Designation: F1004 – 16b

Standard Consumer Safety Specification for Expansion Gates and Expandable Enclosures[1]

This standard is issued under the fixed designation F1004; 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.

INTRODUCTION

This consumer safety specification addresses incidents of head and neck entrapment in children's expansion gates and expandable enclosures. It also addresses the ability of a pressure gate to resist a push-out force.

The U.S. Consumer Product Safety Commission (CPSC) identified incidents that generally involved a child's head or neck, or both, becoming entrapped in diamond shaped openings and strangulation of children in V-shapes at the top of accordion style expansion gates or expandable enclosures. Additional incidents and injuries were identified that involved children attempting to climb up and over expansion gates and expandable enclosures, and pushing or pulling pressure gates out of doorways.

This consumer safety specification is written within the current state-of-the-art of gate and enclosure technology. It is intended that this consumer safety specification will be updated whenever substantive information becomes available, which necessitates additional requirements or justifies the revision of existing requirements.

This specification does not address incidents in which gates or enclosures are blatantly misused although warnings and safety instructions are required to be displayed prominently on and with each gate or enclosure.

1. Scope

1.1 This consumer safety specification covers minimum safety performance requirements, test methods, and requirements for labeling and instructional material to minimize hazards to young children resulting from the normal use and reasonably foreseeable misuse and abuse of expansion gates and expandable enclosures.

1.2 Products known as expansion gates and expandable enclosures, or by any other name, which are in the scope of this consumer safety specification are intended for young children aged six months through 24 months, and are defined in Section 3.

1.3 Expansion gates and expandable enclosures defined in Section 3 are for domestic use and are not to be confused with other types of gates or enclosures that may be specifically designed for commercial, institutional, agricultural, pet use, or any other such use.

1.4 No expansion gate or expandable enclosure as defined in Section 3, that is, produced after the approval date of this consumer safety specification either by label or other means, shall indicate compliance with this specification unless it conforms to all the requirements contained herein.

1.5 For expediency, expansion gates and expandable enclosures as defined in Section 3 will heretofore be referred to in this consumer safety specification as "gates" and "enclosures" unless referred to definitively.

1.6 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.7 The following 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*

[1] This consumer safety specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.16 on Highchairs, Hook-On Chairs and Expandable Gates.

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establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D3359 Test Methods for Measuring Adhesion by Tape Test

F406 Consumer Safety Specification for Non-Full-Size Baby Cribs/Play Yards

F963 Consumer Safety Specification for Toy Safety

2.2 *British Standard:*[3]

BS 4125 Specification for Safety Requirements for Child Safety Barriers for Domestic Use

2.3 *Federal Regulations:*[4]

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

16 CFR 1500 Hazardous Substances Act Regulations, Including Parts:

16 CFR 1500.48 Technical Requirements for Determining a Sharp Point in Toys and Other Articles Intended for Use by Children Under Eight Years of Age

16 CFR 1500.49 Technical Requirements for Determining a Sharp Metal or Glass Edge in Toys and Other Articles Intended for Use by Children Under Eight-Years of Age

16 CFR 1501 Method for Identifying Toys and Other Articles Intended for Use by Children Under Three Years of Age Which Present Choking, Aspiration, or Ingestion Hazards Because of Small Parts

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *automatic closing system, n*—a feature (or mechanism) the manufacturer claims, markets, or intends to close an egress panel automatically without the intervention of the user.

3.1.2 *completely-bounded opening, n*—any opening in the main structure of a product that is enclosed totally by boundaries on all sides.

3.1.3 *conspicuous, adj*—label which is visible, when the gate/expandable enclosure is in a manufacturer's recommended use position, to a person standing near the gate/expandable enclosure at any one position around the gate/expandable enclosure, but not necessarily visible from all positions.

3.1.4 *double-action release mechanism, n*—a release mechanism requiring either two consecutive actions, the first of which must be maintained while the second is carried out, or two separate and independent single action release mechanisms that must be activated simultaneously to unlock the gate/enclosure.

3.1.5 *egress panel, n*—panel(s) within a gate or enclosure designed to swing, retract, or fold open to allow passage.

3.1.5.1 *Discussion*—Pressure mounted gates that require the pressure to be released in order to allow passage, are not considered to contain an egress panel.

3.1.6 *expandable enclosures, n*—self-supporting barrier intended to completely surround an area or play-space within which a young child (see 1.2) may be confined.

3.1.6.1 *Discussion*—Enclosures may be marketed for indoor or outdoor use, or both. Expandable enclosures do not include an attached floor.

3.1.7 *expansion gate, n*—barrier intended to be erected in an opening, such as a doorway, to prevent the passage of young children (see 1.2), but which can be removed by older persons who are able to operate the locking mechanism.

3.1.7.1 *Discussion*—Such gates are available in a number of different styles of construction and are manufactured from a variety of different materials.

3.1.8 *extension panel(s), n*—any panel recommended by the manufacturer for extending the length or height of the product including panels sold with the gate/enclosure and those sold separately.

3.1.9 *hold open mechanism, n*—a feature sometimes included with automatic closing gates where the gate will stay in a fully open position and not automatically close the egress panel.

3.1.10 *manufacturer's recommended use position(s)*—any position that is presented by the manufacturer in any descriptive or instructional literature as a normal, allowable, or acceptable configuration for the use of the product.

3.1.10.1 *Discussion*—This specifically excludes positions which the manufacturer shows in its literature to be unacceptable, unsafe, or not recommended.

3.1.11 *nonpaper label, n*—any label material, such as plastic or metal, which either will not tear without the aid of tools or tears leaving a sharply-defined edge.

3.1.12 *paper label, n*—any label material, which tears without the aid of tools and leaves a fibrous edge.

3.1.13 *partially-bounded opening, n*—any opening in the main structure of a product that is not enclosed totally by boundaries on all sides.

3.1.13.1 *Discussion*—For example, a V-shape in the top of an accordion slat-style product or a rectangular notch resulting from a gap between a wall surface and the main structure of a baby gate would be considered a partially-bounded opening.

3.1.14 *pressure mounted gate, n*—any gate which relies on pressure as the mechanism by which the gate stays in its manufacturer's recommended use position.

3.1.15 *static load, n*—vertically downward force applied by a calibrated force gage or by dead weights.

4. Calibration and Standardization

4.1 All testing shall be conducted on a concrete floor which may be covered with ⅛-in. (3-mm) thick vinyl floor cover, unless the test instructs differently.

[2] 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.

[3] Available from British Standards Institute (BSI), 389 Chiswick High Rd., London W4 4AL, U.K., http://www.bsi-global.com.

[4] *Code of Federal Regulations* is available from the Superintendent of Documents, Government Printing Office, Washington, DC 21402.

4.2 The gate/expandable enclosure shall be completely assembled, unless otherwise noted, in accordance with the manufacturer's instructions.

4.3 No testing shall be conducted within 48 h of manufacturing.

4.4 The product to be tested shall be preconditioned in a room with an ambient temperature of 73 ± 9°F (23 ± 5°C) for at least 1 h prior to testing. Testing then shall be conducted within this temperature range.

4.5 All testing required by this specification shall be conducted on the same unit. The gate/expandable enclosure with and without any and all extension panels installed in any of the manufacturer's recommended use positions must comply with the standard.

5. General Requirements

5.1 *Wood Parts*—Prior to testing, any exposed wood parts shall be smooth and free from splinters. Slats are not permitted to contain any lateral/transverse joints, such as finger-joints, or any other means of joining pieces of lumber end-to-end.

5.2 Screws shall not be used in the assembly of any components or locking or attaching device (or devices) that are intended to be removed by the consumer during daily operations.

5.3 There shall be no hazardous sharp edges or points as defined by 16 CFR 1500.48 and 16 CFR 1500.49 before or after testing to this consumer safety specification.

5.4 There shall be no small parts as defined by 16 CFR 1501 before testing or liberated as a result of testing to this specification.

5.5 *Openings*—Holes or slots that extend entirely through a wall section of any rigid material less than 0.375 in. (9.53 mm) thick and admit a 0.210-in. (5.33-mm) diameter rod shall also admit a 0.375-in. (9.53-mm) diameter rod. Holes or slots that are between 0.210 in. (5.33 mm) and 0.375 in. (9.53 mm) and have a wall thickness less than 0.375 in. (9.53 mm) but are limited in depth to 0.375 in. (9.53 mm) maximum by another rigid surface shall be permissible (see Fig. 1). The product shall be evaluated in all manufacturer's recommended positions.

5.5.1 Openings through multiple wall sections and openings created by multiple wall sections must meet the size requirements in 5.5 if the total thickness of the combined wall sections and any air gap between the wall sections is less than 0.375 in. (9.53 mm).

5.6 *Exposed Coil Springs*—Any exposed coil spring, which is accessible to the occupant having or capable of generating a space between coils of 0.210 in. (5.33 mm) or greater during static load testing in accordance with 7.8 shall be covered or otherwise designed to prevent injury from entrapment.

5.7 *Scissoring, Shearing, and Pinching*—The gate/expandable enclosure when in the manufacturer's recommended use position(s) shall be designed and constructed to prevent injury to the child from any scissoring, shearing, or pinching when members or components rotate about a common axis or fastening point, slide, pivot, fold, or otherwise move relative to one another. Scissoring, shearing, or pinching that may cause injury shall not be permissible when the edges of any rigid parts admit a probe greater than 0.210 in. (5.33 mm) and less than 0.375 in. (9.53 mm) diameter at any accessible point through the range of motion of such parts.

