



Designation: F2549–09 Designation: F 2549 – 09a

## Standard Consumer Safety Specification for Frame Child Carriers<sup>1</sup>

This standard is issued under the fixed designation F 2549; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### INTRODUCTION

This consumer safety specification is intended to address incidents reported by the U.S. Consumer Product Safety Commission (CPSC) relating to frame child carriers.

In response to the incident data compiled by the CPSC, this consumer safety specification attempts to minimize the hazards associated with these products from the following: (1) occupant retention, (2) structural integrity, and (3) deficiency of consumer education regarding product use. This consumer safety specification is intended to deal with reasonably foreseeable use and misuse of the products. This consumer safety specification does not apply to products that are blatantly misused, nor does it apply to products used by consumers in a careless manner, violating normal practice or disregarding the instructions or warnings provided with the product, or both.

### 1. Scope

1.1 This consumer safety specification covers performance requirements, test methods, and marking requirements to promote safe use of frame child carriers.

1.2 This consumer safety specification is intended to minimize the risk of injury to a child from the normal use and reasonably foreseeable misuse of these products.

1.3 For purposes of definition, a frame child carrier is a product, normally of sewn fabric construction on a tubular metal or other frame, which is designed to carry a child, in an upright position, on the back of the caregiver. A frame child carrier is intended for use with a child that is able to sit upright unassisted and weigh between 16 lb (7.3 kg) and up to 40 lb (18.1 kg). The frame child carrier is intended to be worn on the back of the caregiver's body, with the carrier, and thus the child, suspended from both shoulders of the caregiver. The seated position of the child is either facing towards or away from the caregiver.

1.4 No frame child carrier produced after the approval date of this consumer safety specification shall, either by label or other means, indicate compliance with the specification unless it complies with all of the requirements contained herein.

1.5 This consumer safety specification is not intended to address incidents and injuries resulting from the interaction of other persons or objects with the caregiver and child while the frame child carrier is in use.

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

1.7 The following precautionary caveat pertains only to the test method portion, Section 7 of this consumer safety specification. *This standard may involve the use of hazardous materials, operations, and equipment. 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:<sup>2</sup>

D 3359 [Test Methods for Measuring Adhesion by Tape Test](#)

F 963 [Consumer Safety Specification for Toy Safety](#)

#### 2.2 EN Standard:<sup>3</sup>

EN 13209 Child Use and Care Articles (Child Carriers Safety Requirements and Test Methods)

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.21 on Infant Carriers, Bouncers and Baby Swings.

Current edition approved April/July 1, 2009. Published April/August 2009. Originally approved in 2006. Last previous edition approved in 2008/2009 as F 2549 – 089.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from European Committee for Standardization (CEN), 36 rue de Stassart, B-1050, Brussels, Belgium, <http://www.cenorm.be>.



FIG. 1 CAMI Dummy, Mark II

2.3 *Federal Regulations:*<sup>4</sup>

16 CFR 1500 Hazardous Substance Act regulations including:

1500.3 (c) (6) (vi) Definition of “Flammable Solid”

1500.44 Method for Determining Extremely Flammable and Flammable Solids

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 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

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

2.4 *Other Document:*

CAMI Infant Dummy, Mark II (see Fig. 1)

3. Terminology

3.1 *Definitions:*

3.1.1 *conspicuous*—visible when the product is in the manufacturer’s use position to a caregiver who is placing the occupant in the frame child carrier or when the caregiver places the product on his or her body.

3.1.2 *cord*—length of slender, flexible material including monofilaments, rope, woven and twisted cord, plastic or textile tapes, ribbons, and those fibrous materials commonly called string.

3.1.3 *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.

3.1.4 *handle*—a component intended to facilitate lifting of the frame child carrier.

3.1.5 *kickstand*—a hinged frame member designed to deploy and allow the child carrier to stand freely, in the upright position, for loading of child. The frame member can then be retracted when the carrier is in use.

3.1.6 *leg opening*—the opening in the frame child carrier through which the occupant’s legs extend when the product is used in any of the manufacturer’s recommended use positions.

3.1.7 *manufacturer’s recommended use position(s)*— any position that is presented as a normal, allowable, or acceptable configuration for 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.

3.1.8 *occupant*—that individual who is restrained in a seated position inside the frame child carrier in one of the manufacturer’s recommended use positions.

<sup>4</sup> Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

3.1.9 *occupant retention system*—a system provided to secure the occupant in a seated position in any of the manufacturer’s recommended use positions.

3.1.10 *non-paper label*—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.

