



Designation: F 2088 – 03

Standard Consumer Safety Specification for Infant Swings¹

This standard is issued under the fixed designation F 2088; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

INTRODUCTION

This consumer safety specification addresses infant swing incidents identified by the U.S. Consumer Product Safety Commission (CPSC).

In response to incident data compiled by the CPSC, this consumer safety specification attempts to minimize the following: (1) swings tipping over or collapsing, (2) structural failures, and (3) entanglement in the restraints or entrapment in leg holes. This consumer safety specification is intended to cover normal use and reasonably foreseeable misuse or abuse of infant swings. This specification does not cover swings that are blatantly misused or used in a careless manner that disregards the safety instructions and warnings provided with each infant swing.

This consumer safety specification is written within the current state-of-the-art of infant swing technology and will be updated whenever substantive information becomes available that necessitates additional requirements or justifies the revision of existing requirements.

1. Scope

1.1 This consumer safety specification establishes safety performance requirements, test methods, and labeling requirements to minimize the hazards to infants presented by swings as identified in the introduction.

1.2 This consumer safety specification is intended to minimize the risk of injuries to infants resulting from normal use and reasonably foreseeable misuse or abuse of infant swings. It is not intended to address all incidents and injuries resulting from the interaction of other persons with the infant in the swing.

1.3 No swing 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 The values stated in inch-pound units are to be regarded as the standard. The SI values given in parentheses are for information only.

1.5 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 appro-*

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

2. Referenced Documents

2.1 ASTM Standards:

D 3359 Standard Test Methods for Measuring Adhesion by Tape Test²

2.2 Federal Standards:

16 CFR Part 1303 Ban of Lead-Containing Paint and Certain Consumer Products Bearing Lead-Containing Paint³

16 CFR Part 1500 Hazardous Substances Act Regulations including sections:

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

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

1500.50-.51—Test Method for Simulating Use and Abuse of Toys and Other Articles Intended for Use by Children³

16 CFR Part 1501 Method for Identifying Toys and Other Articles Intended for Use by Children Under Three Years of Age Which Present Choking, Aspiration, or Ingestion Hazards Because of Small Parts³

¹ This consumer safety 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 March 10, 2003. Published April 2003. Originally approved in 2001. Last previous edition approved in 2001 as F 2088-01.

² Annual Book of ASTM Standards, Vol 06.01.

³ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401.



FIG. 1 CAMI Infant Dummy, Mark II

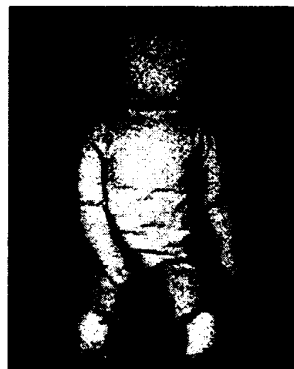


FIG. 2 CAMI Newborn Dummy

2.3 Other Documents:

CAMI Infant Dummy, Mark II (see Fig. 1)⁴

CAMI Newborn Dummy (see Fig. 2)⁵

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *conspicuous*—a label which 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 infant swing but not necessarily visible from all positions.

3.1.2 *cradle swing*—an infant swing which is intended for use by a child lying flat.

3.1.3 *dynamic load*—application of impulsive force through free fall of a weight.

3.1.4 *infant swing*—a stationary unit with a frame and powered mechanism that enables an infant to swing in a seated position. An infant swing is intended for use with infants from birth until a child is able to sit up unassisted.

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

3.1.6 *non-paper label*—any label material (such as plastic or metal) which either will not tear without the aid of tools or tears leaving a sharply defined edge.

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

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

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

3.1.10 *structural component*—any load bearing member or part of the product that supports the weight or portion of the weight of the occupant.

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 test instructs differently.

4.2 The product shall be completely assembled, unless otherwise noted, in accordance with the manufacturer's instructions.

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

4.4 The product to be tested shall be in a room with an ambient temperature of 73° ± 9°F (23 ± 5°C) for at least 1 hour 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.

5. General Requirements

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

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

5.3 The paint and surface coating on the product shall comply to 16 CFR 1303. (LEAD)

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

5.5 *Scissoring, Shearing, Pinching*—A product, when in the manufacturer's recommended use position, shall be designed and constructed so as to prevent injury to the occupant from

⁴ Department of Transportation Memorandum Report AAC-119-74-14, Revision II. Drawing No. SA-1001 by Richard Chandler, July 2, 1974. Federal Aviation Administration, Civil Aeromedical Institute, Protection and Survival Laboratory, Aeromedical Center, Oklahoma City, OK 73125.

⁵ Drawing numbers 126-0000 through 126-0015 (sheets 1 through 3), 126-0017 through 126-0027, a parts list entitled "Parts List for CAMI Newborn Dummy", and a construction manual entitled, "Construction of the Newborn Infant Dummy" (July 1992). Copies of the materials may be inspected at NHTSA's Docket Section, 400 Seventh Street, SW., Room 5109, Washington, DC, or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.



