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Standard Safety Performance Specification for Soft Contained Play Equipment[1]

This standard is issued under the fixed designation F1918; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This safety performance specification provides safety and performance standards for soft contained play equipment. Its purpose is to reduce the potential for life-threatening and debilitating injuries.

1.2 The range of users encompassed by this safety performance specification is the 5th percentile 2 year old to the 95th percentile 12 year old.

1.3 Public playground equipment, home playground equipment, sports equipment, amusement rides, fitness equipment not part of the play system, water-related attractions and devices, and toys and juvenile products are not included in this specification.

1.4 This specification does not address accessibility, except as it pertains to safety issues not covered in The Americans With Disabilities Act Accessibility Guidelines (ADAAG).[2]

1.5 This safety performance specification includes the following sections:

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1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[3]

E648 Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

F1077 Guide for Selection of Committee F16 Fastener Specifications (Withdrawn 2014)[4]

F1292 Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment

F1487 Consumer Safety Performance Specification for Playground Equipment for Public Use

2.2 *Federal Standards:*[5]

16 CFR Part 1303 Ban of Lead-Containing Paint and Certain Consumer Products Bearing Lead-Containing Paint

6 CFR 1500 Hazardous Substances Act Regulations, including Sections:

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.

16 CFR Section 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

Americans With Disabilities Act, Public Law 101–336:

28 CFR 35 Title II, Subtitle A

28 CFR 36 Title III, Appendix A

36 CFR Part 1191 Americans with Disabilities Act Accessibility Guidelines (ADAAG)

[1] This safety performance specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.36 on Soft-Contained Play Systems.

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[2] More information on federal requirements for play equipment accessibility may be obtained from the Office of Technical and Information Services, Architectural and Transportation Barriers Compliance Board, 1331 F Street, NW, Suite 1000, Washington, DC 20004-1111 or at www.access-board.gov/play/finalrule.htm.

[3] 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.

[4] The last approved version of this historical standard is referenced on www.astm.org.

[5] *Code of Federal Regulations*, available from U.S. Government Printing Office, Washington, DC 20402.

2.3 *Other Standards:*
UL Standard 94 Test for Flammability of Plastic Materials for Parts, Devices, and Appliances
UL Standard 1975 Fire Tests for Foamed Plastics Used for Decorative Purposes
NFPA 101 Life Safety Code
NFPA 701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
National Electrical Code (NEC)
California Technical Bulletin 117

3. Terminology

3.1 *Definitions:*

3.1.1 *accessible, adj*—relating to a part or portion of the play system that is (*1*) capable of being contacted by any body part, or (*2*) available to and usable by persons with disabilities.

3.1.2 *air filled device, n*—a play activity which allows the user to bounce upon an inflated structure within soft contained play equipment.

3.1.3 *alternative means of hand support, n*—netting or other material that follows the path of access or egress, that, when grasped, provides balance and support in maintaining a specific body posture.

3.1.4 *ball pool, n*—any contained area with loose balls for the purpose of play or transition.

3.1.5 *barrier, protective, n*—an enclosing device that is intended to prevent both inadvertent and deliberate attempts to pass through the device.

3.1.6 *climber, n*—any component with the purpose of ascending or descending transition.

3.1.7 *completely bounded non-rigid opening, n*—any opening in SCPE that is totally enclosed by flexible boundaries which can deform or deflect during normal use (for example, the openings in a flexible net or lattice of webbing).

3.1.8 *completely bounded opening, n*—any opening in SCPE that is totally enclosed by boundaries on all sides so that the perimeter of the opening is continuous.

3.1.9 *component, n*—a part of a play system, any portion thereof that generates specific activity and does not stand alone.

3.1.10 *containment wall, n*—vertical part of the SCPE, usually made up of netting, mesh or paneling, which serves to enclose the SCPE.

3.1.11 *designated play surface, n*—any elevated surface for standing, walking, sitting or climbing; or flat surface larger than 2 in. (50 mm) wide by 2 in. (50 mm) long having less than a 30° angle from horizontal.

3.1.12 *emergency access/egress pathway, n*—a clear and unencumbered path which leads directly into or out of the play equipment in a continuous manner.

3.1.13 *entanglement, n*—a condition in which the user's clothing or something around the user's neck becomes caught or entwined on a component of playground equipment.

3.1.14 *fabric, mesh, n*—a woven fabric with a permeable network made from interlacing threads or mono filament fibers.

3.1.15 *fabric, solid, n*—a coated or laminated closed weave fabric.

