



Standard Consumer Safety Specification for Infant Walkers¹

This standard is issued under the fixed designation F 977; 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 walker incidents that were identified by the U.S. Consumer Product Safety Commission (CPSC).

Based on data collected by the CPSC, the majority of incidents involved children falling down stairs or steps in walkers. Other incidents involved children tipping over in walkers or accessing hot surfaces or liquids. The injuries associated with these incidents ranged from cuts and bruises to burns, skull fractures, and deaths. Most of the children injured were under 15 months old.

In response to the incident data provided by the CPSC, this consumer safety specification attempts to minimize the risk of injury or death associated with children in walkers falling down stairs or between levels, or tipping over. It also contains provisions to address the risk of injury associated with walker seating systems and folding mechanisms.

1. Scope

1.1 This consumer safety specification covers performance requirements, test methods, and marking requirements to promote safe use of the infant walker (see 3.1).

1.2 This consumer safety specification is intended to minimize accidents to children resulting from normal use and reasonably foreseeable misuse or abuse of walkers.

1.3 No walker 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 requirements contained herein.

1.4 This consumer safety specification is not intended to address accidents and injuries resulting from the interaction of other persons with the child in the walker or the accidents resulting from abuse and misuse by children able to walk.

1.5 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

1.6 The following precautionary caveat pertains only to the test method portion, Section 7, of this consumer safety 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:

D 3359 Test Methods for Measuring Adhesion by Tape Test²

2.2 Federal Regulations:³

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

16 CFR 1500 Hazardous Substances Act Regulations Including Sections:

1500.18 (a) (6) Banned Toys and Other Banned Articles Intended for Use by Children

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

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 Age

1500.50–52 Test Methods for Simulating Use and Abuse of Toys and Other Articles Intended for Use by Children

1500.86 (a) (4) Exemptions from Classification as a Banned Article for Use by Children

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:

¹ This consumer safety performance specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.17 on Carriages, Strollers, and Walkers.

Current edition approved April 10, 2000. Published July 2000. Originally published as F 977 – 86. Last previous edition F 977 – 97.

² *Annual Book of ASTM Standards*, Vol 06.01.

³ Available from U.S. Government Printing Office, N. Capital and H Streets, NW, Washington, DC 20401.

3.1.1 *conspicuous*—a label that is visible, when the walker is in a manufacturer's recommended use position, to a person standing near the walker at any one position around the walker but not necessarily visible from all positions.

3.1.2 *dynamic load*—application of an impulsive force through free fall of a mass.

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 its literature to be unacceptable, unsafe, or not recommended.

3.1.4 *non-paper label, n*—any label material (such as plastic or metal) that 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 walker that is set up in one of the manufacturer's recommended use positions.

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

3.1.7 *static load*—a vertically downward load applied by a fixed mass or other means.

3.1.8 *walker*—a mobile unit that enables a child to move on a horizontal surface when propelled by the child sitting or standing within the walker, and that is in the manufacturer's recommended use position. Examples of different style walkers can be seen in Fig. 1.

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 floor covering, unless testing instructions specify differently.

4.2 The walker 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 an ambient temperature of $73 \pm 9^\circ\text{F}$ ($23 \pm 5^\circ\text{C}$) 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.

4.6 The following guidelines shall apply to force gages used for testing:

4.6.1 *Equipment*—Chatillon Model DPPH 25 or equivalent,⁴

4.6.2 *Range*—0 to 25 lbf (110 N),

4.6.3 *Tolerance*— ± 1 Div.,

4.6.4 *Calibration Interval*—1 year,

4.6.5 *Equipment*—Chatillon Model DPPH 100 or equivalent,⁴

4.6.6 *Range*—0 to 100 lbf (500 N),

4.6.7 *Tolerance*— ± 1 Div., and

4.6.8 *Calibration Interval*—1 year.

5. General Requirements

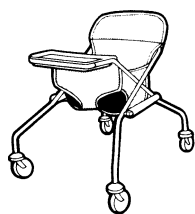
5.1 The walker shall conform to the regulations specified in Section 2 of this specification before and after all testing.

