Designation: F977 – 12

Standard Consumer Safety Specification for Infant Walkers[1]

This standard is issued under the fixed designation F977; 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:*[2]

D3359 Test Methods for Measuring Adhesion by Tape Test

F963 Consumer Safety Specification for Toy Safety

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:

1500.48 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

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

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

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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.

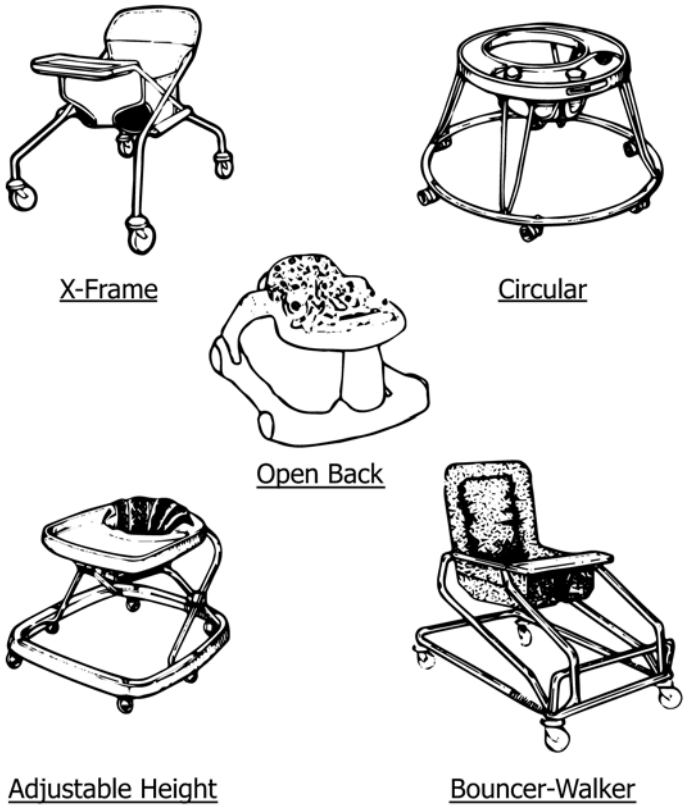


FIG. 1 Illustrations of Five Types of Baby Walkers

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

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

3.1.2 *dynamic load, n*—application of impulsive force through free fall of a weight.

3.1.3 *manufacturer's recommended use position, n*—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 *non-paper 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.

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

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

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

3.1.8 *walker, n*—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 ⅛ in. (3 mm) thick vinyl floor cover, unless test instructs 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 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.

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

4.6.1 *Equipment*—Force gauge with a range of 0 to 25 lbf (111 N) and a tolerance of ±0.25 lbf (1.1 N). A calibration interval shall be maintained for the force gauge which will ensure that the accuracy does not drift beyond the stated tolerance.

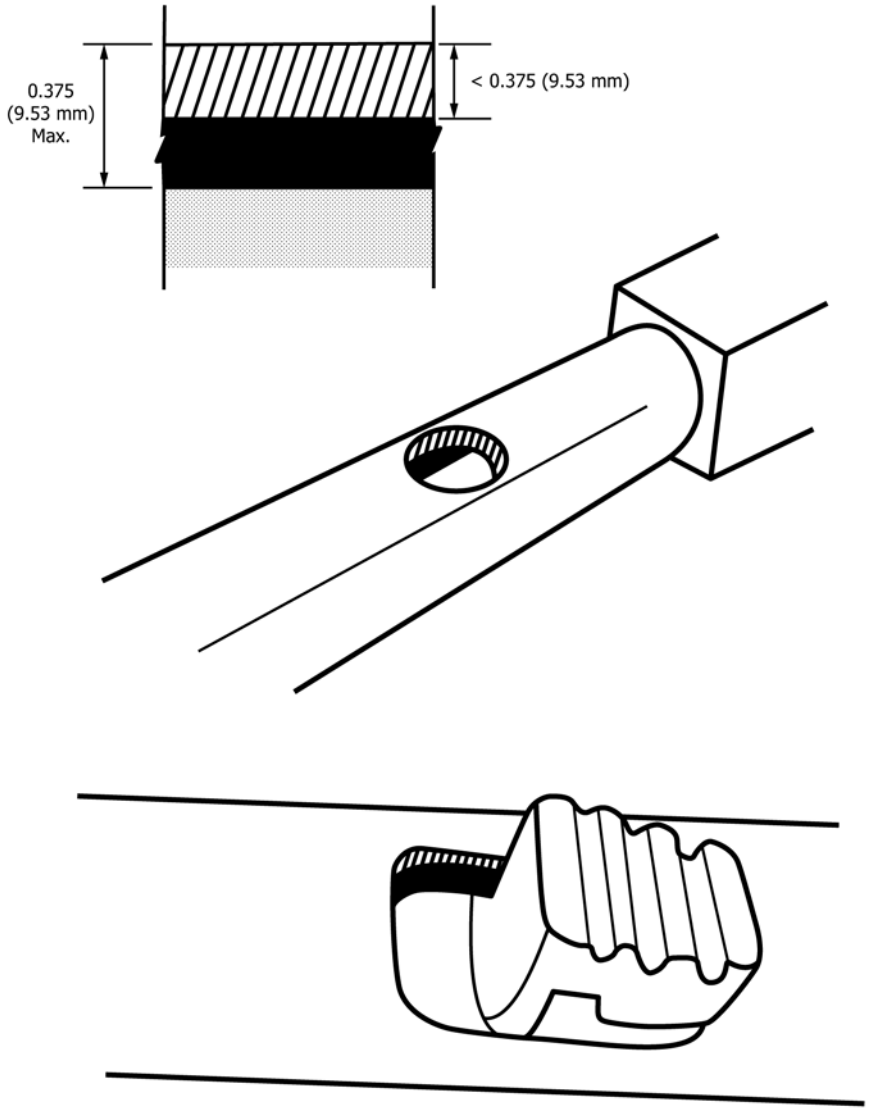


FIG. 2 Opening Examples

4.6.2 *Equipment*—Force gauge with a range 0 to 100 lbf (445 N) and a tolerance of ±1 lbf (4.4 N). A calibration interval shall be maintained for the force gauge which will ensure that the accuracy does not drift beyond the stated tolerance.

