



Standard Consumer Safety Specification for Portable Hook-On Chairs¹

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INTRODUCTION

This consumer safety specification addresses incidents associated with portable hook-on chairs (chairs) that were identified by the United States Consumer Product Safety Commission (CPSC).

CPSC has identified injuries which occurred when chairs fell because the child pushed off the table, components of the chair became detached or broke, and, to a lesser extent, when the table to which the chair was attached tipped over. In response to a review of the data received by the CPSC, this specification attempts to minimize the following: falls due to detachment of the chair from the table or due to breakage or detachment of components; a child falling out of the chair; and chair and table tipping over.

This specification does not cover chairs that are either blatantly misused or are used in a careless manner that disregards the warning statements and safety instructions provided with each chair. This specification is written within the current state-of-the-art of chair technology. It is intended that this specification will be updated whenever substantive information becomes available that necessitates additional requirements or justifies revising the existing requirements.

1. Scope

1.1 This specification covers the performance requirements and test methods designed to ensure the satisfactory performance of the portable hook-on chair.

1.2 This specification is intended to minimize injuries to children resulting from normal use and reasonably foreseeable misuse or abuse of chairs.

1.3 For the purposes of this specification a chair is:

1.3.1 A seat made for the express purpose of seating and holding a child who can remain in a sitting position due to his or her own coordination.

1.3.2 Usually a legless seat constructed to locate the occupant at a table in such a position and elevation so that the surface of the table can be used as the feeding surface for the occupant.

1.3.3 Supported solely by the table on which it is mounted. These chairs are intended for use by children between the ages of six months and three years and who weigh no more than 37 lb (16.8 kg) (95th percentile male at three years).

1.4 No chair produced after the approval date of this consumer safety specification shall, either by label or other

means, indicate compliance with this specification unless it conforms to all applicable requirements contained herein.

1.5 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.

1.6 The following precautionary caveat pertains to the test methods portion only, 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*:²

[D3359 Test Methods for Measuring Adhesion by Tape Test](#)

2.2 *Federal Regulations*:

[16 CFR 1303 Ban of Lead-Containing Paint, and Certain Consumer Products Bearing Lead-Containing Paint](#)³

¹ This 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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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 U.S. Government Printing Office, N. Capital and H Streets, NW, Washington, DC 20401.

16 CFR 1500 Hazardous Substances Act Regulations including sections:

1500.48 Technical Requirements for Determining a Sharp Point in Toys or Other Articles Intended for Use By Children Under Eight Years of Age³

1500.49 Technical Requirements for Determining a Sharp Metal or Glass Edge in Toys or Other Articles Intended for Use By Children Under Eight Years of Age³

1500.50.52 Test Methods for Simulating Use and Abuse of Toys and Other Articles Intended for Use by Children³

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 Parts³

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *conspicuous*—a label that is visible when the portable hook-on chair is in a manufacturer’s recommended use position to a person standing near the chair at any one position but not necessarily visible from all positions.

3.1.2 *fabric*—any woven, knit, coated, laminated, extruded or calendered flexible material that is intended to be sewn, welded, heat sealed or glued together as an assembly.

3.1.3 *manufacturer’s recommended use position*— any position that is presented as a normal, allowable, or acceptable configuration for the use of the product by the manufacturer in any descriptive or instructional literature. This specifically excludes positions that the manufacturer shows in a like manner in its literature to be unacceptable, unsafe, or not recommended.

3.1.4 *nonpaper label*—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.

3.1.5 *occupant*—that individual who is in a product that is set up in one of the manufacturer’s recommended use positions.

3.1.6 *passive crotch restraint*—a component that separates the openings for the legs of the occupant into two separate bounded openings and requires no action on the part of the caregiver to use, except to position one leg into each opening created by the component.

3.1.7 *paper label*—any label material that tears without the aid of tools and leaves a fibrous edge.

3.1.8 *seam*—a means of joining fabric components such as sewing, welding, heat sealing or gluing.

3.1.9 *static load*—a 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 that may be covered with 1/8 in. (3 mm) thick vinyl flooring covering, unless test instructs differently.

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

4.5 All testing required by this specification shall be conducted on the same unit.

5. General Requirements

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

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

5.3 The paint and surface-coatings on the product shall comply with 16 CFR 1303.

5.4 Prior to testing, any exposed wood parts shall be smooth and free from splinters.

5.5 *Latching or Locking Mechanisms*—Any unit that folds shall have a latching or locking device or other provision in the design that will prevent the unit from unintentionally folding when properly placed in the manufacturer’s recommended use position. The unit shall remain in its manufacturer’s recommended use position during and upon completion of the test in accordance with 7.3. If a unit is designed with a latching or locking device, that device shall remain engaged and operative after testing.

5.6 *Scissoring, Shearing, and Pinching:*

5.6.1 A portable hook-on chair, when in a manufacturer’s recommended use position installed per the manufacturer’s instructions on the minimum test surface described in 7.1.16.4, shall be designed and constructed so as to prevent injury to the occupant 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 throughout the range of motion of such parts.

5.6.2 *Disengagement from Table Support Surface*—Scissoring, shearing, or pinching that may cause injury shall not be permissible when an opening in the spaces described below admits a probe greater than 0.210 in. (5.33 mm) and less than 0.375 in. (9.53 mm) in diameter at any accessible point throughout the range of motion that occurs during the test outlined in 7.13.

(1) between the edges of any rigid part of the product and the test surface, or

(2) between the edges of any two rigid parts on the product that rotate about a common axis or fastening point.

5.7 *Exposed Coil Springs*—Any exposed coil spring that is accessible to the occupant, having or capable of generating a space between coils of 0.210 in. (5.30 mm) or greater during

static load testing in accordance with 7.6, shall be covered or otherwise designed to prevent injury from entrapment.

5.8 *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 use positions.

5.9 *Labeling:*

5.9.1 Warning labels (whether paper or non paper) shall be permanent when tested in accordance with 7.11.

5.9.2 Warning statements applied directly onto the surface of the product by hot stamping, heat transfer, printing, wood burning, and so forth shall be permanent when tested in accordance with 7.11.

5.9.3 Nonpaper labels shall not liberate small parts when tested in accordance with 7.11.

5.10 *Protective Components*—If a child can grasp components between the thumb and forefinger, or teeth, (such as caps, sleeves, or plugs used for protection from sharp edges, points, or entrapment of fingers or toes), or if there is at least a 0.040 in. (1.00 mm) gap between the component and its adjacent parent component, such component shall not be removed when tested in accordance with 7.4.

6. Performance Requirements

6.1 *Chair Drop Test*—The chair shall permit subsequent tests and exhibit no mechanical hazards (sharp points, sharp edges, or small parts) when tested in accordance with 7.5.

6.2 *Static Load Test*—The chair shall support a static load on the seat without causing any hazardous conditions as identified within this specification when tested in accordance with 7.6.

6.3 *Seat and Seat Back Disengagement Test*—The seat back and seat shall remain fully attached to the frame of the chair when forces are applied in accordance with 7.7.

6.4 *Chair Bounce Test*—The chair shall remain attached to the standard test surface as described in 7.1.16 and allow no movement greater than 1 in. (25 mm) when forces are applied in accordance with 7.8.

6.5 *Chair Pull/Push Test*—The chair shall remain attached to the standard test surface when tested in accordance with 7.9.