5.2 Before the application of any test methods, any exposed wood parts shall be smooth and free of splinters.

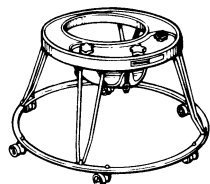
5.3 *Latching or Locking Mechanisms*—Any unit that folds shall have a latching or locking device or other provision in the design that will prevent the unit from unintentionally folding when properly placed in the manufacturer's recommended use position. The unit shall remain in its manufacturer's recommended use position during and upon completion of the test, in accordance with 7.2. If a unit is designed with a latching or locking device, that device shall remain engaged and operative after testing.

5.4 *Openings*—Any shaped holes, slots, or cracks that exist in the product that is in its manufacturer's recommended use position and that are accessible to the toes or fingers of the occupant, through or recessed, or both, into the surface of any rigid material, that admit a 0.210 in. (5.33 mm) diameter rod, shall also admit a 0.375 in. (9.53 mm) diameter rod. Openings that have a minor dimension between 0.210 in. (5.33 mm) and 0.375 in. (9.53 mm) shall be permissible, providing the depth is no greater than the minor dimension of the opening.

5.5 *Scissoring, Shearing, Pinching*—The walker, when in the manufacturer's recommended use position, shall be designed and constructed 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 exists when the edges of the rigid parts admit a probe greater than 0.210 in. (5.33 mm) diameter and less than 0.375 in. (9.53 mm) diameter at any accessible



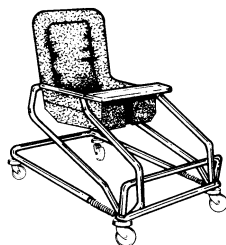
X-Frame



Circular



Adjustable Height



Bouncer - Walker

FIG. 1 Illustrations of Four Types of Baby Walkers

⁴ The sole source of supply of the apparatus known to the committee at this time is John Chatillon and Sons, Inc., 7609 Business Park Dr., Greensboro, NC 27409-9301. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,¹ which you may attend.

point throughout the range of motion of such parts that may cause injury.

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 (see 7.1.2) shall be covered or otherwise designed to prevent injury from entrapment.

5.7 *Labeling:*

5.7.1 Warning labels, whether paper or non-paper, shall be permanent when tested in accordance with 7.4.1-7.4.3.

5.7.2 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 7.4.4.

5.7.3 Non-paper labels shall not liberate small parts when tested in accordance with 7.4.5.

6. Performance Requirements

NOTE 1—The forces that are to be applied to the sample in the tests described in Section 7 of this specification are readily applied by means of a calibrated force gage, or in the case of static load and dynamic load tests, by fixed masses.

6.1 *Stability:*

6.1.1 *Tipping Resistance Against an Immovable Object*—A minimum stability index of 18 shall be required to tip over a walker either forwards or backwards when tested in accordance with 7.3.

6.1.2 *Occupant Leaning Over Edge*—A walker shall remain upright (not tip over) when forces are applied forward, and sideward, in accordance with 7.3.4.

6.2 *Structural Integrity*—All tests that cover static and dynamic loading, and support of the occupant, are to be performed on the same product, sequentially and without refurbishing or repositioning of adjustment, if any. At test conclusion, there shall be no failure of seams, breakage of materials, or changes in adjustments that could cause the unit not to fully support the child or create a hazardous condition as defined in Section 5. Maximum slippage of adjustable features, if any, is 1 in. (25 mm).

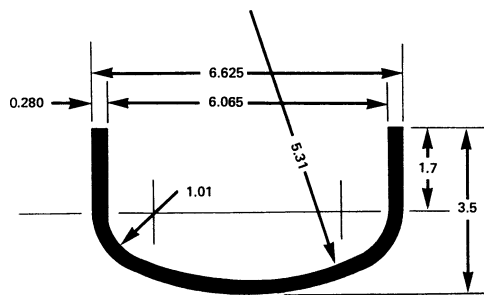
6.2.1 *Dynamic Load*—The occupant support member (seat) shall support a dynamic load when tested in accordance with 7.1.1.