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 Prior to testing, any exposed wood parts shall be smooth and free from 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*—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. 2). The product shall be evaluated in all manufacturer's recommended use positions.

5.5 *Scissoring, Shearing, Pinching*—A product, when in a manufacturer's recommended use position, 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 *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 7.1.2 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 per 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, etc. shall be permanent when tested per 7.4.4.

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

5.8 *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 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 7.5.

5.9 *Toys*—Toy accessories attached to, removable from, or sold with an infant walker, as well as their means of attachment, must meet applicable requirements of Consumer Safety Specification F963.

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 gauge, 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 *Leg Openings*—The seat of the walker shall be designed so that the leg openings will not permit passage of the test probe (see Fig. 3) when tested in accordance with 7.1.3.

6.3 *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.

6.4 *Parking Device (applicable to walkers equipped with parking brakes)*—The walker shall have a maximum displacement of 1.97 in. (50 mm) for each test in each direction (forward, rearward, and sideward) when tested in accordance with 7.7.

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. 4. Attach the weld cap to the bottom of the test weight with the convex surface down.

7.1.1.3 Drop a test weight of 33 lb (15.0 kg), with the weight of the weld cap included, onto the seat at least a distance of 1 in. (25 mm) 100 times at a rate of 4 ± 1 s per cycle.

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 (15.0 kg) weight does not cause the frame to bottom out artificially.

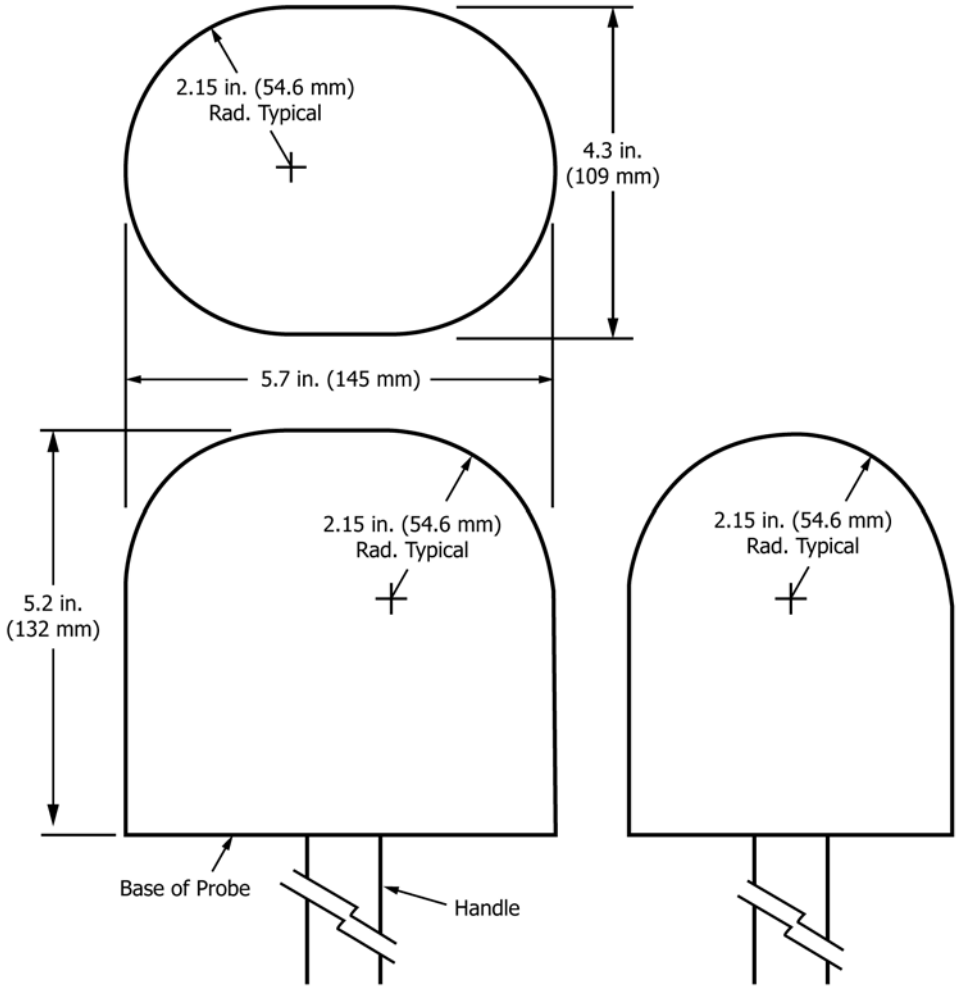
7.1.2 *Static Load (see 6.2.2):*

7.1.2.1 Position the walker as in 7.1.1.1.

7.1.2.2 Center a weight of 90 lb (40.8 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. 4 instead of the specified wood block. Include the weight of the weld cap in the 90 lb (40.8 kg) weight. If the natural action of a bouncer type walker will not allow the full application of 90 lb (40.8 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.