3.1.16 *fall height, n*—the vertical distance between a designated play surface and the protective surfacing beneath it.

3.1.17 *flexible component, n*—any part of the SCPE that temporarily changes its shape when in use; examples include the tire net, the cargo net, and the log bridge.

3.1.18 *netting, n*—an open work fabric made of threads, cords, or mono filament fibers woven or knotted together at regular intervals.

3.1.19 *net, webbing, n*—a lattice of webbing sewn or otherwise affixed together at overlapping conjunctions.

3.1.20 *non-climbable net or mesh, n*—a net or mesh, such as metal, fabric, or synthetic material, that is not intended to be climbed and which passes the test procedure for non-climbable net or mesh.

3.1.21 *partially bounded opening, n*—any opening in SCPE that is not totally enclosed by boundaries on all sides so that the perimeter of the opening is discontinuous.

3.1.22 *platform, n*—a flat surface, intended for more than one user to stand upon, and upon which the user can move freely.

3.1.23 *play area, n*—a designated space intended for children's play.

3.1.24 *play opportunity, n*—any piece of equipment intended to generate specific recreational and/or learning activity.

3.1.25 *preventive maintenance, n*—a planned program of inspections and maintenance intended to keep equipment functioning properly and to forestall equipment failures.

3.1.26 *projection, n*—a condition which, due to its physical nature, must be tested to requirements of this standard to determine whether it is a protrusion or an entanglement hazard or both.

3.1.27 *protective surfacing, n*—surfacing material(s) to be used within the use zone of SCPE.

3.1.28 *protrusion, n*—a projection which, when tested in accordance with requirements of this standard, is found to be a hazard having the potential to cause serious bodily injury to a user who impacts it.

3.1.29 *slide exit region, n*—the lower end of a slide intended to slow the user before exiting.

3.1.30 *slide use zone, n*—the area immediately adjacent to accessible parts of the slide that is designated for circulation and on the surface of which a user would land when falling from or exiting the slide.

3.1.31 *soft contained play, equipment (SCPE), n*—a play structure made up of one or more components where the user enters a fully enclosed play environment that utilizes pliable material(s) (for example, plastic, netting, or fabric).

3.1.32 *stair, n*—device having a slope of 50° or less from a horizontal plane and consisting of a series of steps that can be used for ascending and descending.

3.1.33 *step, n*—horizontal flat crosspiece of a ladder or of a stair used primarily as a foot support.

3.1.34 *upper body equipment, n*—equipment intended to be grasped by the user's hands and maneuvered upon using only the hands and arms.

3.1.35 *webbing, n*—a woven narrow gage flat fabric.

3.1.36 *zone, non-use, n*—locked or secured area around or underneath the play system where unauthorized access is not allowed.

3.1.37 *zone, use, n*—the area immediately adjacent to all external areas of the SCPE that is designated for circulation and on the surface of which a user would land when falling from or exiting the equipment.

4. General Requirements

4.1 Playground equipment represented as complying with this consumer safety performance specification shall meet all applicable requirements specified herein. Anyone representing compliance with this specification shall keep such essential records as are necessary to document any claim that the requirements within this specification have been met.

4.2 SCPE should be designed to allow natural air circulation and lines of visibility between users and persons supervising.

5. Materials and Manufacture

5.1 *General Requirements*—Soft contained play equipment shall be manufactured and constructed only of materials that have a demonstrated durability in the playground or similar setting. Any new materials shall be documented or tested for durability by the soft contained play equipment manufacturer.

5.1.1 Regardless of the material or the treatment process used, the manufacturer shall not utilize materials known to be hazardous (for example, lead, arsenic, creosote). All paints or similar finishes shall comply with 16 CFR Part 1303.

5.2 All fasteners used to construct soft contained play equipment shall be manufactured in accordance with Guide F1077 and shall meet the requirements of Section 6.

5.2.1 All fasteners, connecting, and covering devices shall be inherently corrosion resistant or be provided with a corrosion resistant coating.

5.2.2 When installed in accordance with the manufacturer's instructions, fasteners, connecting, and covering devices shall not loosen or be removable without the use of tools. Lock washers, self-locking nuts, or other locking means shall be provided for all fasteners to secure them from unintentional loosening. Hardware in moving joints shall also be secured against unintentional loosening.