6.6 *Restraint Systems:*

6.6.1 A restraint system shall be provided to secure a child in the seated position in each of the manufacturer’s recommended use positions.

6.6.1.1 The restraint system shall include both waist and crotch restraint. The crotch restraint shall be designed such that its use is mandatory when the restraint system is in use.

NOTE 1—It should be noted that this test applies to all designs of restraining systems, whether they be of the traditional “active” or of the “passive” type.

6.6.2 The restraint system and its closing means (for example, buckle) shall not break, separate or permit removal of the CAMI test dummy (see Fig. 2) from the chair when tested in accordance with 7.10.

6.6.2.1 If during the tests in 7.10 the posterior of the test dummy, with the force applied, is pulled past the front edge of the seat, the dummy shall be considered removed.

6.6.2.2 After the tests in 7.10.6 and 7.10.7, the CAMI dummy shall not be fully released.

6.6.3 The waist restraint shall be capable of adjustment with a positive self-locking mechanism that is capable, when locked, of withstanding the forces of tests in 7.10 without allowing restraint movement or slippage of more than 1 in. (25 mm).

6.6.4 A connecting means and adjustment means for the waist restraint shall be capable of usage independent of one another. The connecting means shall not be an adjustment means, but may have one integrally attached to it.

6.6.5 Before shipment, the restraining system must be attached to the chair in such a manner as to not become detached through normal use. For chairs requiring consumer assembly, buckles must be completely threaded and the restraining system must be attached to a component that would render the chair unusable if not properly assembled.

6.7 *Openings and Passive Crotch Restraint System:*

NOTE 2—A passive crotch restraint required by this section does not meet the restraint system requirement of 6.6.1.1, which requires a crotch restraint as part of the restraint system.

6.7.1 The hook-on chair shall have a passive crotch restraint that meets the following:

6.7.1.1 The passive crotch restraint shall be installed on the product at the time of shipment.

6.7.1.2 The leg openings on each side of the passive crotch restraint shall not allow complete passage of the wedge block when tested in accordance with 7.12.

6.7.2 Completely bounded openings in the surfaces that act as the sides of the seating area shall not allow complete passage of the wedge block when tested in accordance with 7.12.

6.7.3 Completely bounded openings that are located forward of the occupant shall not allow complete passage of the wedge block when tested in accordance with 7.12 (see Fig. 3).

6.7.3.1 Openings in the attachment structure of the product located under the standard test surface are exempt from this requirement (see Fig. 4).

7. Test Methods

7.1 *Test Equipment:*

7.1.1 A push-pull gage.

7.1.2 A CAMI Infant Dummy Mark II (see Fig. 2).⁴

7.1.3 Tension test adapter/clamp (see Fig. 5).

7.1.4 A 0.040 in. (1.00 mm) feeler gage.

7.1.5 A wood block 6 by 6 by ¾ in. thick (150 by 150 by 19 mm). In all cases where there is a hammock type seat, use the weld cap as described in 7.1.6.

⁴ CAMI Infant Dummy (Mark II), Department of Transportation, Federal Aviation Administration, Cami Infant Dummy, Drawing No. SA-100I, Memorandum Report AAC-119-74-14, Revision II, by Richard F. Chandler, July 2, 1974.

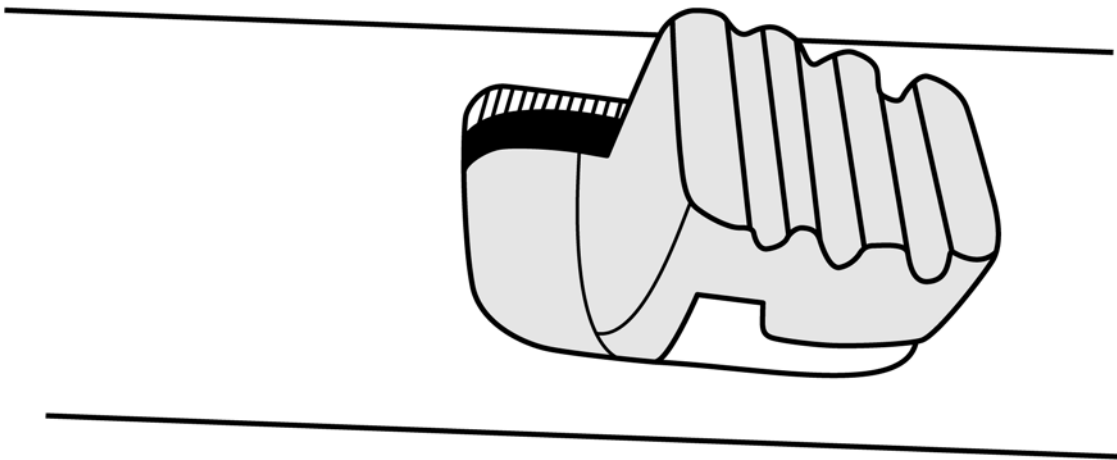
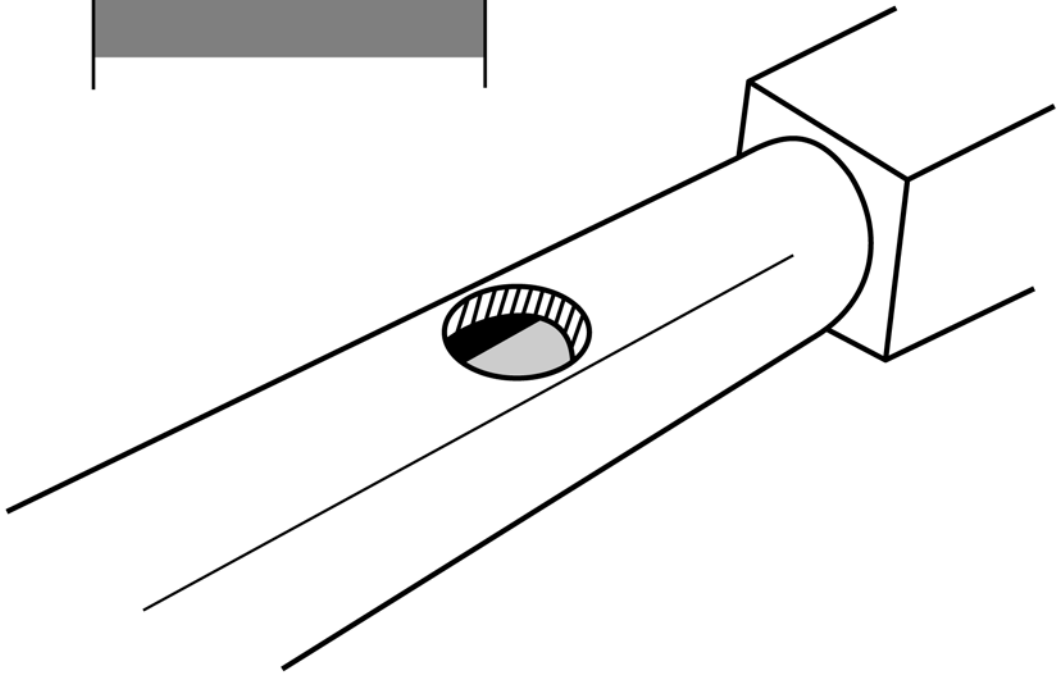
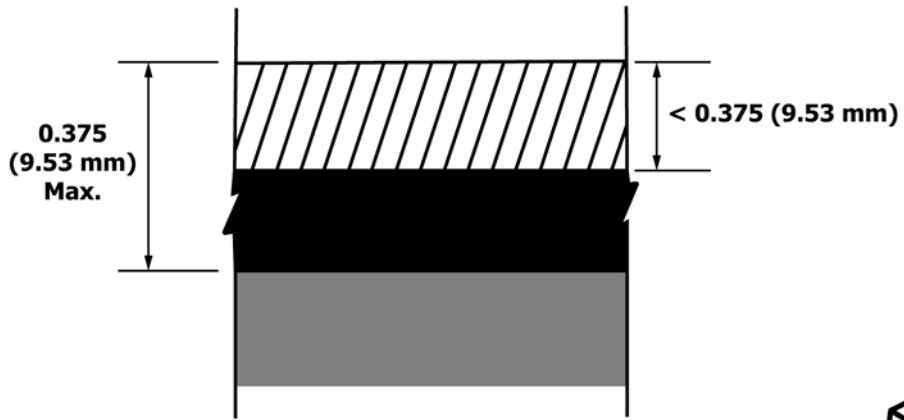