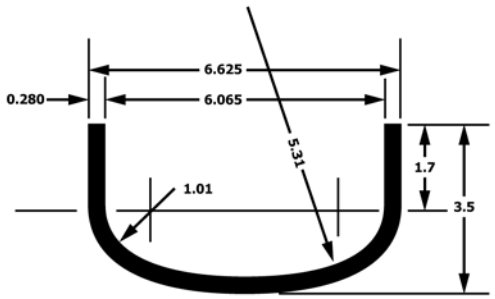
7.1.2.3 Position the walker in the manufacturer's recommended use position with all wheels on the floor. If adjustable, adjust to the lowest use position.

7.1.2.4 Center a weight 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. 4 instead of the specified wood block.



NOTE 1—Dimensions are based on a 5th percentile 6-month-old child. Gauge may be modified to facilitate testing to allow for pulling of the gauge.

FIG. 3 Small Head Test Probe



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

Include the weight of the weld cap in the 50 lb (22.7 kg) weight. 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 *Leg Openings Test (see 6.2.3):*

7.1.3.1 If the seat is adjustable, adjust the seat to obtain the largest leg opening.

7.1.3.2 Rotate the test probe shown in Fig. 3 to the orientation most likely to fail and gradually apply a force of 25 lbf (111 N). Apply the force perpendicular to the base of the probe within a period of 5 s and maintain it for an additional 10 s.

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 ½ in.

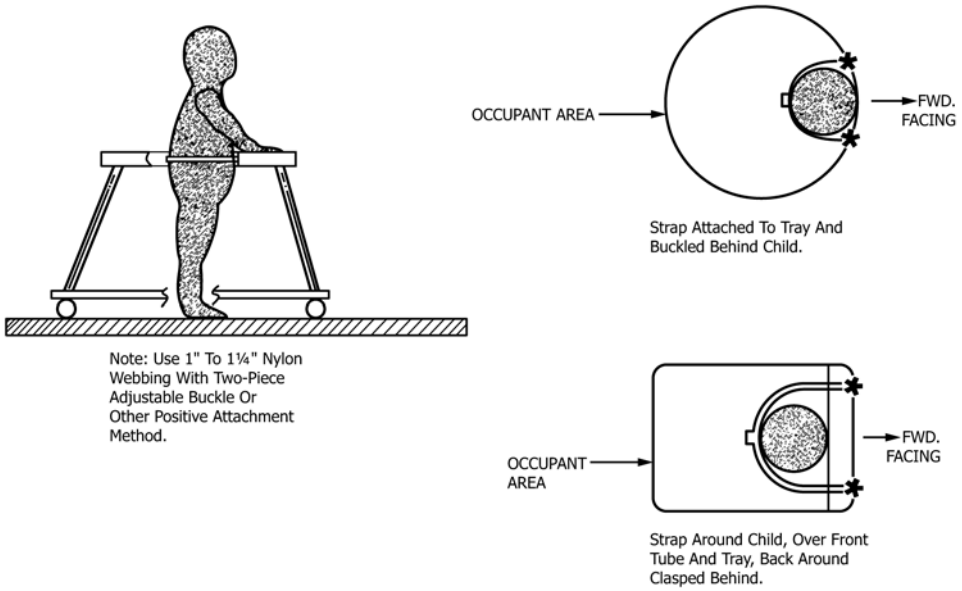


FIG. 5 Placement of CAMI Infant Dummy

(13 mm) high by ¾ 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 manufacturers 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 II[4] 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. 5). 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's[4] armpits in a direction perpendicular to the axis connecting the two most forward wheels and centered halfway between the wheels (see Fig. 6). Then increase the horizontal force until the walker tips over forward.

7.3.2.4 If during the application of the force the front edge of the walker contacts the test plane and the wheels contacting the aluminum stop begin to lift upward, release the force allowing the walker to rest upon the test plane, remove the stop from the wheels and position a suitable stop against the front edge of the walker. Then reapply the force as specified in 7.3.2.3 until the walker tips over forward.

7.3.2.5 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 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 Dummy[4] 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 Dummy's[4] 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

[4] CAMI Infant Dummy (Mark II), Department of Transportation, Memorandum Report AAC-119-74-14, Revision II, Drawing No. SA-1101 (see Fig. 7).

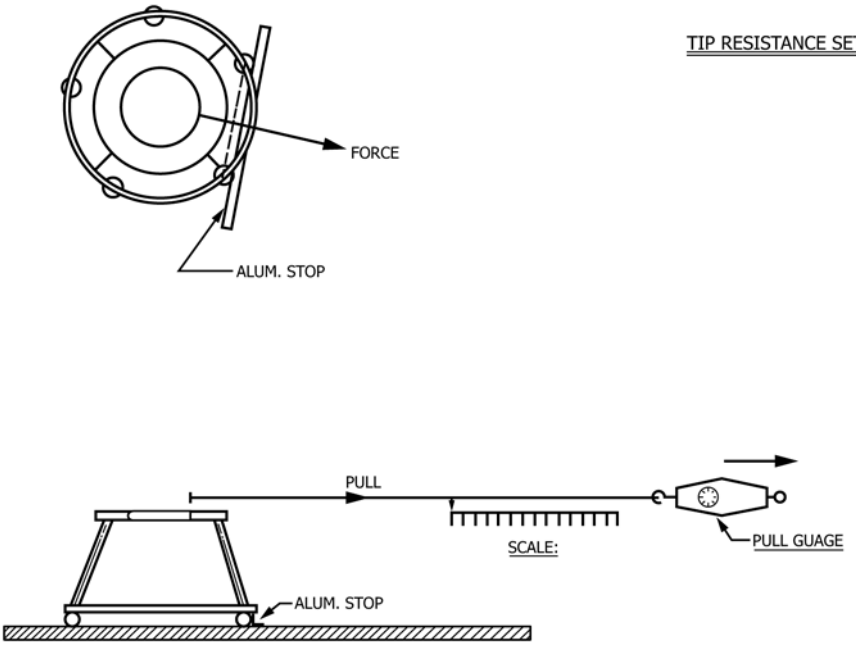
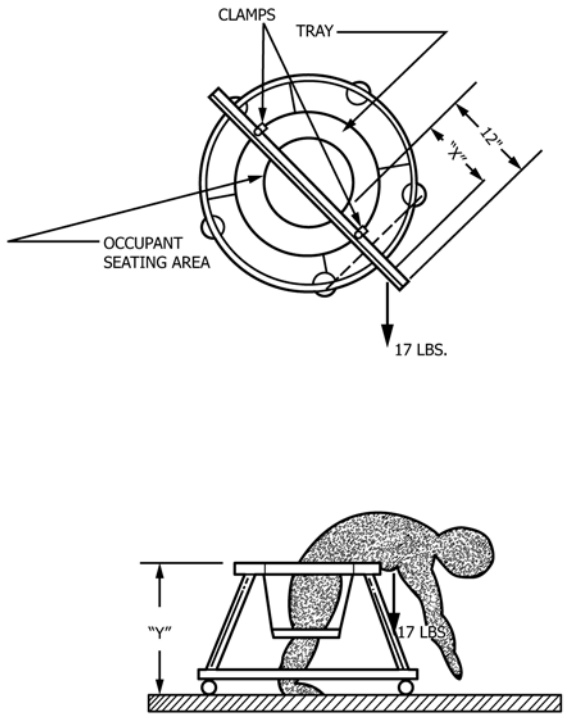