5.8 *Labeling:*

5.8.1 Warning labels (whether paper or nonpaper) shall be permanent when tested in accordance with 7.12.1 – 7.12.3.

5.8.2 Warning statements applied directly onto the surface of the product by hot stamping, heat transfer, printing, wood burning, etc., shall be permanent when tested in accordance with 7.12.4.

5.8.3 Nonpaper labels shall not liberate small parts when tested in accordance with 7.12.5.

5.9 The paint and surface coating on the product shall comply with 16 CFR 1303.

5.10 *Protective Components*—If a child can grasp protective components, such as caps, sleeves, or plugs used for protection from sharp edges, points, or entrapment of fingers or toes, between the thumb and forefinger, or teeth, or if there is at least a 0.040 in. (1.00 mm) gap between the component and its adjacent parent component, such components shall not be removed when tested in accordance with 7.7.

6. Performance Requirements

6.1 The following performance requirements apply to gates and enclosures when they are erected or installed in any of the manufacturer's recommended use positions.

6.1.1 *Completely-Bounded Openings*—Openings within the gate or enclosure, and completely bounded openings between the gate and the test fixture, shall not permit the complete passage of the Small Torso Probe (see Fig. 2) when tested in accordance with 7.10.

6.1.2 *Height of Sides*—The vertical distance from the floor to the lowest point of the uppermost surface shall not be less than 22 in. (560 mm) when measured from the floor.

6.1.3 *Vertical Strength*—Uppermost top rails, edges, or framing components of the gates or enclosures shall be tested in accordance with 7.8 and shall not fracture, disengage, fold, or have a deflection that reduces the lowest point of the uppermost surface of a gate or enclosure to a dimension of less than 22 in. (560 mm) when measured vertically from the floor at any time during or after completion of the test (see 6.1.2). The unit shall remain in its manufacturer's recommended use position and the lock/latch shall remain engaged during the test and engaged and operative upon completion of the tests described in 7.8.

6.1.4 *Bottom Spacing*—For enclosures, the space between the floor and the bottom of the enclosure shall not permit the complete passage of the Small Torso Probe (see Fig. 2) when tested in accordance with 7.10. For gates, the space between the test fixture and the bottom of the gate shall not permit the passage of the Small Torso Probe (see Fig. 2) when tested in accordance with 7.10.

6.1.5 *Configuration of Uppermost Edge*—A partially bounded opening at any point in the uppermost edge of a product that is greater than 1.5 in. (38 mm) in width and more

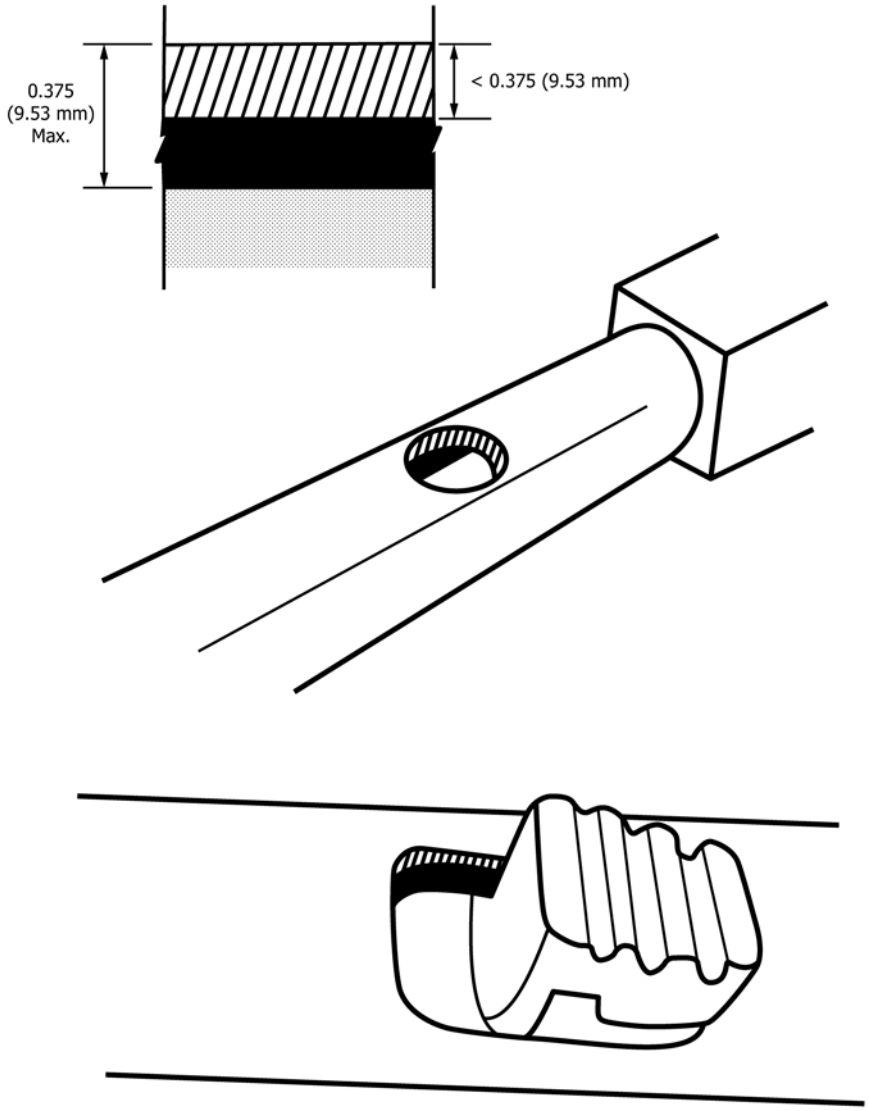


FIG. 1 Openings

than 0.64 in. (16.2 mm) in depth shall be subjected to the test procedure in 7.11 (see Fig. 3). During the test, no portions of the boundaries of the opening shall simultaneously contact more than one of surfaces "B," "C," or corner "BC" or "CC" in any combination if they are not opposing sides of the center line of Test Template B (see Fig. 4).

6.2 *Latching/Locking and Hinge Mechanisms:*

6.2.1 *Pressure Mounted Gates*—All pressure mounted gates shall have a latching or locking device or other provision in the design that will prevent the unit from unintentionally folding or contracting when properly placed in the manufacturer's recommended use position.

6.2.2 *Units with Egress Panels*—All gates or enclosures designed with egress panels shall have a latching or locking device to keep the panel in the closed position and prevent unintentional opening. The locking or latching device shall remain engaged during and upon completion of the testing, and the locking or latching device shall remain operative upon completion of the testing in accordance with 7.3.

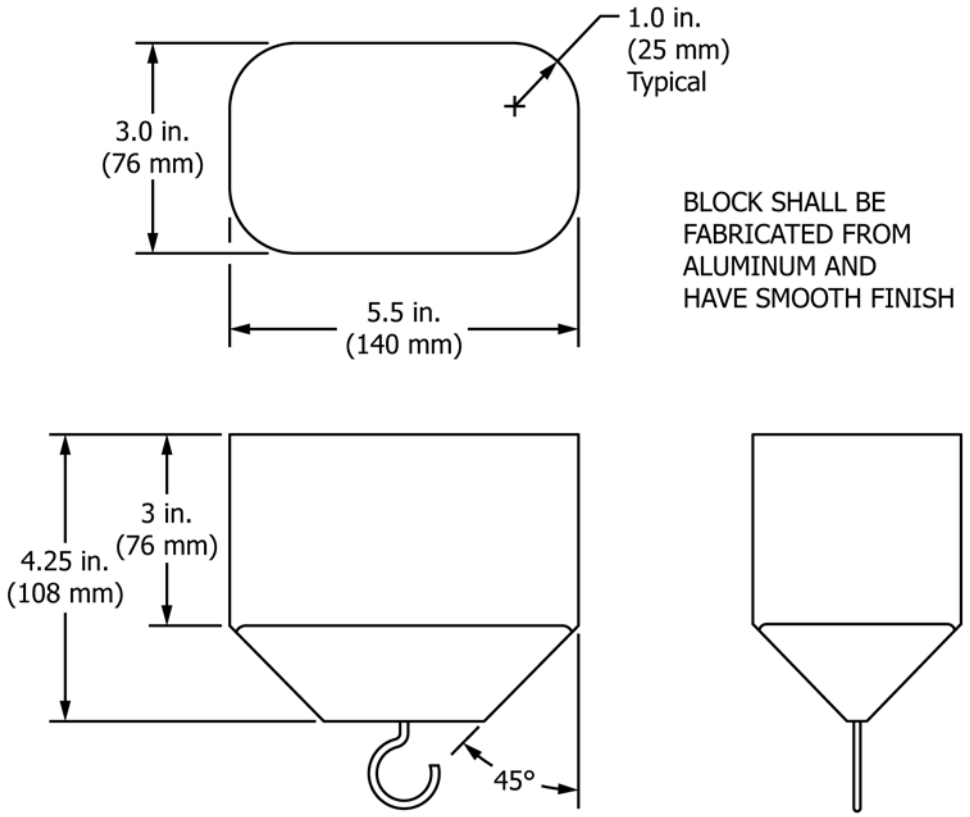
6.2.2.1 *Automatic Closing Systems*—Any unit with an automatic closing mechanism shall continue to close and automatically lock or latch, without the intervention of the user, when tested in accordance with 7.4.

6.3 *Push-Out Test:*

6.3.1 All gates shall be tested in accordance with 7.9. At each test location, the average push-out force shall be a minimum of 10 lbf (45 N).