6.2.2 *Static Load*—The walker shall not create a hazardous condition as defined in 5.4 when tested in accordance with 7.1.2.

6.2.3 *Occupant Retention*—The seat of the walker shall be designed so that the leg openings will not permit the passage of a 6 in. (150 mm) weld cap (see Fig. 2) when tested in accordance with 7.1.3.

6.3 *Methods of Protection*—If a child can grasp 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 component shall not be removed when tested in accordance with 7.6.

6.4 *Prevention of Falls Down Step(s)*—The walker shall maintain contact with and be supported only by the test platform at the conclusion of the tests in 7.6.



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

7. Test Methods

NOTE 2—Except for the structural integrity tests (see 7.1), that shall be performed first, the tests can be performed in any sequence.

7.1 *Structural Integrity (see 6.2):*

NOTE 3—All wood blocks are fabricated from 1 in. nominal thickness lumber having a finish thickness of ¾ in. (19 mm) unless otherwise stated.

7.1.1 *Dynamic Load (see 6.2.1):*

7.1.1.1 Position the walker in the manufacturer’s recommended use position with all wheels on the floor. If adjustable, adjust to the highest and most upright position.

7.1.1.2 Affix to the walker seat a 6 by 6 in. (150 by 150 mm) wood block. If the unit has a hammock type seat, use a standard 6 in. weld cap, as identified in Fig. 2. Attach the weld cap to the bottom of the test mass with the convex surface down.

7.1.1.3 Drop a test mass of 33 lb (15 kg), with the mass of the weld cap included, onto the seat at least a distance of 1 in. (25 mm) one hundred times.

7.1.1.4 When testing a spring supported adjustable bouncer walker, test with the unit in the highest adjustment position and support the frame so that the dropping of the 33 lb (15 kg) mass does not cause the frame to bottom out artificially.

7.1.2 *Static Load (see 6.2.2):*

7.1.2.1 Position the walker as in 7.1.1.1.

7.1.2.2 Center a mass of 90 lb (41 kg) for a period of 1 min on a 6 by 6 in. (150 by 150 mm) wood block affixed to the walker seat. If the unit has a hammock type seat, use a standard 6 in. (150 mm) weld cap, convex surface down, as identified in Fig. 2 instead of the specified wood block. Include the mass of the weld cap in the 90 lb (41 kg) mass. If the natural action of a bouncer type walker will not allow the full application of 90 lb (41 kg) static load, then restrict the bouncer mechanism by any means possible so that the full static load can be applied to the seat or section of the walker occupied by the child.

7.1.2.3 Position the walker in the manufacturer’s recommended use position with all wheels on the floor. If adjustable, adjust to the lowest use position.

7.1.2.4 Center a mass of 50 lb (22.7 kg) for a period of 1 minute on a 6 by 6 in. (150 by 150 mm) wood block affixed to the walker seat. If the unit has a hammock type seat, use a standard 6 in. (150 mm) weld cap convex surface face down, as identified in Fig. 2 instead of the specified wood block.

Include the mass of the weld cap in the 50 lb (22.7 kg) mass. In this test DO NOT restrict the bouncer mechanism from folding or bottoming out. Observe visually the action of all supporting, locking, and adjusting components to make sure that they do not create a hazardous condition as defined in 5.4.

7.1.3 Occupant Retention Testing (see 6.2.3):

7.1.3.1 Position the walker so that the plane of a leg opening is horizontal.

7.1.3.2 Center the convex surface of a 6 in. (150 mm) weld cap in the leg opening so that the weight of the weld cap is supported by the material adjacent to the leg opening.

7.1.3.3 Maintain for 10 s.

7.1.3.4 Repeat 7.1.3.1-7.1.3.3 for the other leg opening.

7.2 Latching or Locking Mechanisms (see 5.3):

7.2.1 Erect the walker in accordance with the manufacturer's instructions and adjust to the highest and most upright recommended use position.