FIG. 6 Tip Resistance Setup

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

FIG. 7 CAMI Infant Dummy—Mark II



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

FIG. 8 Leaning Over Setup

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. 8).

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. 8). 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) weight 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) 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.

7.4.2 A non-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 or such action damages the surface to which it is attached.

7.4.3 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 any direction most likely to cause failure using a ¾ in. diameter clamp surface. Apply the force evenly over 5 s and maintain for an additional 10 s.

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

7.4.4.1 Apply the tape test defined in Test Method B-Cross-Cut Tape Test of Test Methods D3359 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 will 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 5.8):*

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 gauge 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. 9 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 6.3) (Refer to Table 1 and Fig. 10):*

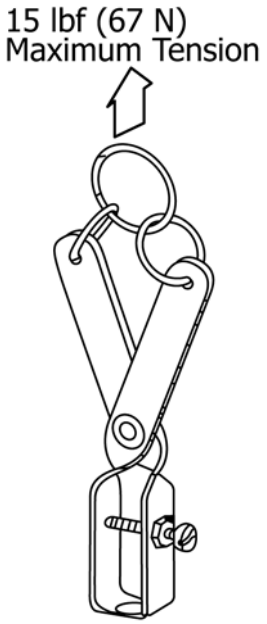


FIG. 9 Tension Test Adaptor/Clamp

TABLE 1 Summary of Step(s) Tests

Section Number	Facing Direction of Walker	Weight of CAMI Dummy, lb	Simulated Speed, ft/s	Apply Tipover Test
7.6.3	forward	17	4	yes
7.6.3.7	forward	28 (vest)	4	yes
7.6.4	sideward	17	2	yes
7.6.4.7	sideward	28 (vest)	2	yes
7.6.5	rearward	17	4	no
7.6.5.6	rearward	28 (vest)	4	no

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 the rope specified in Fig. 10. The dummy's head shall remain unrestrained for all the step tests.

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.

$$d_{CAMI} = \frac{(V_f^2 - V_o^2) * (W_{CAMI} + W_{walker} + W_{drop\ weight})}{2g(W_{drop\ weight} - \mu_k N_{CAMI})} \quad (1)$$