6.3.2 Gates that are marketed as being usable at the top of stairs shall be tested in accordance with 7.9. At each test location, the average push-out force shall exceed 30 lbf (133 N). In addition, each individual force shall exceed 20 lbf (89 N). Gates that do not meet the test requirements in this section shall bear the warning in 8.5.5 that they shall not be used at the top of stairs.

6.4 *Locking Device*—Every device provided to prevent the unlocking or unlatching of a product from the manufacturer's recommended use position(s) shall meet either 6.4.1 or 6.4.2.



NOTE 1—Not to scale.

FIG. 2 Small Torso Probe

6.4.1 Each single-action locking or latching device shall require a minimum force of 10 lbf (45 N) to activate the release mechanism when tested in accordance with 7.6.

6.4.2 The locking or latching device shall be a double-action release mechanism. There are no force requirements for double-action locking or latching devices.

6.5 *Toys:*

6.5.1 Toy accessories shall not be attached to, or sold with, a gate.

6.5.2 Toy accessories attached to, removable from, or sold with an enclosure, as well as their means of attachment, shall meet applicable requirements of Specification F963.

7. Test Methods

7.1 *Test Fixture*—A test fixture, simulating a doorway, suitable for conducting the testing of gates shall be constructed and restrained in such a way to prohibit movement of the fixture and shall not impede the application of the load or deflection of the gate being tested. There shall be a means to adjust the width of the opening in the fixture to allow installation of the gate at the minimum and maximum opening sizes specified by the manufacturer. The height of the fixture shall be at least as tall as the gate being tested.

NOTE 1—Fig. 5 shows an example of a test fixture.

7.1.1 The vertical rigid side members of the fixture shall be faced with 1 by 4-in. (25 by 100-mm) pine boards free of knots and surface blemishes. For wall-mounted gates, the pine boards shall be replaced as needed when gate mounting hardware affects the wood surface so as to influence the test results. A board, approximately ¾ by ½ in. (19 by 13 mm) shall be affixed to each of the facing boards to simulate a doorstop and to serve in positioning pressure mounted gates in the opening. All wooden components shall be painted with a semi-gloss latex paint.

7.1.2 The test fixture shall have some means to ensure that the pine boards are parallel after the width of the opening has been adjusted to accommodate a specific gate sample.

7.2 *Testing Guidelines:*

7.2.1 The tests under this section shall be conducted in the order shown:

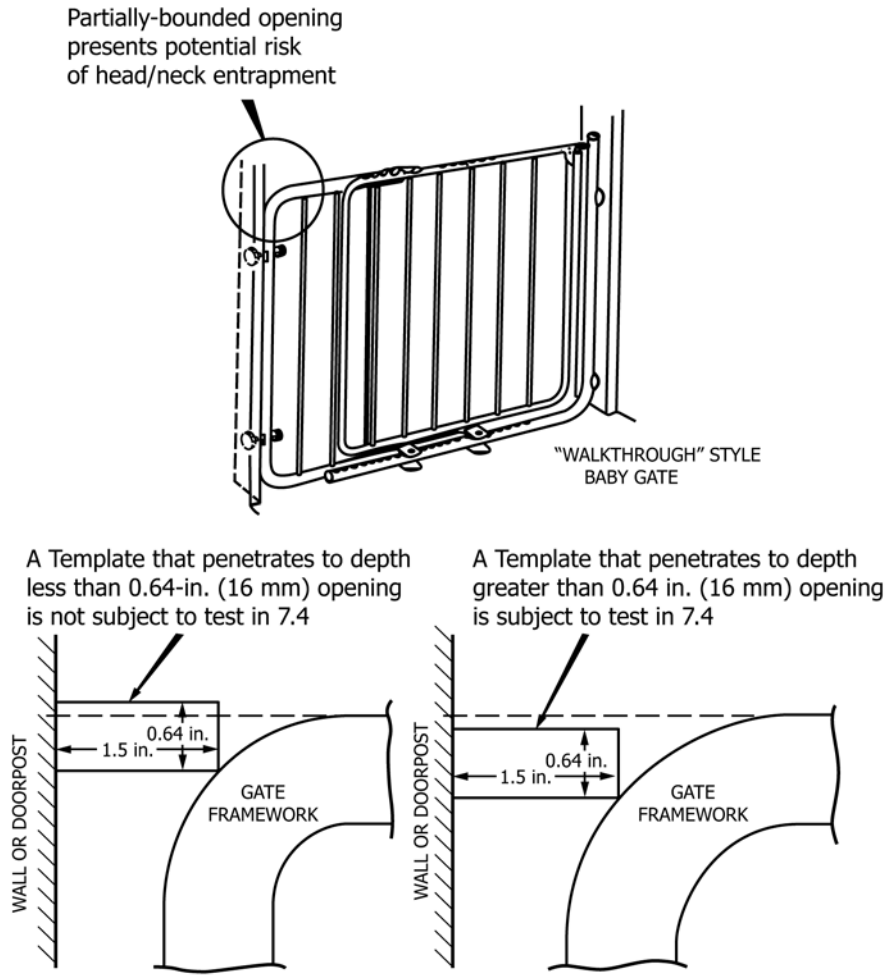
(1) Latching/Locking and Hinge Mechanism Durability Test

(2) Automatic Closing System Test, if applicable

(3) Remaining tests, except Slat Strength test, conducted in any order

(4) Slat Strength Test (the last test)

7.3 *Latching/Locking and Hinge Mechanism Durability Test:*



NOTE 1—Use a rectangular template to determine when a partially-bounded opening must be tested with Test Template B in accordance with 7.11.

FIG. 3 Walk-Through Style Baby Gate and Walls or Doorposts

7.3.1 *Setup for Testing:*

7.3.1.1 *For Testing Gates*—Install the gate in the test fixture and adjust to the maximum opening width recommended by the manufacturer. For pressure gates containing egress panels, the pressure mounts shall be rigidly connected to the test fixture so that proper pressure is maintained to hold the gate in place during the test.

NOTE 2—The purpose of this test is to cycle test hinge mechanisms and locks/latches. It is not meant to test the attachment of any pressure mount.

7.3.1.2 *For Testing Enclosures*—Assemble the enclosure according to manufacturer's instructions and secure the section being tested to the floor such that it does not move during the tests below.

7.3.2 *Mechanisms Durability Testing:*

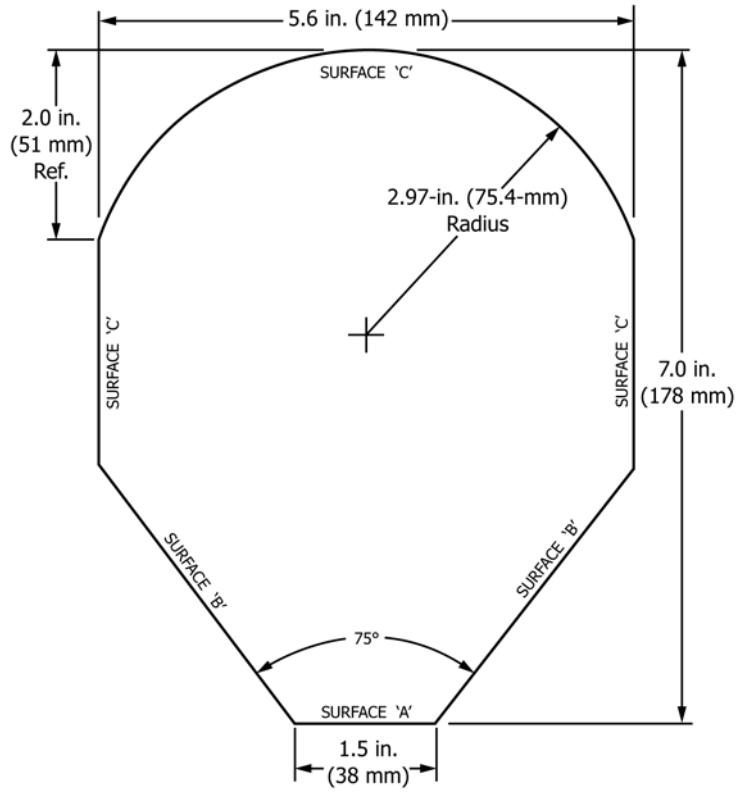
7.3.2.1 Units with egress panels shall be cycled through their normal full range of motion a total of 2000 cycles in accordance with the manufacturer's instructions. For egress panels that open in more than one direction, the cycles shall be done half in one direction and half in the other direction. Cycling shall be conducted at a rate of no less than 12 cycles per minute. For gates equipped with automatic closing systems, perform the test at the rate of the automatic closing system.

NOTE 3—If it is found to be more efficient, test method 7.3.2 may be divided into two separate tests: 2000 cycles of testing the locking/latching mechanisms, and another 2000 cycles to test the hinge or retracting mechanism. In this case, the locking/latching mechanism should be cycled back and forth through its locked/latched position to its unlocked/unlatched position. Then, in a separate test, the durability of the hinge or retract mechanism should be tested cycling the egress panel 2000 times through its full range of motion per 7.3.2, but leaving out the step of actually locking/latching it shut between each cycle.

7.3.2.2 For pressure gates without egress panels, the locking/latching mechanism shall be cycled 550 times; a cycle consisting of removal and re-installing the gate on the test fixture.

7.4 *Automatic Closing System Test*—Following 7.3, with the unit still installed in the test fixture or secured to the floor, open the egress panel 8 ± ¼ in. (203 ± 6 mm) (See Fig. 6) and allow the panel to shut on its own. Repeat the test with the egress panel opened to its maximum allowable opening. If the gate has a hold open feature, open the gate to the point just before the hold open mechanism engages.

