaded on a flexible cord or string.

4.23 *Rattles*—Infant rattles shall conform to the safety requirements as specified in 16 CFR 1510. Illustrations of a rattle test fixture are shown in Fig. 15.

4.23.1 In addition to meeting the requirements of 16 CFR 1510, rigid rattles incorporating nearly spherical, hemispherical, or circular flared ends shall be designed so that such ends are not capable of entering and penetrating to the full depth of the cavity in the supplemental test fixture illustrated in Fig. 16. A rattle shall meet this requirement when tested under the force only of its own weight and in a noncompressed state. These requirements are applicable before and after use and abuse testing in accordance with Section 8.

4.24 *Squeeze Toys*—These requirements are intended to address a potential impaction hazard associated with squeeze toys intended for children under the age of 18 months. These requirements are applicable before and after use and abuse testing in accordance with Section 8.

4.24.1 Squeeze toys shall conform to the dimensional requirements for rattles as specified in 16 CFR 1510. Illustrations of a rattle test fixture are presented in Fig. 15. A squeeze toy shall meet these requirements when tested under the force only of its own weight and in a noncompressed state.

4.24.2 In addition, squeeze toys incorporating nearly spherical, hemispherical, or circular flared ends shall be designed so that such ends are not capable of entering and penetrating to the full depth of the cavity in the supplemental test fixture shown in Fig. 16. A squeeze toy shall meet these requirements when tested under the force only of its own weight and in a noncompressed state.

4.25 *Battery-Operated Toys*—These requirements are intended to address potential risks of injury associated with



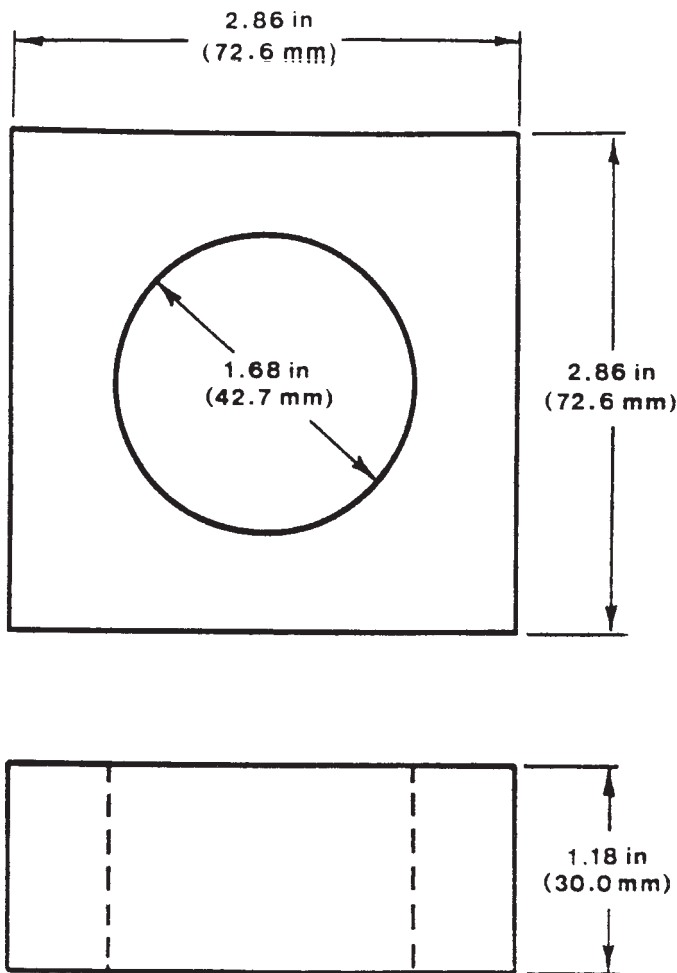


FIG. 16 Supplemental Test Fixture for Rattles, Squeeze Toys, and Teethers

battery usage in toys intended for use by children (for example, battery overheating, leakage, explosion and fire, and choking on or swallowing batteries). Both non-rechargeable and rechargeable batteries are subject to these requirements. Battery-operated toys intended for children 96 months of age or less shall conform to these requirements under conditions of normal use and reasonably foreseeable abuse as specified in 8.5 through 8.10. Battery-operated toys intended for children older than 96 months shall conform to these requirements under applicable conditions of normal use specified in Section 8 but are not subject to the additional abuse tests of 8.6 through 8.10. For purposes of ensuring compliance with these requirements, fresh alkaline batteries that meet the dimensional requirements of the latest revision of ANSI C18.1 or the latest revision of IEC Publication 60086-2 shall be selected for test purposes. If another battery chemistry is specifically required for use in the toy by the manufacturer, testing shall be repeated using that type of battery. When rechargeable batteries are specified by the manufacturer, fully recharged batteries shall be used for testing purposes.

4.25.1 The toy shall be marked permanently on the battery compartment or on the area immediately adjacent to the battery compartment to show the correct battery polarity using the polarity symbols “+” and “-”. Additional markings located on

the toy or in the instructions must indicate the correct battery size and voltage. These markings are not required for non-replaceable batteries or for rechargeable battery packs that, by design, can only be inserted in the correct orientation. Battery compartments for button cell batteries are not subject to this requirement.

NOTE 4—The battery compartment door is considered part of the battery compartment.

4.25.1.1 Toys containing non-replaceable batteries shall be labeled in accordance with 5.15.

4.25.2 The maximum allowable direct current potential between any two accessible electrical points is 24 V nominal.

4.25.3 Battery-operated toys shall be designed so that it is not possible to charge any non-rechargeable battery. This can be achieved through physical design of the battery compartment or through the use of an appropriate electrical circuit design. This applies to situations in which a battery may be installed incorrectly (reversed) or in which a battery charger may be applied to a toy containing non-rechargeable batteries, or both. This section does not apply to circuits having one or two non-rechargeable batteries as the only source of power.

4.25.3.1 Toys having a circuit powered only by button cell type batteries are not subject to this requirement.

4.25.4 For toys intended for children less than 3 years old, all batteries shall not be accessible before or after testing in accordance with 8.5-8.10, without the use of a coin, screwdriver, or other common household tool. Testing is performed using the recommended batteries installed.

4.25.5 For all toys, batteries that fit completely within the small parts test cylinder shown in Fig. 7 shall not be accessible, before or after testing in accordance with 8.5-8.10, without the use of a coin, screwdriver, or other common household tool. Testing is performed using the recommended batteries installed.

4.25.6 Batteries of different types or capacities shall not be mixed within any single electrical circuit. In applications requiring more than one type or capacity of battery to provide different functions or in applications requiring the combination of alternating current and non-rechargeable batteries, each circuit shall be isolated electrically to prevent current from flowing between the individual circuits.

4.25.7 The surfaces of the batteries shall not achieve temperatures exceeding 71°C.

4.25.7.1 This requirement is applicable for all battery-operated toys during normal use conditions. In addition, battery-operated toys intended for children 96 months or less shall meet this requirement after reasonably foreseeable abuse.

4.25.7.2 If external moving parts of the toy that are mechanically linked to the motor can be stalled by the user, test for a stalled motor condition according to the procedures of 8.18 to determine conformance with the temperature limits.

4.25.8 No condition shall occur that would cause the toy to fail the temperature requirements of 4.25.7 or present a combustion hazard as described in 4.25.

4.25.9 Battery-operated toys shall meet the requirements of 6.6 for instructions on safe battery usage. Toys which use non-replaceable batteries as the only source of power are not subject to 6.6.

4.25.10 *Battery-Powered Ride-On Toys*—These requirements cover wheeled ride-on toys, not intended for streets or roadways, using a battery power source that is capable of delivering at least 8 amps into any variable resistor load for at least one minute.

4.25.10.1 The maximum temperature measured on the insulation of any conductor shall not exceed the temperature rating of the material (third party test laboratory rating) when tested in accordance with 8.19.2.

4.25.10.2 Battery-powered ride-on toys shall not present a risk of fire when tested in accordance with the stalled motor test of 8.19.3.

4.25.10.3 A battery-powered ride-on toy designed with a wiring system that has a user replaceable device (fuse type) for the primary circuit protection or a wiring system with user resettable primary circuit protection (manual reset fuse) shall not actuate (open or trip) when tested in accordance with the nuisance tripping test of 8.19.4.

4.25.10.4 Switches used in battery-powered ride-on toys.

(1) Polymeric materials in switches used in battery-powered ride-on toys that are used to support current-carrying parts shall carry a minimum flame rating of UL-94 V-0 or have a glow wire ignition rating of 750°C. Note: This requirement does not apply to switches used in low-power circuits. A low-power circuit is defined as one using an effective battery power source that is not capable of delivering at least 8 amps into any variable resistor load for at least one minute.

(2) The switch body shall not result in a short-circuit condition when subjected to the switch endurance test and overload tests of 8.19.5.

(3) The switch shall not fail in a mode that could cause the vehicle to run continuously (switch stuck in the “on” position) when subjected to the endurance test and the overload test in 8.19.5.

4.25.10.5 User replaceable circuit protection devices in battery-powered ride-on toys.

(1) User replaceable circuit protection devices used in battery-powered ride-on toys shall be listed, recognized or certified by an independent laboratory.

(2) All circuit protection devices used in battery-powered ride-on toys intended to be replaced by the user shall be replaceable only with the use of a tool or by a design which does not easily allow tampering such as a design requiring excessive force to open.

4.25.10.6 Batteries, as described in 4.25.10, and battery chargers.

(1) Battery connectors must be constructed of material with a V-0 flame rating or have a glow wire ignition rating of 750°C.

(2) The battery charging system shall not present a risk of fire due to a short-circuit condition applied to any point in the length of a charger/battery interconnecting cable when tested in accordance with 8.19.6.

(3) During charging, battery-charging voltages shall not exceed the recommended charging voltages when tested in accordance with 8.19.6.

(4) Battery chargers must be certified to the appropriate current national standard, for example UL, CSA, or equivalent standards body.

4.25.10.7 Wiring connected to the main/motor battery shall be short-circuit protected and shall not present the risk of fire when tested in accordance with 8.19.7.

4.25.10.8 Strain relief shall be provided to prevent mechanical stress on wires entering a connector block during routine maintenance such as battery charging, and tested in accordance with 8.19.8.

4.25.10.9 Battery-powered ride-on toys shall comply with the requirements in 5.15.1 for safety labeling, 6.6.3 for additional instructional literature, and 7.3 for required producer’s markings.

4.26 *Toys Intended to be Attached to a Crib or Playpen*—These requirements are intended to minimize entanglement or strangulation hazards that might be caused by toys intended to be attached to a crib or playpen (see also 4.14).

4.26.1 *Protrusions*—Toys attached to a crib or playpen in the manner prescribed by the manufacturer’s instructions shall not have hazardous protrusions that could contribute to entanglement injury. This requirement is applicable before and after use and abuse testing in accordance with 8.5-8.10. Design guidelines are provided in Annex A3.

4.26.2 *Crib Mobiles*—Crib mobiles shall comply with the requirements listed in 5.6 for safety labeling and 6.4 for instructional literature.

4.26.3 *Crib Gyms*—Crib gyms, including crib exercisers and similar toys intended to be strung across a crib or playpen, shall comply with the requirements listed in 5.5 for safety labeling and 6.3 for instructional literature.

4.27 *Toy Chests*—These requirements are intended to minimize the following:

(1) Possible entrapment and strangulation hazards associated with sudden lid closing or dropping;

(2) Possible crushing, pinching, and laceration hazards associated with folding mechanisms, hinges, and lid supports; and

(3) Possible suffocation hazards due to lack of adequate ventilation.

4.27.1 *Lid Support*:

4.27.1.1 Toy chests with vertically opening, hinged lids shall be provided with lid-support mechanisms to prevent sudden collapse or dropping of the lid. The lid-support mechanism shall support the lid so that at no position in the arc of travel of the lid from within 2 in. (50 mm) of the fully closed position, through an arc not to exceed 60° from the fully closed position, shall it drop more than 0.50 in. (13 mm) under the influence of its own weight, except in the last 2 in. (50 mm) of travel. The test shall be conducted in accordance with 8.14.1.

4.27.1.2 The toy chest lid shall comply with this requirement before and after being subjected to 7000 opening and closing cycles, in accordance with 8.14.1.2.

4.27.1.3 The lid-support mechanism shall not require adjustment by the consumer to insure adequate lid support; nor shall it require adjustment in order to comply with 4.27.1.1 after being cycled in accordance with 8.14.1.2.

4.27.1.4 Lid-support mechanisms shall be designed so as to prevent pinching, crushing, or laceration injuries to fingers. Clearances or gaps produced by the action of such mechanisms

(between components of the mechanism or between the mechanism and the toy chest or its lid) shall be constructed so that if the gap admits a 0.19-in. (5-mm) diameter rod, it will also admit a 0.50-in. (13-mm) diameter rod at all positions of the arc of travel of the lid. This requirement does not apply to lid support mechanisms installed on the inside of the toy chest that are at least 12 in. (300 mm) from the front and side edges of the toy chest or its lid.

4.27.2 *Hinge Line Clearance*—Toy chests having a gap or clearance along a hinge line between a stationary portion and a moveable portion shall be constructed so that, if the gap admits a 0.19-in. (5-mm) diameter rod, it will also admit a 0.50-in. (13-mm) diameter rod at all positions of the arc of travel of the moveable portion.

4.27.3 *Closures*—Toy chest closures such as lids, covers, and doors shall not be fitted with automatic locking devices. Closures and lids shall be of a type that can be opened with a force of 10 lbf (45 N) or less when tested in accordance with 8.14.2.

4.27.4 *Ventilation:*

4.27.4.1 Any toy chest having a door or lid that encloses a continuous volume greater than 1.1 ft<sup>3</sup> (0.031 m<sup>3</sup>) and in which all of the internal dimensions are 6 in. (150 mm) or more shall provide an unobstructed ventilation area of greater than a total of 2 in.<sup>2</sup> (1300 mm<sup>2</sup>) over two or more separate openings situated at least 6 in. (150 mm) apart. The ventilation area shall remain unobstructed when the toy chest is placed on the floor in any position and adjacent to two vertical plane surfaces meeting at a 90° angle, so as to simulate the corner of a room.

4.27.4.2 If a permanent partition or bars (two or more) that limit the continuous space by making the largest internal dimension less than 6 in. (150 mm) (excluding diagonal measurements) are used to subdivide a continuous space, the ventilation area shall not be required.

4.27.5 Toy chests shall comply with the requirements listed in 7.2 for safety labeling and 6.2 for accompanying instructional literature.

4.28 *Stuffed and Beanbag-Type Toys*—Stuffed and beanbag-type toys shall meet the applicable requirements of this specification after being tested in accordance with 8.9.1.

4.29 *Stroller and Carriage Toys*—Stroller and carriage toys shall comply with the requirements for safety labeling in 5.7.

4.30 *Art Materials*—The purpose of this requirement is to minimize the potential risks associated with the use of art materials that present chronic health hazards.

4.30.1 Toys and components of toys that fall within the definition of art material as found in 16 CFR 1500.14 (b) (8) shall meet the requirements for toxicological review by a U.S. board-certified toxicologist. The protocol used to evaluate the art materials must be filed with the Consumer Product Safety Commission (CPSC), and the list of ingredients must also be filed with the commission if the material is or contains a chronically hazardous substance.

4.30.2 Toys and components of toys that are art materials and are determined to contain hazardous materials must have appropriate warnings as defined in the Federal regulations and as noted in 5.13 of this specification. Items that do not contain hazardous materials must also be labeled as to their conformity.

4.30.3 Toys and components of toys that have been determined to pose a chronic health hazard and require warnings are not suitable for use by children who are in pre-kindergarten, or grades one through six.

4.31 *Toy Gun Marking*—This requirement is intended to minimize the potential for a toy gun to be mistaken for a real firearm.

4.31.1 This requirement applies to all toy, look-alike, and imitation firearms which have the general appearance, shape, or configuration, or combination thereof, of a firearm. This includes, but is not limited to, nonfunctional guns, water guns, air soft guns, cap guns, light emitting guns, and guns with an opening to eject any nonmetallic projectile.

4.31.2 This requirement does not apply to the following types of guns:

4.31.2.1 Futuristic toy guns that do not have the general appearance, shape, or configuration, or combination thereof, of any firearm.

4.31.2.2 Nonfiring collector replica antique firearms that look authentic and may be a scale model but are not intended as toys.

4.31.2.3 Traditional B-B guns, paint ball guns, or pellet guns that expel a projectile through the force of compressed air, compressed gas, or mechanical spring action, or combination thereof.

4.31.2.4 Decorative, ornamental, and miniature objects having the appearance, shape, or configuration, or combination thereof, of a firearm provided that the objects measure no more than 1.50 in. (38 mm) in height by 2.75 in. (70 mm) in length, with the length measurement excluding any gun stock length measurement. This includes items intended to be displayed on a desk or worn on bracelets, necklaces, key chains, etc.

4.31.3 Items subject to this requirement must be marked or manufactured, or both, in any one of the following ways. The marking must be permanent and must remain in place after being tested in accordance with 8.5-8.10. The word “permanent” excludes the use of ordinary paint or labels for the purposes of this section. The “blaze orange” color referred to in 4.31.3.1 and 4.31.3.2 is Federal Standard 595a, Color 12199.

4.31.3.1 A blaze orange plug, or brighter orange colored plug, affixed into the muzzle end of the barrel as an integral part of the toy. The plug shall not be recessed more than 0.25 in. (6 mm) from the muzzle end of the barrel.

4.31.3.2 A blaze orange band, or brighter orange colored band, covering the circumference of the muzzle end of the barrel for a distance of at least 0.25 in. (6 mm).

4.31.3.3 Coloration of the entire exterior surface of the toy in white, bright red, bright orange, bright yellow, bright green, bright blue, bright pink, or bright purple, either individually or as the predominant color in combination with any other color in any pattern.

4.32 *Balloons*—Packages containing latex balloons and toys or games containing latex balloons shall comply with the labeling requirements of 16 CFR 1500.19. Labeling statements for balloons are contained in 5.11.5 of this specification.

4.33 *Certain Toys with Spherical Ends*—These requirements are intended to address a potential impaction hazard associated with certain toys incorporating spherical-shaped ends.

4.33.1 Toys intended for children up to the age of 18 months, having a total weight less than 1.1 lb (0.5 kg) incorporating spherical, hemispherical, or circular flared ends and which are attached to a shaft, handle, or support that has a smaller cross section, shall be so designed that such ends are not capable of entering and penetrating past the full depth of the cavity of the supplemental test fixture shown in Fig. 16. A toy shall meet this requirement when tested under the force only of its own weight and in a noncompressed state.

4.33.1.1 *Exclusion*—The requirement of 4.33.1 shall not apply to soft-filled (stuffed) toys or soft-filled parts of toys or parts of fabric.