FIG. 1 Opening Example

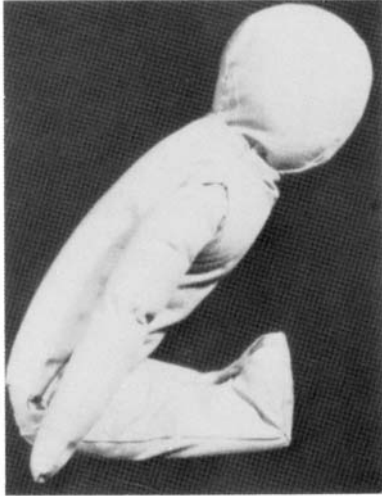


FIG. 2 CAMI Infant Dummy, Mark II⁶

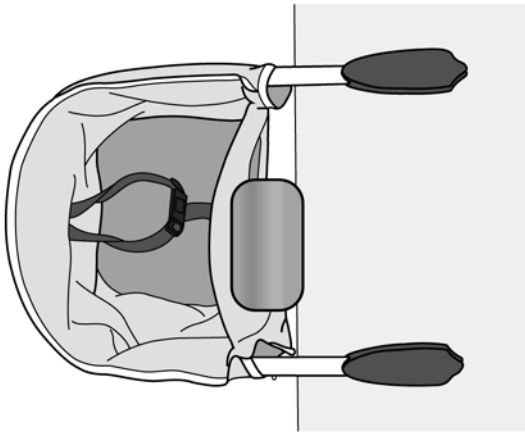


FIG. 3 Hook-On Chair Openings Evaluation

7.1.6 A 6 in. (150 mm) weld cap, as identified in Fig. 6, for use with a hammock type seat.

NOTE 3—If using a weld cap, subtract the weight of the cap from the indicated test weight.

7.1.7 A wood block 2 by 2 by 3/4 in. thick, (50 by 50 by 19 mm).

7.1.8 A 100 lb (45.5 kg) weight.

7.1.9 A 30 lb (13.6 kg) weight.

7.1.10 A 20 lb (9.1 kg) weight.

7.1.11 A 12 lb (5.4 kg) weight.

7.1.12 A 10 lb (4.5 kg) weight.

7.1.13 A 5 lb (2.2 kg) weight.

7.1.14 Webbing tension pull device (see Fig. 7).

7.1.15 A clamp with 3/4 in. (19 mm) diameter clamping surfaces.

7.1.16 *Standard Test Surface, Underlayment, and Thickness:*

7.1.16.1 The standard test surface should be a smooth finish, impregnated high pressure, high gloss laminate.⁵

7.1.16.2 The underlayment should be clean particle board, smooth side down.

7.1.16.3 Two standard test surface thicknesses are required.

7.1.16.4 The minimum test surface shall be equal to or to the nearest 1/4 in. (6 mm) greater than the minimum surface thickness stated by the manufacturer on the retail package.

7.1.16.5 The maximum test surface shall be equal to or to the nearest 1/4 in. (6 mm) less than the maximum thickness stated by the manufacturer on the retail package.

7.2 *Chair Assembly*—Assemble the chair in accordance with the manufacturer’s instructions.

7.3 *Latching Mechanisms for Prevention of Unintentional Folding:*

7.3.1 Securely affix the chair according to the manufacturer’s directions to the maximum test surface so that the normal folding motion is not impeded.

7.3.2 Gradually apply a force of 45 lbf (200 N) within 5 s and maintain for an additional 10 s. Apply the force in the direction normally associated with folding or disassembly of the chair at a position most likely to cause failure. Repeat twice for a total of three times within a 2 min period.

7.4 *Removal of Protective Components From Chairs:*

7.4.1 Any protective component which a child may reasonably be expected to grasp between the thumb and forefinger, or teeth, or that has at least a 0.040 in. (1.00 mm) gap between itself and its adjacent parent component shall be tested in accordance with each of the following methods in the sequence listed.

7.4.2 Secure the chair so that it cannot move during the performance of the following tests.

7.4.3 *Torque Test*—A torque of 3 lbf-in. (0.3 N·m) shall be applied evenly 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 exceeded. The torque or 180° displacement 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 a counterclockwise direction.

7.4.4 *Tension Test:*

7.4.4.1 Attach a force gage to the protective component by means of any suitable device. For components that cannot reasonably be expected to be grasped between thumb and forefinger, or teeth, on their outer diameter, but have at least a 0.040 in. (1.00 mm) gap or more behind the rear surface of the components and the structural member of the chair to which they are attached, a clamp such as shown in Fig. 5 may be a suitable device.

7.4.4.2 Be sure that the attachment device does not compress or expand the component so that it hinders any possible removal of the component.

7.4.4.3 Gradually apply a 15 lbf (67 N) force in a direction that would normally be associated with the removal of the

⁵ Formica, a registered trademark of Formica Corp., has been found suitable for this purpose.