5.2.3 Connecting devices and hooks shall be subject to the requirements of Section 6.

6. Performance Requirements

6.1 These requirements apply to the play equipment and do not apply to nonuse zones.

6.2 *Head and Neck Entrapment*—Soft contained play equipment shall be designed and constructed or assembled so that any accessible opening shall meet the following performance requirements to reduce the risk of head or neck entrapment by either a head first or feet first entry into the opening. Openings between the bottom edge of the equipment and the surface directly beneath it (that is, the ground or floor) are exempt from this requirement.

6.2.1 *Accessible Openings*—A completely bounded rigid opening is accessible when it is possible to insert the torso test probe (see Fig. A1.1) into the opening to a depth of 4.0 in. (100 mm) or more.

6.2.1.1 *Test Procedure for Completely Bounded Rigid Openings*—Align the torso probe (see Fig. A1.1) so that the plane of its base is parallel to the plane of the opening. Rotate the probe to its most adverse orientation (that is, major axis of the base of the probe parallel to the major axis of the opening) and attempt to insert it in the opening. If it is possible to insert the torso probe into the opening to a depth of 4.0 in. (100 mm) or more, place the head probe (see Fig. A1.2) in the opening with the plane of the base of the probe parallel to the plane of the opening. An opening passes this test if (*1*) the opening does not admit the torso probe when it is rotated to any orientation about its own axis, or (*2*) the opening admits the torso probe and also admits the head probe. An opening fails the test if the opening admits the torso probe but does not admit the head probe.

6.2.2 *Nonrigid Completely Bounded Openings*—A nonrigid opening such as may be found in but not limited to flexible nets, tarps, and plastic enclosures is considered accessible if a torso probe will penetrate the opening to a depth of 4.0 in. (100 mm) or more when tested in accordance with the test procedure outlined in 6.2.2.1 (see Figs. A1.1 and A1.2 for probe dimensions).

6.2.2.1 *Test Procedure for Completely Non-rigid Bounded Openings*—Align the torso probe (see Fig. A1.1) so that the plane of its base is parallel to the plane of the opening. Rotate the probe to its most adverse orientation (that is, major axis of the base of the probe parallel to the major access of the opening). Apply a force 50 lbf (220 N) to the probe to attempt to pass it through the opening. If the base of the probe passes through the opening, place the large head probe in the opening, tapered end first, with the plane of its base parallel to the plane of the opening. Apply a force of 50 lbf (220 N) to the probe to attempt to pass it through the opening. A nonrigid opening passes the test if: (*1*) the opening does not allow the torso probe to be inserted so deep that the opening admits the base of the probe when it is rotated to any orientation about its own axis, or (*2*) the opening allows full passage of the torso probe and also allows the large head probe to pass completely through. A nonrigid opening fails the test if the opening allows full passage of the torso probe but does not admit the large head probe.

6.2.3 *Angular Portions of Openings*—Angles formed by the surfaces of an opening (that is, adjacent surfaces or surfaces that intersect when projected with a distance between surfaces greater than 9.0 in. (230 mm)) should be at least 55° unless one of the conditions defined in 6.2.3.1 exists.

6.2.3.1 Exemptions to 6.2.3:

(1) Inverted Angle of V Condition—Those V's which are inverted. A V is considered inverted if the lower adjacent leg forming the V is horizontal or slopes downward from the apex (see Fig. A1.3).

(2) Filled Apex Condition—V angles less than 55° where the apex of the angle is filled to the point that will not allow the head probe (see Fig. A1.3) to contact both surfaces of the angle simultaneously when the probe is rotated to any orientation about its own axis (see Fig. A1.3).

6.3 *Sharp Points and Edges*—There shall be no accessible sharp points or edges, on soft contained play equipment.

6.3.1 *Sharp Points and Sharp Edges*—All points and edges on soft contained play equipment shall be tested for sharpness in accordance with the federal technical requirements in 16 CFR 1500 referenced in 2.2.

6.3.2 The exposed open ends of all tubing not resting on the ground, or otherwise covered, shall be provided with caps or plugs that cannot be removed without the use of tools.

6.3.3 Suspended members, such as rings on upper body equipment and swing seats, shall have a minimum radius of 0.25 in. (6 mm) on corners and edges. This requirement does not apply to swing belt seats, straps, ropes, chains, connectors, and other flexible components.

6.3.4 A cut-off bolt end projecting beyond the face of the nut shall be free of burrs, sharp points, and sharp edges.

6.4 *Protrusions*—There shall be no protrusions on the accessible portions of soft contained play equipment. Four protrusion test gages (shown in Fig. A1.4 and Fig. A1.5) are required to determine whether projections are protrusions. Their use is described in this section.