4.33.2 *Preschool Play Figures*—This requirement is intended to address the potential choking/obstruction hazard associated with certain preschool figures intended for children under three years of age. The characteristics that distinguish toy figures falling within the scope of this requirement include: (1) a round, spherical, or hemispherical end with tapered neck attached to a simple cylindrical shape without appendages, and (2) an overall length not exceeding 2.5 in. (64 mm) (see examples in Fig. 17). This includes figures with added or molded features such as hats or hair, which retain the rounded shape of the end.

4.33.2.1 Preschool play figures intended for children under three years of age shall be designed so that their rounded ends are not capable of entering and penetrating to the full depth of the cavity in the Supplemental Test Fixture illustrated in Fig. 16. Test the play figure under the force of its own weight.

4.33.2.2 *Exclusion*—The requirement of 4.33.2.1 shall not apply to soft play figures made of textiles.

4.34 *Marbles*—Marbles shall comply with the labeling requirements of 16 CFR 1500.19. Labeling statements for marbles are contained in 5.11.4 of this specification.

4.34.1 Toys and games intended for children at least 3 years of age but less than 8 years of age that contain a marble shall comply with the labeling requirements 16 CFR 1500.19. Applicable labeling statements are contained in 5.11.4.1 of this specification.

4.35 *Balls:*

4.35.1 Balls intended for children under 36 months of age are subject to the requirements of 16 CFR 1500.18 (a)(17). A

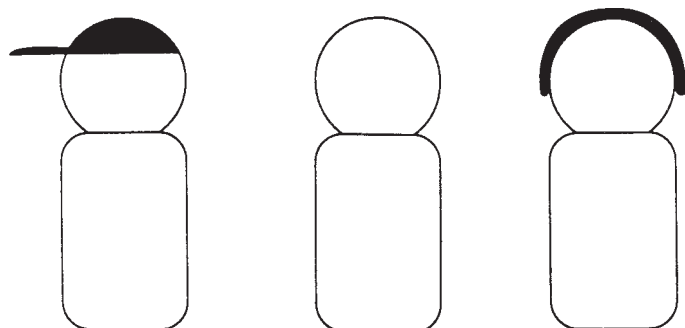


FIG. 17 Examples of Preschool Play Figures

loose ball in toys intended for children under 36 months of age shall not, under the influence of its own weight and without compression, pass entirely through the template shown in Fig. 18. A ball which does pass through the template is determined to be a “small ball.”

4.35.2 Toys intended for children at least 3 years old but less than 8 years of age that contain a loose small ball are subject to the requirements of 16 CFR 1500.19. Applicable labeling statements are contained in 5.11.3 of this specification.

4.36 *Pompoms*—These requirements are intended to address choking hazards associated with pompoms on toys intended for children under three years of age that detach during 8.17. Pompoms detached during 8.17 must not pass entirely through the 1.75-in. (44.5-mm) test fixture (see Fig. 18) under their own weight. Any components, pieces, or individual strands of the pompom that are liberated during the torque and tension tests should not be subject to this test. Test the pompoms by putting the free ends of fiber into the gage.

4.37 *Hemispheric-Shaped Objects*—These requirements apply to toy cup-, bowl-, or one-half egg-shaped objects having a nearly round, oval, or elliptical opening with the minor and major outer diameters between 2.5 in. (64 mm) and 4.0 in. (102 mm), a volume of less than 6.0 oz (177 mL), a depth greater than 0.5 in. (13 mm), and intended for children under 3 years of age. The following are exempt from this requirement:

4.37.1 Objects intended for drinking (for example, tea cups).

4.37.2 Objects intended to hold liquids in products appropriate for children at least 2 years old (for example, pots and pans).

4.37.3 Containers that must be airtight so the contents can maintain their functional integrity (for example, modeling clay containers.)

4.37.4 Non-detachable (as determined by testing in accordance with 8.6-8.10 of this specification) components of larger

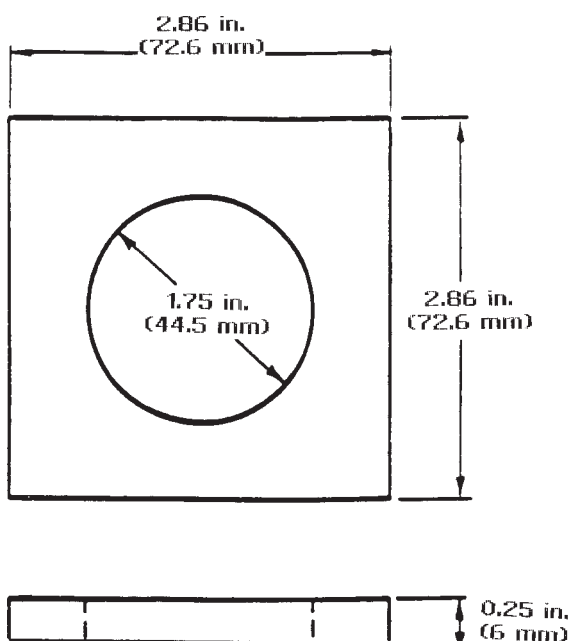


FIG. 18 Test Fixture for Small Balls



products (for example, bowl-shaped smoke stack that is permanently attached to a toy train or a swimming pool that is molded into a larger toy playscape).

4.37.5 Containers that are part of the retail package intended to be discarded once the toy is removed from the package.

4.37.6 *Performance Requirements*—Cup/bowl/one-half egg-shaped objects must have, as a minimum, one of the following characteristics (*a*, *b*, *c*, or *d*). For purposes of these requirements an opening is defined as a hole of any shape with a minor dimension of 0.080 in. (2 mm). These requirements apply before and after testing in accordance with 8.6-8.10 of this specification.

(*a*) Have at least two openings that are a minimum of 0.5 in. (13 mm) from the rim as measured along the outside contour.

(1) If the openings are placed in the base of the object, at least two of the openings must be a minimum of 0.5 in. (13 mm) apart. (See Fig. 19.)

(2) If the openings are not placed in the base of the object, at least two of the openings must be placed at least 30° but not more than 150° apart. (See Fig. 20.)

(*b*) The plane of the open end of the cup shape shall be interrupted at the center by some type of divider that extends to 0.25 in. (6 mm) or less from the plane of the open end of the cup. (See Fig. 21 for an example.)

(*c*) Have three openings that are at least 100° apart, located between 0.25 in. (6 mm) and 0.5 in. (13 mm) from the rim as measured along the outside contour.

(*d*) Have a repeating scalloped edge pattern around the entire rim. The maximum distance between center lines of adjacent peaks shall be 1 in. (25 mm) and the minimum depth shall be 0.25 in. (6 mm). (See Fig. 22 for examples of scalloped edge patterns.)

## 5. Labeling Requirements

5.1 *Federal Government Requirements*—All toys that fall within the definitions and requirements of the U.S. FHSA shall conform to the labeling requirement of that act. For specific requirements, reference 16 CFR 1500.3, 1500.14, 1500.19, 1500.82, 1500.83, 1500.86, 1500.121, 1500.122, 1500.123, 1500.125, 1500.126, 1500.127, 1500.128, 1500.130, 1505.3, and 1511.7. In addition, state labeling requirements may exist.

5.2 *Age Grading Labeling*—Toys that are subject to any of the requirements of this specification should be labeled to indicate the minimum age for intended use or have such labeling on any retail packaging. If the toy or toy package is not age labeled in a clear and conspicuous manner or, based on such factors as marketing practices and the customary patterns of usage of the toy by children, is inappropriately age labeled, the toy shall be subjected to the most stringent applicable requirements within this specification. (Examples: (1) a tensile force of 15 lbf (67 N) shall be required instead of 10 lbf (45 N) when testing in accordance with 8.9 if no limiting age range is specified; (2) the “highest age of the age range” in 4.15 would be 14 years, the maximum age addressed in the scope of this specification.)

5.2.1 For certain toys, such as costumes and riding toys, it may also be appropriate to label the toy or its package, or both, in terms of height or weight limitations.

5.2.2 Guidelines for determining the appropriate age grade for toys are provided in Annex A1 of this specification.

5.3 *Safety Labeling Requirements*—Certain toys, and in some cases their packages, are required to carry safety labeling to comply with this specification.

5.3.1 Safety labeling shall consist of an alert symbol (an exclamation mark within an equilateral triangle), a signal word (CAUTION or WARNING), and text that describes the hazard that is present. Additionally, safety labeling may contain text about what to do or not to do to avoid injury (for example, “Keep out of baby’s reach”). The signal word shall be in all upper case sans serif letters not less than 1/8 in. (3.2 mm) in height and shall be center or left aligned. The alert symbol shall directly precede the signal word. The height of the triangle shall be at least the same height as the signal word. The height of the exclamation point shall be at least half the height of the triangle and be centered vertically in the triangle. Text describing the hazard(s) and hazard avoidance behavior(s) shall appear in sans serif lettering and shall be either left aligned or center justified. Capital letters shall be no less than 1/16 in. (1.6 mm). Recognizing space constraints, it is recommended, that where possible, such text begin on the next line below the signal word, and that a new line be used for each subsequent statement or separate thought.

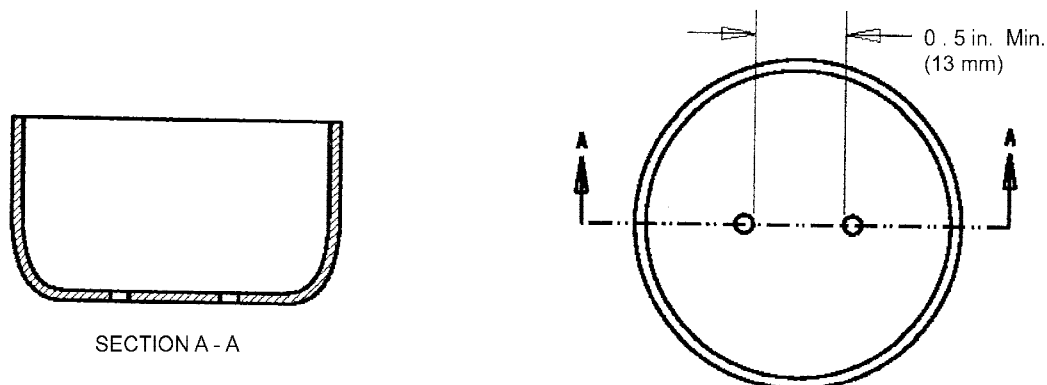


FIG. 19 Openings in Base of Bowl

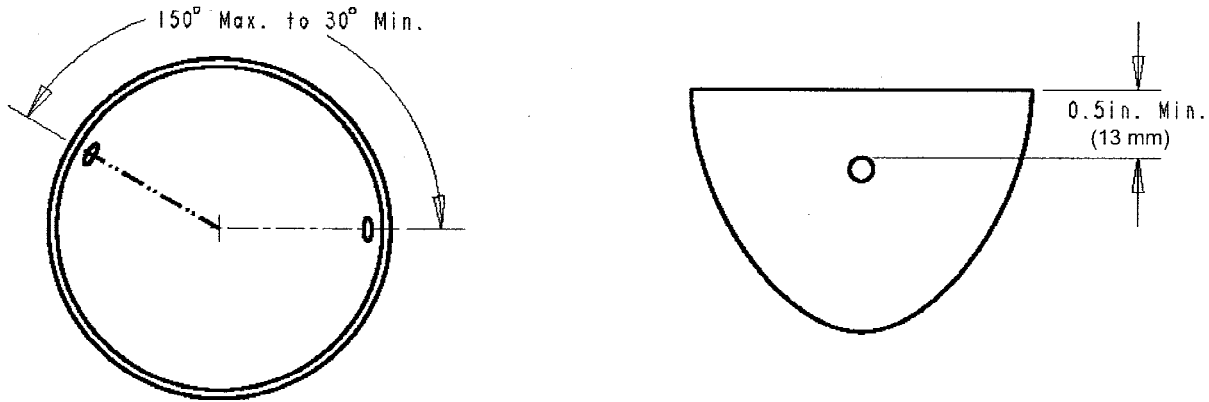


FIG. 20 Opening Placement

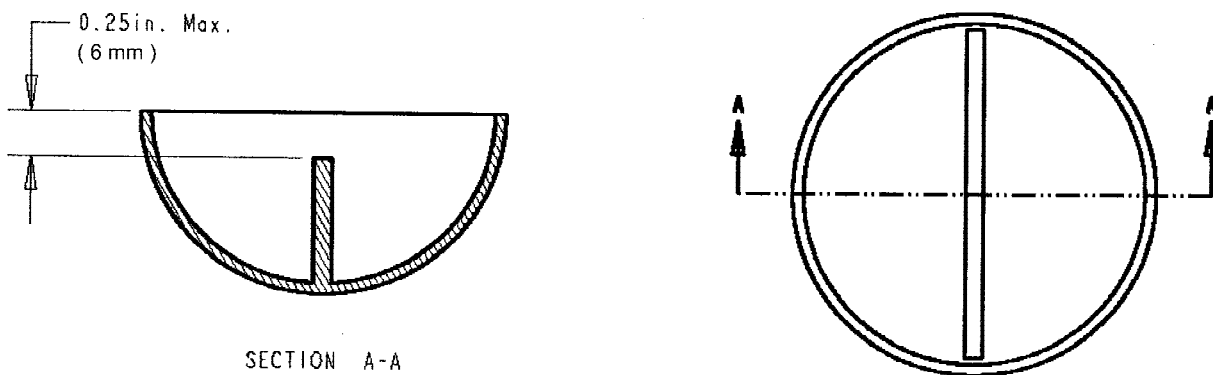


FIG. 21 Rib Through Cup Center

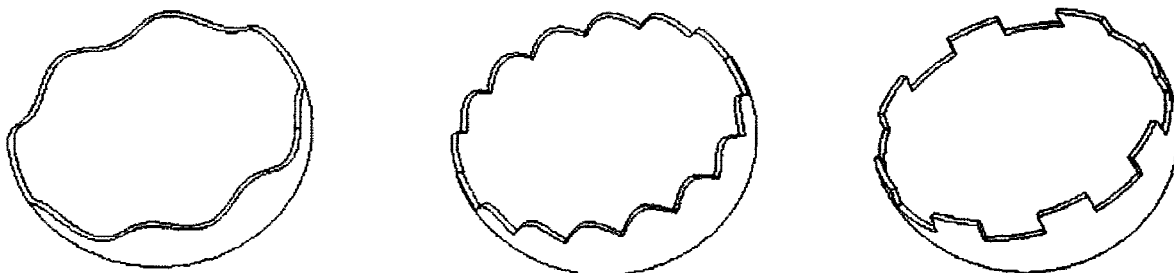


FIG. 22 Scalloped Edge Pattern

5.3.2 Sections 5.4, 5.5, 5.6, 5.7, 5.11, and 5.15 require the signal word **WARNING**. When no signal word is specified for safety labeling in accordance with 5.3, it is recommended that the signal word **CAUTION** be used to indicate a potentially hazardous situation which could result in minor or moderate injury, and that the signal word **WARNING** be used to indicate a potentially hazardous situation which could result in death or serious injury.

5.3.3 Sections 5.11 and 5.15 specify required text describing the hazard(s) and hazard avoidance behavior(s). When no required text is specified for safety labeling in accordance with 5.3, the text is left to the discretion of the manufacturer.

Sections 5.4, 5.5, 5.6, 5.7, and 5.15.1.1 provide recommended text to describe the hazard(s) and hazard avoidance behavior(s).

5.3.4 The required safety labeling described throughout Section 5 shall be on the principal display panel.

5.3.5 For toy items packed as premiums in or on a package containing other items, safety labeling shall be on the toy package, and similar labeling shall appear on the larger package.

5.3.6 All safety labeling shall be conspicuous and legible, shall be separated distinctively from any other wording or designs, and shall appear in the English language at a minimum. Such labeling shall be clearly visible to the intended audience and shall be in a color contrasting with the background on which it appears.

5.3.7 When safety labeling is printed onto the toy itself using a decoration process such as hot stamping, silk screening, or a similar process, it shall remain legible after normal use and reasonably foreseeable abuse when tested in accordance with 8.5-8.10.

5.3.8 When safety labeling is affixed to a toy in the form of an applied label, the label shall be applied so that it adheres firmly to the toy and none of its edges is lifted off the surface of the toy. Such label shall remain legible after normal use and reasonably foreseeable abuse when tested in accordance with 8.5-8.10.

5.4 *Aquatic Toys*—Aquatic toys and their packages shall carry safety labeling in accordance with 5.3, consisting of the signal word "WARNING" and contain, at a minimum, the following text or equivalent text which clearly conveys the same warning: *This is not a lifesaving device. Do not leave child unattended while device is in use.* In addition, no advertising copy or graphics shall state or imply that the child will be safe with such a toy if left unsupervised.

5.5 *Crib and Playpen Toys*—This requirement is applicable to toys intended to be strung across a crib or playpen by means of string, cord, elastic, or straps (including, but not limited to, crib exercisers, crib gyms, and activity toys).

5.5.1 *Age Grading*—Crib and playpen toys, as well as their packages, shall be labeled with the following text or equivalent information (text or graphic), which clearly conveys the age grade: *from birth to 5 months.*

5.5.2 *Safety Labeling*—Crib and playpen toys shall carry safety labeling, in accordance with 5.3, consisting of the signal word "WARNING" and contain, at a minimum, the following text or equivalent text which clearly conveys the same warning: *Possible entanglement or strangulation. Remove toy when baby begins to push up on hands and knees.*

5.6 *Mobiles*—This section addresses all mobiles intended to be attached to a crib, playpen, wall, or ceiling.

5.6.1 *Age Grading*—Mobiles intended to be attached to a crib or playpen, as well as their packages, shall be labeled with the following text or equivalent information (text or graphic), which clearly conveys the age grade: *from birth to 5 months.*

#### 5.6.2 *Safety Labeling:*

5.6.2.1 Mobiles intended to be attached to a crib or playpen, and mobiles intended to be attached to a crib or playpen and later moved to a wall or ceiling, as well as their packages, shall carry safety labeling in accordance with 5.3. The labeling shall consist of the signal word "WARNING" and contain, at a minimum, the following text or equivalent text which clearly conveys the same warning: *Possible entanglement injury. Keep out of baby's reach. Remove mobile from crib or playpen when baby begins to push up on hands and knees.*

5.6.2.2 Mobiles intended to be attached only to a wall or ceiling, as well as their packages, shall carry safety labeling in accordance with 5.3. The labeling shall consist of the signal

word "WARNING" and contain, at a minimum, the following text or equivalent text which clearly conveys the same warning: *Possible entanglement injury. Keep toy out of baby's reach.*

5.7 *Stroller and Carriage Toys*—Toys intended exclusively to be strung across strollers or carriages by means of string, cords, elastic, or straps shall carry safety labeling in accordance with 5.3. The labeling shall consist of the signal word "WARNING" and contain, at a minimum, the following text or equivalent text which clearly conveys the same warning: *Possible entanglement or strangulation injury when attached to crib or playpen. Do not attach to crib or playpen.*

5.8 *Toys Intended to be Assembled By an Adult*—Packages of toys that are intended to be assembled by an adult and that in their unassembled state contain potentially hazardous sharp edges or points, or small parts if the toy is intended for children under 3 years of age, shall carry safety labeling in accordance with 5.3 stating that the toy is to be assembled by an adult.