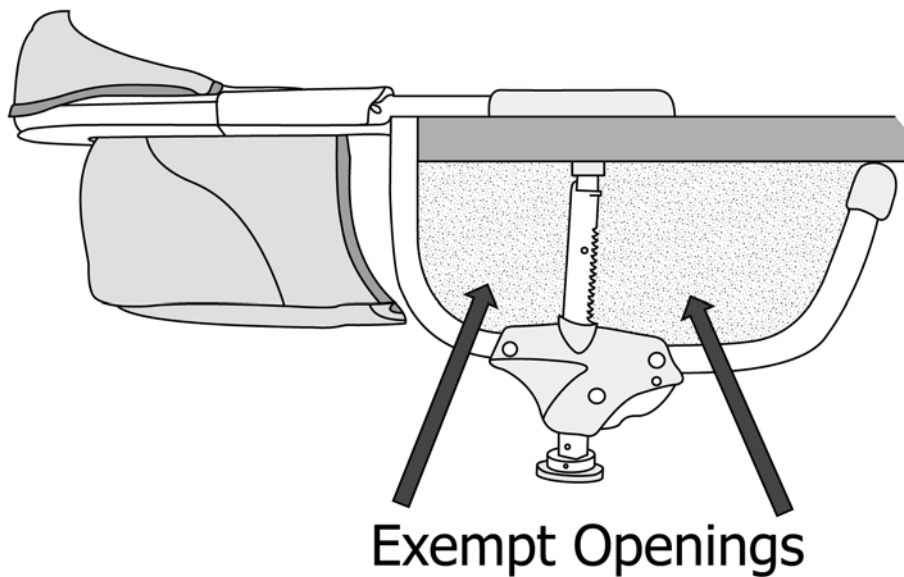
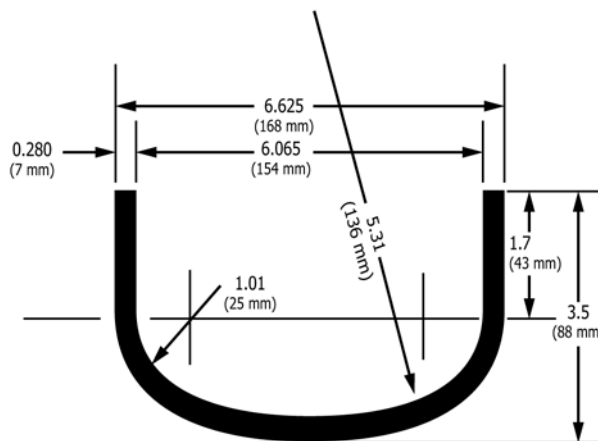


FIG. 4 Example of Exempt Openings Area

15 lbf (67 N) MAX TENSION



FIG. 5 Tension Test Adapter/Clamp



NOTE 1—Caps furnished to ANSI standards unless otherwise specified. Welding caps are formed from steel plate and are ellipsoidal in shape. The minor axis being equal to one half the major axis radii “R” and “r” closely approximate the actual semi-ellipsoidal shape. All dimensions in inches and are in accordance with ANSI B16.9.

FIG. 6 Nominal Weld 6 in. Weld Cap—Weight (Approximately) 6.4 lb

protective component. Gradually apply the force within 5 s and maintain for an additional 10 s.

7.5 Chair Drop Test:

7.5.1 Conduct all drop testing on a concrete floor, with 1/8 in. (3 mm) thick vinyl flooring cover.

7.5.2 Drop a chair that does not fold, from a height of 36 in. (910 mm). Drop the chair twice on each of six different planes.

7.5.3 Drop a chair that does fold, from a height of 36 in. (910 mm). Drop the chair once on each of six different planes, both in the folded and erect configurations.

7.5.4 Conduct all further tests on chairs that have passed this drop test.

7.6 Static Load Test:

7.6.1 Securely affix the chair according to manufacturers directions to the minimum standard test surface.

7.6.2 Place a weight of 100 lb (45.5 kg) on the center of the seat and distribute it upon the 6 by 6 in. wood block.

7.6.3 Maintain this load for 60 s.

7.6.4 Repeat this procedure on the maximum standard test surface.

7.7 Seat and Seat Back Disengagement Test:

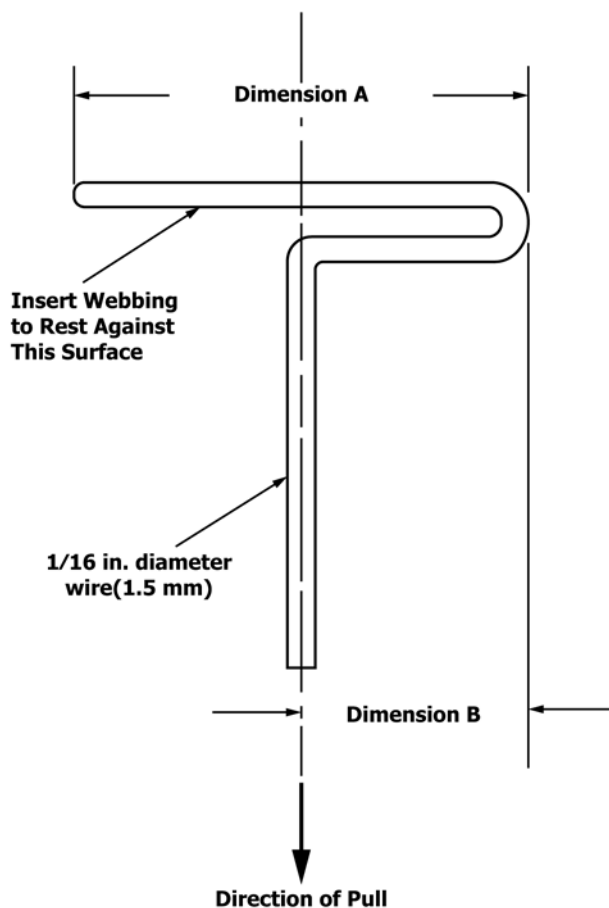
7.7.1 All forces in this section shall be gradually applied over 5 s through the 2 by 2 in. wood block and maintained for an additional 10 s.

7.7.2 Step 1:

7.7.2.1 Securely affix the chair according to the manufacturer’s directions to the maximum test surface.

TABLE 1 Chair Pull/Push Test, Step 1

	Weight in Seat, lb (kg)	Pull Back Force, lbf (N)
Test No. 1	30 (13.6)	60 (267)
Test No. 2	20 (9.1)	50 (222)
Test No. 3	10 (4.5)	40 (178)



NOTE 1—Dimension A—Width of webbing plus 1/8 in. (3 mm).

NOTE 2—Dimension B—One half of Dimension A.

FIG. 7 Webbing Tension Pull Device

7.7.2.2 Place a weight of 20 lb (9.1 kg) on the center of the seat and distribute it upon the 6 by 6 in. wood block.

7.7.2.3 Gradually apply a force of 35 lbf (156 N) within 5 s downward on the middle of the top edge of the seat back. Repeat this step on the left and right top edge of the seat back. Make sure the wood block does not extend beyond the side edge of the seat back.

7.7.2.4 Gradually apply a force of 35 lbf (156 N) within 5 s upward on the middle of the bottom edge of the seat back. Repeat this step on the left and right bottom edge of the seat back. Make sure the wood block does not extend beyond the side edge of the seat back.

7.7.2.5 Gradually apply a force of 35 lbf (156 N) within 5 s toward the test surface on the middle of the seat back. Repeat this step on the left and right corner of the top and bottom of the seat back. Make sure that the wood block does not extend beyond the edge of the seat back.

7.7.2.6 Gradually apply a force of 35 lbf (156 N) within 5 s away from the test surface on the middle of the seat back. Repeat this step on the left and right corner of the top and bottom of the seat back. Make sure that the wood block does not extend beyond the edge of the seat back.

7.7.3 Step 2:

7.7.3.1 Securely affix the chair according to the manufacturer's directions to the maximum test surface.

7.7.3.2 Gradually apply a force of 35 lbf (156 N) within 5 s downward on the middle of the seat. Repeat this step on each corner of the seat. Make sure the wood block does not extend beyond the edge of the seat.

7.7.3.3 Gradually apply a force of 35 lbf (156 N) within 5 s away from the test surface on the middle of the front edge of the seat. Repeat this step on each corner of the front edge of the seat being sure that the wood block does not extend beyond the side edge of the seat.

7.7.3.4 Gradually apply a force of 35 lbf (156 N) within 5 s toward the test surface on the middle of the back edge of the seat. Repeat this step on each corner of the back edge of the seat being sure that the wood block does not extend beyond the side edge of the seat.