7.2.2 Position the walker so that the normal folding motion is not impeded.

7.2.3 Apply a force of 10 lbf (44 N) in the direction normally associated with folding the walker in accordance with manufacturer's instructions. Apply the force gradually over a 5 s period and maintain for an additional 10 s before releasing the force.

7.2.4 Perform this procedure for a total of five times within a 2 min period.

7.3 Stability Test (see 6.1):

7.3.1 *Tipping Resistance Against An Immovable Object (see 6.1.1)*—Establish a horizontal test plane with a piece of 1/2 in. (13 mm) high by 3/4 in. (19 mm) wide aluminum angle stop affixed thereto. Its length shall be a minimum of 6 in. (150 mm) wider than the width of the walker being tested.

7.3.2 Forward Tip Resistance:

7.3.2.1 Place the walker on the horizontal test plane and adjust it to the manufacturer's highest recommended use position. If the walker has a reclinable seat, place it in its most upright position. Place a six month old CAMI Infant Dummy

Mark II⁵ in the walker and affix it in a position so that its feet just touch the test plane and its abdomen is positioned firmly against the forward edge of the occupant area (see Fig. 3). If the Dummy's feet do not touch the test plane when the walker is in its highest use position, lower the walker until the Dummy's feet just touch the test plane.

7.3.2.2 Position the walker so that its two most forward wheels are touching and perpendicular to the aluminum stop. For walkers that have offset wheels, place the wheels in the most disadvantageous position.

7.3.2.3 Pretension by gradually applying 3 lbf (13 N) forward horizontal force at a level just below the CAMI Dummy's⁵ armpits in a direction perpendicular to the axis connecting the two most forward wheels and centered halfway between the wheels (see Fig. 4). Then increase the horizontal force until the walker tips over forward.

7.3.2.4 Record the distance pulled in inches after pretensioning and the maximum force exerted in pounds (including pre-tensioning). The sum of the distance pulled and maximum force exerted shall be considered the stability index.

7.3.3 Rear Tip Resistance:

7.3.3.1 Without adjusting the seat height or the height of the CAMI Dummy⁵ relative to the horizontal test plane, position the Dummy so that its back is firmly against the rear of the occupant area.

7.3.3.2 Position the walker so that its two most rearward wheels are touching and perpendicular to the aluminum stop. For walkers that have offset wheels, place wheels in the most disadvantageous position.

7.3.3.3 Pretension by gradually applying a 3 lbf (13 N) horizontal force in a rearward direction perpendicular to the axis connecting the two most rear wheels and centered between the wheels. Apply the force at a level just below the CAMI

⁵ CAMI Infant Dummy (Mark II), Department of Transportation, Memorandum Report AAC-119-74-14, Revision II, Drawing No. SA-1101 (see Fig. 5).

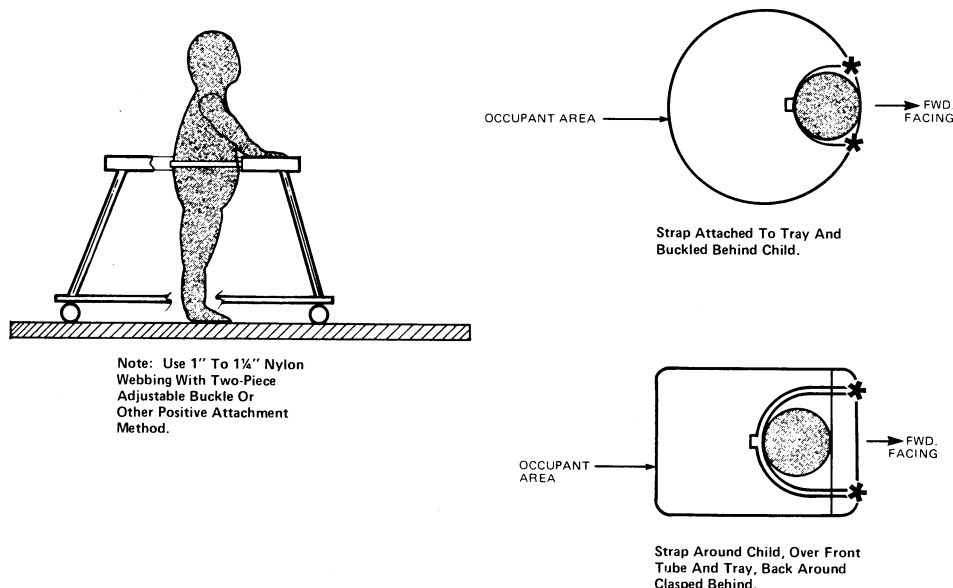
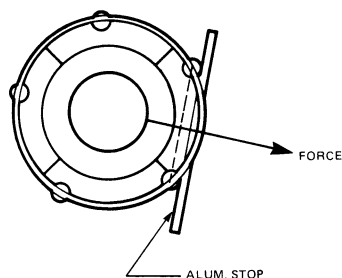