5.9 *Simulated Protective Devices*—Toys that simulate safety protective devices (examples include, but are not limited to, construction helmets and sports helmets), as well as their packages, shall carry safety labeling as defined in 5.3, stating that these toys are not safety protective devices.

5.10 *Toys with Functional Sharp Edges or Points*—Toys that are intended for use by children between the ages of 48 and 96 months, which contain accessible potentially hazardous sharp edges or sharp points that are a necessary part of the function of the toy, shall carry safety labeling on their packages as defined in 5.3, stating that a sharp edge or sharp point, or both, exists.

#### 5.11 *Small Objects, Small Balls, Marbles, and Balloons:*

5.11.1 The packages of small balls, marbles, balloons, and certain toys and games, any descriptive material that accompanies them, and, if unpackaged and unlabeled, any retail display container provided by manufacturers or importers shall carry safety labeling in accordance with 16 CFR 1500.19(b).

5.11.1.1 In accordance with 16 CFR 1500.19(d), all labeling statements required by 5.11 shall appear at least in the English language on the principal display panel (except under 5.11.7) and shall be blocked together within a square or rectangular area, with or without a border. The label design, the use of vignettes, or the proximity of other labeling or lettering shall not obscure or render inconspicuous any labeling statement.

5.11.1.2 The statements required by 5.11 must appear on at least two lines and appear on a solid background and be separated from all other graphic material by a space no smaller than the minimum allowable height of the type size for "other cautionary material" (for example the phrase "Not for children under 3 yrs.>"). If not separated by that distance, the labeling statements must be surrounded by a border line.

5.11.1.3 All labeling statements required by 5.11 shall comply with the following type size requirements based on the computed area of the principal display panel. For these purposes, Signal Word means the word "Warning" and the words "Safety Warning"; Statement of Hazard means "Choking Hazard"; Other Material means all other remaining statements.

Area, in. <sup>2</sup>	0–2	+2–5	+5–10	+10–15	+15–30	+30–100	+100–400	+400
Type Size— Signal Word	<sup>3</sup> / <sub>64</sub> in.	<sup>1</sup> / <sub>16</sub> in.	<sup>3</sup> / <sub>32</sub> in.	<sup>7</sup> / <sub>64</sub> in.	<sup>1</sup> / <sub>8</sub> in.	<sup>5</sup> / <sub>32</sub> in.	<sup>1</sup> / <sub>4</sub> in.	<sup>1</sup> / <sub>2</sub> in.
Type Size— Statement of Hazard	<sup>3</sup> / <sub>64</sub> in.	<sup>3</sup> / <sub>64</sub> in.	<sup>1</sup> / <sub>16</sub> in.	<sup>3</sup> / <sub>32</sub> in.	<sup>3</sup> / <sub>32</sub> in.	<sup>7</sup> / <sub>64</sub> in.	<sup>5</sup> / <sub>32</sub> in.	<sup>1</sup> / <sub>4</sub> in.
Type Size— Other Material	<sup>1</sup> / <sub>32</sub> in.	<sup>3</sup> / <sub>64</sub> in.	<sup>1</sup> / <sub>16</sub> in.	<sup>1</sup> / <sub>16</sub> in.	<sup>5</sup> / <sub>64</sub> in.	<sup>3</sup> / <sub>32</sub> in.	<sup>7</sup> / <sub>64</sub> in.	<sup>5</sup> / <sub>32</sub> in.

5.11.1.4 An equilateral triangle with an exclamation point (shown in 5.11.2) shall precede the signal word. The height of the triangle shall be equal to or exceed the height of the letters of the signal word “WARNING” and separated from it by a distance at least equal to the space occupied by the first letter of the signal word. The height of the exclamation point shall be at least half the height of the triangle, and be centered vertically in the triangle.

5.11.2 For toys and games intended for children at least 3 years old but less than 6 years of age, and which contain as-received small part(s), the labeling shall read:

△ WARNING:  
CHOKING HAZARD—Small parts.  
Not for children under 3 yrs.

5.11.3 For any small ball intended for children 3 years of age or older the labeling shall read:

△ WARNING:  
CHOKING HAZARD—Toy contains a small ball.  
Not for children under 3 yrs.

5.11.3.1 For any toy or game intended for children who are at least 3 years old but less than 8 years of age that contains a small ball the labeling shall read:

△ WARNING:  
CHOKING HAZARD—Toy contains a small ball.  
Not for children under 3 yrs.

5.11.4 For any marble intended for children 3 years of age or older the labeling shall read:

△ WARNING:  
CHOKING HAZARD—This toy is a marble.  
Not for children under 3 yrs.

5.11.4.1 For any toy or game intended for children who are at least 3 years of age but less than 8 years of age that contains a marble the labeling shall read:

△ WARNING:  
CHOKING HAZARD—Toy contains a marble.  
Not for children under 3 yrs.

5.11.5 For any latex balloon or any toy or game that contains a latex balloon, the labeling shall read:

△ WARNING:  
CHOKING HAZARD—Children under 8 yrs. can choke or suffocate on uninflated or broken balloons.  
Adult supervision required.

Keep uninflated balloons from children.  
Discard broken balloons at once.

5.11.6 *Combination of Labeling Statements*—The labels of products that contain more than one item subject to the requirements of 5.11 may combine information, if the condensed statement contains all of the information necessary to describe the potential hazard associated with each product. For

products that contain a balloon *and* a small ball, small object, or marble, only the signal word and statement of hazard may be combined.

5.11.7 *Alternative Labeling Statements for Items Subject to the Requirements of 5.11*—Labeling statements on small packages of toys or balloons that have a principal display panel of 15 in.<sup>2</sup> or less and that display cautionary statements in three or more languages may appear on a display panel other than the principal display panel if the principal display panel bears the appropriate statement below and bears an arrow or other indicator pointing toward or directing the purchaser’s attention to the display panel on the package where the full labeling statement appears.

5.11.7.1 For a toy or game that is or contains a small object, small ball, or marble:

△ SAFETY WARNING

5.11.7.2 For a balloon or a toy or game that contains a balloon:

△ WARNING—Choking Hazard

5.12 *Toy Caps*—Refer to 16 CFR 1500.86 for required labeling.

5.13 *Art Materials*—Toys and components of toys that fall within the definition of art material as found in 16 CFR 1500.14 (b) (8) shall be labeled in accordance with the provisions of that section and Practice D 4236.

5.14 *Electric Toys*—Refer to 16 CFR 1505.3 for required labeling.

5.15 *Battery-Operated Toys*—Toys with non-replaceable batteries that are accessible with the use of a coin, screwdriver, or other common household tool shall bear a statement that the battery is not replaceable. If the manufacturer determines that it is impractical to label the product, this information shall be placed on the packaging or in the instructions.

5.15.1 *Battery-Powered Ride-on Toys*:

5.15.1.1 Battery powered ride-on toys shall carry safety labeling in accordance with 5.3, consisting of the signal word “WARNING” and contain, at a minimum, text which clearly conveys the following:

(a) To reduce the risk of injury, adult supervision is required. Never use in roadways, near motor vehicles, on or near steep inclines or steps, swimming pools or other bodies of water; always wear shoes, and never allow more than \_\_\_\_ rider(s)

(b) RISK OF FIRE. Do not bypass. Replace only with \_\_\_\_\_. (Note: This warning must be placed at the location of any user replaceable fuse or circuit protection device. Manufacturer should state the part number or equivalent.

5.15.1.2 The packaging or point-of-sale literature of battery-powered ride-on toys shall state the manufacturer’s recommended user age or weight limitations for use of the toy, or both.

5.15.1.3 The packaging or point-of-sale literature of battery-powered ride-on toys shall bear the warnings as specified in 5.15.1.

5.16 *Promotional Materials*—Packaging, literature accompanying toys, and point-of-sale presentations shall not use



words, statements, or graphics that are inconsistent in any way with the safety labeling instructions for use or assembly or age grading of the toy.

## 6. Instructional Literature

6.1 *Definition and Description*—Information and instructions that are provided for the safe use or assembly, or both, of a toy, whether on the package or in leaflet form, shall be easy to read and understand by persons of the age level for whom the instructions and information are intended, including, if appropriate, children for whom the toy is intended. All such literature shall be shown in the English language at a minimum.

6.2 *Toy Chests*—Instructions for proper assembly and maintenance shall be provided in sufficient detail to describe the correct assembly of components, the resulting hazard if the lid support device is not installed, and a description of how to determine whether the support is working properly.

6.3 *Crib and Playpen Toys*—Toys intended to be strung across a crib or playpen by means of string, cords, elastic, or straps (including, but not limited to, crib exercisers, crib gyms, and activity toys) shall be provided with instructions for proper assembly, installation, and use to insure that the product does not present an entanglement or strangulation hazard. The instructions shall include at least the following information:

6.3.1 This toy is not intended to be “mouthed” by the baby and should be positioned clearly out of reach of the baby’s face and mouth.

6.3.2 On cribs with adjustable mattress levels, the highest position may allow the toy to be too close to the baby. The second or lower position is more appropriate.

6.3.3 The drop side of the crib should never be lowered with the toy in place and the baby left unattended.

6.3.4 Always attach all provided fasteners (strings, straps, clamps, etc.) tightly to a crib or playpen according to the instructions. Check frequently.

6.3.5 Do not add additional strings or straps to attach to a crib or playpen.

6.4 *Mobiles*—Mobiles intended to be mounted on a crib, playpen, or wall or ceiling nearby shall be provided with instructions for proper assembly, installation, and use to insure that the product does not present an entanglement hazard. The instructions shall include at least the following information:

6.4.1 A crib mobile is intended for visual stimulation and is not intended to be grasped by the child.

6.4.2 If attached to the crib or playpen, remove when baby begins to push up on hands and knees. If so designed, mount on wall or ceiling clearly out of a standing baby’s reach.

6.4.3 If mounted on a wall or ceiling, install the mobile clearly out of a standing baby’s reach.

6.4.4 Always attach all provided fasteners (strings, straps, clamps, etc.) tightly to a crib or playpen according to the instructions. Check frequently.

6.4.5 Do not add additional strings or straps to attach to a crib or playpen.

6.5 *Toys Intended to be Assembled By an Adult*—Assembly instructions that accompany toys that are intended to be assembled by an adult and that in their unassembled state contain potentially hazardous sharp edges or sharp points, or

small parts if the toy is intended for children under 3 years of age, shall carry safety labeling as defined in 5.3 and also state that the toy is to be assembled by an adult.

6.6 *Battery-Operated Toys*—For toys that use more than one battery in one circuit, the instructions or the toy shall be marked with the following (or equivalent) information.

6.6.1 Do not mix old and new batteries.

6.6.2 Do not mix alkaline, standard (carbon-zinc), or rechargeable (nickel-cadmium) batteries.

6.6.3 Instructions supplied with battery-powered ride-on toys shall contain guidance for safe use and maintenance of the toy. The instructions shall include at least the following:

6.6.3.1 Maximum weight or age limitations, or both, for safe use of the toy,

6.6.3.2 The kinds of surfaces which are appropriate for safe use of the toy,

6.6.3.3 The warning statements contained in 5.15.1.1,

6.6.3.4 Only use the battery(ies) specified by the manufacturer, and

6.6.3.5 Only use the charger(s) specified by the manufacturer.

6.7 *Toys in Contact with Food*—The packages or instructions, or both, for toys and their components intended to be used in contact with food shall be labeled to alert caregivers to wash the product thoroughly before use.

## 7. Producer’s Markings

7.1 Either a principal component of a toy or the package of a toy shall be marked with the name and address of the producer or the distributor. In the case of toys sold in bulk, such as jacks or marbles, only the container need be marked. All of these markings shall be legible and so positioned as to be seen easily by the customer and shall resist normal use conditions. Toys may carry a code that will enable the producer to identify model changes except for toys comprising many loose components, in which case the container may be so coded.

7.2 *Toy Chests*:

7.2.1 Each toy chest shall be labeled permanently and conspicuously to identify the name and address (city, state, and zip code) of either the manufacturer, distributor, or seller.

7.2.2 A code mark or other mark shall be provided on the toy chest and either the packaging or shipping container that will identify the date (month and year) of manufacture and permit future identification of any given model.

7.2.3 The manufacturer shall change the model number whenever the toy chest undergoes a significant structural design, or material modification, or a change that affects its conformance with this consumer safety specification.

7.3 *Battery-Powered Ride-on Toys*—Battery-powered ride-on toys shall bear a permanent label or marking identifying the manufacturer or distributor, place of business, the model numbers, and a date of manufacture or date code that will allow determination of, at a minimum, the month and year of manufacture.

## 8. Test Methods

8.1 *General*—The inspection and test procedures contained herein are to be used to determine the conformance of products to the requirements of this specification. All types of toys

covered by this specification must undergo the normal use and abuse tests in accordance with 8.5-8.10. The remaining tests in this section apply to types of toys as specified within the requirements of Section 4. The relevant tests for a type of toy can be performed in any order except where specified. Each test may be conducted on a different toy unless otherwise specified. The tests can be considered as qualification tests and not necessarily as quality control tests. These tests shall also be conducted when there is a design or material change in the toy. Each producer or distributor who represents his products as conforming to this specification may use statistically based sampling plans that are appropriate, but he shall keep such essential records as are necessary to document with a high degree of assurance his claim that all of the requirements of this specification have been met. Any test methods that are made mandatory by the CPSC shall supersede any applicable test methods in this section.

8.2 *Testing for Hazardous Substance Content*—The applicable sections of 16 CFR, issued under the FHSA to be used for determining the presence of hazardous substances, are given in Table 4. The references in Table 4 refer to the regulations issued on Sept. 27, 1973.

NOTE 5—The latest issue of the regulation shall be used to determine compliance of the toy with the requirements of this specification. The requirements of the FHSA are mandatory by law.

8.3 *Method to Dissolve Soluble Matter*—Soluble elements are extracted from toys under conditions that simulate the situation in which the materials stay 4 h in the alimentary tract after swallowing. The content of soluble elements in the extract is determined.

8.3.1 *Apparatus*—Normal laboratory apparatus and the following:

8.3.1.1 *Metal Sieve*, plain weave wire mesh stainless steel metal sieve with a nominal opening of 0.5 mm and the following specifications:

- (1) Nominal wire diameter: 0.315 mm,
- (2) Maximum size deviation for an individual opening: +0.090 mm,
- (3) Tolerance for average opening:  $\pm 0.018$  mm, and
- (4) 6 % or less of the openings to exceed the nominal plus: +0.054.

8.3.1.2 *pH*, a means of measuring pH with a minimum accuracy of 0.2 pH units.

8.3.1.3 *Membrane Filter*, with a pore size of 0.45  $\mu\text{m}$ .

8.3.2 *Reagents*—Use only reagents of recognized analytical grade during the analysis.

8.3.2.1 Hydrochloric acid solution, 0.07 mol/L.

8.3.2.2 Hydrochloric acid solution, approximately 2.0 mol/L (7.3 % m/m).

8.3.2.3 Type 3 water in accordance with Specification D 1193 or Grade 3 water in accordance with ISO 3696.

8.3.2.4 *Centrifuge*, capable of achieving  $5000 \pm 500$  g.

8.3.2.5 *Container*, of gross volume between 1.6 and 5.0 times that of the volume of HCL extractant.

8.3.3 *Preparation of Test Samples*—A laboratory sample for testing shall consist of a toy in the form in which it is marketed, excluding the package and packaging components.

(1) The test sample shall be taken from the accessible portions of a single toy sample.

(2) Identical materials in the sample may be combined and treated as a single sample. A single sample may not consist of more than one material or color (that is, composite testing is not allowed).

(3) The test sample can alternatively be taken from materials in a form such that they are representative of the relevant material specified above.

(4) When a toy is intended to be taken apart or can be taken apart without the use of tools, each piece shall be considered separately.

(5) For reference purposes, the sample may be taken from the raw material rather than scraped from the sample.

8.3.3.1 Scrape the coating off the test sample, and grind it through the sieve. Obtain a portion of not less than 100 mg of the resulting material.

(1) Where there is only between 10 and 100 mg of uniformly ground material available, test that quantity and calculate the results as if 100 mg of the sample had been available. The report should note this procedure and the actual sample account.

(2) If there is less than 10 mg of sample available, the test is not performed.

(3) In the case of coatings that by their nature cannot be ground (for example, elastic, rubber, or plastic paint), test the sample as it was removed from the toy.

NOTE 6—The methods and exclusions given in 8.3.3.1 do not apply to surface coatings being tested for total lead content as required by 16 CFR 1303. Total lead determination under CPSC requirements at 16 CFR 1303 applies to any coating that can be scraped off, regardless of the amount with results calculated based on the actual sample weight.

8.3.4 *Test Procedures*:

8.3.4.1 Prepare a test portion in accordance with 8.3.3.

8.3.4.2 Mix the test portion so prepared with 50 times its mass of an aqueous solution of 0.07 mol/L hydrochloric acid at  $37 \pm 2^\circ\text{C}$ . In the case of a test portion of less than 100 mg, mix the test portion with 5.0 mL of this solution at the given temperature. Shake for 1 min.

**TABLE 4 Determination of Hazardous Substance Content**

Hazardous Substance	Regulation (Title 16 CFR)
Toxic substance	1500.3(b)5, 1500.3(c)2, and 1500.40
Corrosive substance	1500.3(b)7, 1500.3(c)3, and 1500.41
Irritant substance	1500.3(b)8, 1500.3(c)4, 1500.41, and 1500.42
Strong sensitizer	1500.3(b)9, 1500.3(c)5, and 1500.13
Pressure-generating substance	1500.3(c)7
Radioactive substance	1500.3(b)11 and 1500.3(c)8
Flammability	1500.3(b)10, 1500.3(c)6, 1500.43, and 1610.

(1) Check the acidity of the mixture. If the pH is greater than 1.5, add dropwise while shaking an aqueous solution of 2 mol/L (7.3 % m/m) hydrochloric acid until the pH is between 1.0 and 1.5. Protect the mixture from light. Shake the mixture efficiently for 1 h continuously, and then allow the mixture to stand for 1 h at  $37 \pm 2^\circ\text{C}$ .

NOTE 7—It has been shown that the extraction of soluble cadmium can reveal a two-fold to five-fold increase when extraction is conducted in the light rather than the dark.