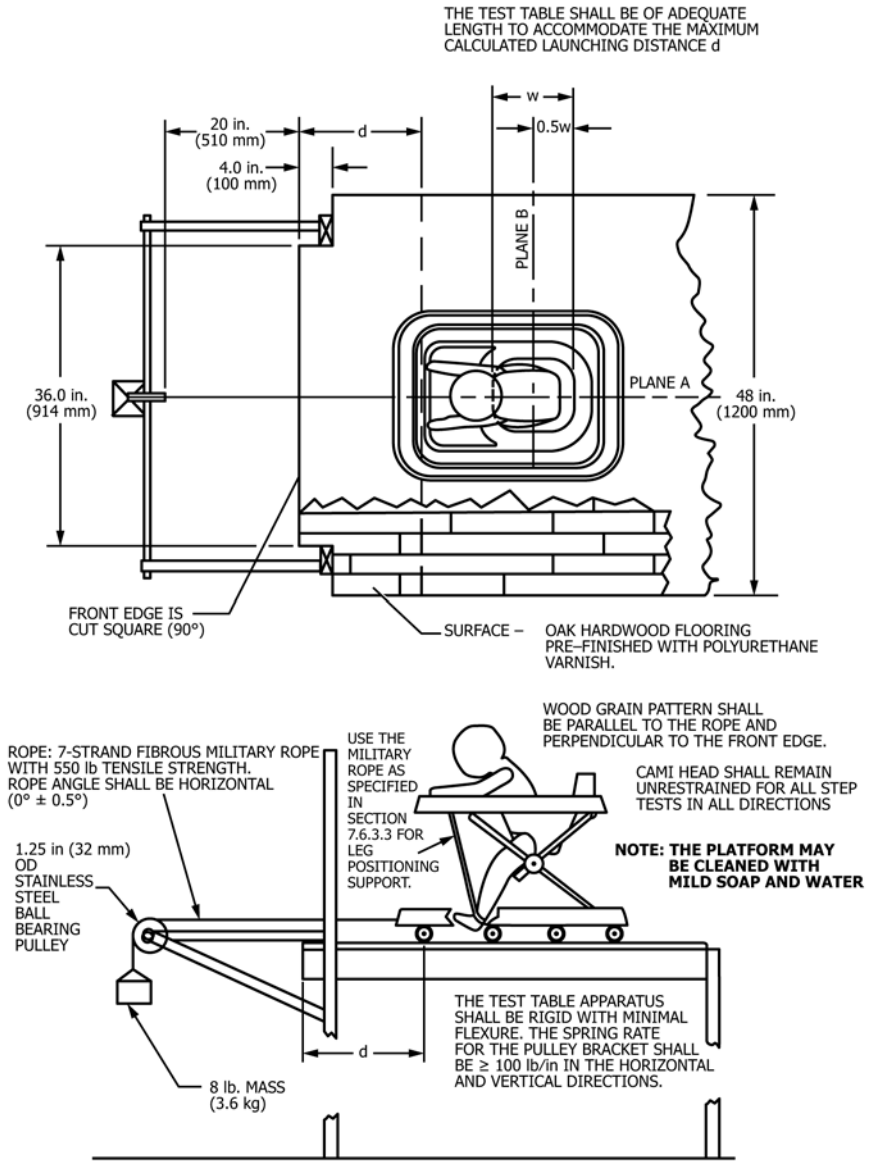


FIG. 10 Test Platform

where:

V_f = maximum velocity of walker at edge of platform (4 ft/s)
V_o = initial velocity (0)
W_{CAMI} = measured weight of CAMI dummy
W_{walker} = weight of walker
$W_{drop\ weight}$ = drop weight (8 lb)
μ_k = dynamic coefficient of friction (0.05)
N_{CAMI} = normal force (for CAMI dummy scenario) (weight of CAMI dummy + walker)
g = acceleration of gravity (32.2 ft/s^2)

Position the swivel wheels in such a way that the walker moves forward in a straight line parallel to Plane A.

7.6.3.2 Place a CAMI Infant Dummy Mark II in the walker and position it as shown in Fig. 11 with the torso contacting the front of the occupant seating area and arms placed on the walker tray.

7.6.3.3 While holding the walker stationary, attach an 8-lb (3.6-kg) weight to the front of the walker base at Plane A by means of a 7-strand military rope with a 550 lb tensile strength (for example, paracord 550) and a stainless steel ball bearing pulley with an outside diameter of 1.25 in. (32 mm) and adjust the pulley so that the force is applied horizontally (0 ± 0.5° with respect to the table surface).

7.6.3.4 Release the walker. When the walker comes to rest the 8 lb (3.6 kg) weight must still be applied to the walker.

7.6.3.5 If any part of the walker extends over the edge of the test platform, perform the following tipover test. Without repositioning the walker, remove the CAMI dummy and the 8 lb (3.6 kg) weight. Perform the tipover test as specified in 7.3.4.2 and 7.3.4.3 except that the aluminum angle should be positioned in Plane A.

7.6.3.6 Repeat 7.6.3.3 – 7.6.3.5 two additional times.

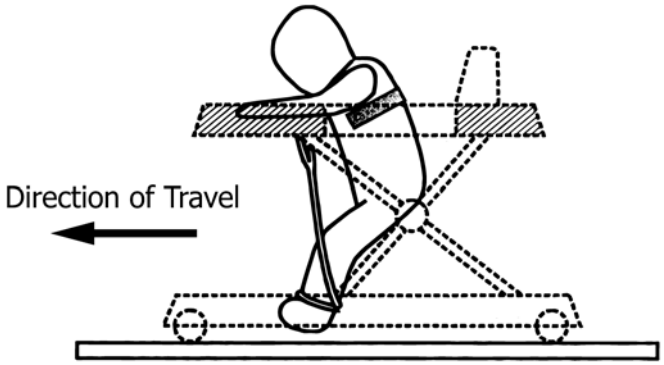


FIG. 11 Dummy Position for Forward Facing Test

7.6.3.7 Repeat 7.6.3.1 – 7.6.3.6 using the CAMI dummy with the weighted vest (see Fig. 12) and with distance computed using the following equation:

$$d_{CAMI\ w/vest} = \frac{(V_f^2 - V_o^2)*(W_{CAMI\ w/vest} + W_{walker} + W_{drop\ weight})}{2g(W_{drop\ weight} - \mu_k N_{CAMI\ w/vest})} \quad (2)$$

where:

V_f = maximum velocity of walker at edge of platform (4 ft/s)
V_o = initial velocity (0)
$W_{CAMI\ w/vest}$ = measured weight of CAMI dummy and weighted vest
W_{walker} = weight of walker
$W_{drop\ weight}$ = drop weight (8 lb)
μ_k = dynamic coefficient of friction (0.05)
$N_{CAMI\ w/vest}$ = normal force (for CAMI dummy fitted with 11 lb vest scenario) (weight of CAMI dummy + vest + walker)
g = acceleration of gravity (32.2 ft/s^2)

7.6.4 *Sideward Facing Step Test:*

7.6.4.1 Center the walker on the test platform facing sideways so that Plane B is perpendicular to the front edge of the platform and the walker is distance d from the center of the most sideward wheel(s) to the edge of the test platform.

$$d_{CAMI} = \frac{(V_f^2 - V_o^2)*(W_{CAMI} + W_{walker} + W_{drop\ weight})}{2g(W_{drop\ weight} - \mu_k N_{CAMI})} \quad (3)$$

where:

V_f = maximum velocity of walker at edge of platform (2 ft/s)
V_o = initial velocity (0)
W_{CAMI} = measured weight of CAMI dummy
W_{walker} = weight of walker
$W_{drop\ weight}$ = drop weight (8 lb)
μ_k = dynamic coefficient of friction (0.05)
N_{CAMI} = normal force (for CAMI dummy scenario) (weight of CAMI dummy + walker)
g = acceleration of gravity (32.2 ft/s^2)

Position the swivel wheels in such a way that the walker moves sideward in a straight line parallel to Plane B.