7.5 *Locking Mechanism Test*—For foot pedal actuated gates, apply a force of 35 lbf (156 N) in the direction tending to unlock it. The force shall be applied to the foot pedal through



NOTE 1—Test Template B is to be constructed of smooth rigid material not less than ⅛ in. (3.18 mm) thick.

FIG. 4 Test Template B

a 2 by 2 by ¾-in. (50 by 50 by 19-mm) wooden block. Gradually apply the force within 5 s and maintain for an additional 10 s.

7.6 *Release Mechanism Test Method*—With the product in each of the manufacturer's recommended use position(s), gradually apply a force of 10 lbf (45 N) to the release mechanism in the direction tending to unlock it.

7.7 *Removal of Protective Components (5.10):*

7.7.1 Components shall be tested in accordance with each of the following methods in the sequence listed.

7.7.2 Securely affix the gate/expandable enclosure so that it cannot move during performance of the following tests.

7.7.3 *Tension Test*—Attach a force gauge to the component (cap, sleeve, or plug) by means of any suitable device. A clamp, such as shown in Fig. 7 may be a suitable device for components that cannot reasonably be expected to be grasped by a child's fingers on their outer diameter but which have a gap of 0.040 in. (1.00 mm) or more between the rear face of the component and the structural member of the gate/expandable enclosure to which they are attached.

7.7.3.1 The attachment device shall not compress or expand the component so that it hinders any possible removal.

7.7.3.2 Apply force on the scale in a direction that normally would be associated with the removal of the protective component.

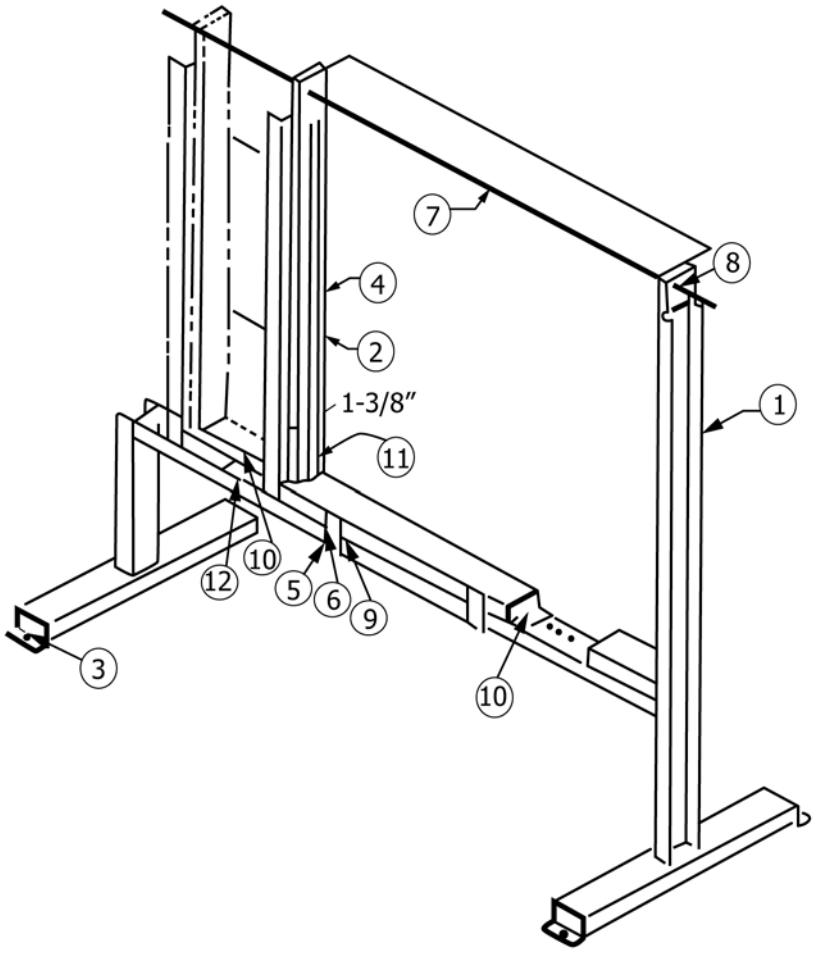
7.7.3.3 Apply the force gradually over a 5 s period and hold for an additional 10 s. The force required to break or remove the component shall not be less than 15 lbf (67 N). Repeat this procedure once.

7.7.4 *Torque Test*—A torque of 3 lbf-in. (0.3 N-m) shall be applied gradually within a period of 5 s in a clockwise direction until a rotation of 180° from the original position has been attained or 3 lbf-in. (0.3 N-m) has been reached. The torque or maximum rotation shall be maintained for an additional 10 s. The torque shall then be removed and the test components permitted to return to a relaxed condition. This procedure shall then be repeated in the counter clockwise direction.

7.8 *Vertical Strength (6.1.3 and 5.6):*

7.8.1 *Gates*—Adjust the gate to the maximum opening width recommended by the manufacturer. Install the gate in the test fixture according to the manufacturer's instructions and lock or latch it in the closed position. Apply a static load of 45 lbf (200 N) vertically downward five times to the center of the top rail, surface, or edge. For gates without a single top rail, surface, or edge, apply the force to each of the top points of the gate. The force shall be applied through a 2 by 2 by ¾ in. (50 by 50 by 19 mm) wood block. Gradually apply the force within 5 s and maintain for an additional 10 s, with approximately 5 s intervals between applications. Repeat the test with the gate adjusted to the minimum opening width recommended by the manufacturer.

7.8.2 *Enclosures*—Adjust the enclosure to the manufacturer's recommended maximum size configuration. Setup the enclosure in the manufacturer's recommended use position. Apply the same loading procedure as specified in 7.8.1 to every other uppermost rail, surface, or edge and every other top joint. If there is an odd number of top joints, apply the loading procedure to an additional joint. If the joints are different, apply



1. 3 in. × 5#/ft channel
2. 1 × 1 × ⅛ in. angle iron
3. 2 × 2 × ¼ in. angle iron
4. 1 × 4 in. pine with semigloss latex paint (white)
5. ¼ × 1-½ in. flat stock (steel)
6. ½ × 4 in. steel pin with 1 in. cotter pin
7. ⅜ in. threaded rod
8. ⅜ in. 16 hex nut
9. Cap screw socket head
10. ½ × 13 × 1-½ in. bolt, ½ in. flat washer and nut
11. ½ × ¾ in. door stop
12. ½ × 3 in. flat stock

FIG. 5 Example of Test Fixture for Gates

load to the joints, which are more likely to result in failure or a nonconformance as defined in 5.3.

7.9 *Horizontal Push-Out Tests:*

7.9.1 *Test Procedure:*

7.9.1.1 Gate security tests shall be conducted at the minimum and maximum opening widths recommended by the manufacturer.

7.9.1.2 Follow the manufacturer's installation instructions when installing the gate in the test opening. For a gate in which the installation force may influence the test results, install the gate by applying a maximum force of 25 lbf (111 N) to a hand operated mechanism or a maximum force of 35 lbf (157 N) to a foot operated mechanism.

7.9.1.3 This section applies only to pressure mounted gates. To ensure alignment, install the gate in the test opening with the sides of the pressure pads touching the board that simulates a door stop. Care should be exercised to ensure that, when pressure is applied to the gate through the locking mechanism, bending of the gate's vertical end members does not cause these members to touch the doorstop molding.

7.9.1.4 Gradually apply a force to the gate at each location, Nos. 1–5 (see Fig. 8), over a period of 5 s until it reaches 45 lbf (200 N) and sustain this force for an additional 10 s. Make sure that the force is applied perpendicular to the plane of the gate. If the gate contact surface loses contact with the test fixture before attaining 45 lbf (200 N), record the force at which loss

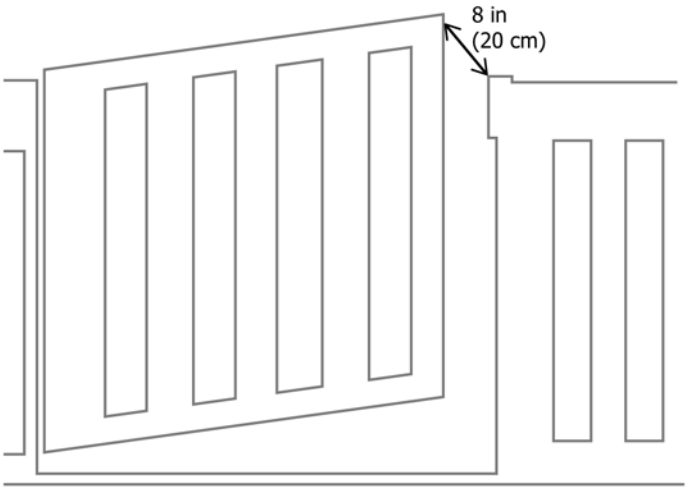


FIG. 6 Open Egress Panel

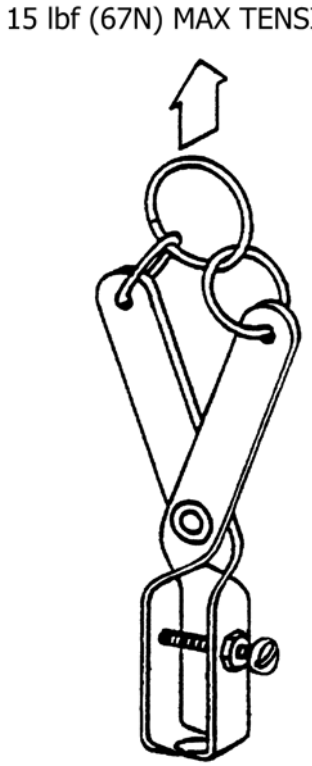


FIG. 7 Tension Test Adapter/Clamp

of contact occurred. Each location shall be tested five times and the five readings then shall be averaged.