(2) Without delay, separate the solids from the mixture by filtration through a membrane filter with a pore size of 0.45  $\mu\text{m}$ . If necessary, centrifuge at 5000 g for no longer than 10 min. Examine the solution to determine the presence of the elements identified in 4.3.5.2. If it is not possible to examine the sample within one working day, stabilize by the addition of hydrochloric acid so that the resulting solution is approximately 1 mol/L of HCL.

(3) If necessary, centrifuge the mixture and separate the solids from the mixture by filtration through a membrane filter with a pore size of 0.45  $\mu\text{m}$ , and examine the resulting solution to determine the presence and quantity of the elements identified in 4.3.5.2. Take care to insure the stability of the solution if it is not possible to examine within one working day.

8.3.4.3 The analytical results as determined in 8.3 shall be adjusted by subtracting the analytical correction factor in the following table using the following method. This is necessary to make statistical correction for interlaboratory error.

Element	Analytical Correction							
	Sb	As	Ba	Cd	Cr	Pb	Hg	Se
Analytical correction, %	60	60	30	30	30	30	50	60

NOTE 8—Example of Calculations Using the Table:

Example 1:

The analytical result for lead is 120 mg/kg; the correction factor from the table is 30 % (0.30).

Adjusted analytical results =  $120 - (120 \times 0.30) = 120 - 36 = 84$  mg/kg.

The result does not exceed the allowed value for lead in the table and is therefore acceptable.

Example 2:

The analytical result for chromium is 90 mg/kg; the correction factor from the table is 30 % (0.30).

Adjusted analytical results =  $90 - (90 \times 0.30) = 90 - 27 = 63$  mg/kg.

The result exceeds the allowed value for chromium in the table and is therefore not acceptable.

#### 8.4 Tests for Cleanliness and Preservative Effectiveness:

8.4.1 *Cleanliness of Materials*—The cleanliness of cosmetics, liquids, pastes, putties, gels, and powders used in toys (excluding art materials) shall be determined using the methods in USP 24 <61> Microbial Limits Tests or the most current edition of the U.S. Pharmacopeia.<sup>11</sup> Another method may be substituted provided it has been properly validated as giving equivalent or better results, as specified in USP 24 <61> or the most current edition of the U.S. Pharmacopeia. In conjunction

with the chosen test method, the limits for determining the cleanliness of materials will consist of the most current guidelines for cosmetics set forth by the Cosmetic, Toiletry, and Fragrance Association (CTFA).

8.4.2 *Preservative Effectiveness*—The formulations of cosmetics used in toys shall be evaluated for the potential microbiological degradation, or they shall be tested for microbial control and preservative effectiveness using the methods and limits in USP 24 <51> Antimicrobial Effectiveness Testing or the most current edition of the U.S. Pharmacopeia.

8.5 *Normal Use Testing*—These tests are intended to simulate normal use conditions so as to ensure that hazards are not generated through normal wear and deterioration. The object of these tests shall be to simulate the normal play mode of the toy, and the tests are therefore unrelated to the reasonably foreseeable abuse tests of 8.6-8.13. The tests are intended to uncover hazards rather than to demonstrate the reliability of the toy. The fact that a mechanism or material of a toy fails during testing is relevant only if the failure creates a potential hazard. Toys shall be subject to appropriate tests to simulate the expected mode of use of the particular toy. For example, levers, wheels, catches, triggers, strings, wires, chains, and so on, that are intended to be actuated by a child shall be operated repeatedly. Spring or power-operated devices shall be tested similarly. The tests shall be conducted in an expected use environment. For example, toys intended for use in the bathtub shall be tested in soapy water, and toys intended for use in the sandbox shall be exposed to sand during testing. It is recognized that no specific requirements are defined here; it would not be possible in view of the wide range of toys covered by this specification. However, the manufacturer or distributor must do enough testing to satisfy himself that normal use during the estimated lifetime of the toy is being simulated. The toy shall be inspected after such tests, and hazards such as points, sharp edges, and release of small parts shall be evaluated in accordance with the relevant requirements listed in Section 4.

8.5.1 *Washable Toys*—Toys described as machine washable on the toy, package, or instructions shall be subjected to six machine washing and tumble drying cycles, as described in 8.5.1.1, unless a different drying method is specified by the toy manufacturer by means of a permanent label. They shall then be inspected for compliance with this specification.

8.5.1.1 *Conditions for Machine Washing and Tumble Drying*—Any commercially available top-loading washer, dryer, or laundry detergent intended for use in the home may be used for this test. The weight of each toy is determined prior to the beginning of the test. The toys, plus a dummy load of clothes sufficient to bring the total dry weight to a minimum 4 lb (1.8 kg), are washed in an automatic washing machine using the warm water setting and a 12-min wash cycle at the normal setting. The toys and dummy load shall then be tumble dried in an automatic clothes dryer using the warm setting, or air dried, until the load is dried. The toy shall be deemed dry when the final weight does not exceed the original dry weight by more than 10 %.

8.6 *Abuse Testing*—The tests described in 8.7-8.13 are to simulate the exposure of a toy to mechanical damage through dropping, throwing, and other actions likely to be performed by

<sup>11</sup> *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.



a child, which are characterized as reasonably foreseeable abuse. After testing, the toy shall be examined for mechanical hazards, such as hazardous sharp edges and points, and ingestion hazards, such as small liberated components, chips, or fragments. The severity of the abuse tests described in 8.7, 8.8, 8.9, 8.10, and 8.12 shall be determined according to the age group for which the test is intended. If the toy is intended for an age group that spans more than one age group according to Table 5, the toy shall be subjected to the most severe test. Toys reasonably intended to be assembled by an adult, and not intended to be taken apart by a child, shall be tested only in the assembled state if the shelf package and assembly instructions indicate prominently that the article is to be assembled by an adult. Individual parts of toys that are intended to be assembled by children shall be tested as well as the fully assembled toy; however, the assembled toy shall be made of components that have not been subjected to the abuse testing.

**8.7 Impact Tests**—These tests are intended to simulate situations in which possible damage can occur to a toy by reason of its falling from a crib, table, or counter top, or other impact situations that may occur as a result of reasonably foreseeable abuse. After undergoing the appropriate test, the toy shall be examined for possible hazards, such as points, edges, or ingestible objects, in accordance with the relevant requirement of Section 4.

**8.7.1 Drop Test**—Except for toys covered in 8.7.2, toys falling below the weight limit given below shall be dropped onto a specified impact area. The number of times the toy will be dropped, and the height from which it is dropped, is to be determined from Table 5. The toy shall be dropped in random orientation. The test sample shall be allowed to come to rest after each drop and shall be examined and evaluated before continuing. The impact medium shall consist of a 1/8-in. (3-mm) nominal thickness of Type IV vinyl composition tile, composition 1-asbestos free, as specified in Federal Specification SS-T-312B over at least a 2.5-in. (64-mm) thickness of concrete. The impact area shall be at least 3 ft<sup>2</sup> (0.3 m<sup>2</sup>). The recommended batteries shall be in place during the drop test for battery-operated toys. If no specific type of battery is recommended, the heaviest battery that is generally available shall be used.

Age Group	Weight Criteria, lb (kg)
18 months or less	less than 3 ± 0.01 (1.4)
over 18 months, not over 36 months	less than 4 ± 0.01 (1.8)
over 36 months, not over 96 months	less than 10 ± 0.01 (4.5)

**8.7.2 Tipover Test for Large, Bulky Toys**—Large, bulky toys shall not be subjected to the drop test of 8.7.1, but they shall be tipped over according to the following procedure:

**8.7.2.1 Tipover Test for Large, Bulky Toys**—Large, bulky toys shall be tested for impact by tipping over three times, one of which is in the worst attitude by pushing the sample slowly past its center of balance onto the impact medium described in 8.7.1.

**8.7.3 Tumble Test for Wheeled Toys**—Wheeled toys weighing more than 3 lb (1.4 kg) but not more than 10 lb (4.5 kg) shall be tumbled down a flight of six steps with risers not less than 7 in. (180 mm) high (see Fig. 23). The treads may be wood, cement, or metal. The toy, including accessories, where applicable, shall be caused to fall down the steps two times in each of four attitudes: tumbling forwardly end-over-end and tumbling rearwardly end-over-end from each side. The toy shall be pushed slowly over the edge of the top step in the appropriate attitude and released as soon as it begins to fall of its own weight. The test shall be considered complete for an attitude even if the toy does not reach the bottom of the flight of steps.

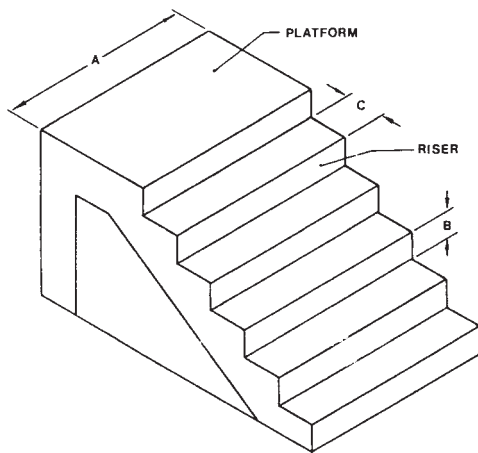
**8.7.4 Impact Test for Toys that Cover the Face**—The toy shall be held firmly in a suitable clamp with that portion that covers or surrounds the eyes (in the case of cutout eye holes) in a horizontal plane. Drop a 5/8-in. (16-mm) diameter steel ball weighing 0.56 oz. (15.8 g) (with a tolerance of +0.03 (0.8 g, -0 oz)) from a height of 50 in. (1.3 m) upon the horizontal upper surface of the toy in the area that would cover the eyes in normal use. In the case of toys with cutout eye holes, impact the area that would be directly adjacent to the eyes in normal use. The ball may be guided, but not restricted, in its fall by being dropped through a perforated tube extending to within approximately 4 in. (100 mm) of the toy.

**8.8 Torque Tests for Removal of Components**—Any toy with a projection, part, or assembly that a child can grasp with at least the thumb and forefinger or the teeth shall be subject to this test. The amount of torque shall be determined from Table

**TABLE 5 Test Parameters for Use and Abuse Tests**

Test	Age Category of Intended User, months	Numerical Value	
		Stated by the Voluntary Standard	Recommended for Toy Manufacturers
Impact test	0 to 18	10 × 4.5 ft ± 0.5 in. (137 cm)	4 ft, 6.5 in. (1.38 m)
	over 18 to 36	4 × 3.0 ft ± 0.5 in. (91 cm)	3 ft, 0.5 in. (0.93 m)
	over 36 to 96	4 × 3.0 ft ± 0.5 in. (91 cm)	3 ft, 0.5 in. (0.93 m)
Torque test	0 to 18	2 ± 0.2 in.-lbf (0.23 N-m)	2.2 in.-lbf (0.25 N-m)
	over 18 to 36	3 ± 0.2 in.-lbf (0.34 N-m)	3.2 in.-lbf (0.36 N-m)
	over 36 to 96	4 ± 0.2 in.-lbf (0.45 N-m)	4.2 in.-lbf (0.47 N-m)
Tension test	0 to 18	10 ± 0.5 lbf (44.5 N)	10.5 lbf (46.7 N)
	over 18 to 36	15 ± 0.5 lbf (66.8 N)	15.5 lbf (69.0 N)
	over 36 to 96	15 ± 0.5 lbf (66.8 N)	15.5 lbf (69.0 N)
Compression test	0 to 18	20 ± 0.5 lbf (89.0 N)	20.5 lbf (91.2 N)
	over 18 to 36	25 ± 0.5 lbf (111.3 N)	25.5 lbf (113.5 N)
	over 36 to 96	30 ± 0.5 lbf (133.5 N)	30.5 lbf (135.7 N)
Flexure test	0 to 18	10 ± 0.5 lbf (44.5 N)	10.5 lbf (46.7 N)
	over 18 to 36	15 ± 0.5 lbf (66.8 N)	15.5 lbf (69.0 N)
	over 36 to 96	15 ± 0.5 lbf (66.8 N)	15.5 lbf (69.0 N)





Dimensions  
 "A" shall be not less than 3 ft (914 mm)  
 "B" shall be not less than 7 in. (180 mm)  
 "C" shall be not more than 9 in. (230 mm)

FIG. 23 Illustration of Step Construction

5, according to the age group for which the toy is intended. The loading device used in the test shall be a torque gage, torque wrench, or other appropriate device having an accuracy of  $\pm 0.2$  in.·lbf ( $\pm 0.02$  N·m). A clamp capable of holding the test component firmly and transmitting a torsional force shall be used. The clamp is fastened to the test object or component with the toy fastened rigidly in any reasonable test position. The torque shall be applied evenly within a period of 5 s in a clockwise direction until either (1) a rotation of  $180^\circ$  from the original position has been attained, or (2) the required torque is exceeded. The maximum rotation or required torque shall be maintained for an additional 10 s. The torque shall then be removed and the test component permitted to return to a relaxed condition. This procedure shall then be repeated in a counterclockwise direction. Projections, parts, or assemblies that are mounted rigidly on an accessible rod or shaft designed to rotate along with the projections, parts, or assemblies shall be tested with the rod or shaft clamped to prevent rotation. If a component that is attached by a screw thread that has been assembled by the manufacturer, or that has been assembled to the manufacturer's instructions, becomes loosened during application of the required torque, continue to apply the torque until either (1) the required torque is exceeded, or (2) the part disassembles. The test should be terminated if it becomes obvious that the part under test will continue to rotate at less than the required torque limit and will not disassemble.

8.8.1 If the part disassembles, evaluate it for compliance with the appropriate requirements. If the disassembly exposes an accessible component that can be grasped as noted above, repeat the torque test on that component.

8.9 *Tension Test for Removal of Components*—Any projection of a toy that a child can grasp with at least the thumb and forefinger or the teeth shall be subjected to this test. The tension test shall be performed on the same components of the toy subjected to the torque test described in 8.8. The amount of force used shall be determined from Table 5, according to the age group for which the toy is intended. A clamp capable of applying a tension load to the test component shall be applied

in a manner that will not affect the structural integrity of the attachment between the component and the toy. The loading device shall be a self-indicating gage or other appropriate means having an accuracy of  $\pm 0.5$  lb ( $\pm 2$  N). With the test sample fastened in a convenient position, an appropriate clamp shall be attached to the test object or component. The required tensile force shall be applied evenly, within a period of 5 s, parallel to the major axis of the test component, and maintained for an additional 10 s. The tension clamp shall then be removed, and a second clamp suitable for applying a tension load perpendicularly to the major axis of the test component shall be attached to the test object component. The required tensile force shall be applied evenly, within a period of 5 s, perpendicularly to the major axis of the test component and maintained for an additional 10 s.

8.9.1 *Tension Test for Seams in Stuffed Toys and Beanbag-Type Toys*—A stuffed toy or beanbag constructed of pliable material having seams (including, but not limited to, seams that are stitched, glued, heat sealed, or ultrasonic welded) shall have the seams subjected to a separate tension test in any direction using the forces specified in 8.9 and determined from Table 5 according to the age group for which the toy is intended.

8.9.1.1 The clamps used to grip the material on either side of the seam to be tested shall have jaws to which are attached  $\frac{3}{4}$ -in. (19-mm) diameter washers (see Fig. 24). The clamps shall be attached to the cover material of a completely assembled stuffed toy in a manner such that the outside diameter of the  $\frac{3}{4}$ -in. (19-mm) washers at a point nearest the seam shall be close to, but no closer than,  $\frac{1}{2}$  in. (13 mm) from the edge of the seam stitching thread. This seam test shall not be performed if the material adjacent to the seam cannot be grasped between the thumb and forefinger of the test personnel sufficient for full clamping by the  $\frac{3}{4}$ -in. (19-mm) diameter washer jaws. If such is the case, a torque and tension test shall be performed on an arm, leg, or other appendage of the toy instead of the seam test.

8.9.1.2 In performing a seam test, the force appropriate for the age category into which the toy falls (see Table 5) shall be applied evenly within 5 s and maintained for an additional 10 s.

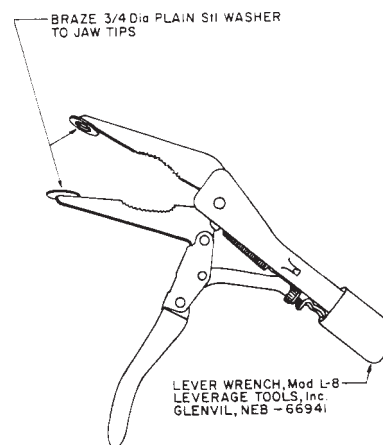


FIG. 24 Seam Clamp

8.10 *Compression Test*—Any area on the surface of a toy that is accessible to a child and inaccessible to flat surface contact during the impact test shall be subject to this test. The compression force shall be determined from Table 5 according to the age group for which the toy is intended.

8.10.1 The loading device shall be a rigid metal disk 1.125 ± 0.015 in. (0.380 mm) in diameter and 0.375 in. (9.52 mm) in thickness. The perimeter of the disk shall be rounded to a radius of 1/32 in. (0.8 mm) to eliminate irregular edge. The disk shall be attached to an appropriate compression scale having an accuracy of ±0.5 lb (2 N). The disk shall be positioned so that the flat contact surface is parallel to the surface under test. The required force shall be applied evenly within 5 s through the disk. This load shall be maintained for an additional 10 s. The toy is to rest on a flat, hard surface in any convenient position during the test.

8.11 *Tests for Tire Removal and Snap-in Wheel and Axle Assembly Removal*—These tests relate to the requirements of 4.17.

8.11.1 *Removal of Tires*—The toy shall be clamped so that the wheel axle is vertical. A wire hook shaped as shown in Fig. 25 shall be positioned on the lower tire and attached to a dead weight of 10 ± 0.5 lb (4.5 kg) if the tire is on a toy intended for children aged 18 months or less, or to a dead weight of 15 ± 0.5 lb (6.8 kg) if the tire is on a toy intended for children aged over 18 months but not over 36 months. The load shall be applied gradually over a period of 5 s and maintained for 10 s.

8.11.2 *Toys Assembled With Snap-in Axles*—A 15 ± 0.5-lb (6.8-kg) dead weight shall be applied perpendicularly to the axle and in the least favorable direction, adjacent to a bearing (but between the two bearings), for 10 s, using a hook and string for attachment to the toy. The toy shall be held horizontally in a test-convenient fixture, and the load shall be applied gradually over a 5-s period and then shall be maintained for 10 s. The toy shall be held horizontally if the axle cannot be hooked as described above, and a 10 ± 0.5-lb (4.5-kg) dead weight shall be attached to one wheel by means of a hook or clamp that acts perpendicular to the axle in the least favorable direction. The load shall be applied gradually over a 5-s period and then be maintained for 10 s.