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

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

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

#### 4. Calibration and Standardization

4.1 The product shall be completely assembled in accordance with the manufacturer’s instructions.

4.2 No testing shall be conducted within 48 h of manufacture.

4.3 The product to be tested shall be at an ambient temperature of  $73 \pm 9^\circ\text{F}$  ( $23 \pm 5^\circ\text{C}$ ) for at least 1 h before testing. All testing shall be conducted in this temperature range.

4.4 All testing required by this consumer safety specification shall be conducted on the same unit in the order presented in this specification.

#### 5. General Requirements

5.1 *Hazardous Sharp Points or Edges*— There shall be no sharp points or edges as defined by 16 CFR 1500.48 and 16 CFR 1500.49 before and after testing.

5.2 *Small Parts*—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 *Lead in Paint*—The paint or surface coating on the product shall comply with 16 CFR 1303.

5.4 *Wood Parts*—Prior to testing, any wooden parts shall be smooth and free of splinters.

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 an 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. (5.30 mm) and less than 0.375 in. (9.50 mm) diameter at any accessible point throughout the range of motion of such parts.

5.6 *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 manufacturers’ recommended use positions.

5.7 *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 7.3) shall be covered or otherwise designed to prevent injury.

5.8 *Locking and Latching*—Any frame child carrier that folds, for storage or transport, 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 7.10. If a unit is designed with a latching or locking device, that device shall remain engaged and operative after testing.

NOTE 1—This requirement does not apply to the carrier kickstand.

5.9 *Unintentional Folding*—If the frame child carrier is designed to allow it to stand freely in the upright position, the carrier shall remain in the manufacturer’s recommended use position before and after completion of all tests in 7.11.

5.10 *Labeling*—Warning labels (whether paper or non-paper) shall be permanent when tested in accordance with 7.7, 7.8, and 7.9.

5.10.1 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 7.8.

5.10.2 Non-paper labels shall not liberate small parts when tested in accordance with 7.9.

5.11 *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 7.12.

5.12 There shall be no flammable solids as defined in 16 CFR 1500.3 (c) (6) (vi) before or after testing in accordance with this specification.

5.13 *Toys*—Toy accessories attached to, removable from, or sold with a child frame carrier, as well as their means of attachment, must meet applicable requirements of Consumer Safety Specification F 963.