7.7.4 Step 3:

7.7.4.1 Invert the chair and support it so the seat is parallel to the test floor.

7.7.4.2 Gradually apply a force of 35 lbf (156 N) within 5 s downward on the middle of the seat. Repeat this step on each corner of the seat. Make sure the wood block does not extend over the edge of the seat.

7.8 Chair Bounce Test:

7.8.1 Securely affix the chair according to the manufacturer's directions to the minimum test surface.

7.8.2 Place a weight of 12 lb (5.4 kg) on the center of the seat and distribute it upon the 6 by 6 in. wood block.

7.8.3 Gradually apply a force of 15 lbf (67 N) within 5 s away from the test surface from a point in the middle of the seat back along the same plane of the test surface. Apply the force using a strap or belt.

7.8.4 Drop a weight of 24 lb (10.9 kg) from a height of 1 in. (25 mm) onto the center of the seat.

7.8.5 Repeat for a total of 50 drop cycles.

7.8.6 Securely affix the chair according to the manufacturer's directions to the maximum test surface, and repeat 7.8.1 – 7.8.5.

7.9 Chair Pull/Push Test:

7.9.1 Step 1:

7.9.1.1 Securely affix the chair according to the manufacturer's directions to the minimum test surface.

7.9.1.2 Place the weight indicated in Table 1 on the center of the seat, distributed evenly on the 6 by 6 in. wood block.

7.9.1.3 Apply a force as indicated in Table 1 away from the test surface from a point in the middle of the seat back along the same plane of the test surface. Using a strap or belt, gradually apply the force within 5 s and maintain for 10 s.

7.9.1.4 Repeat 7.9.1.1 – 7.9.1.3 for each set of force and weight loading requirements in Table 1.

7.9.1.5 Repeat 7.9.1.1 – 7.9.1.4 on the maximum test surface.

7.9.2 Step 2:

TABLE 2 Chair Pull/Push Test, Step 2

	Weight in Seat, lb (kg)	Push Force, lbf (N)
Test No. 1	30 (13.6)	25 (111)
Test No. 2	20 (9.1)	25 (111)
Test No. 3	10 (4.5)	25 (111)

7.9.2.1 Securely affix the chair according to the manufacturer’s directions to the minimum test surface.

7.9.2.2 Place the weight indicated in **Table 2** on the center of the seat, distributed evenly on the 6 by 6 in. wood block.

7.9.2.3 Apply a force indicated in **Table 2**, parallel to the test surface edge, to the side edge of the seat back, or the frame if a hammock type seat, at a point as close as possible to the test surface plane. Gradually apply the force within 5 s through the 2 by 2 in. wood block and maintain for 10 s.

7.9.2.4 Repeat 7.9.2.1 – 7.9.2.3 for each set of force and weight loading requirements in **Table 2**.

7.9.2.5 Repeat 7.9.2.2 and 7.9.2.4 on the maximum test surface.

7.10 Restraining System Integrity and Retention Tests:

7.10.1 Securely affix the chair according to the manufacturer’s directions to the minimum test surface. The attachment shall be such that it does not influence the manner in which the test dummy is restrained in the seat.

7.10.2 Apply a force of 45 lbf (200 N) to a single attachment point of the restraint system in the normal use direction(s) that stress would be applied to that attachment. Gradually apply the force within 5 s and maintain for 10 s.

7.10.2.1 Repeat 7.10.2 four additional times with a maximum interval of 2 s between tests.

7.10.2.2 Repeat 7.10.2 and 7.10.2.1 for each attachment point of the restraint system, and to the connection provided by any fastening device.

7.10.3 If the chair has an adjustable seat back, place it in the most upright use position. Place a CAMI Infant Dummy⁴ (see **Fig. 2**) in the chair with the restraining system fastened in accordance with the manufacturer’s instructions. Tighten the restraining system in such a manner that a force of 2 lbf (9 N) or less will provide at least a ¼ in. (6 mm) space between the restraint system and the dummy. The webbing tension pull device shown in **Fig. 7** is required to determine the proper restraint system fit. Perform the tests given in 7.10.4 – 7.10.7 without readjusting the restraining system.

7.10.4 Apply a pull force of 45 lbf (200 N) horizontally on the approximate centerline of either leg of the dummy (at the ankle). Gradually apply the force within 5 s and maintain for 10 s.

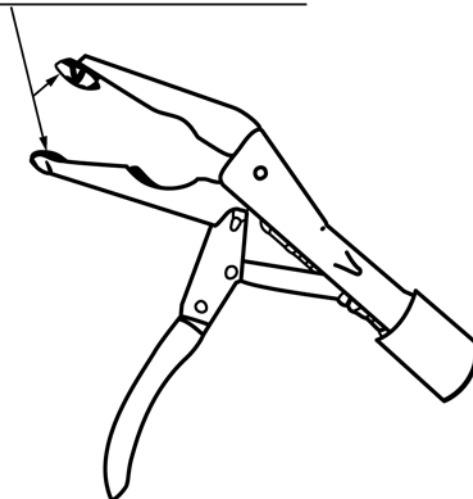
7.10.4.1 Repeat test 7.10.4 four additional times with a maximum interval of 2 s between tests.

7.10.5 Release the chair from its attachment (see 7.10.1).

7.10.6 By any convenient means, lift the chair and rotate it 360°, front to back, around an axis approximating the back edge of the seating surface at a rate of 1 s per 90° with a hesitation of 1 s at each 90°.

7.10.7 By any convenient means, lift the chair and rotate it 360°, left to right, around an axis approximating the side edge of the seating surface at a rate of 1 s per 90° with a hesitation of 1 s at each 90°.

BRAZE 3/4 in. Dia. PLAIN STL WASHER TO JAW TIPS



3/4-in. (19-mm) Diameter Clamp

FIG. 8 ¾ in. (19-mm) Diameter Clamp

7.11 Label Testing:

7.11.1 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.

7.11.2 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.

7.11.3 A warning label attached by a seam shall be considered permanent if it does not detach when subjected to a 15 lb pull force applied in the direction most likely to cause failure using a ¾ in. diameter clamp surface (see **Fig. 8**). Apply the force evenly over 5 s and maintain for an additional 10 s.

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

7.11.4.1 Apply the tape test defined in Test Method B—Cross-Cut Tape Test of Test Methods **D3359** eliminating parallel cuts.