8.11.3 *Compression Test for Snap-in Wheel and Axle Assemblies*—This test is for determining compliance with 4.17 if the axle and wheel are removed by the procedure described in 8.11.2. The wheel and axle assembly shall be positioned with the axle vertical over a hole in a rigid plate, as shown in

Fig. 26. The hole shall be large enough in diameter to permit the axle to pass through. A load of 20 ± 0.5 lb (89 N) is applied to the upper wheel, using a suitable circular adaptor to prevent interference with the axle. The load shall be applied gradually over a 5-s period and then shall be maintained for 10 s. When applying the load, the upper wheel shall be guided, if necessary, in order to maintain the axle in a vertical position, but it shall not be restrained from moving downward. The axle shall not form a hazardous point or projection in those cases in which it is forced through either wheel.

8.12 *Flexure Test*—This test is for determining compliance with 4.10, for wires or rods used as flexible skeletons. The toy shall be secured in a vise equipped with vise shields that are fabricated from 13-gage thick cold-rolled steel or other similar material and that have a 0.375-in. (9.5-mm) inside radius as shown in Fig. 27. The component shall then be bent through a 60° arc by a force applied perpendicularly to the major axis of the component at a point 2 ± 0.05 in. (50 mm) from the intersection of the component with the main body of the toy or applied at the end of the component if the component is less than 2 in. (50 mm) long. The force shall be determined from Table 5. The component shall then be bent in the reverse direction through a 120° arc. This process shall be repeated for 30 cycles at a rate of 1 cycle/2 s, with a 60-s rest period occurring after each 10 cycles. Two 120° arc bends shall constitute one cycle.

8.13 *Test for Mouth-Actuated Toys*—A piston pump capable of discharging and taking in more than 18 in.<sup>3</sup> (295 cm<sup>3</sup>) of air in less than 3 s shall be connected to the mouthpiece of the toy. A relief valve shall be so arranged that the pump will not generate a positive or negative pressure of more than 2 psig. The toy shall be subjected to 10 alternating blowing-and-sucking cycles of at least 18 in.<sup>3</sup> (295 cm<sup>3</sup>) of air, including that volume that may be discharged through the relief valve. Any objects released as a result of this test shall be inspected for conformance with 4.6. The above procedure shall also be applied to the outlet if the air outlet of the toy is accessible as described in 4.6.2.

8.14 *Tests for Toy Chest Lids and Closures*—The toy chests shall be assembled in accordance with the manufacturer's instructions before testing.

8.14.1 *Lid Support Mechanisms:*

8.14.1.1 Lift the lid to any position in its arc of travel to a distance greater than 2 in. (50 mm) but not to cause the lid to

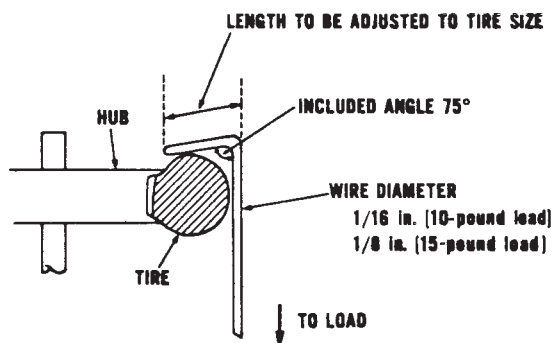


FIG. 25 Hook for Tire Removal

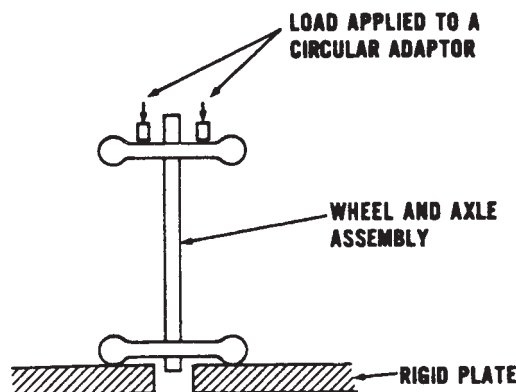


FIG. 26 Compression Test for Wheel Assemblies

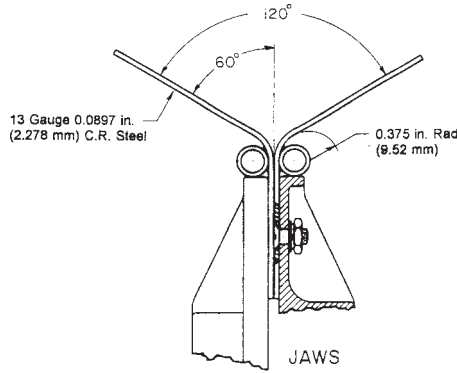


FIG. 27 Flexure Tester

move through an arc of more than 60° from the lid's fully closed position measured at the outermost edge of the lid. Release the lid, and observe any dropping motion of a point in the approximate center of the outermost edge of the lid.

8.14.1.2 Subject the lid to 7000 opening and closing cycles. One cycle consists of raising the lid from its fully closed position to fully open and returning it to fully closed.

8.14.1.3 Take care not to force the lid beyond its normal arc of travel to prevent undue stress on screws or other fasteners used to attach lid support mechanisms.

8.14.1.4 The time to complete one cycle shall be approximately 15 s. The 7000 cycles shall be completed within a time period of 72 h, after which the test described in 8.14.1.1 should be repeated.

8.14.2 Closures/Lids:

8.14.2.1 *Vertically Hinged Lids*—With the lid in a closed position, apply a gradually increasing force in an upward direction perpendicular to the plane of the lid at a point within 1 in. (25 mm) from its geometric center. Record the maximum force to cause the lid to begin to open.

8.14.2.2 *Other Lids, Covers, and Doors*—For all other closures, apply a gradually increasing force in the direction required to open a completely closed toy chest. Record the maximum force to cause the closure to begin to open.

8.15 Projectiles:

8.15.1 *Kinetic Energy Determination*—The kinetic energy of a projectile as defined in 3.1.42 shall be determined from the following equation:

$$\text{kinetic energy} = 1/2 mv^2 \quad (1)$$

where:

- $m$  = mass of projectile, kg, and
- $v$  = velocity of the projectile, m/s.

8.15.2 The mass of a projectile,  $m$ , shall be determined by weighing a sample on a laboratory balance. The velocity of a projectile,  $v$ , shall be determined by firing a sample from the discharge mechanism of the toy across ballistic screens placed a known distance apart ( $s$ , metres) and recording the time ( $t$ , seconds) to travel that distance. The velocity of the projectile shall be calculated from the expression  $v = s/t$  m/s.

8.15.3 When performing the test to measure the velocity of a projectile, the second screen shall be placed a distance no more than 1 ft (300 mm) plus one projectile length from the point at which the entire projectile enters free flight (see Fig.

28). Due to the flight characteristics of certain projectiles and other factors that may influence the accuracy of the measurement of projectile velocity, the value of  $v$  in the equation for kinetic energy shall be the average of five measurements.

8.15.4 *Impact Test for Projectiles*—Projectiles, as defined in 3.1.42, shall be propelled by their discharge mechanism three times into a concrete block wall (or equivalent surface) located at a distance 1 ft (300 mm) plus the length of the projectile from the front end of the launcher. The discharge mechanism shall be aimed perpendicular to the wall.

8.16 *Test for Stability of Ride-On Toys*—These tests relate to the requirements of 4.15.

8.16.1 Place the toy across the slope of a smooth surface inclined 10° to the horizontal plane. (Some tests require a 15° slope; refer to 4.15.2.2 and 4.15.3.)

8.16.2 Turn the steering mechanism, if any, to a position at which the toy is most likely to tip.

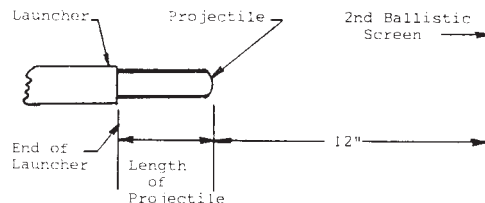
8.16.3 Chock the wheels to restrict rolling, but allow casters to assume their natural position before chocks are applied.

8.16.4 Apply to the seat a static load equal to the weight indicated in Table 3 at the highest age of the age range for which the toy is intended, but not exceeding 60 months. When the highest age of the intended age range falls between two ages listed in Table 3, the higher of the two shall be chosen. The load shall be applied so that the major axis is perpendicular to the true horizontal while the toy is on the incline specified. The load shall be designed so that the height of its center of gravity is  $8.7 \pm 0.5$  in. ( $220 \pm 13$  mm). The center of gravity of the load for all ride-ons shall be secured both 1.7 in. (43 mm) rearward of the front-most portion of the designated seating area and 1.7 in. (43 mm) forward of the rear-most portion of the designated seating area (note: two separate tests). If there is no designated seating area, the load shall be placed at the least favorable position that it is reasonable to anticipate that the child will choose to sit.

8.17 Pompoms are subjected to the torque test as described in 8.8 and 8.8.1 and the tension test as described herein. The clamps used to grip the material to be tested shall have jaws to which 3/4-in. (19-mm) diameter washers are attached (see Fig. 24). One clamp shall be attached to the pompom and a second clamp used to grip the base material. A force of 15 lbf (67 N) shall be applied evenly within 5 s and maintained for an additional 10 s.

8.18 *Stalled Motor Test for Battery-Operated Toys*:

8.18.1 The test shall be conducted using a new toy. Each motor shall be tested separately using fresh alkaline batteries. If another battery chemistry is specifically recommended for



NOTE 1—First ballistic screen to be located between end of launcher and second screen.

FIG. 28 Diagram of Layout to Determine Projectile Velocity



use in the toy by the manufacturer, repeat the test using the batteries specified by the manufacturer. If the toy will not operate using alkaline batteries, test with the type of battery recommended by the manufacturer at the specified voltage. The test is to be carried out in a draft-free location at an ambient temperature of  $20 \pm 5^\circ\text{C}$ .

8.18.2 Operate the toy with moving parts that are mechanically linked to a motor locked in a fixed position. Only lock moving parts which can be stalled external to the toy. Do not disable any mechanical or electrical protective device such as clutches or fuses. Monitor the temperatures with the toy fully assembled. If normal use allows the motor to run unattended or if the toy has a non-recessed switch allowing it to be kept in the “on” position, operate the toy continuously and record the maximum temperatures. The test may be discontinued 60 min after the peak temperature of each component being tested is recorded. If the toy shuts off automatically or must be kept “on” by hand or foot, monitor temperatures for 30 s, resetting the toy as many times as necessary to complete the 30 s of operation. If the toy shuts off automatically after an operating time of greater than 30 s, continue the test until the toy shuts off. At the conclusion of the test, the stalled motor condition shall not cause temperatures to exceed the limits of 4.25.7, or cause battery leakage, an explosion, or a fire.

#### 8.19 Tests for Battery-Powered Ride-on Toys:

8.19.1 Components tested in accordance with the following sections are to be installed and operated in the toy, as they would be during normal use unless otherwise specified. Testing is to be conducted using fully charged batteries.<sup>12</sup>

##### 8.19.2 Maximum Temperature Test:

8.19.2.1 Mechanically precondition all electrical pressure connections used for charging or discharging the battery(ies). If a main harness connector is provided, the main harness connection must be connected and disconnected 600 times before the Maximum Temperature Test is performed. If a user replaceable fuse is provided, remove and insert the fuse 25 times before the Maximum Temperature test is performed.

8.19.2.2 Power the test sample using a fully charged battery as specified by the manufacturer. Operate the vehicle in the mode that results in the maximum continuous current draw. Determine the maximum continuous current draw by testing the vehicle on any intended surface as specified by the manufacturer, and by adjusting the weight, up to the manufacturer specified maximum. Several trials on different surfaces and with different weights may be necessary to determine the maximum continuous current draw.

8.19.2.3 Physically load the vehicle in any way necessary to obtain the maximum continuous current draw. Operate the vehicle continuously until the battery is exhausted or until thermal equilibrium is reached. If thermal equilibrium is not reached, replace the battery with a fully charged battery and continue the test.

8.19.3 *Stalled Motor Test for Battery-Powered Ride-on Toys*—Mechanically lock any accessible motor driven parts. For toys having more than one motor, each motor shall be tested individually. For toys having more than one operating mode, a different toy shall be tested in each mode. The toy shall be entirely draped with a double layer of cheesecloth during the test. For motors or other electrical components that are accessible, the cheesecloth shall also be draped over the component.

8.19.3.1 Operate the toy, under the stalled condition, until a circuit protection device interrupts the current or until the battery is depleted.

8.19.3.2 If the circuit protection device interrupts the circuit, immediately reset the circuit protection device or replace it in the case of a fuse and repeat the test three more times. If the circuit protection device automatically resets, continue the stalled motor test until the battery is exhausted.

8.19.3.3 The test shall not result in ignition of the cheesecloth.

8.19.4 *Nuisance Tripping Test*—Conduct the tests on a level surface as specified in 8.19.1, loading the vehicle with the maximum weight specified by the manufacturer.

8.19.4.1 *Start/Stop Condition*—Start and stop the toy in 1-s cycles for 30 repetitions (0.5 s start followed by 0.5 s stop) in the mode that draws the greatest current.

8.19.4.2 *Forward/Reverse*—If the toy has a reverse direction feature, cycle the toy in the forward and reverse directions in 1-s cycles for 30 repetitions (0.5 s forward followed by 0.5 s reverse) in the mode that draws the greatest current.

8.19.5 *Switch Endurance and Overload Tests*—Precondition switches at 95 % relative humidity between  $20^\circ\text{C}$  and  $32^\circ\text{C}$  for 48 h. Conduct the Switch Endurance and Overload Tests at  $40^\circ\text{C}$ . A switch is to be operated by means of its actuating member either manually or by mechanical means making and breaking the test current. If a fuse or protective device operates (opens or trips) the device must be replaced or reset as many times as necessary to complete the required number of cycles. The test may be concluded at less than the prescribed number of cycles if the switch fails safe (switch stuck in the “off” position and no short-circuit condition results). Test 3 samples. All samples must pass.

8.19.5.1 *Switch Endurance Test*—If a switch is relied upon for starting and stopping of the vehicle, conduct the endurance test for 100 000 cycles. Cycle (minimum 1 s on time and at least 6 cycles per minute) a switch in the toy using the maximum continuous current load as determined in the Maximum Temperature Test or in an equivalent simulated motor load circuit including the inrush and inductive characteristics. All other switches are to be subjected to 6000 cycles of endurance testing. Cycle (minimum 1 s on time and at least 6 cycles per minute) a switch in the toy using the maximum continuous current load as determined in the Maximum Temperature Test or in an equivalent simulated motor load circuit including the inrush and inductive characteristics.

8.19.5.2 *Switch Overload Test*—The overload test is to be conducted on a switch that is relied upon for starting and stopping of the vehicle. Stall the motor(s) of the toy. Operate

<sup>12</sup> Testing is to be conducted while the vehicle is operated on a hard level surface covered with 3M #610 General Purpose Safety Walk tape or equivalent surface with a coefficient of friction between 1.27 and 1.32 when measured in accordance with MIL-D-17951. Cheesecloth referenced in the following tests is #60 cotton gauze with a thread count of 32 by 28 threads per inch.



the switch for 50 cycles of operation at a rate of 6 cycles per minute with 1 s on and 9 s off.

8.19.6 *Battery Overcharge Test*—Each battery shall be charged with its intended charger continuously for 336 h. The test shall not result in the release of electrolyte, or cause explosion or fire.

8.19.6.1 If the battery can be charged in the vehicle, place the battery in the vehicle and connect it to the charging circuit. Apply the short-circuit condition and drape the charger, cable, and battery with a double layer of cheesecloth. Conduct the test until the battery is depleted. The test shall not result in ignition of the cheesecloth.

8.19.7 *Short-Circuit Protection Test*—Entirely drape the toy with a double layer of cheesecloth. Short-circuit parts of opposite polarity. Any possible short-circuit condition shall not result in ignition of the cheesecloth.

8.19.8 *Strain Relief Test*—The electrical connections of the cord or harness are to be disconnected. Apply a 20 lbf (90 N) to the cord so that the strain relief will be stressed from any angle permitted by the construction of the toy. Maintain the specified force for 1 min. There shall be no movement of the cord to indicate stress on the connections.

8.20 *Tests for Toys which Produce Noise:*

8.20.1 *Test Equipment*—In order to achieve the accuracy necessary to determine conformance with the requirements of this specification, sound measuring devices shall have the following capabilities:

8.20.1.1 Meet ANSI Standards (ANSI S1.4) for Type 2 or higher specifications,

8.20.1.2 Have capability to determine variable duration equivalent sound pressure level ( $L_{Aeq}$ ),

8.20.1.3 Have “peak” measurement capability ( $L_{Cpk}$ ),

8.20.1.4 Have a calibration device to check calibration prior to and following measurement activities.

8.20.2 *Test Environment*—When determining sound pressure levels, both the toy and the test equipment shall be at least 1 m from any wall, ceiling, or other large obstruction, unless otherwise directed by this procedure. The background noise level of the room must be at least 15 dB lower than the sound being measured.

8.20.3 *Test Preparation*—Check the calibration of the sound level meter before making measurements. Toys shall be re-

moved from the packaging before testing. Toys that utilize batteries to produce sound shall be tested with fresh batteries installed. If the toy has a sound volume control, turn the volume to the maximum level. The distance from the microphone to the surface of the toy is 25 cm (9.8 in.). If a toy can be used in more than one of the following modes (for example, either handheld or tabletop), test the product in each mode.

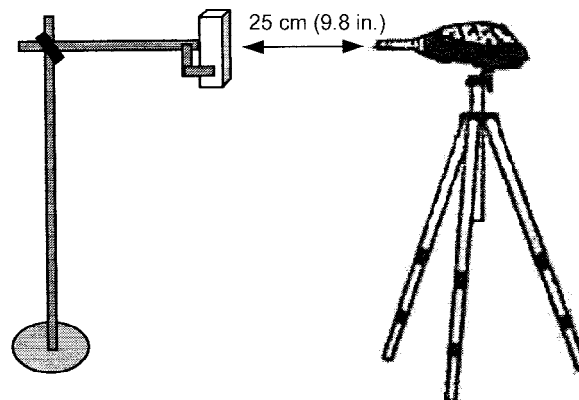
8.20.3.1 *Handheld and Close-to-the-Ear Toys*—Handheld and close-to-the-ear toys should be suspended in air by using a laboratory stand and clamp or by holding the toy in an outstretched arm. Care should be taken to minimize reflections from the toy support. (See Fig. 29.)

8.20.3.2 *Tabletop, Floor, and Crib Toys*—Tabletop, floor, and crib toys should be tested while resting on a standard table such as that described in ISO 7779. A table with a wooden top with a thickness of 0.04 m (1.6 in.) or larger and leg construction providing a stable test surface is considered sufficient.