FIG. 3 Placement of CAMI Infant Dummy



TIP RESISTANCE SETUP

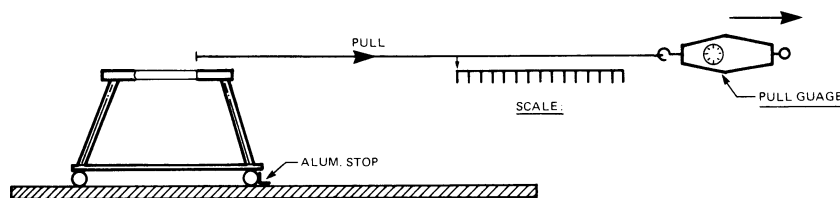


FIG. 4 Tip Resistance Setup



NOTE 1—This CAMI Infant Dummy was constructed in accordance with the Department of Transportation Specification dated April 29, 1975.

FIG. 5 CAMI Infant Dummy—Mark II

Dummy's⁵ armpits. Then increase the force until the walker tips over. If the walker has a seat pad whose back is higher than the Dummy's armpits, apply the horizontal force at the same height as that of the Dummy's armpits.

7.3.3.4 Record the distance pulled in inches after pre-tensioning and the maximum force exerted in pounds including pre-tensioning. The sum of the distance pulled and the maximum force exerted shall be considered the stability index.

7.3.4 *Occupant Leaning Outward Over Edge of Walker (see 6.1.2):*

7.3.4.1 Position walker in the manufacturer's recommended use position with all wheels on the floor (flat horizontal plane).

For walkers that have offset wheels, place wheels in the most disadvantageous position. If the walker is adjustable, adjust to its highest use position.

7.3.4.2 Clamp a 1 by 1 in. (25 by 25 mm) rigid aluminum angle to the uppermost front and rear horizontal frame members of the walker in a direction perpendicular to the axis of the two most forward wheels and centered between the wheels. The length of the aluminum angle should be such that it extends forward at least 12 in. (300 mm) beyond the front edge of the occupant seating area (see Fig. 6).

7.3.4.3 Locate the point on the aluminum angle that is 1 in. (25 mm) less than one half the difference between 32 in. (810 mm), and the height of the walker at the top edge of the tray adjacent to the seating area (see Fig. 6). Over a period of 5 s, gradually apply a vertically downward force of 17 lb to this point and maintain it for an additional 10 s.

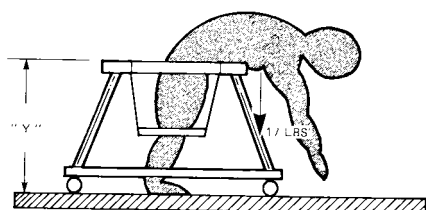
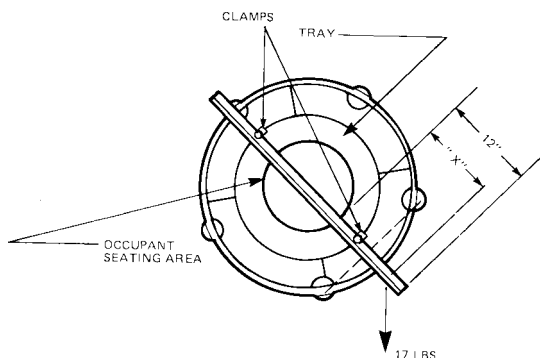
NOTE 4—32 in. is the maximum height of the user.