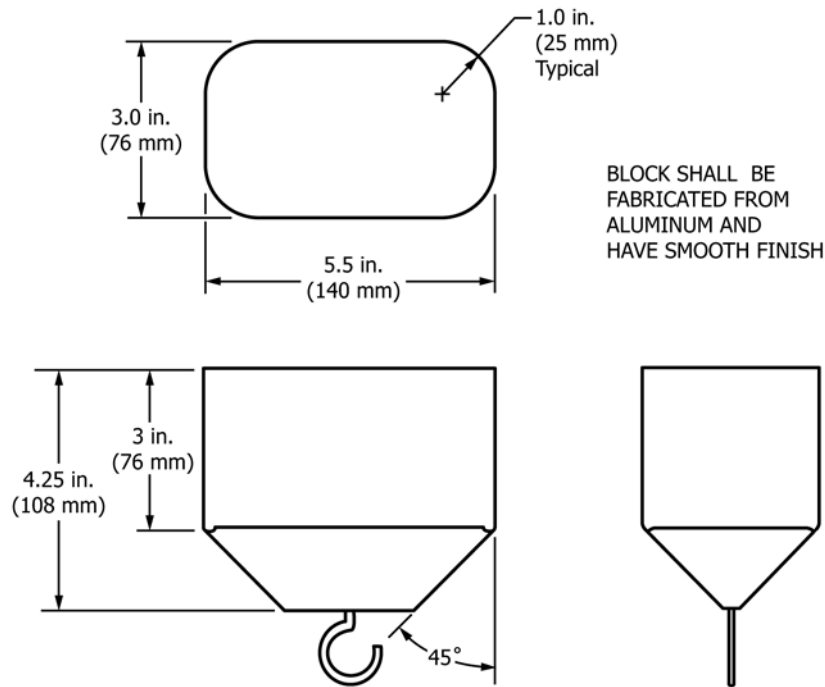
7.11.4.2 Perform this test once in each different location where warnings are applied.

7.11.4.3 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.

7.11.5 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.

7.12 Completely Bounded Openings:

7.12.1 Securely affix the hook-on chair according to the manufacturer’s instructions to either the minimum or maximum standard test surface, whichever creates the largest openings.



NOTE 1—Not to scale.

FIG. 9 Wedge Block

7.12.2 Into each opening, insert the tapered end of the wedge block, shown in Fig. 9, in the most adverse orientation. Apply a 25-lbf (111-N) force perpendicular to the base of the wedge block. The force shall be applied gradually within 5 s and maintained for an additional 10 s.

7.13 *Disengagement Test:*

7.13.1 Attach the chair to the minimum test surface as described in 7.1.16.4. Follow the manufacturer’s directions to securely attach one of the attachment fastening devices to the test surface. Leave the other fastening device loose (see Fig. 10).

7.13.2 Place a CAMI Infant Dummy Mark II (see Fig. 2) in the chair and fasten and adjust the restraint according to the manufacturer’s instructions.

7.13.3 Apply a force, up to 45 lbf (200 N), to the chair/arm frame, in line with the loose fastening device. Gradually apply the force within 5 s away from the test surface in a direction that results in the rotation of the product on a horizontal plane around the other (fully tightened) attachment point (see Fig. 11). Discontinue the force application when the side on which the force is being applied is no longer supported by the test surface, or 45 lbf (200 N) is reached, whichever comes first. If the 45 lbf (200 N) is reached first, maintain the force for an additional minute. If the product has rotated such that the side is no longer supported by the test surface, let the product rotate vertically downward from the test surface.

8. Marking and Labeling

8.1 Each chair and its retail carton shall be marked or labeled clearly and legibly to indicate the following: name and address (city, state, and zip code) of the manufacturer, distributor, or seller.

8.2 A permanent code mark or other means that identifies the date (month and year as a minimum) of manufacture. Any upholstery label required by law shall not be used to meet label requirements in Section 8.

8.2.1 Label all chairs with both warning and safety-related use statements. All statements shall be in contrasting color(s), permanent, conspicuous, and sans serif type.

8.3 In warning and safety-related use statements, the safety alert symbol “△” and the word “**WARNING**” shall be not less than 0.2 in. (5 mm) high and the remainder of the text shall be in characters whose upper case shall be at least 0.1 in. (2.5 mm) high except as specified.

8.3.1 *Warning Label Format*—The safety alert symbol “△” and the signal word “**WARNING**” shall be in contrasting color to the background and delineated with solid line black borders. The background color behind the safety alert symbol “△” and the signal word “**WARNING**” shall be orange, yellow, or red, whichever provides best contrast against the product background. The remainder of the text shall be black and in upper and lower case on a white background surrounded by a black border. Precautionary statements shall be indented from hazard statements and preceded with bullet points. Safety-related use statements in 8.3.2.3 shall be separated from precautionary statements. An example label in the format described in this section is shown in Fig. 12.

8.3.2 The warning label(s) shall address the following at a minimum:

8.3.2.1 *Hazard Statement:*

△**WARNING**—Failure to follow all warnings and instructions could result in serious injury or death.

8.3.2.2 *Precautionary Statements:*

Fall Hazard. To prevent falls:

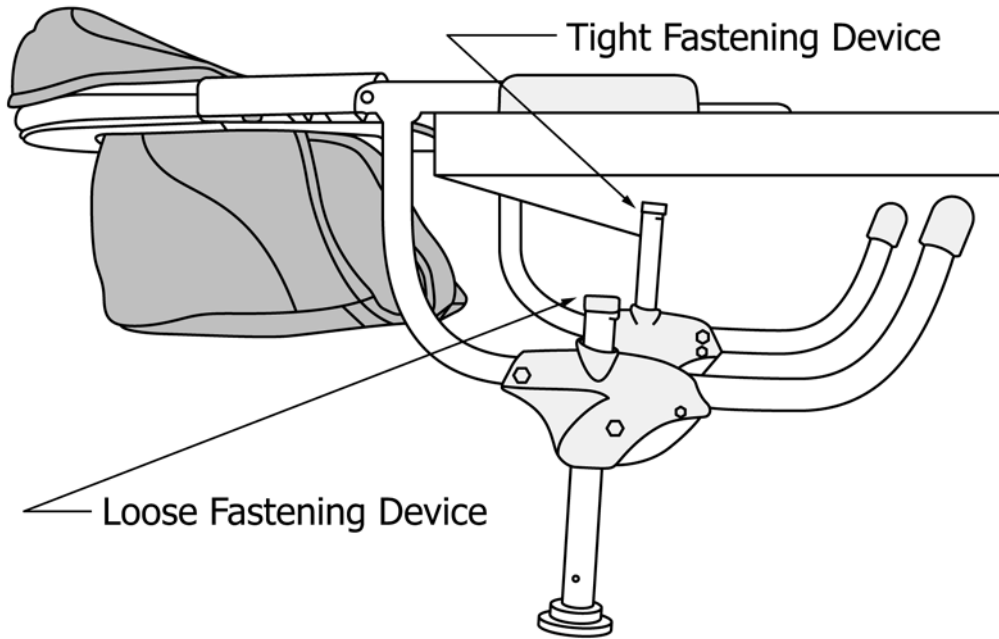


FIG. 10 Partial Attachment of Chair

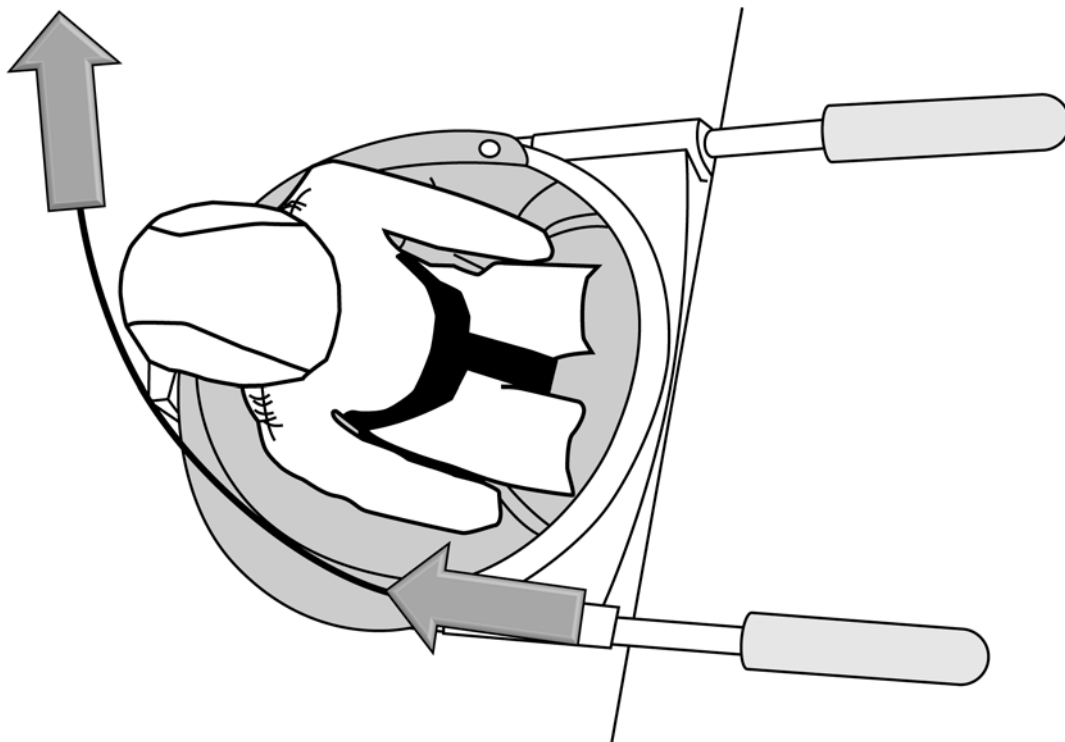


FIG. 11 Disengagement Test Force Direction (rotation is around the secured attachment point)

- Always use restraints. Adjust to fit snugly.
- Keep child in view.
- To prevent tipover, check stability of table before and after seating child.
- Never use with:
 - × glass table top
 - × loose table top
 - × table leaf

- × card table
- × single pedestal table
- × table cloths or placemats
- Child can use nearby structures to push chair off. Never use hook-on chair:
 - × with ordinary chair underneath
 - × in reach of table legs
 - × near island below counter tops

⚠WARNING									
Failure to follow all warnings and instructions could result in injury or death.									
Fall Hazard. To prevent falls:									
<ul style="list-style-type: none"> ▪ ALWAYS use restraints. Adjust to fit snugly. ▪ Keep child in view. ▪ To prevent tipover, check stability of table before and after seating child. 									
<ul style="list-style-type: none"> ▪ NEVER use with: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">× glass table top</td> <td style="width: 50%;">× loose table top</td> </tr> <tr> <td>× table leaf</td> <td>× card table</td> </tr> <tr> <td>× single pedestal table</td> <td></td> </tr> <tr> <td>× table cloths or placemats</td> <td></td> </tr> </table> 		× glass table top	× loose table top	× table leaf	× card table	× single pedestal table		× table cloths or placemats	
× glass table top	× loose table top								
× table leaf	× card table								
× single pedestal table									
× table cloths or placemats									
<ul style="list-style-type: none"> ▪ Child can use nearby structures to push chair off. NEVER use hook-on chair: <ul style="list-style-type: none"> × with ordinary chair underneath × in reach of table legs × near island below counter tops 									
Use only for:									
<ul style="list-style-type: none"> ▪ child who can sit upright without help. ▪ child up to 37 pounds (16.8 kg). ▪ tables _____ to _____ in. thick (_____ to _____ mm). (Manufacturer must insert recommended thicknesses). 									

FIG. 12 Label Format Example Addressing Warnings and Safety-Related Use Statements

8.3.2.3 The following safety-related use statements shall be addressed on the warning label, or on a separate label, as shown in Fig. 13.

Use only for:

- child who can sit upright without help.
- child up to 37 lb (16.8 kg).
- tables _____ to _____ in. thick (_____ to _____ mm). (Manufacturer must insert recommended thicknesses).

8.4 *The Retail Packaging Shall State:*

- Use only for children up to 37 lb (16.8 kg)
- Use only for tables _____ to _____ in. thick (_____ to _____ mm) (Manufacturer must insert recommended thicknesses)
- Do not use with:
 - × glass table top
 - × loose table top
 - × table leaf
 - × card table
 - × single pedestal table
 - × table cloths or placemats

⚠WARNING	
Use only for:	
<ul style="list-style-type: none"> ▪ child who can sit upright without help. ▪ child up to 37 pounds (16.8 kg). ▪ tables _____ to _____ in. thick (_____ to _____ mm). (Manufacturer must insert recommended thicknesses). 	

FIG. 13 Example of Separate Label Addressing Safety-Related Statements

8.4.1 The above shall be printed on the principal display panel, in upper and lower case letters, in sans serif text whose upper case letters shall be not less than 0.1 in. (2.5 mm) high.

8.4.2 Packaging shall depict only the manufacturer’s intended use of the product, and shall include only table styles and surfaces with which the product can be used safely.

NOTE 4—Figs. 12-14 label formats below are presented as EXAMPLES ONLY for the display of the required warnings. The safety alert symbol “⚠” and the signal word “WARNING” shall be as specified above, but with the option of background colors as described above. The warning statements’ wording content, as well as the use of any underlining, capital lettering, or bold typeface, or a combination thereof, are at the discretion of the manufacturer.

9. Instructional Literature

9.1 Instructions must be provided with the chair and shall be easy to read and understand. These instructions shall include information regarding assembly, maintenance, cleaning, and use.

9.1.1 The instructions shall include the following statement at the beginning of the assembly instruction: “READ ALL INSTRUCTIONS BEFORE ASSEMBLY AND USE OF CHAIR. **KEEP INSTRUCTIONS FOR FUTURE USE.**” (The statement “**KEEP INSTRUCTIONS FOR FUTURE USE**” is to be highlighted via bold face type, color, etc.). The statement “**KEEP INSTRUCTIONS FOR FUTURE USE**” is not required if the instructions are permanently affixed to the chair.

9.1.2 In warning and safety-related use statements located in the instructional literature, the letters of the word “WARNING” shall not be less than 0.2 in. (5 mm) high and the remainder of the text shall be in characters whose upper case shall be at least 0.1 in. (2.5 mm) high.

9.2 The instructional literature shall address the warning and safety-related use statements in 8.3.2.

9.2.1 Warning and safety-related use statements in the instructions shall be in contrasting colors and formatted as in 8.3.1, except that the header background need not be in color. Warning statements and safety-related use statements shall be in upper and lower case text. An example label is shown in Fig. 14.

9.3 The instructional literature shall also address the following information if applicable:

Discontinue use if hook-on chair is broken. Contact manufacturer immediately for replacement parts or

▲ WARNING
Failure to follow all warnings and instructions could result in injury or death.
<p>Fall Hazard. To prevent falls:</p> <ul style="list-style-type: none"> ▪ ALWAYS use restraints. Adjust to fit snugly. ▪ Keep child in view. ▪ To prevent tipover, check stability of table before and after seating child. ▪ NEVER use with: <ul style="list-style-type: none"> × glass table top × loose table top × single pedestal table × card table × table leaf × table cloths or place mats ▪ Child can use nearby supports to kick or push chair off table or counter. <p>NEVER use hook-on chair:</p> <ul style="list-style-type: none"> × with ordinary chair underneath × in reach of table legs × near island below countertop
<p>Use only for:</p> <ul style="list-style-type: none"> ▪ child who can sit upright without help. ▪ child up to 37 pounds (16.8 kg). ▪ tables _____ to _____ in. thick (_____ to _____ mm). (Manufacturer must insert recommended thicknesses).