8.20.3.3 *Toy Orientation*—For measurements of continuous sounds, orient the toy as it would be during play. If no obvious use orientation exists, orient the toy such that it yields the maximum sound output in the direction of the microphone. When applying close-to-the-ear continuous sound requirements, the earpiece of the toy shall be oriented toward the microphone. When measuring peak levels, orient the toy such that it yields the maximum sound output in the direction of the microphone regardless of orientation during play. (See Figs. 30 and 31.) In all instances, the sound-producing portion of the toy should be 25 cm (9.8 in.) from the microphone during sound measurement.

8.20.4 *Test Procedure*—If the toy has different functional modes that affect the sound produced, determine which mode produces the maximum sound pressure level. For example, if a toy plays several songs, the measurement results should pertain to the song that produces the maximum sound pressure level. For a battery-operated toy telephone, use the key that produces the maximum sound pressure level.

8.20.4.1 For continuous sounds, determine the appropriate duration of the test period. This is normally a factor of the “cycle” of a sound source. For example, if a preprogrammed musical toy is under test, the  $L_{Aeq}$  should be integrated over the full musical piece. As a general rule, a sound source with a



**FIG. 29 Typical Setup for Testing Handheld and Close-to-the-ear Toys**

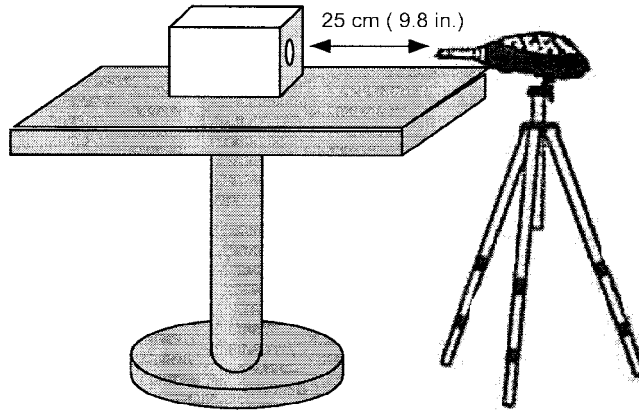


FIG. 30 Tabletop Setup for a Toy with the Sound Output on the Side

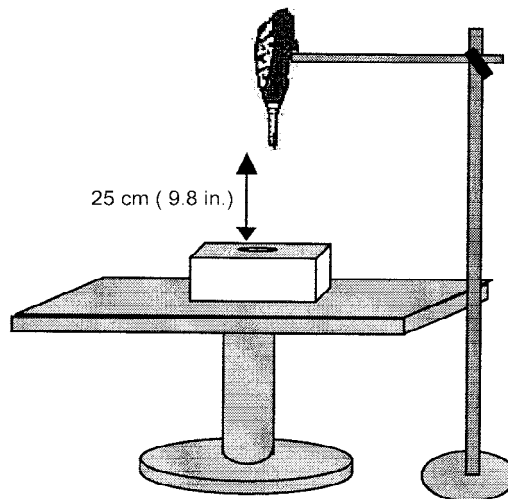


FIG. 31 Tabletop Setup for a Toy with the Sound Output on the Top

variable sound output with little or no “silent periods” should be sampled a minimum of 15 s.

8.20.4.2 *Continuous Sounds*—Set the sound level meter such that it will measure a RMS value using “A” weighting, and the “fast” response mode as defined in ANSI S1.4. Actuate the sound-producing mechanism of the toy and measure the equivalent sound pressure level ( $L_{Aeq}$ ) over the period determined in 8.20.4.1. Repeat until a total of three measurements have been obtained.

8.20.4.3 *Impulsive Sounds*—Reconfigure the sound level meter, if necessary, to record the sound pressure level using “C” weighting, and the “peak” parameter as defined in ANSI S1.4. Actuate the sound-producing mechanism of the toy and measure the peak sound pressure level ( $L_{Cpk}$ ). Repeat until a total of three measurements have been obtained.

8.20.4.4 *Rattles*—Configure the meter to measure impulsive sounds as previously described. Shake the rattle at two cycles per second. The downstroke should end abruptly on each cycle at 25 cm (9.8 in.) from the microphone. Using this technique, determine which rattle orientation yields the maximum sound pressure level. Using this orientation and technique, shake the rattle for approximately 10 s and measure the peak sound

pressure level ( $L_{Cpk}$ ). Repeat until a total of three measurements has been obtained.

8.20.4.5 The measurement result is the average of the three measurements. If the difference between the maximum and minimum sound pressure level reading is 5 dB or less, simple arithmetic averaging of the decibel values can be used. If the difference is greater than 5 dB, convert each decibel value into its corresponding pressure ratio using Eq 2. Then calculate the arithmetic average of the resulting ratios. Convert the average ratio back into decibels by using Eq 3. This is the measurement result.

$$\text{Pressure ratio} = (P_n/P_o) = 10^{L/20} \quad (2)$$

where:

- $L$  = sound pressure level, in dB,
- $P_n$  = corresponding pressure value, and
- $P_o$  = reference pressure.

The quantity  $P_n/P_o$  is the pressure ratio.

$$\text{Decibel sound pressure level} = 20 \log_{10}(P_n/P_o) \quad (3)$$

8.21 *Dynamic Strength Test for Wheeled Ride-on Toys*—Load the toy for 5 min in the most onerous position with the

appropriate mass in accordance with Table 3 on its standing or sitting surface. Secure the load to the toy in a position corresponding to the normal use of the toy. Drive the toy three times at a speed of 6.6 ft/s (2 m/s)  $\pm$  0.7 ft/s (0.2 m/s) into a nonresilient step with a height of 2 in. (50 mm). If the toy is intended to bear the mass of more than one child at a time, test each sitting or standing area simultaneously. Determine whether the toy continues to conform to the relevant requirements of this specification.

**8.22 Packaging Film Thickness**—Use a measuring device (dial-type thickness gage or equivalent) capable of measuring thickness to an accuracy of 4  $\mu$ m. Measurements shall be taken at 10 equidistant points across the diagonal of any 3.94 by 3.94-in. (100 by 100-mm) area. The average thickness of the ten measurements shall not be less than 0.00150 in. (0.03810 mm) and none of the measurements shall be below the 0.00125-in. (0.03175-mm) minimum thickness. For plastic bags, prepare by cutting the sides, without stretching, into two single sheets.

**8.23 Test for Loops and Cords**—Anchor or secure the toy. Place the head probe (Fig. 10) in the loop/opening formed by the cord/s, tapered end first, with the plane of its base parallel

to the plane of the opening. Rotate the probe to any orientation about its own axis while keeping its base parallel to the plane of the opening; apply 10 lbf (45 N) while attempting to push the probe through the opening.

## 9. Identification

9.1 So that purchasers may identify products conforming to all of the requirements of this specification on toy safety, producers, importers, and distributors may include a statement of compliance in conjunction with their name and address on product labels, invoices, and sales literature.

9.1.1 The following statements are suggested:

(1) Conforms to the requirements of ASTM Standard Consumer Safety Specification on Toy Safety, F 963 (name and address of producer, importer, or distributor).

(2) Conforms to the safety requirements of Specification F 963 (name and address of producer, importer, or distributor).

## 10. Keywords

battery-operated toys; children; safety labeling; safety testing; toy safety requirements

# ANNEXES

## (Mandatory Information)

### A1. AGE GRADING GUIDELINES +

#### A1.1 Purpose and Scope

A1.1.1 Good age-grading practices are important to ensure that a toy is appropriate and safe at particular stages of physical and mental development.

A1.1.2 Age labeling is intended to provide point-of-sale guidance to consumers for the selection of appropriate toys for children with respect to average abilities, interests of various age groups, and safety aspects of the toys themselves.

A1.1.3 This guideline is intended to provide thoughts and considerations necessary to establish meaningful age recommendations for toy products.

A1.1.4 “Guidelines for Relating Children’s Ages to Toy Characteristics (1985)” is available from the Consumer Product Safety Commission, Washington, DC 20207.

#### A1.2 Criteria for Establishing Age Grades

A1.2.1 The following criteria should be considered when establishing age grading for a toy. While all of these should be considered in total, each one may be weighted individually to arrive at the appropriate age grading.

A1.2.1.1 The physical ability of a child to manipulate and play with the specific features of a toy. This necessitates an understanding of the physical coordination, fine and gross motor capabilities, size, and strength generally available at a given age.

A1.2.1.2 The mental ability of a child to understand how to use the toy (that is, understand instructions, sequences of operations, objective of the toy). Consideration of the mental

skills at a given age is important in order to provide a concept that will challenge abilities and stimulate further development, yet not frustrate. Accomplishment should be neither too easy nor too difficult to be satisfying to the child.

A1.2.1.3 The toy must meet play needs and interests at different levels of development. Understanding developmental levels and identifying play materials and play environments to enhance each developmental stage is important for assigning appropriate age grades. Play interests and toy preferences change rapidly; there should be careful attention to a child’s preference or aversion to specific toy subjects at certain stages. In order for a toy to enhance play, it obviously must be appealing to its user. In short, it must be fun.

#### A1.3 Tools

A1.3.1 Use of the following tools can help guide the establishment of meaningful age grading for a toy. These tools are not arranged in a particular order of importance; all of them should be considered during the age grading process.

A1.3.1.1 Prior experience with the toy or a similar toy in the marketplace indicating suitability for a specific age group.

A1.3.1.2 Reference materials on comparative body measurements and human factors elements.

A1.3.1.3 Reference resources on child development norms to establish developmental mileposts.

A1.3.1.4 Identification of developmental features to be enhanced/stimulated within certain age spans.

A1.3.1.5 Expertise of outside consultants, child development specialists, physicians, and psychologists.

A1.3.1.6 Testing of models or prototypes with children.

A1.3.1.7 Observing skill levels in children at play.

A1.3.1.8 Seeking opinions of parents.

A1.3.1.9 Interacting with children and asking questions.

#### **A1.4 Safety Considerations of Age Grading**

A1.4.1 The toy must be safe for the intended user. Once the skill level has been determined, the design must be tailored to satisfy the requirements of this specification associated with that age level.

A1.4.2 Age grades are indicators of average development, which does not necessarily reflect suitability for the exceptional child. A parent remains the best judge of whether the child is at the appropriate development stage for safe play with a particular toy.

A1.4.3 A primary consideration should be potential choking and aspiration hazards associated with small parts. Children under the age of three are more prone to placing objects in their mouths. However, the propensity to put nonfood objects in the mouth does not disappear at the chronological age of three years. The following toys are appropriate for children under three years of age and are cited specifically as subject to the safety requirements of 16 CFR 1501 for small parts regulations:

A1.4.3.1 Squeeze toys, teething, crib exercisers, crib gyms, crib mobiles, toys intended to be affixed to a crib, stroller, playpen, or baby carriage, pull and push toys, pounding toys, blocks and stacking sets, bathtub, wading pool and sand toys, rocking, spring, and stick horses and other figures, chime and musical balls and carousels, jack-in-the-boxes, stuffed, plush, and flocked animals and other figures, and those preschool toys, games and puzzles, riding toys, dolls and animal figures, cars, trucks, and other vehicles that are intended for use by children under the age of three years.

A1.4.4 Some of the characteristics of toys that describe those preschool toys that are appropriate for children under the age of three years are listed below by class of toy:

A1.4.4.1 *Dolls*—Soft-bodied baby dolls or character dolls that are for holding or cuddling, stuffed or “bean bag” dolls, rag or cloth dolls with simple features (including accessories), and lightweight plastic dolls with simple features and limited articulation at the limb joints.

A1.4.4.2 *Infant Toys*—Toys intended to be used in a crib or playpen, to be held easily by small hands, shaken, grasped, rattled, or cuddled.

A1.4.4.3 *Toy Vehicles*—Cars, trucks, boats, and trains of simple chunky shape, decorated in primary colors without extensive descriptive detail or representation of a particular make or model of vehicle and that require simple actions such as rolling, dumping, pushing, and releasing.

A1.4.4.4 *Action Toys*—Simple action toys for the identification of sounds or pictures and surprise action toys.

A1.4.4.5 *Early Learning Toys*—Toys, books, and puzzles for learning basics such as letters or numbers or shapes, and

simple physical motions such as turning wheels or knobs, pulling and letting go, or sorting by size, etc.

A1.4.4.6 *Blocks and Stacking Toys*—Toys that do not require finger dexterity or fitting together of small intricate pieces.

A1.4.4.7 *Soft Balls and Similar Items*—Soft, lightweight balls or other shapes for squeezing, shaking, rolling, or tossing.

A1.4.5 Toys that should not be considered appropriate for very young children, and therefore not be age labeled as such, have the following characteristics:

A1.4.5.1 Toys that require intricate finger movements or controlled adjustments, fitting intricate pieces together.

A1.4.5.2 Toys, for example, games that require or incorporate elements of reading ability beyond the ABCs or 123s.

A1.4.5.3 Toys that simulate adult figures or characters and their associated accessories.

A1.4.5.4 Collecting sets (for example, figures and vehicles).

A1.4.5.5 Projectile-type toys, launched vehicles, planes, etc.

A1.4.5.6 Makeup sets.

A1.4.6 Another major development cutoff has been cited at approximately eight years of age, at which time reading ability has progressed so that a child can, on his own, read, understand, and heed instructions, caution statements, etc. Because the instructions and caution statements are necessary for the safe use of the product in some cases, those products should be labeled for use by children over the age of eight. Products that fall into this category include the following:

A1.4.6.1 Science and environmental kits or sets containing breakable glass components and complex instructions.

A1.4.6.2 Complex model and craft sets requiring precision assembly and finger dexterity or incorporating sharp tools or components.

A1.4.6.3 Electrically operated toys incorporating heating elements.

A1.4.6.4 Certain chemistry sets, fueled model vehicles, and rockets, etc. that contain chemicals that may be hazardous, cannot generally be handled safely by children unable to read and understand instructions and cautionary statements. The minimum age for which any such product should be recommended is eight years and then *only* with adult supervision.

#### **A1.5 Descriptive Age Labeling**

A1.5.1 Manufacturers can assist parents and other purchasers in the appropriate selection of toys by incorporating descriptive labeling to identify potential safety concerns if the toy is accessible to children outside the recommended age group.

A1.5.2 For example, if a toy contains small play pieces and is labeled for older children, such as an action figure set, the manufacturer should consider including a statement on the retail packaging that the toy contains small pieces.

A1.5.3 Factors to consider would include the appeal of the toy to young children, market experience, the design or construction of the toy, and whether the packaging provides visual indication of any small play pieces. In addition, a manufacturer should consider the probability that a purchaser may overestimate a child’s physical or mental abilities and the child’s understanding of a potential hazard related to the toy.



## A2. PACKAGING AND SHIPPING

### A2.1 Packaging

A2.1.1 Packages that are intended to be opened by adult purchasers should be constructed as to avoid hazards during the opening process from metal fasteners, particularly staples, and should not contain common pins used to position the toy within the package.

### A2.2 Shipping

A2.2.1 Packaged and unpackaged toys can be subjected to a wide variety of tests designed to test the ability of toys to

withstand the destructive forces encountered in the distribution cycle. The tests used most widely include drop, vibration, compression, and incline impact. Limited testing may be sufficient for many toys, especially those that are of light weight and constructed of resilient materials, such as dolls and stuffed toys. Others, however, such as large plastic or heavy metal toys, may be damaged during shipment and should be subjected to appropriate tests. Guidance for useful tests can be obtained from the following ASTM sources: Test Methods D 642, D 5276, D 880, and D 999.

## A3. DESIGN GUIDELINES FOR TOYS ATTACHED TO CRIBS OR PLAYPENS

### A3.1 Purpose and Scope

A3.1.1 This annex provides guidance for design practices intended to encourage the careful examination of product characteristics and configurations with respect to safety. As there are no objective means for determining conformance with these design guidelines, they are not to be used to judge compliance with this specification.

### A3.2 Guidelines

A3.2.1 Designs for all products intended to be attached to cribs or playpens should be accomplished in a manner that minimizes the potential for strings, ribbons, elastic, or parts of clothing to become caught on the product, such that an infant

is placed in a dangerous predicament in which possible strangulation could occur.

A3.2.2 Examples of the implementation of good design practices for crib and playpen environments include the following:

- (1) Rounded corners with the use of generous radii wherever possible.
- (2) Smooth contours that minimize abrupt changes in shape that could easily become a catch point for strings, ribbons, elastic, or loose clothing.
- (3) Isolation of fastening hardware using recesses, counter-bores, or other similar methods.
- (4) Reduction of the potential for any mismatch of surfaces where a catch point could develop.

## A4. FLAMMABILITY TESTING PROCEDURE FOR TOYS

### A4.1 Purpose

A4.1.1 This annex establishes the protocol and general criteria for flammability testing in conformance with the requirements of 16 CFR 1500.44.

### A4.2 Definitions

A4.2.1 *major axis*—a straight line through the longest dimension of the product connecting the most distant parts or ends of the product. A product can have more than one major axis (see Fig. A4.1), but they must be equal in length.

A4.2.2 *soft toy*—any stuffed or plush toy, including soft animals or dolls, that may be parts or components of other toys.

A4.2.3 *solids*—toys or toy parts constructed of rigid, flexible, or pliable solids.

### A4.3 Exemptions

A4.3.1 Strings, paper, packaging materials, and ping-pong balls.

A4.3.2 Accessible components having a major dimension of 1 in. (25 mm) or less.

A4.3.3 Unstuffed textile fabrics and removable unstuffed toy clothing shall be tested separately and shall meet the requirements of 16 CFR 1610. When sold as part of a toy such

that the clothing is not intended to be removed, the clothing shall become subject to the test to the extent that it becomes a part of the major axis.

### A4.4 Sample Preparation

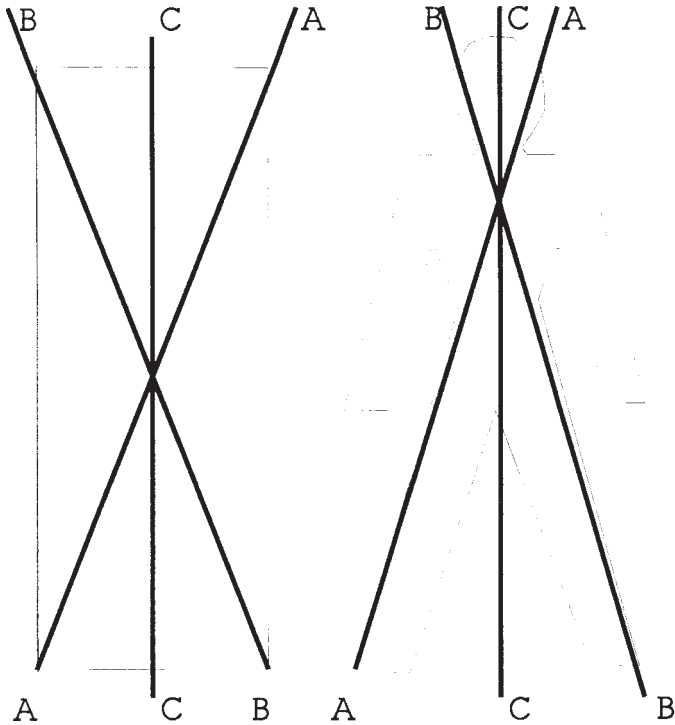
A4.4.1 When testing rigid or pliable solids and soft toys, a minimum of four test specimens is most desirable. However, in cases in which it is impractical to acquire the minimum of four test specimens, a preliminary determination may be made based on as few as one sample.