(1) Tensile forces shall be applied to the side of the gate opposite to the side normally occupied by the child. The tensile force is applied by attaching a cord (such as a venetian blind cord) to the gate at each location.

(2) Whenever possible, the cord shall be attached by passing it through the gate and tying it around the frame or multiple components of the gate. If the frame or multiple components are not located at a test location, the force shall be applied by attaching the cord to the center of a hardwood block with a contact area of 6 by 6 in. (152 by 152 mm). When performing the test, one side of the block shall be aligned with the top or bottom of the gate; the center of the block shall be located 5 in. (127 mm) from the side of the opening and 3 in. (76 mm) from the top or bottom of the gate, as applicable.

(3) If the gate configuration does not allow the attachment of a cord per 7.9.1.4 (No. *(1)*), compressive forces shall be applied to the side of the gate normally occupied by the child. A compressive force may be applied through a hardwood block with a contact area of 1 by 2 in. (25 by 50 mm).

7.10 *Completely-Bounded Openings and Bottom Spacing (6.1.1 and 6.1.4):*

7.10.1 *For Testing Gates*—Securely install the gate in the test fixture in the manufacturer's recommended use position deemed most likely to cause failure. Pressure gates shall be rigidly connected to the test fixture in order to hold the gate in place during the test.

7.10.2 *For Testing Enclosures*—Assemble the enclosure in the manufacturer's recommended use position deemed most likely to cause failure and secure the section being tested to the floor such that it does not move during the tests below.

7.10.3 Into each completely bounded opening or bottom space, insert the tapered end of the Small Torso Probe, shown in Fig. 2, in the most adverse orientation and in the locations deemed most likely to fail. Apply a 25 lbf (111 N) perpendicular to the base of the probe. The force shall be applied gradually within 5 s and maintained for an additional 10 s.

NOTE 4—The probe can be either pushed or pulled into the opening.

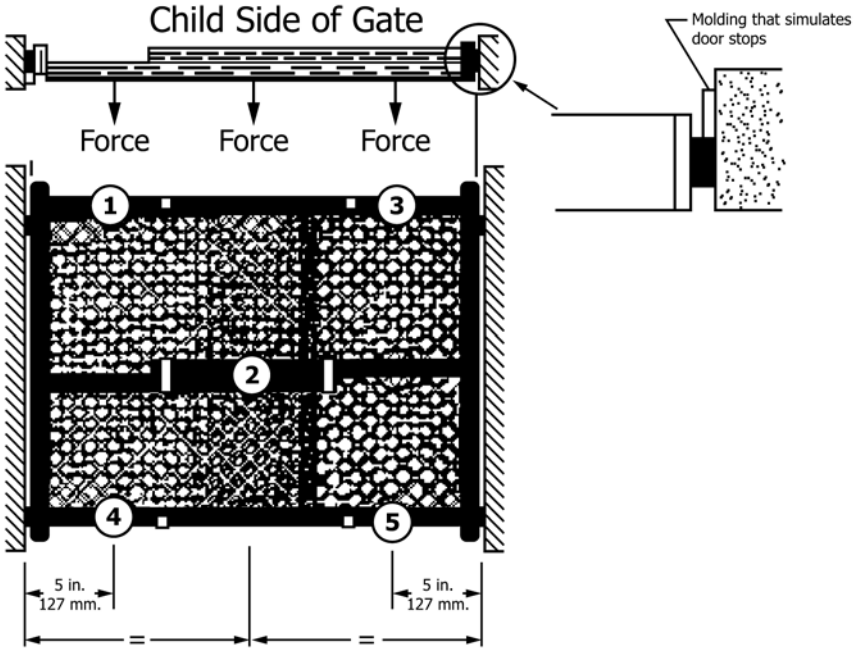
7.11 *Partially-Bounded Openings at the Uppermost Edge (6.1.5):*

7.11.1 Place Test Template B (see Fig. 4) vertically downward into the opening with its center line vertical and the plane of the template parallel to the plane of the opening, until downward motion is arrested by contact between the test template and the boundaries of the opening. By visual inspection, determine if there is simultaneous contact between more than one of surfaces "B" or "C," or corners "BC" or "CC," in any combination, that are on opposite sides of the template center line.

7.11.2 If the opening conforms to the requirements, but is not symmetrical about a vertical centerline, perform the following additional test:

7.11.2.1 Rock the template sideways (parallel to the plane of the opening), while maintaining contact between the boundary of the opening and surface "A" or corners "AB," or both. The rocking motion shall be terminated when there is either contact between a boundary of the opening and a surface or corner of the template other than surface "A" or corners "AB," or until surface "B" attains a vertical orientation. Again, visually determine if there is simultaneous contact between more than one of surfaces "B" or "C," or corners "BC" or "CC," in any combination, that are on opposite sides of the template center line. If such contact occurs, the opening fails to conform to the requirement.

7.11.3 If a product contains any partially-bounded openings, which change their configuration if the product is erected to less than the maximum dimension claimed by the manufacturer, the test for conformance shall be repeated at the



NOTE 1—For Locations 1 and 3, force is applied at the top edge.

FIG. 8 Location of Force Application

minimum dimension and, at the discretion of the test personnel, at any dimension between the claimed minimum and maximum.

7.11.4 For any product in which the uppermost edge is a nonrigid member, the visual inspection for conformance to the requirement shall be performed when a force of 30 lbf (134 N) is applied vertically downwards to Test Template B (see Fig. 4).

7.12 *Label Testing (5.8):*

7.12.1 A paper label (excluding labels attached by a seam) shall be considered permanent if, during an attempt to remove it without the aid of tools or solvents, it cannot be removed, it tears into pieces upon removal, or such action damages the surface to which it is attached.

7.12.2 A nonpaper label (excluding labels attached by a seam) shall be considered permanent if, during an attempt to remove it without the aid of tools or solvents, it cannot be removed or such action damages the surface to which it is attached.

7.12.3 A warning label attached by a seam shall be considered permanent if it does not detach when subjected to a 15-lbf (67-N) pull force applied in any direction using a ¾-in. (19-mm) diameter clamp surface.

7.12.4 Adhesion test for warnings applied directly onto the surface of the product.

7.12.4.1 Apply the tape test defined in Test Method B (Cross-Cut Tape Test of Test Methods D3359) eliminating parallel cuts.

7.12.4.2 Perform this test once in each different location where warnings are applied.

7.12.4.3 The warning statements will be considered permanent if the printing in the area tested is still legible and attached after being subjected to this test.

7.12.5 A nonpaper label, during an attempt to remove it without the aid of tools or solvents, shall not be removed or shall not fit entirely within the small parts cylinder defined in 16 CFR 1501 if it can be removed.

8. Marking and Labeling

8.1 Each gate/expandable enclosure shall have a permanent label or marking that identifies the name and address (city, state, and zip code) of either the manufacturer, distributor, or seller.

8.2 A permanent code mark or other product identification shall be provided on the gate/expandable enclosure and its package or shipping container, if multiple packaging is used. The code will identify the date (month and year as a minimum) of manufacture and permit future identification of any given model.

8.3 The manufacturer shall change the model number of the gate/expandable enclosure whenever it undergoes a significant structural or design modification or change which affects its conformance to this specification.

8.4 Each gate/expandable enclosure shall be labeled with warning statements. The warning statements shall be in contrasting color(s), permanent, conspicuous, and in sans serif style font. The warnings shall appear in the English language at a minimum.

8.4.1 Letters burned in wood are considered contrasting.

8.4.2 In warning statements, the Safety Alert Symbol ⚠ and the signal word “WARNING” shall not be less than 0.2 in. (5 mm) high and the remainder of the text shall be in characters whose uppercase shall not be less than 0.1 in. (2.5 mm) high except as otherwise specified.

8.5 Warning statements on the product shall address the following:

8.5.1 Children have died or been seriously injured when [gates/enclosures] are not securely installed. ALWAYS install and use [gates/enclosures] as directed using all required parts.

NOTE 5—The words in the brackets provide a wording option. The label should contain the word "gate" or "enclosure," whichever is correct.

8.5.2 STOP using when a child can climb over or dislodge the [gate/enclosure].

NOTE 6—The words in the brackets provide a wording option. The label should contain the word "gate" or "enclosure," whichever is correct.

8.5.3 *Pressure-mounted gates that have single action locking mechanisms on one side of the product* shall have a warning located on a vertical surface on the side with the locking mechanism stating: Install with this side AWAY from child.

8.5.4 *For enclosures with locking/latching mechanisms*: Use only with the [locking/latching] mechanism securely engaged.

NOTE 7—The words in the brackets provide a wording option. The label should contain words appropriate to the mechanism.

8.5.5 *For gates that do not meet the test requirements of 6.3.2:* To prevent falls, never use at top of stairs.

8.5.6 *NEVER use to keep child away from pool.*

8.6 The retail package for gates shall state recommended age of the user of the product, that the product is not to be used with a child able to climb over or dislodge/open the gate, and for gates that fail the test requirements of 6.3, the warning in 8.5.5. The warnings and statements are not required on the retail package if they are on the product and visible in their entirety and are not concealed by the retail package. Cartons and other materials used exclusively for shipping the product are not considered retail packaging.