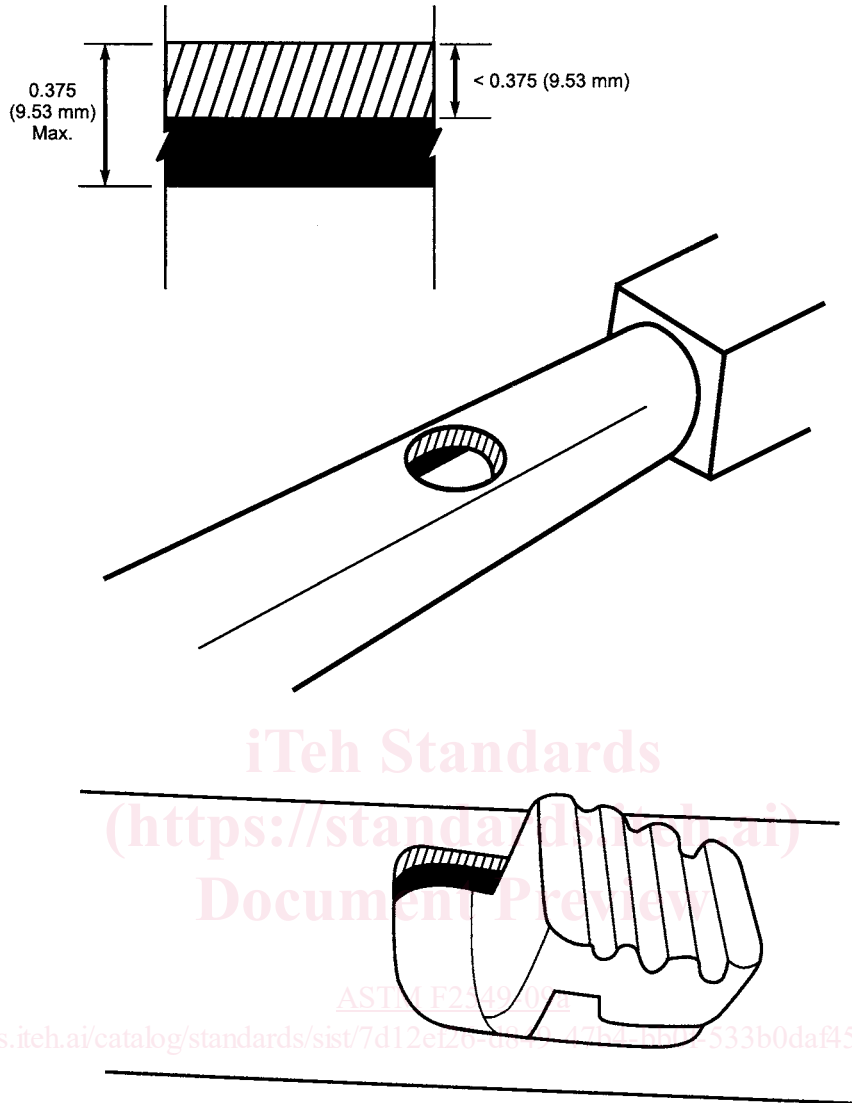


FIG. 2 Opening Example

## 6. Performance Requirements

6.1 *Leg Openings*—Leg openings shall not permit the passage of the Leg Opening Test Sphere when tested in accordance with 7.1.

6.2 *Dynamic Strength*—The carrier shall not create a hazardous condition, such as frame or fasteners breaking or disengaging or seams separating, when tested in accordance with 7.2. Adjustable elements in the occupant retention system shall not slip more than 1 in. (25.4 mm) per strap as a result of the dynamic testing in accordance with 7.2.

6.3 *Static Load*—The carrier shall not create a hazardous condition, such as not supporting the test weight, frame or fasteners breaking or disengaging, or seams separating, when tested in accordance with 7.3. Adjustable elements in the occupant retention system shall not slip more than 1 in. (25.4 mm) when tested in accordance with 7.3.

6.4 *Stability*—If the frame child carrier is designed to allow it to stand freely in the upright position, the frame child carrier shall not tip over when tested in accordance with 7.4.

### 6.5 Retention System:

6.5.1 A retention system, including a shoulder restraint, shall be provided to secure the occupant in a seated position in any of the manufacturer's recommended use positions when tested in accordance with 7.5.

6.5.2 Before shipment, the manufacturer shall attach the retention system in such a manner that it will not detach in normal usage.

6.5.3 If the retention system includes a crotch restraint designed to work with a lap belt, it shall be designed such that its use is mandatory when the retention system is in use.

6.6 *Handle Integrity*—The carrier shall not create a hazardous condition such as handle or frame breaking or disengaging or seams separating when tested in accordance with 7.6.

**7. Test Methods**

*7.1 Leg Openings:*

7.1.1 If the leg opening is adjustable in size to allow for growth, it shall be tested with the leg opening adjusted to its smallest size as described in the manufacturer’s literature or instructions.

7.1.2 Place the Leg Opening Test Sphere (Fig. 3) in the carrier leg opening and adjust the carrier in a manner such that the leg opening of the carrier is horizontal. Remove the test sphere.

NOTE 2—Sphere shall be fabricated from a smooth, rigid material weighted to 7.0 lb (3.20 kg). Sphere is machined to 16.5 in. (419.1 mm) circumference.

7.1.3 Place the Leg Opening Test Sphere inside the carrier and gradually allow the sphere to rest in the leg opening over a period of 5 s. Allow the sphere to rest in the opening for an additional 1 min.

7.1.4 Repeat the test for the other leg opening.

*7.2 Dynamic Strength Test:*

7.2.1 Fasten the frame child carrier to a test torso (see Fig. 4) in the same or similar manner as the instruction manual directs the carrier should be attached to the human torso during actual use.

7.2.2 Position a weight of 40 lb (18.1 kg), using a 6 to 8 in. diameter shot bag, in the seat of the frame child carrier. Adjust all straps to firmly retain the shot bag in the same or similar manner as the instruction manual directs that the straps should be adjusted on the child occupant during actual use.

7.2.3 Complete ten cycles of alternating vertical movement at amplitude of 4.7 in. (120.0 mm) and a frequency of 2 cycles/s  $\pm 20\%$  (2 Hz). Mark the position of the adjustment hardware.

7.2.4 Complete an additional 90 cycles and measure the slippage, if any. If during testing, the adjustment straps allow significant slippage, causing the frame child carrier to be tested in an unrealistic position, the adjustment straps may be secured to prevent further movement.

7.2.5 Complete an additional 49 900 cycles. Verify the general condition of the frame child carrier in accordance with 6.2.

7.2.6 If the frame child carrier is designed to allow it to stand freely in the upright position, the following test will be performed.