A4.4.2 Samples shall consist of assembled product as intended to be received by the customer. If adult assembly is required, testing shall be performed after all such assembly has taken place. All clothing and accessory items intended to be attached permanently shall be affixed to the sample as intended by the manufacturer.

A4.4.3 If the product has removable clothing, the clothing shall be removed and tested separately (see A4.3.3).

### A4.5 Procedure

A4.5.1 Place the prepared sample in a draft-free area that can be ventilated and cleared after each test. The temperature



NOTE 1—Lines A-A and B-B are both major axes. Line C-C is not a major axis.

FIG. A4.1 Illustration for Determining Major Axis

of the sample at the time of testing shall be between 68 and 86°F (20 and 30°C) at a relative humidity of 20 to 70 %.

A4.5.2 The test fixture shall be corrected to a clean condition prior to the start of each test.

A4.5.3 Measure the dimensions of the sample, and support it by means of the test fixture (see Fig. A4.2) or equivalent, so that the major axis is oriented horizontally. Placing a scale along the major axis is a sufficient means for gaging the burn distance.

A4.5.3.1 *Orientation and Locations for Ignition of Specimens*—When orienting specimens, provide support over the entire length of the major axis without sagging, making sure the supporting device does not retard the spread of flame materially. Optional: for samples with long hair, it may be necessary to add fine wire (24 AWG or higher) between some nails to provide sufficient support for laying the hair out flat. The addition of support for hair is not necessary unless the hair exceeds shoulder length.

NOTE A4.1—The CPSC does not test hair separately but rather tests hair as a normal part of the toy. The toy might be tested in a face-down position, with the hair in a horizontal position on top of the toy. The toy could also be tested lying on its back, with the hair lying beneath the toy. Hair that hangs vertically would not be used to calculate the burn rate.

A4.5.3.1.1 A sample that is so large that it becomes impractical to support its entire length must be arranged in such a manner that support at the end of a major axis is provided by the test fixture.

A4.5.3.1.2 One or more specimens shall be ignited at one end of the major axis, and, when practical, one or more specimens shall be ignited at the opposite end of the major

axis. Specimens shall be positioned in the worst case position, as dictated by experience.

A4.5.4 Hold a burning paraffin candle whose diameter is at least 1 in. (25 mm) so that the flame is a minimum of 5/8 in. (16 mm) high, with the tip of the inner cone of the flame in contact with the surface of the sample at the end of the major axis for 5 s. Maintain contact of the candle with the sample for 5 s or until ignition occurs. If the sample melts away from the flame, move the candle and maintain contact for the full 5 s or until the sample ignites. If the ignition occurs immediately, hold the candle steady and allow the ignited flame to move away.

A4.5.4.1 Trim the candle and wick as necessary to maintain a flame height of 5/8 to 1 in. (16 to 25 mm).

A4.5.5 Remove the candle. Determine the time of combustion by means of a stop watch. Do not allow the test time to exceed 60 s with a self-sustaining flame.

A4.5.6 Extinguish the flame with a CO<sub>2</sub> or similar nondestructive extinguisher, if necessary, after 60 s. The experienced application of water is an acceptable method for extinguishing the flame.

NOTE A4.2—Extinguishing the flame must be accomplished in a manner that preserves the accuracy of the burned distance.

A4.5.7 Measure the length of the burned area, and calculate the rate of burning along the major axis of the sample.

A4.5.8 Products that do not ignite are considered acceptable. No burn rate is calculated for these samples. The burn rate for products that self-extinguish in less than 60 s shall be computed by using the actual burning time as the denominator when calculating the burn rate. For example, ignited product burns 3 in. (76 mm) in 20 s and self-extinguishes. The burn rate is calculated as follows:

$$\frac{3 \text{ in.}}{20 \text{ s}} = 0.15 \text{ in./s} \quad (\text{A4.1})$$

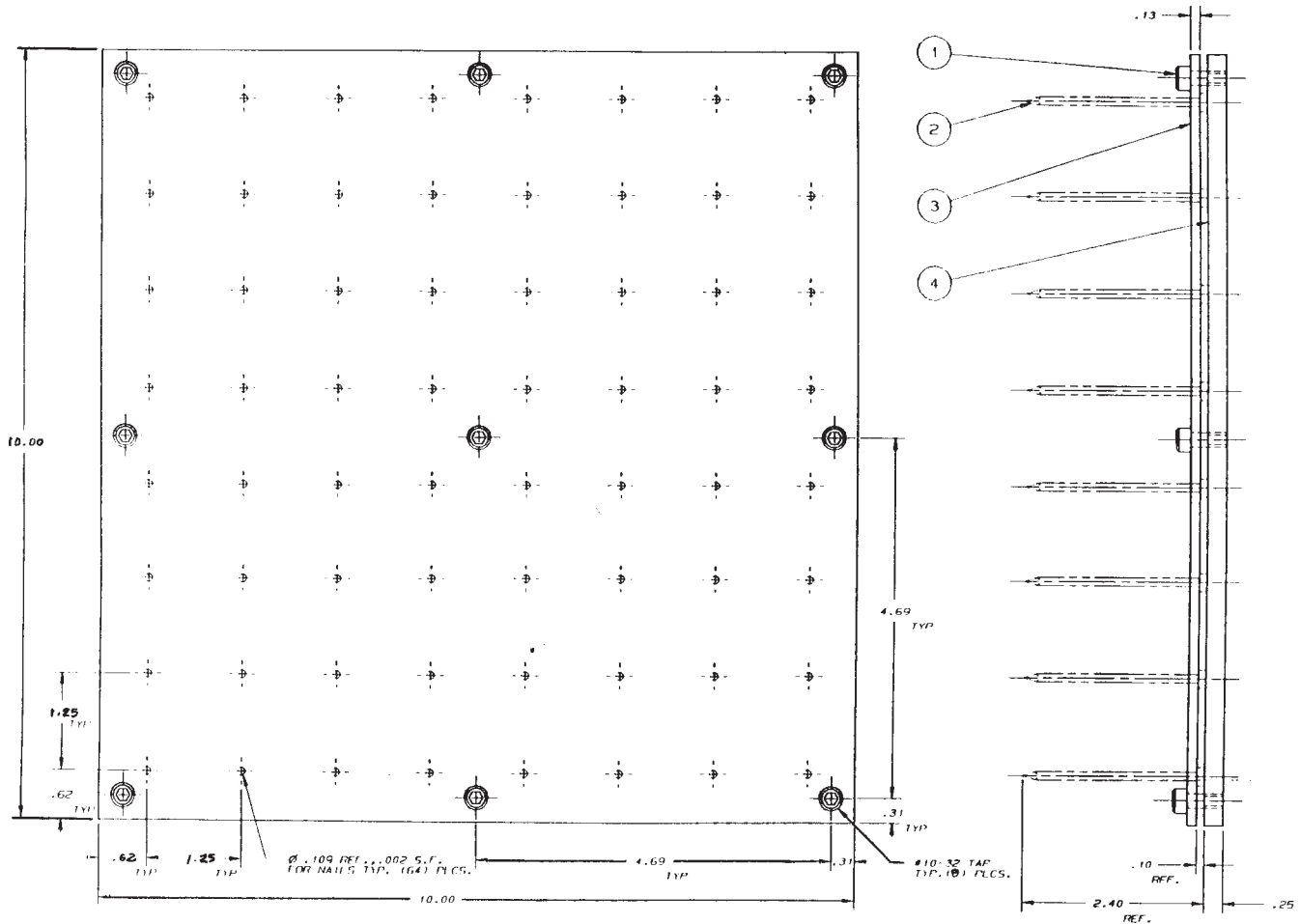
A4.5.8.1 Burn-rate calculations for a product that self-extinguishes must be approached cautiously to avoid the introduction of measurement error since small measurement errors can become a significant portion of final calculations when the burn distance is short.

NOTE A4.3—It is unlikely that the CPSC would pursue an enforcement action that includes a burn rate calculation higher than 0.10 in. per s and yet consistently self-extinguishes during the test. However, the CPSC reserves the right to proceed with an action if such a burn rate may result in the product's causing substantial personal injury or substantial illness.

A4.5.8.1.1 When the product does not self-extinguish, the flame shall be allowed to continue for 60 s. Calculate the rate of burning using the actual distance of flame spread during the full 60 s. For example, the product ignites and burns 9 in. (229 mm) in 60 s. The burn rate is calculated as follows:

$$\frac{9 \text{ in.}}{60 \text{ s}} = 0.15 \text{ in./s (a flammable solid)} \quad (\text{A4.2})$$

NOTE A4.4—While testing, samples shall not be extinguished prematurely if such action will affect the burn rate. For example, if a stuffed rabbit is ignited at the tip of one ear and the flame is extinguished when the flame reaches the base of the ear, this may produce an inflated burn rate if the ear material burns at a faster rate than the rest of the product.



Item	Required	Description	Material
1	9	# 10-32 × 0.38 LG.	S.H.C.S.
2	64	# 8d × 2.50 LG.	Common Nail
3	1	0.12 × 10.12 × 10.12 LG.	Stainless Steel
4	1	0.25 × 10.00 × 10.06 LG.	Stainless Steel

NOTE 1—Tolerances (unless otherwise specified):

- 3 Place DIMS ± 0.005
- 2 Place DIMS ± 0.015
- Angles ± 1°

NOTE 2—Break all sharp edges, stamp tool name and number on all components, and screw to suit unless otherwise specified.

**FIG. A4.2 Suggested Flammability Test Fixture**

### A4.6 Requirements

A4.6.1 A toy shall be considered a flammable solid if it ignites and burns with a self-sustaining flame at a rate greater than 0.10 in./s (2.5 mm/s) along its major axis.

#### A4.6.2 Criteria for Acceptance:

A4.6.2.1 Sample size = four, whenever practical.

A4.6.2.2 A burn rate is not calculated for samples that do not ignite.

A4.6.2.3 Calculate the burn rate to two significant figures (to the nearest hundredth using conventional rounding rules, that is, for 5 or higher, round up).

A4.6.2.4 Round the burn rate to the nearest tenth (that is, round 0.15 up to 0.2).

A4.6.2.5 Level of acceptance = 0.1 in./s (2.5 mm/s), maximum, along the major axis.

A4.6.2.6 *Additional Guidance for Manufacturers*—Manufacturers' decisions on the performance of an item should be based on a minimum of four samples. This provides a reasonable opportunity for detecting undesirable variations in the product. Proceed as follows:

(1) If the burn rate of all samples is less than 0.1 in./s (2.5 mm/s), accept.

(2) If the burn rate of all samples is greater than 0.1 in./s (2.5 mm/s) but less than 0.15 in./s (3.75 mm/s), accept and consider further investigation for action to improve performance.

(3) If the burn rate of one of the samples is 0.15 in./s (3.75 mm/s) or greater, reject and repeat the test with four additional samples (one time only).

(4) If the burn rate of more than one sample is 0.15 in./s (3.75 mm/s) or greater, reject.

NOTE A4.5—CPSC makes its decision on whether a product is a flammable solid based on the burn rate of each individual sample. It then

determines whether the product may cause substantial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use. CPSC has no objection to other laboratories rounding off to the nearest 0.1 in./s. It will calculate burn rates to two decimal places but does not envision enforcement action where the burn rate is greater than 0.10 in./s and less than 0.15 in./s. However, CPSC reserves the right to proceed if such burn rate may result in the product's causing substantial personal injury or substantial illness.

## A5. RATIONALE FOR 2003 REVISIONS<sup>13</sup>

### A5.1 Battery Operated Toys

A5.1.1 *Section 4.25*—This section has been revised to clarify the applicability of the requirements to both rechargeable and non-rechargeable batteries. In addition, the revised language clarifies the applicability of use and abuse testing for battery-operated toys intended for different age groups. This is consistent with other provisions of Specification F 963 and with the application of Simulated Use and Abuse test procedures to CPSC mandatory standards and technical requirements addressing potential risks of injury associated with mechanical hazards. It is intended that the term "normal maintenance" includes any directions or procedures contained in the instruction manual.

A5.1.2 In addition, it has been recognized that while it is certainly possible to install batteries of a given size and voltage with differing manufacturers' brands and electrochemistries, the combinations are numerous and make testing every possible combination impractical. Therefore, fresh alkaline batteries have been required for test purposes, given their high rate capability and predominance in the marketplace, and when another battery chemistry is specifically required for use in the toy by the manufacturer, testing shall be repeated using that type of battery.

A5.1.3 *Section 4.25.1*—The revised text excludes from this requirement toys which use only non-replaceable batteries or "keyed" battery packs. Since these batteries are either not replaced by the consumer or cannot be inserted incorrectly, the requirement is not necessary for safety. In addition, the text clarifies that the battery compartment door is considered part of the battery compartment. See 3.1.41 for the definition of "non-replaceable battery".

A5.1.4 *Section 4.25.2*—The term "direct current" replaces "dc" for clarification.

A5.1.5 *Section 4.25.3*—This revised text replaces the term "primary" with "non-rechargeable". This revision clarifies the situations in which inadvertent charging of non-rechargeable batteries might occur. The effects of battery reversal in button cell circuits do not present a significant hazard to consumers. The volume of electrolyte leakage due to charging is negligible. Since the reversal condition is not significantly hazardous and since common practice in circuits requiring more than

two button type cells is to stack those cells, protection against reversal of button cell batteries should not be required by the standard.

A5.1.6 *Section 4.25.6*—The text has been revised by replacing "primary" with "non-rechargeable" as in 4.25.3 above. In addition, "alternating current" replaces "ac" for clarification.

A5.1.7 *Section 4.25.7*—The existing section addresses temperature limits for battery surfaces only. The text of these requirements has been reorganized for clarity and references a proposed new 8.18 (Stalled Motor Test for Battery Operated Toys).

A5.1.8 *Section 4.25.8*—Normal use and foreseeable abuse testing can result in other defects creating hazards in addition to the short circuit condition. The scope of this section should not be limited to the short circuit condition. For example, it is possible for abuse testing to create stalled motor conditions, or changes in convection due to abuse of the toy's enclosure which could cause elevated temperatures.

A5.1.9 *Section 4.25.9*—The text in Specification F 963-96a at 4.27.9 is to be deleted. The requirement is superfluous and already addressed in 4.27.7.3. Revised text excludes toys using only non-replaceable batteries from the requirements of 6.6 for instructions on safe battery usage. Section 6.6 is not relevant for non-replaceable batteries.

A5.1.10 *Section 4.26.10*—This section will be deleted. The existing provisions are ambiguous and provide little guidance on the conditions for conformance testing which has resulted in conflicting results by testing laboratories. A specification dealing with gas absorption or emission is not feasible due to the multiplicity of product specific issues which arise with these devices.

A5.1.11 *Section 5.15*—This section requires toys using non-replaceable batteries to inform the consumer that the batteries are not to be replaced.

A5.1.12 *Section 8.18*—The proposed stalled motor test method identifies alkaline batteries as the "worst case" power supply for the test and requires their use if possible. The ambient temperature for testing is the same requirement as is in the European standard for Safety of Electric Toys EN 50088, clause 5.11. This test method sets conditions for determining conformance with the requirement at 4.25.7 and allows a 60-min safety margin for temperature rise in the surface being tested or adjacent accessible parts. It gives consideration to toys which can operate unattended. The termination of the test after 30 s for toys which must be kept on by hand or foot is in accordance with the European standard for Safety of Electric Toys, EN 50088, clause 9.6. Failure criteria are consistent with

<sup>13</sup> Rationale for the revisions published in the 1996a<sup>e2</sup> edition of Specification F 963 may be obtained from ASTM Headquarters. Request RR: F15-1000.



4.25. Instructions to monitor temperatures with the toy fully assembled are given to insure that the test accurately simulates the intended use heating conditions of the toy. Stalled motor conditions are limited to applications where moving parts driven by motors can be stalled by the user.

## A5.2 Battery-Powered Ride-On Toys

A5.2.1 *Section 4.25.10*—The lower limit of 8 amps was chosen because it is a benchmark used in other standards. The amount of heat that can be generated from a battery is a function of the current squared times the specific resistance of the circuit. Batteries that do not meet this criteria are considered as "low power" (that is, "D" batteries and smaller) and are covered in 4.26.1 through 4.26.9. Batteries that meet the above criteria are considered "high power" and are subject to additional requirements for battery-powered ride-on toys.

A5.2.2 *Section 4.25.10.1*—The main harness connectors are mechanically cycled to ensure that the design is robust enough to last for the life of the battery and replacement batteries without damage that could lead to overheating. The heating test is conducted under maximum load conditions on surfaces specified by the manufacturer to account for the intended use environment for which the toy was designed.

A5.2.3 *Section 4.25.10.2*—It is foreseeable that a child may intentionally hold down a foot pedal or an object may fall onto the pedal, in storage or transport, holding the pedal down in this position. A battery-powered ride-on toy with the foot pedal held down should not cause a risk of fire. The ignition of cheesecloth is a criterion used by many standards to make an objective assessment of the risk of fire.

A5.2.4 *Section 4.25.10.3*—Stalling of the toy is common from overloading and harsh terrain or objects (curbs, trees, and steep inclines). It is foreseeable that a fuse that is used as the primary protection and frequently opens may be bypassed or changed to a higher value by the consumer.

A5.2.5 *Section 4.25.10.4*—Preconditioning and elevated ambient testing accounts for the outdoor environmental conditions in which the toys are used. Testing establishes that the switches are suitable for the application and that they shall not fail to cause a "run-on" condition. Testing is based on UL1054 and UL508.

A5.2.6 *Section 4.25.10.6*—These requirements cover risks associated with overcharging and damage to charger cables.

A5.2.7 *Section 4.25.10.7*—All wiring connected to the main/motor battery should be protected from faults.

A5.2.8 *Section 4.25.10.8*—The 20 lbf strain relief is consistent with strain relief requirements for low voltage circuits in UL standards.

A5.2.9 *Section 8.19.1*—Test conditions were specified to ensure repeatability.

A5.2.10 *Maximum Temperature Test—Section 8.19.2*—The main harness connectors are mechanically cycled to ensure that the design is robust enough to last for the life of the battery and replacement batteries without damage that could lead to overheating. The heating test is conducted under maximum load conditions on surfaces specified by the manufacturer to account for the intended use environment for which the toy was designed.