8.6.1 Retail packaging shall state the applicable opening sizes for the product.

9. Instructional Literature

9.1 Instructions shall be provided with the gate/expandable enclosure and shall be easy to read and understand. The instructions shall include all warning statements required in 8.5 as well as assembly, operating, folding, maintenance, and cleaning instructions as applicable.

9.2 Installation instructions for gates shall include a statement of the limitations regarding the use of any included mounting hardware and information regarding where to install the gate, relative to the floor.

9.3 Instructions shall include all warnings in accordance with Section 8.

9.4 Instructions shall define the applicable opening sizes for which the product is to be used.

10. Keywords

10.1 enclosure; expandable enclosures; expansion gates; gates

APPENDIXES

(Nonmandatory Information)

X1. RATIONALE

X1.1 History of Consumer Safety Specification F1004

X1.1.1 Task group F15.22 formed in May 1982 to address fatalities and injuries involving young children as a result of the use of expansion gates and expandable enclosures. The task group was similar to other F15 task groups developing consumer product safety performance standards for juvenile products, having representatives from the Consumer Product Safety Commission, the Juvenile Products Manufacturers Association, manufacturers, consumers, the Consumers Union, ASTM staff, and interested parties from the academic community. The group based this rationale on notes taken during its meetings, as well as the minutes of those meetings.

X1.1.2 The history of this product category dates back to the end of the 1800s. Today, intense competition exists in this industry.

X1.1.3 The task group defined products on the market at the time of its initial meeting (in 1982) as "gates" (mesh-type/pressure-mounted gates and accordion-style gates). At that meeting, the group identified the hazards to be addressed as: injuries or deaths as a result of head entrapment and strangulation of children when their heads or necks were entrapped in the V-shaped and diamond-shaped openings on accordion-style gates; and injuries or deaths as a result of the tendency of children to climb up and over gates. The task group based its identification of hazards of CPSC documents (a briefing package to CPSC commissioners from the product identification team of CPSC staff). The CPSC commissioners decided that if a safety standard were developed it should address these hazards and not merely be a "hang-tag" and, that it should address foreseeable misuse, as well as include a better system of marking the product. The task group also decided to look at known hazards in products being marketed currently, rather than look at the hazards resulting from old products.

X1.1.4 The task group, thus approved unanimously the following: that the task group develop a standard; that "corrals" (expandable enclosures) be addressed in this specification rather than in Consumer Safety Specification F406; and, that this product is meant for children and not for pets.

X1.1.5 The subject of corrals developed outside the task group, namely on the basis of discussions between the manufacturers and the CPSC. This discussion resulted in a voluntary

suspension of the manufacturing of corrals in September 1982. (Corrals, however, are addressed with this consumer safety specification under the category of expandable enclosures.)

X1.2 *Discussion of Items in This Consumer Safety Specification:*

X1.2.1 *Title*—The title of this consumer safety specification evolved from the original title and appears more descriptive of the product as it now reads.

X1.2.2 *Introduction*—The hazards itemized in the introduction to this consumer safety specification are based on data provided by CPSC. The scenarios of head and neck entrapment were suggested as follows: the child may climb the gate and slip or manages otherwise to get the head at the neck or the neck into the V-shaped opening at the top of the gate or enclosure, and the child may get his or her head or neck into the diamond-shaped opening of the body of the gate or enclosure. Additional accidents result from design enabling children to climb over or under the gate or enclosure or from other interactions with the product.

X1.2.3 *Scope:*

X1.2.3.1 *Young Children*—The group felt it had to use the adjective "young," since the product is meant for the age group from 6 months to 24 months. (Whereas, by legal definition other age groups are considered "children." BS 4125 states the adjective "young," as well.)

X1.2.3.2 *Six Months Age Group*—Six months was chosen using as rationale information about motor skills and anthropometric data. Children begin to sit unassisted at this age and do not require this product at a younger age. The upper limit of 24 months is the same as stated in BS 4125. Consideration was given to anthropometric data for 24-month-old children as well. Children over 24 months may be too tall, too heavy, and too strong to be effectively retained by these products.

X1.2.3.3 The task group felt that the consumer could misinterpret some labels that give the upper age limit. The group felt that a label stating " . . . through 24 months" or ". . . to 24 months," could be interpreted by the consumer as inclusive of the 24th month; whereas, it felt that wording stating ". . . up to 24 months" would better describe the intent to exclude the 24th month. The actual effect with respect to this consumer safety specification is the same regardless of the wording used. It was stated that anthropometric data are viewed in terms of a three-month range, for example, one that includes the 23rd through the 25th month.

X1.2.3.4 The task group discussed whether corrals are play yards and whether they should be addressed in this consumer safety specification or in Consumer Safety Specification F406. Because both products serve to confine the child, the task group questioned whether corrals should therefore be considered for exclusion from the play yard standard. The task group concluded that this was not necessary. While some manufacturers refer to their products as "play fences" or similar names, no manufacturer actually calls it a "play yard" or "playpen," nor does any manufacturer recommend it as a play yard. There is a large degree of conflict in the design of a corral versus the design of a play yard. Beyond the above considerations the definition if 3.1.6 is self-explanatory. All other definitions in the scope are considered self-explanatory.

X1.2.4 *General Requirements:*

X1.2.4.1 The wording in 5.1 does reflect that major components of this product are wood, rigid, or semirigid plastics, although all-metal gates also exist.

X1.2.4.2 The requirements in 5.2 was suggested by the CPSC. It was based on information they obtained suggesting that such locking or attaching devices, which shall be removed during the product's operation (or daily operation) could be encountered in the market place. The wording "daily operation" was thought to be a necessary statement to differentiate it from the actual assembly or original mounting of the product. The term "screws or of a similar nature" reflect the concern that use of "sheet metal screws," for example, could be a substitute for wood screws should the specification be restrictive of wood screws only. Refastening an important component of the product with the same wood screws initially used is not recommended. Unless wood screws of a larger size are used, the refastening may be inadequate. (This requirement originally was part of the performance requirements section and was moved to this general requirements section.)

X1.2.4.3 The requirement in 5.5 aims to prevent finger and toe entrapment. This requirement addresses accessible holes, slots, or cracks in gates or expandable enclosures intended for children 6 to 24 months of age. These dimensional requirements are standard for many juvenile products. This subcommittee is not aware of incident data that would support a change to these dimensions.

X1.2.4.4 Warnings are required to be permanent since they contain essential safety information, which should remain with the product.

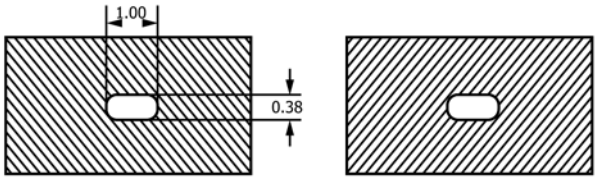
X1.2.4.5 Non paper labels fall with the scope of 16 CFR 1501, therefore, they must not liberate small parts. Nonpaper labels that tear upon removal are considered labels that may liberate a small part. Paper and fabric labels, other than paper and fabric warning labels, are not required to be permanent since paper and fabric are exempt from the requirements of 16 CFR 1501. There is no choking incident data associated with paper and fabric labels.

X1.2.4.6 Many gate designs include more than one panel; therefore the requirement in 5.5.1 includes holes and openings created by multiple wall sections. The "total thickness" includes any air gaps that may be present between the panels.

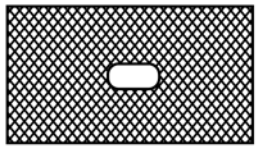
X1.2.4.7 An opening that fails the test for size (using the .210 - .375 rule) but is defined by two wall surfaces with a total thickness less than 0.375 in., will pass 5.5. Yet, this design would present a potential entrapment hazard for small fingers.

X1.2.4.8 Consider a ⅛-in. thick surface with a 0.375-in. wide by 1.000-in. long slot. Alone this presents no finger entrapment hazard and passes the standard as written. If we place an identical piece on top of it (aligning the slots), we now have a thicker surface but it still doesn't present a hazard and passes.

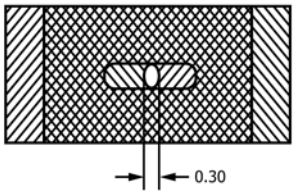
X1.2.4.9 Now, assume we were to slide the panels causing the resulting opening from the slots to shorten in length from 1 to 0.300 in. long. The resulting opening creates a potential finger entrapment hazard, yet it passes the standard since it is



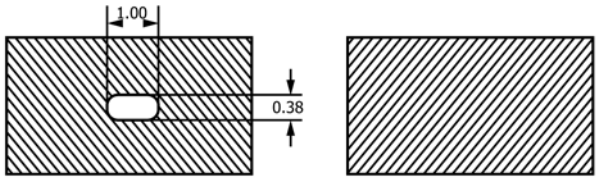
The drawing above shows two flat panels (1/8" thick) each with a slot measuring 3/8" wide × 1" long. Each panel passes the requirement for holes and openings.



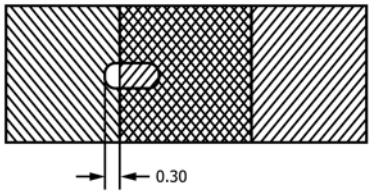
The middle drawing shows the same two panels stacked together with the slots aligned. The panels now create a wall that is 1/4" thick but still passes the requirement.



The bottom drawing shows the two panels stacked together but the slots are not aligned. The configuration does not pass the requirement for Openings unless the total thickness of the two panels, including any air gap, is greater than 3/8".