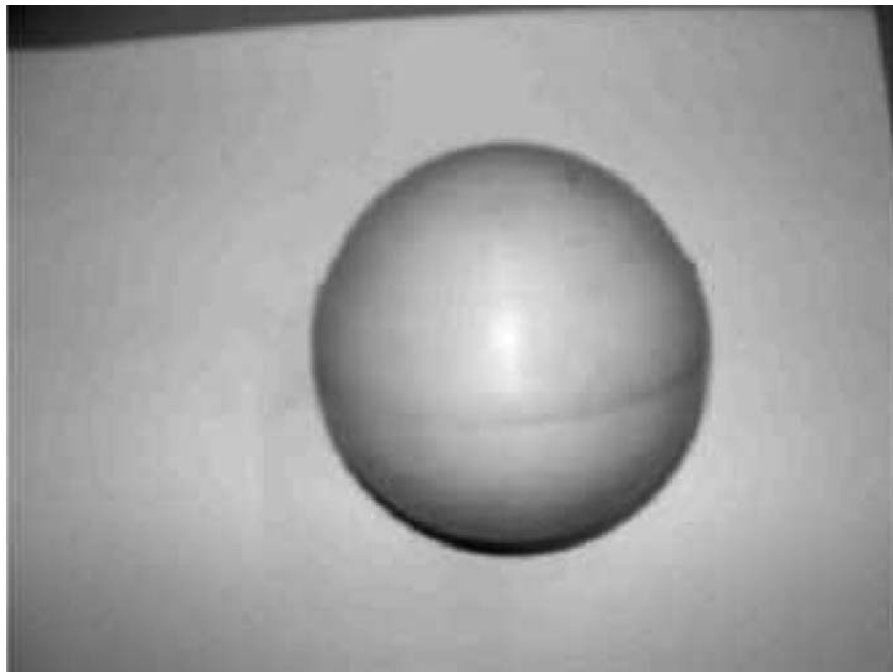
7.2.6.1 Secure the frame child carrier in the manufacturer’s use position to a horizontal test plane.

7.2.6.2 Position a weight of 40 lb (18.1 kg), using a 6 to 8 in. (150 to 200 mm) diameter shot bag, in the seat of the frame child carrier.

7.2.6.3 Lift the weight a vertical distance of 3 in. (75 mm) from the seat surface and drop onto the seat. Perform the drop test a total of 500 times with a cycle time of  $4 \pm 1$  s/cycle. If required, adjust the drop height to maintain the 3 in. (75 mm).

*7.3 Static Load Test:*

7.3.1 Fasten the frame child carrier to a test torso (see Fig. 4) in the same or similar manner as the instruction manual directs



**FIG. 3 Leg Opening Test Sphere**



NOTE—This figure illustrates typical device that is acceptable.

FIG. 4 Test Torso

the carrier should be attached to the human torso during actual use.

7.3.2 Using a 6 in. (150 mm) Standard Weld Cap (see Fig. 5), center a weight equal to three times the maximum manufacturer’s recommended weight in the seat area of the frame child carrier. Include the weight of the weld cap. Gradually apply the weight within a 5 s period and maintain for an additional 1 min.

7.3.3 If the frame child carrier is designed to allow it to stand freely in the upright position, repeat the Static Load Test of 7.3.2 with the frame child carrier placed on a concrete floor that may be covered with 1/8 in. (3 mm) thick vinyl floor covering.

7.4 Stability Test:

7.4.1 Place the frame child carrier in the manufacturer’s use position with all frame members on a 12° inclined plane. If the carrier is designed with adjustable seat heights, test in the highest use position.

7.4.2 Place a stop on the plane against the frame in a manner that will prevent the frame child carrier from moving on the plane, but will not prevent tipping.

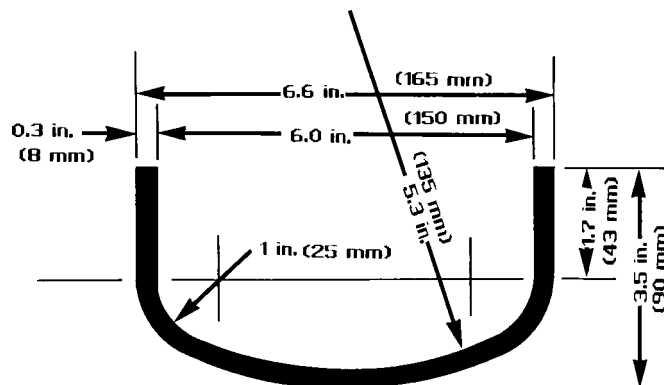


FIG. 5 Standard 6 in. (150 mm) Weld Cap