7.6.4.2 Place a CAMI Infant Dummy Mark II in the walker and position it as shown in Fig. 13 with the torso contacting the side of the occupant seating area.

7.6.4.3 While holding the walker stationary, attach an 8 lb (3.6 kg) weight to the side of the walker base at Plane B by means of a rope (as specified in 7.6.3.3) and a pulley (as specified in 7.6.3.3) and adjust the pulley so that the force is applied horizontally (0 ± 0.5° with respect to the table surface).

7.6.4.4 Release the walker. When the walker comes to rest the 8 lb (3.6 kg) weight still must be applied to the walker.

7.6.4.5 If any part of the walker extends over the edge of the test platform, perform the following tipover test. Without repositioning the walker, remove the CAMI dummy and the 8 lb (3.6 kg) weight. Perform the tipover test as specified in 7.3.4.2 and 7.3.4.3 except that the aluminum angle should be positioned in Plane B.

7.6.4.6 Repeat 7.6.4.3 – 7.6.4.5 two additional times.

7.6.4.7 Repeat 7.6.4.1 – 7.6.4.6 using the CAMI dummy with the weighted vest (see Fig. 12) and with distance computed using the following equation:

$$d_{CAMI\ w/vest} = \frac{(V_f^2 - V_o^2)*(W_{CAMI\ w/vest} + W_{walker} + W_{drop\ weight})}{2g(W_{drop\ weight} - \mu_k N_{CAMI\ w/vest})} \quad (4)$$

where:

V_f = maximum velocity of walker at edge of platform (2 ft/s)
V_o = initial velocity (0)
$W_{CAMI\ w/vest}$ = measured weight of CAMI dummy and weighted vest
W_{walker} = weight of walker
$W_{drop\ weight}$ = drop weight (8 lb)
μ_k = dynamic coefficient of friction (0.05)
$N_{CAMI\ w/vest}$ = normal force (for CAMI dummy fitted with 11 lb vest scenario) (weight of CAMI dummy + vest + walker)
g = acceleration of gravity (32.2 ft/s^2)

7.6.5 *Rearward Facing Step Test:*

7.6.5.1 Center the walker on the test platform facing rearward 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 rearward wheel(s) to the edge of the test platform.

$$d_{CAMI} = \frac{(V_f^2 - V_o^2)*(W_{CAMI} + W_{walker} + W_{drop\ weight})}{2g(W_{drop\ weight} - \mu_k N_{CAMI})} \quad (5)$$

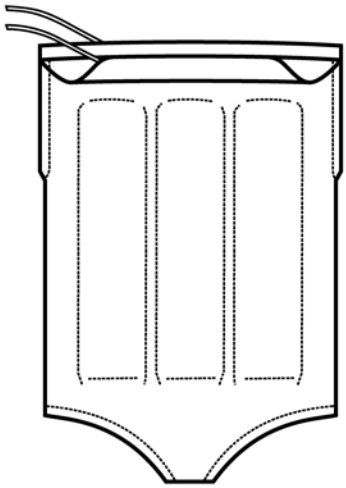


FIG. 12 Weighted Vest

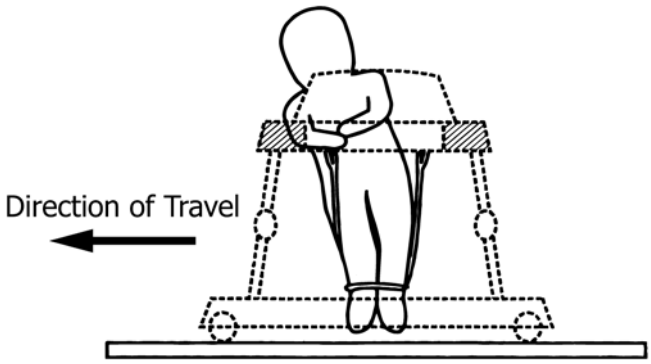


FIG. 13 Dummy Position for Sideward Test

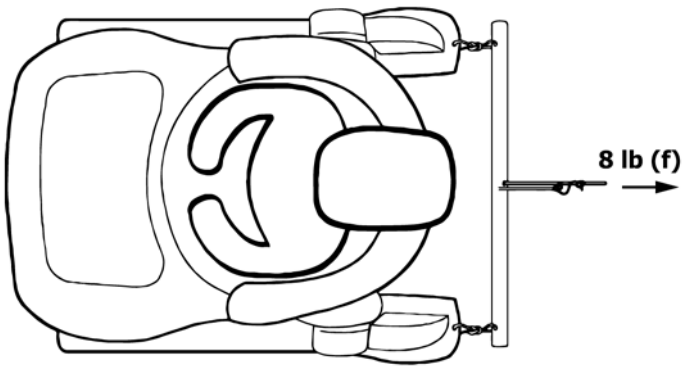


FIG. 14 Open Back Base

where:

V_f = maximum velocity of walker at edge of platform (4 ft/s)
V_o = initial velocity (0)
W_{CAMI} = measured weight of CAMI dummy
W_{walker} = weight of walker
$W_{drop\ weight}$ = drop weight (8 lb)
μ_k = dynamic coefficient of friction (0.05)
N_{CAMI} = normal force (for CAMI dummy scenario) (weight of CAMI dummy + walker)
g = acceleration of gravity (32.2 ft/s^2)

Position the swivel wheels in such a way that the walker moves rearward in a straight line parallel to Plane A. If the walker has an open back base design, attach the ends of a lightweight bar to the back of the walker near the wheels using loops of cord to allow the bar to float. The distance between the attachment points on the bar and those on the walker must be equal to prevent pulling the wheels inward or outward during the test. The cord from the 8-lb (3.6-kg) weight is then attached to the bar halfway between the attachment points (see Fig. 14).