The top drawing shows two flat panels, each (1/8" thick), one with a slot measuring 3/8" wide × 1" long. Each panel passes the requirement for holes and openings.



The bottom drawing shows the two panels stacked together. This configuration results in a hole or opening that does not pass the requirement for Openings unless the total thickness of the two panels, including any air gap, is greater than 3/8".

FIG. X1.1 Openings Created by Two or More Panels

created by two surfaces or material thickness. Fig. X1.1 shows a visual representation.

X1.2.5 *Performance Requirements:*

X1.2.5.1 For further explanation of 6.1, see Small Torso Template A in 7.10.

X1.2.5.2 The height of 22 in. (560 mm) stated in 6.1.2 was judged to be approximately the proper height to retain a child of the specified age group. During the early stages of the development of this consumer safety specification, the maximum child age of 30 months corresponding to a maximum

child height of 34 in. was considered. This was later changed to a maximum child age of 24 months. According to a statement by a member of Committee F15, the height of the sides of gate should be about ¾ (or 80 %) of the height of the maximum age child.

X1.2.5.3 The explanation of 6.1.5 as stated in 3.1.13 defines the term "partially-bounded opening." The dimensions for the templates and the procedure were suggested by the CPSC, and Fig. 3 shows the use of the template with respect to its orientation when applied to the product.

X1.2.6 *Test Methods:*

X1.2.6.1 The 45-lbf (200-N) static vertical force in 7.8.1 represents a minimum force requirement. This force was considered by the task group to be somewhat greater than a force or load that can be applied by a child of maximum user age.

X1.2.6.2 The basic intent of 7.8.1 and 7.8.2 is to test for safety from possible dislodgment of the gate or enclosure. The test load in essence should stimulate the effects of the child's weight and the resultant forces that could dislodge a gate or enclosure.

X1.2.6.3 Small Torso Template A, referred to in 7.10, was modified in 2000 to address incidents of children passing through gate openings feet first and becoming entrapped by the head.

X1.2.6.4 For all practical purposes, this template is two-dimensional, although the text accompanying the drawing notes a minimum thickness of ⅛ in. (3.18 mm). This dimension merely provides adequate rigidity to the template.

X1.2.6.5 The dimensions of Test Template B are supported by the rationale contained in a CPSC memo drafted in 1985. This template has evolved from earlier templates of similar shapes and dimensions. As it now measures, it should address head/neck entrapment in V-shaped or diamond-shaped openings as its primary function. Appendix X2 is the text of that memo.

X1.2.6.6 Push-out testing of pressure-gates addresses incidents of gates pushing out of openings. Installation force is specified, and readings are averaged to achieve consistency in test results. The test method was evaluated in round robin testing. The 30-lb limit was determined based on European standards, and limited child strength data. It is also consistent with CPSC recommendations.

X1.2.6.7 The intent of the minimum push-out force requirement in 6.3.1 is to assure that gates will perform to at least a minimum standard at the minimum and maximum opening sizes recommended by the manufacturer.

X1.2.6.8 Push-out testing includes all gates rather than just pressure mounted gates to assure that all types of gates are tested to the push-out requirements.

X1.2.6.9 The force applied during the push-out test was reduced from 100 lbf (445 N) to 45 lbf (100 N) to more closely reflect the forces that a young child could apply to the product.

X2. CPSC MEMO ON VOLUNTARY STANDARDS FOR GATES AND ENCLOSURES

X2.1 This memorandum responds to your request for assistance in developing recommendations for a new template to address head entrapment in "V" shapes along the top edges of the subject products.

X2.2 In order to design a new template, the ages of the intended users of the product must first be identified. The latest draft voluntary standard (September 19, 1984) states that these products are intended to restrain children from 6 to 24 months of age. There have been 43 head entrapment incidents in both gates and enclosures which involved children between 9 months and 31 months of age (see Fig. X2.1 and Fig. X2.2). The five victims, 24 months of age and over, were reported to be: a child approximately 1-½ to 2 years of age;[5] a 24-month-old;[6] a 25-month-old;[7] a 27-month-old child who stopped using an enclosure at 18 months of age but who was attempting to climb over the product to visit an infant inside the enclosure;[8] and a 31-month-old child with Down's Syndrome,[9] a type of mental retardation;[10] therefore, all the victims, 24 months of age and over, for whom the product was being used, were close to 24 months of age, except the child with impaired capabilities. In addition, the products in question are not needed much beyond 24 months of age since a 24-month-old generally can be trusted alone on stairs;[11] thus, we believe that the 6- to 24-month intended age, as proposed by the voluntary standard, is adequate.

X2.3 In order for a template to address head/neck entrapment in "V" shapes, it must screen out nonhazardous openings with angles that are either too narrow to admit the smallest user's neck, or too wide to entrap the largest user's head.

X2.4 The neck breadth of the smallest user (a 5th percentile 6-month-old) is 2.0 in.[12] Approximately 25 % of this figure should be subtracted to allow for tissue compression; therefore, openings less than 1.5 in. in width would not admit a child's neck.

X2.5 The head size of the largest user (a 95th percentile 24-month old) has several components including head height, which is 7.0 in., head breadth, which is 5.6 in., and angle under chin and jaw, a dimension which is unavailable at this time;[13]

[5] In-depth Investigation (IDI) #800507CEP0807; Consumer Complaint #CC40496.

[6] IDI #821206HIA2061.

[7] Death Certificate #541003882.

[8] IDI #811006SF00001.

[9] IDI #840327CBC3136.

[10] Dorland's Illustrated Medical Dictionary, 24th Edition, pp. 447 and 938.

[11] Caplan, Frank, The Second Twelve Months of Life, p. 300.

[12] Data Cell 4–6 Months, December 4, 1984, University of Michigan, "Preliminary Report on Manual Measurement Results."

[13] Data Cell 19–24 Months, December 4, 1984, University of Michigan, "Preliminary Report on Manual Measurement Results."

however, the angles of the "V"s and diamonds in which head entrapment occurred are known for some incidents. Two of these incidents occurred in openings having angles greater than 70°, the angle referred in the latest draft voluntary standard. One of the incidents occurred in a diamond shaped opening with a 77° angle when the child was reaching for a toy on the other side of the gate.[14] While the information in the in-depth investigation is unclear, we believe that the child may have had his head, neck, and arm through the opening. The other incident was a death that occurred in a diamond shaped opening with a 71° angle.[15] The marks left on the back of each jaw indicates that the child's arm was not a factor in this case. This incident supports our original recommendation that openings with angles less than approximately 75° may entrap a child's head.

X2.6 Therefore, a template to address head entrapment in "V" shapes should combine the smallest user's neck breadth with the largest user's head height, head breadth, and with an angle larger than the largest angle of a "V" or diamond which has entrapped a child's head. Fig. X2.3 is our recommended template for addressing head entrapment in "V"s which combines the dimensions stated above. Fig. X2.4 illustrates some examples of "passes" and "failures" using the template.

[14] IDI #790516CEP0817.
[15] IDI #841017WES0012.

Case/ Source	Date of Incident	Diagnosis		Victim		Opening Shape			Secured/ Surface	Approximate Angle (°)
		Fatal	Non-Fatal	Age	Sex	Vee	Diamond	NOS		
760803BEP7004	6/76		X	16 Mo.	M		X		No/Porch	NOS
800423CEP0001	2/8/80		X	14 Mo.	M	X			No/House	69°
831221IICC2018	6/80		X	13 Mo.	F		X		NOS/Grass	NOS
800903CEP0009	8/25/80		X	1 Yr.	M		X		NOS/Grass	NOS
810814IIIA2524	9/5/80	X		14 Mo.	M	X			No/House	48°
810514BOSO417	5/7/81	X		14 Mo.	F	X			No/Porch	39°
820511CEP1178	4/24/82		X	13 Mo.	F		X		No/Grass	65°
821005IIIA1002	8/15/82	X		12 Mo.	F	X			No/House	58°
83122IIICC1056	12/24/82		X	14 Mo.	F	X			No/House	53°
840210CAA3103	1/83		X	10 Mo.	F		X		No/House	49°
CC II400014A1	1/84		X	18 Mo.	NOS			X	NOS	NOS
840327CDC3136	1/84		X	27 Mo.	M	X			No/House	42°
Totals - 12	**'76-'84**	**3**	**9**	**10-27 Mo.**	**M-5 F-6 NOS-1**	**6**	**5**	**1**	**9-No 0-Yes 3-NOS**	**39-69°**

CC = Consumer Complaint
NOS = Not Otherwise Stated

Source: U.S. Consumer Product Safety Commission
Directorate for Epidemiology
Division of Human Factors

FIG. X2.1 Entrapment in Expandable Enclosures (Date—12/84)