7.3.4.4 Repeat the steps in 7.3.4.1, 7.3.4.2, and 7.3.4.3, except position the aluminum angle in a sideward direction perpendicular to the axis connecting the two most sideward wheels and centered halfway between the wheels. Be sure the aluminum angle extends at least 12 in. (300 mm) beyond the inside edge of the tray or horizontal frame member. Placement of the 17 lb (7.7 kg) mass to the side shall not cause the walker to tip over.

7.4 *Permanency of Labels and Warnings (see 5.7):*

7.4.1 A paper label (excluding labels attached by a seam) is 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.

7.4.2 A non-paper label (excluding labels attached by a seam) is 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.



NOTE 1—X inches depends on height of walker, Y = height of walker tray or uppermost frame member.

FIG. 6 Leaning Over Setup

7.4.3 A warning label attached by a seam is considered permanent if it does not detach when subjected to a 15 lb pull force applied in any direction using a 3/4 in. diameter clamp surface.

7.4.4 Adhesion Test for Warnings Applied Directly to the Surface of the Product:

7.4.4.1 Apply the tape test defined in Test Method B, Cross-Cut Tape Test of Test Method D 3359, eliminating parallel cuts.

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

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

7.4.5 A non-paper 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.

7.5 Removal of Components (see 6.3):

7.5.1 Test components in accordance with each of the following methods in the sequence listed.

7.5.2 Secure the walker so that it cannot move during the performance of the following tests.

7.5.3 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 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 a counter-clockwise direction.

7.5.4 Tension Test:

7.5.4.1 Attach a force gage to the cap, sleeve or plug 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 a gap of at least 0.040 in. (1.00 mm) between the rear surface of the component and the structural member of the walker to which they are attached, a clamp such as the one shown in Fig. 7 may be a suitable device.

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

7.5.4.3 Gradually apply a 15 lbf (67 N) force in the direction that would normally be associated with the removal of the component over a 5 s period and hold for an additional 10 s.

7.6 Step(s) Tests (see 6.4) (Refer to Table 1 and Fig. 8):

7.6.1 Walker and Dummy Positioning for Step Tests:

7.6.1.1 Adjust the walker seat and tray to the manufacturer's highest recommended use position. If the walker has any consumer controllable features (that is, manual brakes, toy bars, etc.), place them in the configuration deemed most likely to cause failure of this test.

7.6.1.2 The dummy may be secured to the tray to maintain contact during the test. Raise the dummy's legs just enough so its feet do not touch the platform during the performance of the test and position using a non-elastic means.

7.6.2 Establish a vertical Plane A that passes through the center of the seating area and is parallel to the direction the child faces. Establish a vertical Plane B that is perpendicular to Plane A and passes through the center of the seating area.

7.6.3 Forward Facing Step Test:

7.6.3.1 Center the walker on the test platform facing forward so that Plane A is perpendicular to the front edge of the platform and the walker is distance *d* from the center of the most forward wheel(s) to the edge of the test platform, *d* = 14.6 in. (371 mm). Position swivel wheels as they would be if the walker was moving forward.

**15 lbf (67 N)
Maximum Tension**

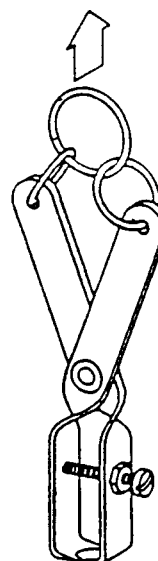


FIG. 7 Tension Test Adaptor/Clamp