7.6.5.2 Place a CAMI Infant Dummy Mark II in the walker and position it as shown in Fig. 15 with the torso contacting the back of the occupant seating area.

7.6.5.3 While holding the walker stationary, attach an 8 lb (3.6 kg) weight to the rear of the walker base at Plane A by means of a rope (as specified in 7.6.3.3) and a pulley (as specified in 7.6.3.3) and adjust the pulley so that the force is applied horizontally (0 ± 0.5° with respect to the table surface).

7.6.5.4 Release the walker. When the walker comes to rest the 8 lb (3.6 kg) weight must still be applied to the walker.

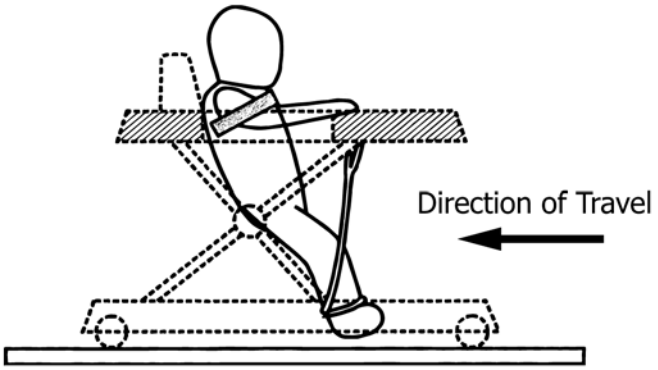


FIG. 15 Dummy Position for Rear Facing Test

7.6.5.5 Repeat 7.6.5.3 and 7.6.5.4 two additional times.

7.6.5.6 Repeat 7.6.5.1 – 7.6.5.5 using the CAMI dummy with the weighted vest (see Fig. 12) and with distance computed using the following equation:

$$d_{CAMI\ w/vest} = \frac{(V_f^2 - V_o^2)*(W_{CAMI\ w/vest} + W_{walker} + W_{drop\ weight})}{2g(W_{drop\ weight} - \mu_k N_{CAMI\ w/vest})} \quad (6)$$

where:

V_f = maximum velocity of walker at edge of platform (4 ft/s)
V_o = initial velocity (0)
$W_{CAMI\ w/vest}$ = measured weight of CAMI dummy and weighted vest
W_{walker} = weight of walker
$W_{drop\ weight}$ = drop weight (8 lb)
μ_k = dynamic coefficient of friction (0.05)
$N_{CAMI\ w/vest}$ = normal force (for CAMI dummy fitted with 11 lb vest scenario) (weight of CAMI dummy + vest + walker)
g = acceleration of gravity (32.2 ft/s^2)

7.7 *Parking Device Test (see 6.4):*

7.7.1 Perform the parking device test using a Test Mass that is A rigid cylinder 6.30 ± 0.04 in. (160 ± 1 mm) in diameter, 11.02 ± 0.04 in. (280 ± 1 mm) in height with a mass of 16.9 lb (7.65 kg), with its center of gravity in the center of the cylinder.

7.7.2 Adjust the walker seat to the highest position (if applicable). Place the Test Mass vertically in the walker seat. Set any manual speed control to the fastest position (if applicable). 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.

7.7.3 Perform the parking device test in the forward, sideward, and rearward directions.

7.7.4 *Forward Facing Test of Parking Devices:*

7.7.4.1 Position the walker including the Test Mass facing forward so that plane A is perpendicular to the front edge of the platform (see Fig. 10) and passes through the center of the pulley. Engage all parking devices in accordance with the manufacturer's instructions.

7.7.4.2 Within 1 min of placing the walker with the Test Mass on the platform, attach an 8-lb (3.6-kg) weight gradually within 5 s to the walker frame base at plane A by means of a rope and a pulley per the test apparatus specifications in the step test procedure, adjusted so that the force is applied horizontally (rope angle shall be 0 ± 0.5°). Remove the 8-lb (3.6-kg) weight after 1 min. Measure the displacement.

7.7.5 *Sideward Facing Test of Parking Devices:*

7.7.5.1 Position the walker including the Test Mass facing sideward so that plane B is perpendicular to the front edge of the platform and passes through the center of the pulley. Engage all parking devices in accordance with the manufacturer's instructions.

7.7.5.2 Within 1 min of placing the walker with the Test Mass on the platform, attach an 8-lb (3.6-kg) weight gradually within 5 s to the walker frame base at plane B by means of a rope and a pulley per the test apparatus specifications in the step test procedure, adjusted so that the force is applied horizontally (rope angle shall be 0 ± 0.5°). Remove the 8-lb (3.6-kg) weight after 1 min. Measure the displacement.

7.7.5.3 If the walker is equipped with fixed direction rear wheels and the walker is displaced in a curved path, establish the location of the rope attachment as the reference point and measure the linear displacement of that reference point after performing the procedure as described in 7.7.5.1 and 7.7.5.2.

7.7.6 *Rearward Facing Test of Parking Devices:*

7.7.6.1 Position the walker including the Test Mass facing rearward so that plane A is perpendicular to the front edge of the platform and passes through the center of the pulley. Engage all parking devices in accordance with the manufacturers' instructions.

7.7.6.2 Within 1 min of placing the walker with the Test Mass on the platform, attach an 8-lb (3.6-kg) weight gradually within 5 s to the walker frame base at plane A by means of a rope and a pulley per the test apparatus specifications in the step test procedure, adjusted so that the force is applied horizontally (rope angle shall be 0 ± 0.5°). Remove the 8-lb (3.6-kg) weight after 1 min. Measure the displacement.