## A5.3 Toys With Spherical Ends

A5.3.1 *Certain Toys with Spherical Ends—Section 4.33*—Several deaths and incidents were reported through the U.S. Consumer Product Safety Commission involving young children (under 18 months) playing with various toys featuring spherical ends attached to a handle or shaft. The deaths or incidents resulted from the spherical end of a toy becoming lodged in the child's throat causing an asphyxiation death or hazard. The incidents were similar to those previously addressed by use of the supplemental gage in sections 4.23.2 and 4.24.2. The European standard EN 71 was also used as reference as it addresses similar situations. The exclusion for toys weighing over 1.1 lbs was incorporated to differentiate subject toys from other toys as also referenced from the European EN 71 standard. Existing Section 4.36 was incorporated as 4.33.2 for consistency in subject matter.

## A5.4 Hemispheric-Shaped Objects

A5.4.1 *Section 4.37*—The purpose of this requirement is to address suffocation risks presented by certain shapes (cup- or bowl-shape; half-ball or egg-shape) that can be placed over a young child's nose and mouth forming an airtight seal. The available data indicate that the children involved in fatalities were between the ages of 4 and 24 months, while near misses involved children up to 36 months of age. The CPSC staff has analyzed the incident data and has concluded the following regarding the dimensions of the containers involved in these incidents:

	English Measurements	Metric Measurements
Diameter Range	2.5 to 3.8 in.	64 to 97 mm
Depth Range	1.6 to 2.0 in.	42 to 51 mm
Volume Range	3.4 to 6.0 oz	100 to 177 ml

The work group observed children and cups in the diameter range of 2.0 to 4.5 in. (51 to 114 mm). Based on these observations and the dimensions of the cups involved in the incidents, it was concluded that the size range of interest is 2.5 to 4.0 in. (64 to 102 mm).

A5.4.2 Four design features are listed as ways to minimize the likelihood of a vacuum forming.

A5.4.3 *Section 4.37.6 (a) and (c)*—The two hole positions described in *a* and the three hole positions described in *c* are intended to minimize the likelihood that both/all holes could be blocked simultaneously. The size of the opening is specified to prevent a vacuum from forming. The openings are not intended as breathing holes.

## A5.5 Acoustics

A5.5.1 *Section 4.5*—These requirements have been developed after extensive review of known research on noise-related injury to hearing and existing published recommendations for noise limits. The Occupational Safety and Health Administration (OSHA) has set acceptable limits at 85 dB(A) for 8 h of exposure. Dr. David Lipscomb, an independent audiologist consulted by the work group, has recommended a similar exposure level. His recommendations are for an 8 h exposure level,  $L_{eq}$ , 8h, of 85 dB(A) for continuous sound, and 82 dB(A)

for the continuous sound emitted from toys that produce both continuous and impulsive sound, all measured at a distance of 25 cm (9.8 in.).

A5.5.2 Exposure to noise from toys is intermittent and integrated with other daily noises. It is unlikely that a toy would present 8 h continuous exposure to sound. These assumptions are consistent with the findings of European research into continuous sound testing of toys, conducted by ISVR Consultancy Services in Southampton U. K. and published as "Noise from Toys and its Effect on Hearing." Based on that study, the probable duration of play with a sound-producing toy was determined by the ISVR to be 1.5 h per day.

A5.5.3 Using Dr. Lipscomb's recommended exposure levels, the ISVR study's conclusion on the duration of play, and a 3 dB exchange rate, the equivalent recommended values are 92.3 dB(A) and 89.3 dB(A) respectively. Rounding each value to the nearest 5 dB(A) yields 90 dB(A) for both.

A5.5.4 A reasonable use distance for close-to-the-ear toys is 2.5 cm. However, testing the toy at 25 cm instead of 2.5 cm reduces the sensitivity to errors in measurement distance and other artifacts inherent in very near field sound measures. Applying the 90 dB(A) requirement discussed above and converting to the 25 cm free-field equivalent yields a value of 70 dB(A).

A5.5.5 A technically accurate impulsive sound requirement would involve a combination of decibel levels and number of repetitions per day of the sound and also determine the potential for misuse (actuating close to the ear). This alternative would result in some subjective determinations regarding repetitions/day and the likelihood for actuating close to the ear. Therefore, a conservative approach was adopted that limits impulsive sounds to 120 dB (C-weighted peak). This requirement protects against misuse and allows up to 10 000 repetitions per day at 25 cm. This requirement only applies to impulsive sounds created by two masses colliding (impact-type).

A5.5.6 The explosive-type impulsive sound requirement will remain at a limit of 138 dB(C). The rationale for distinguishing between impact-type and impulsive-type is as follows: the frequency response of the human ear cannot "follow" the rapid rise in pressure produced by the explosion. This rapid rise time combined with the brief duration of the sound causes the human ear to effectively "clip" the peak of the sound wave. Conversely, impulsive sounds created by impacts have a much slower rise time that the human ear may be able to follow. These types of sounds also may resonate increasing the exposure time. Therefore, a more conservative requirement is warranted.

A5.5.7 *Section 8.20—Test Protocol*—The test protocol has been subjected to extensive verification. A wide range of noise-producing toys were tested and retested in multiple laboratories in order to standardize the procedure and assure that results could be obtained which minimize the effects of differences in equipment and operator technique.

A5.5.7.1 Differing methods were appropriate to test different types of products. Therefore, each toy in the interlaboratory test was categorized into one of the following categories: (1) rattles, (2) squeeze toys, (3) close-to-the-ear toys, (4) table top,

floor, and crib toys, and (5) handheld toys. No effort was made to test caps and cap toys according to this protocol as the Federal Rules at 16 CFR 1500.47 will continue to be controlling.

A5.5.7.2 The 25 cm was selected as the distance from the toy sound output port to the meter's microphone to provide for consistency of testing. Arithmetic calculations can be made for translating sound pressure levels at different distances.

A5.5.7.3 Dr. Lipscomb recommended that rattles need only be tested to peak-impulse requirements. Peak-impulses are less dependent on shaking technique than are continuous "A" weighted levels and thereby increase the reproducibility of the measurement.

A5.5.7.4 Methods and validation for other types of toys (such as squeeze toys and earphone type toys) are not complete at the time of this writing.

## **A5.6 Harmonization with ISO 8124–1: 2000**

A5.6.1 *Section 3.1.2—Accessible*—used ISO definition and added references to CFR sections, merged 3.1.1.1 into 3.1.2.

A5.6.2 *Section 3.1.7—Battery-Operated Toy*—added definition from ISO 8124–1: 2000.

A5.6.3 *Section 3.1.12—Collapse*—added definition from ISO 8124–1: 2000.

A5.6.4 *Section 3.1.13—Compression Spring*—added definition from ISO 8124–1: 2000.

A5.6.5 *Section 3.1.17—Crushing*—added definition from ISO 8124–1: 2000.

A5.6.6 *Section 3.1.20—Driving Mechanism*—added definition from ISO 8124–1:2000.

A5.6.7 *Section 3.1.24—Extension Spring*—added definition from ISO 8124–1: 2000.

A5.6.8 *Section 3.1.25—Fastener*—added definition from ISO 8124–1: 2000.

A5.6.9 *Section 3.1.29—Fuzz*—added definition from ISO 8124–1: 2000. However, note that *fuzz* is undefined in 16 CFR 1501.

A5.6.10 *Section 3.1.32—Helical Spring*—added definition from ISO 8124–1: 2000.

A5.6.11 *Section 3.1.39—Large and Bulky Toy*—added definition from ISO 8124–1: 2000.

A5.6.12 *Section 3.1.44—Packaging*—added definition from ISO 8124–1: 2000.

A5.6.13 *Section 3.1.57—Simulated Protective Equipment*—added definition from ISO 8124–1: 2000.

A5.6.14 *Section 3.1.59—Soft-Filled Toy/Stuffed Toy*—added definition from ISO 8124–1: 2000.

A5.6.15 *Section 3.1.61—Spiral Spring*—added definition from ISO 8124–1: 2000.

A5.6.16 *Section 3.1.60—Splinter*—added definition from ISO 8124–1: 2000.

A5.6.17 *Section 3.1.64—Teether*—removed definition from 4.24 and placed in Section 3, harmonized with ISO 8124–1: 2000.

A5.6.18 *Section 3.1.65—Tool*—added definition from ISO 8124–1: 2000.

A5.6.19 *Section 4.1—Material Quality*—added definition from ISO 8124–1: 2000 for visual inspection.

A5.6.20 *Section 4.6.1.2*—added compact discs (CDs) to the list of exempt articles.

A5.6.21 *Section 4.9—Projection*—added last three paragraphs of ISO 8124-1: 2000, Section 4.6, here.

A5.6.22 *Section 4.11—Wires or Rods*—added paragraph 4.9 (b) of ISO 8124-1: 2000 here.

A5.6.23 *Section 4.15.1—Cords on Toy Bags*—added ISO 8124-1: 2000, Section 4.11.4, here.

A5.6.24 *Section 4.17.1—Ventilation*—minor editorial change, reiterate wording “head-enclosing toys such as space helmets”.

A5.6.25 *Section 4.23—Teethers and Teething Toys*—removed teether definition from requirements and placed in Terminology, Section 3.

A5.6.26 *Section 8.7.2.1—Tipover Test for Large, Bulky Toys*—definition of large and bulky toys was moved to Section 3.

A5.6.27 *Section 8.21—Dynamic Strength Test for Wheeled Ride-On Toys*—added text from ISO 8124-1: 2000, Section 5.24.4, here.

### **A5.7 Miscellaneous Technical Issues**

A5.7.1 *Sections 1.3 and 3.1.33*—The revisions align the specification with the wording of ISO 8124-1: 2000 and provide consistency in terminology throughout the document.

A5.7.2 *Section 3.1.4—Aquatic Toy*—The revision defines this term to harmonize with ISO 8124-1: 2000.

A5.7.3 *Section 3.1.49—Principal Display Panel*—Definition has been edited slightly for clarity.

A5.7.4 *Sections 3.1.21, 4.3.4, 4.3.4.1, 4.3.4.2, 4.3.6—Cosmetics, Liquids, Pastes, Putties, Gels, and Powders*—The revision eliminates the need to make a subjective judgment regarding what constitutes a cosmetic intended for play. The revision applies the established age threshold of children over 8 years to define what falls outside the scope of the requirement. While cosmetics intended for children over 8 will still be required to meet FDCA regulations as stipulated in 4.3.4, they will not be required to meet FHSA regulations.

A5.7.5 *Section 4.3.6.4*—Revised numbering.

A5.7.6 *Section 8.4.1—Cleanliness of Materials*—The revision clarifies the reference to USP and allows for the use of equally effective methods to account for new developments of microbiological techniques. The revision references limits in accordance with the CTFA Guidelines.

A5.7.7 *Section 8.4.2—Preservative Effectiveness*—The revision specifies the use of limits defined in USP 24 <51>, which are already commonly used. The scope of this test has been limited to cosmetics because cosmetics typically require preservatives.

A5.7.8 *Section 4.13—Packaging Film*—The revision specifies use of the test method for determining film thickness in 8.22.

A5.7.9 *Section 4.13.1*—The revision aligns with ISO 8124-1: 2000.

A5.7.10 *Section 4.13.2—Bags or Plastic Film:*

A5.7.10.1 The revision aligns with the 3.94 in. x 3.94 in. (100 mm x 100 mm) dimension exemption from ISO 8124-1: 2000, which is supported by anthropometric information as well as injury data.

A5.7.10.2 Based on injury data and analysis, bags have been involved in some injuries and should not be exempt if they are larger than 3.94 in. x 3.94 in. (100 mm x 100 mm). There is no difference between a piece of film and a bag of the same overall dimensions (thickness and area) with regard to the hazard presented.

A5.7.11 *Section 8.22—Test for Packaging Film Thickness*—The revision aligns with the ISO 8124-1: 2000 test method for determining thickness.

A5.7.12 *Section 4.15.1—Cords and Elastics in Toys and Figure 11, Loop Example*—The revision clarifies the configuration of a loop perimeter.

A5.7.13 *Section 8.23—Test for Loops and Cords and Figure 10*—The length (5.0 in.) and width (3.9 in.) of the probe are based on the head length and head breadth dimensions, respectively, of a 5th percentile, 0-3 month old (1986 CPSC Anthropometric Report). The height of the probe (4.0 in.) and the height of the base (1.0 in.) are based on the configuration of the torso and head probes used in the Home Playground Standard (Specification F 1148). The test method was also taken from the Home Playground Standard (Test Procedure for Entrapment in Non-Rigid Openings). The force to be applied has been modified from 50 lbf in Specification F 1148 to 10 lbf for this requirement. The 10 lbf is a reasonable force to simulate a child’s pulling a loop over the head.

A5.7.14 *Figure 4*—Fig. 4 has been enhanced to show the rear view of the hinge line, as done in Fig. 2 in ISO 8124-1: 2000. The revision clarifies definition of hinge line and harmonizes the specification with ISO 8124-1: 2000.

A5.7.15 *Section 4.14—Folding Mechanisms and Hinges*—The revision replaces the term “capable of” with “intended to” to clarify that the requirements only apply to those products that are intended to support a child.

A5.7.16 *Section 4.14.1—Folding Mechanisms*—Revised to reflect that 4.14 applies only to toys intended to support the weight of a child.

A5.7.17 *Section 4.16.2.1—Sideways Stability, Feet Available for Stabilization, Section 4.16.5—Overload Requirements for Ride-On Toys and Seats, and Section 8.16.4*—When an intended age range falls between years, the revision specifies that the more conservative year is used.

A5.7.18 *Sections 4.16.1, 4.16.2, and 4.16.3*—The scope of 4.16.1, 4.16.2, and 4.16.3 are interpreted to include seats. In fact, 4.16.1 specifically states that 4.16.2 and 4.16.3 include “stationary toys with seats” within their scope.

A5.7.19 *Section 4.16.3—Fore and Aft Stability*—The “feet available” exemption for aft stability has been eliminated. A child’s feet would not be effective in preventing a rearward fall.

A5.7.20 *Section 4.21.2*—The revision closes the loophole for pacifiers included with toys intended for children from 18 to 36 months. The loophole allowed pacifiers that comply with the 10 lb tension test under 16 CFR 1511 to be sold with toys, while other toys in the 18 to 36 month age group must comply with the 15 lb tension test under ASTM Specification F 963.



A5.7.21 *Section 8.16—Test for Stability of Ride-On Toys*—The revision allows for center of gravity adjustment to account for product geometry that prevents load application at the specified locations.

## A5.8 Labeling

A5.8.1 Section 5 revisions improve the clarity and flow of the section. The essence of the section has remained intact, but the information has been redistributed among the subsections differently. The major changes to the structure of the section are:

A5.8.1.1 Separating Federal requirements from ASTM requirements.

A5.8.1.2 Separating safety labeling from age grade labeling and from instructions/producer markings.

A5.8.1.3 Identifying the specific components of a safety label.

A5.8.1.4 Identifying more clearly where signal words and message text are required verbatim and not left to manufacturers' discretion.

A5.8.2 The rationale for changes to specific subsections is as follows:

A5.8.2.1 *Section 5*—Title change from Safety Labeling Requirements to Labeling Requirements reflects the content of the section.

A5.8.2.2 *Section 5.1*—Title change to reflect that it is only Federal labeling requirements that are referenced, with the addition of a reference to 1500.19 for labeling of small balls.

A5.8.2.3 *Section 5.2*—Formerly 5.6.

A5.8.2.4 *Section 5.3*—Formerly 5.2, with title change for clarity.

A5.8.2.5 *Section 5.3.1*—Clarifies and specifies components and formatting of safety labeling.

A5.8.2.6 *Section 5.3.2*—Clarifies and specifies appropriate signal words.

A5.8.2.7 *Section 5.3.3*—Clarifies where message text is required verbatim and not left to manufacturers' discretion.

A5.8.2.8 *Section 5.3.4*—Specifies package location for safety labeling.

A5.8.2.9 *Section 5.3.5*—Formerly 5.2.6.

A5.8.2.10 *Section 5.3.6*—Clarifies that safety labeling, whether on the package or product, must contrast with the background and be clearly visible to the intended audience.

A5.8.2.11 *Section 5.3.7*—Formerly 5.2.8.

A5.8.2.12 *Section 5.3.8*—Formerly 5.2.9.

A5.8.2.13 *Section 5.4*—Formerly 5.3. Flotation toys now defined as aquatic toys (see Section 3). Changes “CAUTION” to the more appropriate signal word, “WARNING.”

A5.8.2.14 *Section 5.5*—Formerly 5.4. Subsections added to distinguish age grading from safety labeling.

A5.8.2.15 *Section 5.6*—Formerly 5.11. Subsections revised to better distinguish age grading from safety labeling.

A5.8.2.16 *Section 5.7*—Formerly 5.12.

A5.8.2.17 *Section 5.8*—Formerly 5.9. Clarifies that safety labeling is intended to inform that an adult assemble an item which, in its unassembled state, presents a hazard(s).

A5.8.2.18 *Section 5.9*—Formerly 5.13.

A5.8.2.19 *Section 5.10*—Formerly 5.14.

A5.8.2.20 *Section 5.11*—Formerly 5.10.

A5.8.2.21 *Section 5.11.1*—Formerly 5.10.1, with minor editorial revision.

A5.8.2.22 *Section 5.11.1.1*—Formerly 5.10.1.1, with minor editorial revision.

A5.8.2.23 *Section 5.11.1.2*—Formerly 5.10.1.3.

A5.8.2.24 *Section 5.11.1.3*—Formerly 5.10.1.2, with editorial clarification.

A5.8.2.25 *Section 5.11.1.4*—Formerly 5.10.1.4.

A5.8.2.26 *Section 5.11.2*—Formerly 5.10.2, with clarification regarding small parts.

A5.8.2.27 *Section 5.11.3 through 5.11.7.2*—Formerly 5.10.3 through 5.10.7.2, respectively.

A5.8.2.28 *Section 5.12*—Formerly 5.15.

A5.8.2.29 *Section 5.13*—Formerly 5.16.

A5.8.2.30 *Section 5.14*—New subsection for labeling of electric toys added for consistency.

A5.8.2.31 *Section 5.15*—New subsection for labeling of battery operated toys.

A5.8.2.32 *Section 5.16*—Formerly 5.7.

A5.8.3 *Section 6*

A5.8.3.1 *Section 6.5*—Clarifies that referenced hazard(s) exist in unassembled state only.

A5.8.3.2 *Section 6.6.3*—Specifies minimum requirements for instructional literature of battery-operated toys, to guide safe use and maintenance.

A5.8.3.3 *Section 6.7*—Formerly 5.8, with minor editorial revision.

A5.8.4 *Section 7*

A5.8.4.1 *Section 7.2 through 7.2.3*—Formerly 5.5 through 5.5.3, respectively.



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