6.4.1 *Accessible Projections*—A projection is not accessible and is not a protrusion when it is recessed or located in such a manner that does not allow any of the protrusion gages to be placed over it. Any of the conditions described in the remainder of this section constitutes a protrusion hazard.

6.4.2 *Determining Whether a Projection is a Protrusion*—Successively place each of three gages (see Fig. A1.4) over each accessible projection (see Figs. A1.6 and A1.7). Determine whether the projection extends beyond the face of any gage. The projection fails the test and is a protrusion if it extends beyond the face of any of the three gages.

6.4.3 *Suspended Member Protrusions*—Test for this condition with the suspended member in all positions of its intended travel. Place the suspended member protrusion gage (see Fig. A1.5), oriented vertically, over any projection accessible at any point throughout the path of travel. Any projection on the front or rear surface of suspended members of swing assemblies which extends beyond the face of the test gage (see Fig. A1.5) is a protrusion.

6.5 *Entanglement*—There shall be no accessible entanglement hazards on soft contained play equipment. Three test gages, a feeler gage, and the means to accurately measure a 0.12 in. (3 mm) extension are required to determine whether entanglement hazards exist. Any of the conditions described in this section constitutes an entanglement hazard.

6.5.1 *Slides*—Slides, especially in their entrance areas, together with their means of attachment, pose a greater risk of entanglement than other play components. Therefore, the following requirements apply to slides in the areas shown in Fig. A1.8.

6.5.1.1 A projection that meets both of the following conditions is an entanglement hazard: *(1)* The projection allows one of the three protrusion gages (see Fig. A1.4) to pass over it and contact the initial surface, and *(2)* the projection extends perpendicular (±5°) from the initial surface more than 0.12 in. (3 mm).

6.5.1.2 Slides shall be constructed in such a manner as to provide a smooth continuous sliding surface (roller slides exempted), with no gaps or spaces that might create an entanglement hazard such as but not limited to the space created between sidewalls when two single slides are combined to create a doublewide slide or the point where a hood attaches to the sidewalls of a slide.

6.5.2 *Projections from a Horizontal Plane*—A projection that meets all of the following three conditions is an entanglement hazard.

6.5.2.1 The projection fits within any of the three protrusion gages (see Fig. A1.4).

6.5.2.2 It projects upwards from a horizontal plane (see Fig. A1.9 (1) through (6) and Fig. A1.10).

6.5.2.3 The projection extends greater than 0.12 in. (3 mm) perpendicular (±5°) to the plane of the initial surface (see Fig. A1.9 (1) through (6) and Fig. A1.10).

6.5.3 *Exposed Bolt End Projections*—Any accessible bolt end projecting beyond the face of the nut more than two full threads is an entanglement hazard. A bolt end is inaccessible and not an entanglement hazard when it is not possible for any of the three protrusion gages (see Fig. A1.4) to pass over it or if the bolt end is recessed and the 3.5 in. (89 mm) OD protrusion gage (see Fig. A1.4) cannot be made to contact the bolt end when the outside curve of the gage is placed flat against the recessed area (see Fig. A1.11).

6.5.4 *Projections That Increase in Size*—Any projection that fits within any of the three protrusion test gages (see Fig. A1.4) and increases in size or diameter from the initial surface to the outer end (see Fig. A1.9 (7)) is an entanglement hazard.

6.5.5 *Connecting Devices*—Connecting devices such as but not limited to, S-hooks, pelican hooks, and C-hooks, when properly closed, are not entanglement hazards. These connectors are considered closed when there is no gap or space greater than 0.04 in. (1 mm) when measured with a feeler gage (see Fig. A1.12 (1)).

6.5.5.1 S-hook connectors are subject to the additional requirements in 1 through 3 below, since failure to meet any of the corresponding requirements will result in an entanglement hazard.

(1) No portion of the closed end of an S-hook lower loop shall project beyond the vertical boundary established by the upper loop (see Fig. A1.12 (2)).

(2) An S-hook upper loop that completely overlaps the connector body shall not extend past the connector body (see Fig. A1.12 (3)). An S-hook upper loop shall also be permitted to align with or partially overlap with the connector body.

(3) An S-hook lower loop shall align with the connector body and not overlap it in any way (see Fig. A1.12 (4)).

6.5.6 Windows in slides must be completely covered with a transparent material. Windows and their means of attachment must meet the requirements of 6.4.