8. Marking and Labeling

8.1 Each product and its retail package shall be marked or labeled clearly and legibly to indicate the following:

8.1.1 The name of the manufacturer, distributor, or seller and either the place of business (city, state, and mailing address, including zip code) or telephone number, or both.

8.1.2 A code mark or other means that identifies the date (month and year as a minimum) of manufacture.

8.1.3 The markings on the product shall be permanent.

8.1.4 Any upholstery label required by law shall not be used to meet the requirements of 8.1.

8.2 Each walker shall be labeled with warning statements. The warning statements shall be in contrasting color(s), permanent, conspicuous, and in sans serif style font.

8.2.1 In warning statements, the word " **WARNING**" shall not be less than 0.2 in. (5 mm) high and the remainder of the text shall be in letters not less than 0.1 in. (2.5 mm) high except as specified.

8.2.2 The warnings shall include the following exactly as stated below:

⚠**WARNING**
Never leave child unattended. Always keep child in view while in walker.

8.2.3 Additional warnings shall address the following:

8.2.3.1 Use only on flat surfaces free of objects that could cause the walker to tip over.

8.2.3.2 To avoid burns, keep the child away from hot liquids, ranges, radiators, space heaters, fireplaces, etc.

8.2.3.3 If the walker is equipped with a parking brake, a warning statement shall address the following:
WARNING: Parking brake use does not totally prevent walker movement. Always keep child in view when in the walker, even when using the parking brakes.

8.2.4 Each walker shall be labeled with a separate stairs warning visible to the consumer when placing the child in the walker.

8.2.4.1 In the stairs warning, the safety alert symbol "⚠" and the word "**WARNING** " shall not be less than 0.2 in. (5 mm) high and shall be black lettering on orange background surrounded by a black border. The remainder of the text shall be characters whose upper case shall be at least 0.1 in. (2.5 mm) high and shall be black lettering on white background.

8.2.4.2 The stairs warning shall be stated exactly as follows:

⚠**WARNING—STAIR HAZARD**
Avoid serious injury or death
Block stairs/steps securely before using walker even when using parking brake

(1) The statement "even when using parking brake" applies only to walkers equipped with a parking brake.

9. Instructional Literature

9.1 Instructions must be provided with the walker, and shall be easy to read and understand. Assembly, maintenance, cleaning, operating, folding instructions, and warnings, where applicable, must be included.

9.1.1 The instructions shall include the following:
Read all instructions before assembly and use of the walker.
Keep instructions for future use.

9.2 *Warning Statements with the Instructional Literature:*

9.2.1 In warning 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 letters not less than 0.1 in. (2.5 mm) high.

9.2.2 If the unit is designed with a restraint, the instructions must advise that the restraint system be used.

9.2.3 The instructions must indicate the manufacturer's recommended height, weight, or age, or combination thereof, of the child for which the walker is intended. If the walker is not intended for use by a child who can already walk unassisted, the instructions shall so state this limitation.

9.2.4 The instructions shall contain warning statements which address the following:

(1) Do not use the walker if it is damaged or broken.

(2) Do not use until baby can sit up by itself.

(3) Address the following if the walker uses friction devices to pass the stair test: Clean (*friction components*) regularly to maintain stopping performance.

9.2.5 The instructions must include all warnings in 8.2.

10. Keywords

10.1 infant walker

APPENDIX

(Nonmandatory Information)

X1. RATIONALE

X1.1 The 8 lb falling weight is based on the horizontal force generated when ten different children were tested in walkers. The children ranged in age from 6½ to 11 months and in weight from 15 to 23 lb. The children were placed in walkers on several different floor surfaces and the force they generated to move the walker was measured. The highest measured force out of approximately 125 readings was 7.5 lb.

X1.2 The use of the falling weight simulates a child in a walker approaching a step at approximately 4 ft/s (for the forward and rearward directions) or 2 ft/s (for the sideward direction). It assumes the walker's weight is 8 lb, the child's weight is 17 lb (or 28 lb), and the walker has normal caster wheels with normal rolling friction. By varying distance *d*, the desired number of ft/s can be achieved.

X1.3 The 4 ft/s is based on the test results of seven different children in walkers. The maximum speed attained was 4.02 ft/s. It should be noted that the children were selected because they were judged to be very active in a walker. Additionally,

top speeds were sustained for only very brief moments under ideal conditions, that is, smooth floors with plenty of space to get up speed.

X1.4 The test is performed at both ends of the weight range for children who use walkers. The CAMI Infant Dummy Mark II represents the 50th percentile weight of 6 to 8 month old children. The 28 lb CAMI Infant Dummy (CAMI with weighted vest) represents the 95th percentile weight of 12 to 15 month old children.

X1.5 The 17 lb weight in the tipover test simulates a child leaning forward or sideways over the edge of the occupant seating area. Seventeen pounds represents the upper body weight of children in the 12 to 15 month age range (17 lb = 3/5 of 28 lb, the 95th percentile weight of 12 to 15 month old children.)

X1.6 The tipover sequence is not included in the rearward facing tests since the walker seat back prevents a child from leaning backward in a walker to any significant degree.

X1.7 The use of a 36 in. opening on the test platform is based on a CPSC study of walker stair/step incidents in which approximately 80 % of the openings the walkers passed through prior to going over steps were 36 in. or less.

X1.8 *Sections 6.2.3 and 7.1.3*—This test is to address entrapment in the leg openings. Leg openings are evaluated after application of a 25-lbf force to the small head probe. This is the same force used in evaluating leg openings in passive restraint systems in high chairs, entrapment in non-full-size crib/play yard attachments, entrapment in shelves in changing tables, and for evaluating mattress support systems in full-size cribs and non-full-size cribs/play yards. Users of these products are of similar developmental stage to users of infant walkers.