Case/ Source	Date of Incident	Diagnosis		Victim		Opening Shape			City/ State	Approximate Angle (°)
		Fatal	Non-Fatal	Age	Sex	Vee	Diamond	NOS		
CC F4A0176	1975		X	NOS	M	X			Meridian/ID	NOS
DC 541003882	3/8/75	X		2 Yr.	M			X	Medford/OR	NOS
DC 755200762	2/9/77	X		14 Mo.	M			X	Milwaukee/WI	NOS
800507CEP0807	1977		X	2 Yr.	F	X			San Diego/CA	NOS
DC 842016422	2/7/78	X		16 Mo.	M			X	Erie/PA	NOS
790517H1A0872	3/13/79		X	18 Mo.	F	X			Edon/OH	NOS
790516CEP0017	5/7/79		X	1 Yr.	M		X		Bellevue/WA	77°
CC H490261A1	9/11/79		X	12 Mo.	F			X	North East/PA	NOS
811103SF00001	10/19/79	X		16 Mo.	F	X			Richmond/CA	33°
CC H090115	1980		X	14 Mo.	M			X	Greenlane/PA	NOS
800908CEP0012	3/21/80		X	13 Mo.	F		X		Cincinnati/OH	NOS
CC H0C0204	11/1/80		X	11 Mo.	F			X	Holden/MA	NOS
810304HIA1167	2/10/81		X	11 Mo.	F		X		Rochester/NY	NOS
CC H120289	2/24/81		X	9 Mo.	M			X	Herndon/VA	NOS
810522H1A3359	4/14/81		X	14 Mo.	M		X		El Granada/CA	53°
810527H1A3367	5/81		X	20 Mo.	M	X			Shingle Spgs/CA	52°
811006SF00001	10/3/81	X		2 Yr.	F	X			Pittsburg/CA	40°
820122WES000 1	12/17/81	X		18 Mo.	F	X			Lake LA/CA	48°
820830H1A3182	5/82		X	11 Mo.	M	X			Twin Falls/IO	55°
820901CH10733	8/31/82	X		16 Mo.	F	X			Milwaukee/WI	47°
820915WES001 2	9/9/82		X	14 Mo.	F		X		Alameda/CA	57°
821014NYC5010	9/24/82		X	9 Mo.	F		X		Waterbury/CT	59°
821126CEP3018	11/4/82		X	11 Mo.	M		X		Cupertino/CA	53°
821206H1A2061	11/12/82		X	2 Yr.	F		X		Louisville/KY	53°
830323DAL5057	3/15/83		X	13 Mo.	M	X			Belton/MO	41°
830001CHI1050	7/26/83		X	15 Mo.	F		X		Chicago/IL	53°
831109NYC5026	10/12/83		X	11 Mo.	M		X		Lansdowne/PA	NOS
CC H3A0151A0	10/19/83		X	NOS	F		X		Chicago/IL	NOS
840326OAL4077	3/20/84		X	14 Mo.	M	X			Roseland Park/KS	NOS
840724HCC1317	7/12/84		X	14 Mo.	M		X		Toledo/OH	60°
841017WES001 2	10/4/84	X		11 Mo.	M		X		Meridian/ID	71°
Totals - 31	**'75-'84**	**8**	**23**	**9 Mo.- 2 Yr.**	**M-16 F-15**	**11**	**13**	**7**		

CC = Consumer Complaint
DC = Death Certificate
NOS = Not Otherwise Stated

Source: U.S. Consumer Product Safety Commission
Directorate for Epidemiology
Division of Human Factors

FIG. X2.2 Entrapment in Accordion Style Gates (Date—11/84)

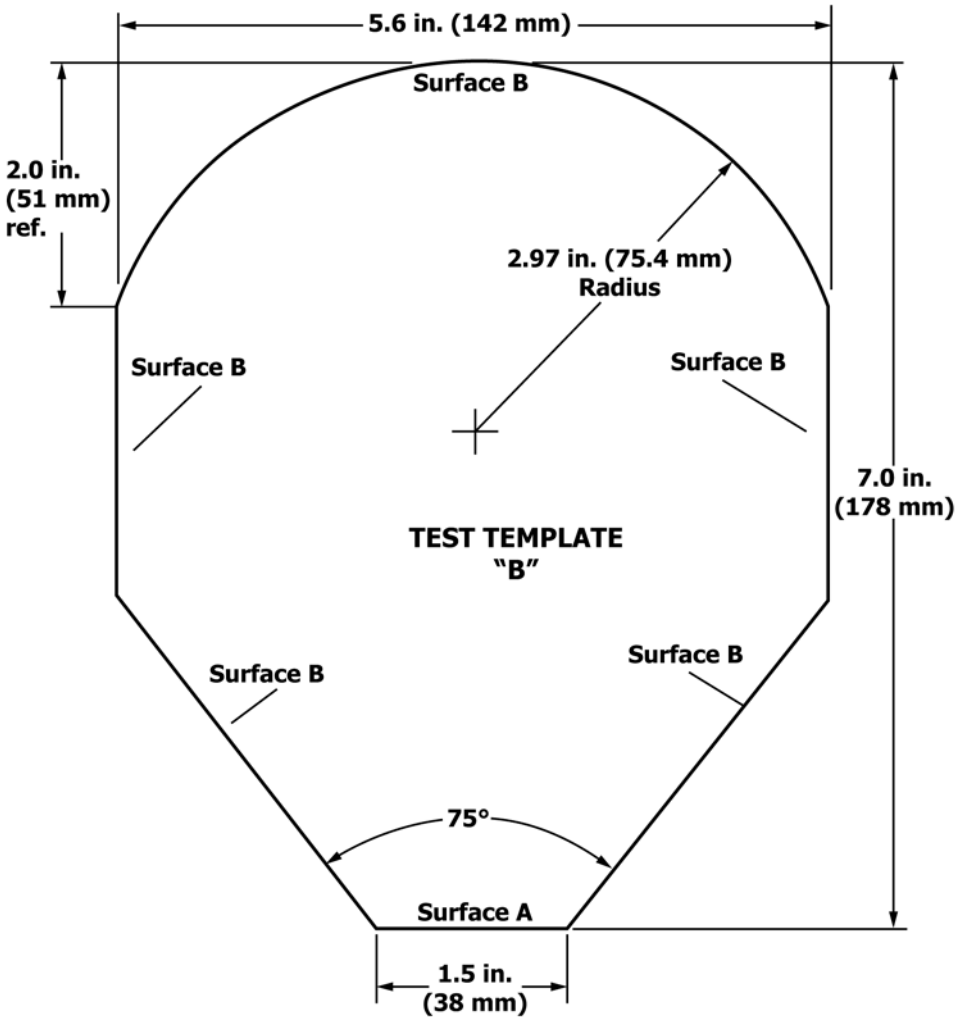


FIG. X2.3 Recommended Template for Addressing Head Entrapment in "V"s

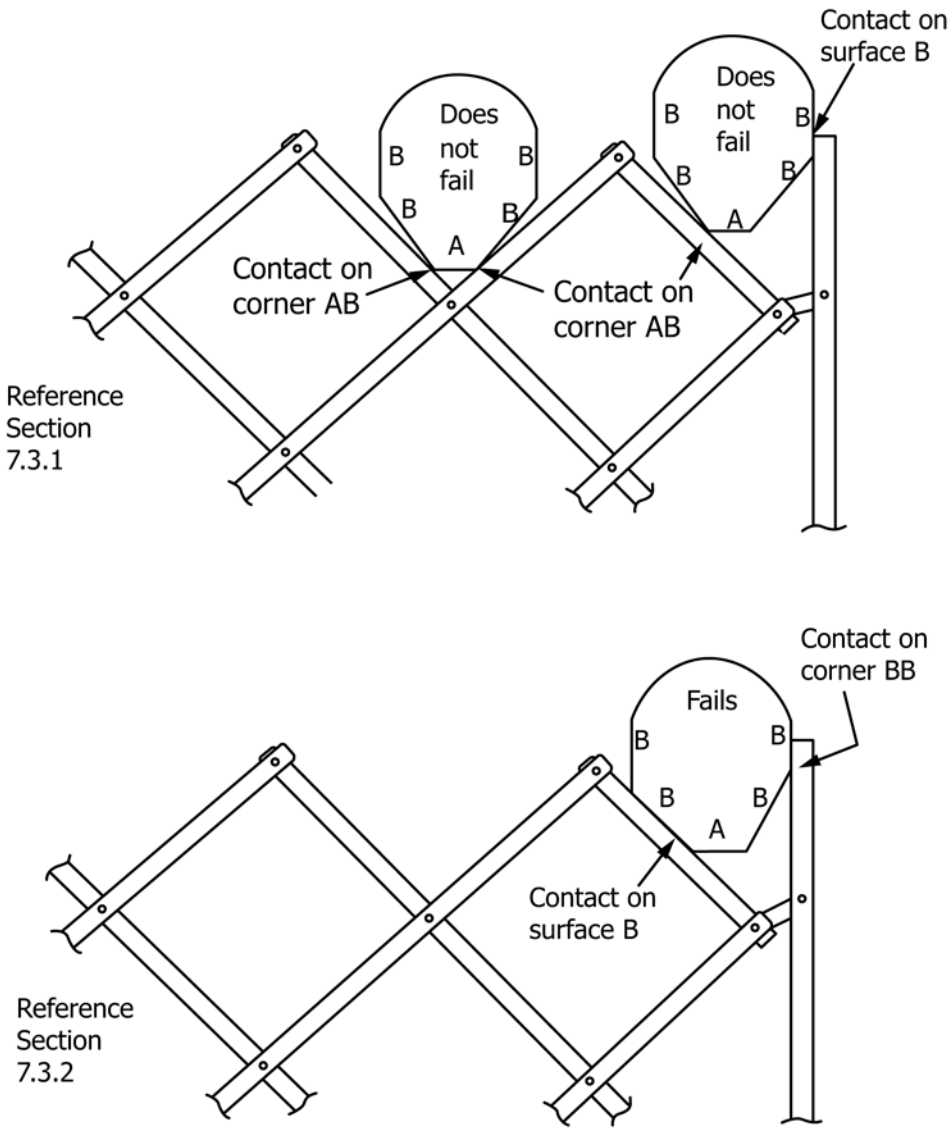


FIG. X2.4 Examples of Passes and Failures to the Suggested Requirement for Configuration of Uppermost Edge Using Test Template B