FIG. 14 Example of Addressing Instruction Format

service.
 Do not use without all tips (suction cups or other locking/latching mechanisms) attached securely to table surface.
 Discontinue use if child, when seated in hook-on chair, is able to move the hook-on chair arms on the table top.
 Do not allow other children to play near or walk

under hook-on chair while in use.
 Before removing child from hook-on chair, be sure child's legs are free from hook-on chair supports.
 Keep table and seat clean and dry to prevent slipping.

10. Keywords

10.1 hook-on; instructions; labels; permanent; rational; references; restraint; test; warning

APPENDIXES
(Nonmandatory Information)
X1. RATIONALE FOR CONSUMER SAFETY SPECIFICATION FOR PORTABLE HOOK-ON CHAIRS⁶
X1.1 History

X1.1.1 Portable hook-on chairs (chairs) are a product that appeared on the market in the late 1970s. In addition to the original cantilever action, manufacturers introduced clamping or fastening features with a number of degrees of effectiveness in holding the chair to the table. An ASTM task group was formed in May 1984.

X1.1.2 Incidents reported through NEISS were primarily in the area of dislodgment of the chair from the table and cracking of the chair (plastic) allowing the occupant to fall in either case. Restraining system failures, table instability, and detachment of seats and backs from frames also presented safety problems.

X1.2 Production Description

X1.2.1 Chairs “hook” onto a table and early models were basically seat pan/seat back components held together by frame

members. The frame members normally formed the sides or armrests of the chairs. Newer models may feature a unitized seat and back. All lack legs, that is one major feature that differentiates these from “floor model” high chairs. The chairs “hook” onto the table top edge rather than free-stand as do high chairs. Attachment or “hook-on” to the table top edge is by cantilever-style suspension, and usually by the use of some form of retention or holding feature. Hook-on chair seats and backs may be rigid and upholstered with padding, rigid nonpadded, or be a cloth/fabric bucket-type seat attached to a frame. The frame ends are normally equipped with rubber or plastic caps and/or clamps to provide some degree of frictional properties.

X1.2.2 Quick attachment and removal, together with lightness and compactness makes them a relatively portable product.

⁶ This rationale will be updated as this specification evolves.

X2. ADDITIONAL RATIONALE

X2.1 The numbers in parentheses refer to the appropriate subsections.

X2.1.1 Fabric, fuzz, elastic and string are excluded by 16 CFR 1501.

X2.1.2 Warning labels are required to be permanent.

X2.1.3 Add a pass/fail criterion (see 6.6.2.1).

X2.1.4 Add a pass/fail criterion (see 6.6.2.2).

X2.1.5 Add a pass/fail criterion (see section 6.6.3).

X2.1.6 To prevent consumers from incorrectly threading the restraint assembly buckle (see 6.6.5).

X2.1.7 To keep the test surfaces within the manufacturer’s recommended minimum and maximum use specifications (see 7.1.16.4 and 7.1.16.5).

X2.1.8 Deleted testing on the minimum test surface. Testing for the prevention of accidental folding of the latching/locking mechanisms is not relevant to the thickness of the test surface. The maximum test surface is specified only to provide a sturdier base, and consequently, a more stringent test for latching/locking mechanisms (see 7.3.1).

X2.1.9 Changed from 4 lbf-in. (0.4 N·m) to 3 lbf-in. (0.3 N·m) because of the age group using this product (see 7.4.3).

X2.1.10 To make the number of drops uniform for hook-on chairs that fold and those that do not (see 7.5.3).

X2.1.11 Deleted testing on the minimum test surface. Testing for seat and seat back disengagement is not relevant to the

thickness of the test surface. The maximum test surface is specified only to provide a sturdier base, and consequently, a more stringent test for seat and back disengagement (see 7.7.2.1).

X2.1.12 To clarify for all hook-on chair types (see 7.9.2.3).

X2.1.13 To specify rotation and hesitation time (see 7.10.6).

X2.1.14 To specify rotation and hesitation time (see 7.10.7).

X2.1.15 Specific recommendations for ASTM warnings, as approved by an ASTM subcommittee for cribs, is partially referenced from ANSI Z535.4. This report was approved by the Section 15.16 Hook-On Chair task group (see 8.3).

X2.1.16 Safety-related use statements are separated from warning statements so as not to dilute the warnings (see 8.3.1).

X2.1.17 To require warnings which must be on the chair to also be included in the instructions. See rationale above (see 9.1).

X2.1.18 Minimum required warnings. Additional warnings may be added as deemed necessary by a manufacturer (see 8.3.2).

X2.1.19 Revisions to Sections 8 and 9 add no new warning statements and include no mandatory language. Some terminology is changed to acknowledge that the statements previously referred to as “informational” are related to safe use of hook-on chairs. The format of the warnings and safety-related use statements organizes the information into brief chunks to ensure that they are clearly presented and easy to read (cf.

reviews Frascara, 2006 (1);⁷ Wogalter and Vigilante, 2006 (2); FDA, 1999 (3); Miller, 1994 (4); Shiffrin and Nosofsky, 1994 (5); Chandler and Sweller, 1991 (6); see also Young et al., 2006 (7); Shaver and Wogalter, 2003 (8)). The use of red, orange, or yellow in the background of the header panel in on-product warning labels helps attract attention and communicates hazard. This replaces the provision that allows the use of any contrasting color because some colors are not associated with hazard (for example, Wogalter et al., 1998 (9)). A white background, for example, typically used as a contrasting color, has been found to weaken the impact of the signal word (that is, WARNING); hazard-related colors have the opposite effect (Chapanis, 1994 (10)), and support the intended purpose of the label. Formatted labels written in plain language that is easy to comprehend are presented to provide examples that meet the provisions of the standard. Although its use is not required, the example warnings include one form of highlighting. Highlighting is recommended to emphasize key information (for example, Fischhoff, Brewer, and Downs, 2011 (11); Singer,

Balliro, and Lerner, 2003 (12); Felker et al., 1981 (13)). Various types of highlighting draw attention, so that if a caregiver glances at the warning, he or she is more likely to notice information associated with a highlighted word (“ALWAYS use restraints” and “NEVER use with”) than if the text were uniformly plain.

X2.1.20 With one loose attachment point, most hook-on-chairs are expected to disengage from the test surface during this test, well before the tester reaches the 45 lb force application. The 45 lbf is a maximum force that should be applied during this test if the chair does not first detach at the loosened attachment point. This force was derived from **Table 1**. This test applies a force to the middle of the seat back in a direction away from the test surface. A 40 lbf is applied with 10 lb in the seat, and a 50 lbf is applied with 20 lb in the seat. From this it can be assumed that a 45 lbf would be used for 15 lb in the seat. The subcommittee deemed it appropriate to use 45 lbf applied to the loosened side of the chair when a 17 lb CAMI is in the seat. The force being applied in line with the loose fastening device offsets the additional weight of the dummy. (See 7.13.3.)

⁷ The boldface numbers in parentheses refer to a list of references at the end of this standard.

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