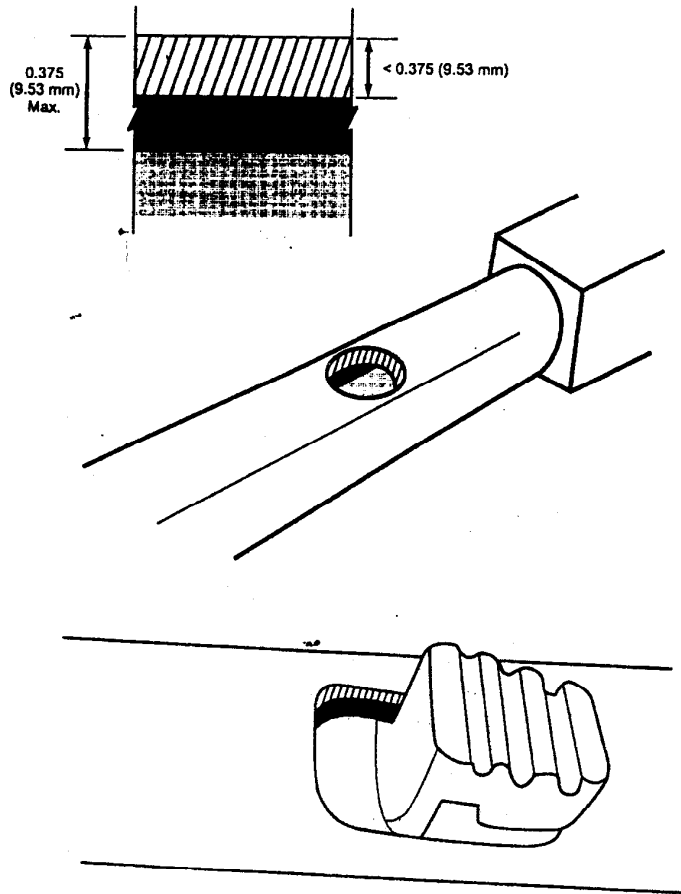


FIG. 3 Opening Examples

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 could exist 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 *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. 3). The product shall be evaluated in all manufacturer's 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 7.2) shall be covered or otherwise designed to prevent injury from entrapment.

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 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 7.1.

5.9 *Labeling*

5.9.1 Warning labels, (whether paper or non paper) shall be permanent when tested per 7.7.

5.9.2 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 7.8.

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

6. *Performance Requirements*

6.1 *Static Load*—The swing shall not create a hazardous condition (such as breakage or pinch points, or both) when tested in accordance to 7.2.

6.2 *Stability Test*—The swing shall not tip over when tested according to 7.3.

6.3 *Unintentional Folding*—The swing shall remain in the manufacturer's recommended use position when tested per 7.4. If a unit is designed with a latching or locking device, that device shall remain engaged and operative after testing.

6.3.1 Threaded fasteners used to attach structural components shall have a locking mechanism such as lock washers, self-locking nuts or other means to prevent detachment due to vibration.

6.4 *Restraint System*—A restraint system shall be provided to secure a child in the seated positions in any of the manufacturer's recommended use positions.

6.4.1 The restraint system shall include either a fixed passive crotch restraint and a waist belt, or a waist and crotch belt where the crotch belt's use is mandatory when the waist belt is in use.

6.4.2 If the swing seat has a tray, a passive crotch restraint system shall be designed such that its use is mandatory when the tray is in use. If the tray is moveable, the restraint system must have a waist and crotch belt where the crotch belt's use is mandatory when the waist belt is in use.

6.4.3 This system and its closing means shall not slip more than 1 in. (25 mm), break, separate, or permit the removal of the test dummy when tested per 7.3.

6.5 *Cradle Swing Orientation*—The angle of the cradle swing surface along the dummy's head-to-toe axis relative to the horizontal shall not be greater than 5 degrees when tested in accordance with 7.6.

6.6 *Battery Operated Swings*

6.6.1 The battery compartment or area immediately adjacent to the battery compartment shall be marked permanently and legibly to show the correct battery polarity, size and voltage.

6.6.2 Battery operated swings shall provide a means to contain the electrolytic material in the event of a battery leakage. This containment means shall not be accessible to the occupant.

6.6.3 Positive protection from the possibility of charging any primary (non-rechargeable) battery shall be achieved either through physical design of the battery compartment or through the use of appropriate electrical circuit design. This applies to situations in which a battery may be installed incorrectly (reversed), and in which a battery charger may be applied to a product containing primary batteries. This section does not apply to a circuit having one or two batteries as the only source of power.

7. Test Methods

7.1 *Removal of Protective Components Test*

7.1.1 Any protective component shall be tested in accordance with each of the following methods in the sequence listed.

7.1.2 Securely locate the swing so that it cannot move during the performance of the following tests:

7.1.3 *Torque Test*—A torque shall be applied to any graspable component (see 5.8) within a period of 5 s in a clockwise direction until either the component rotates 180° from the original position or the torque attains 2 lbf-in. (0.2 Nm). The torque or maximum rotation shall be maintained for an additional 10 s. The torque shall then be removed and the test

15 lbf (67 N)
Maximum Tension



FIG. 4 Tension Test Adapter/Clamp

components permitted to return to a relaxed condition. This procedure shall then be repeated in the counter-clockwise direction.

7.1.4 *Tension Test*

7.1.4.1 Attach a force gage to the component cap, sleeve, or plug by means of any suitable device. For protective components that cannot be reasonably expected to be grasped between thumb and forefinger, or teeth on their outer diameter but have a gap of 0.040 in. (1.0 mm) or more behind the rear surface of the component and the structural member of the swing to which they are attached, a clamp such as the one shown in Fig. 4 may be a suitable device.

7.1.4.2 Be sure that the attachment device does not compress or expand the component hindering any possible removal.

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

7.2 *Static Load Test*—Erect the unit in accordance with the manufacturer's instructions. By any necessary means, place a weight of 75 lb. (34.1 kg) in the center of the seat distributed by a 6 in. by 6 in. (150 mm by 150 mm) wood block ¾ in. (19 mm) thick. Gradually apply the weight within 5 s and maintain for 60 s.

7.3 *Stability Test*

7.3.1 Place the CAMI dummy Mark II in the swing seat.

7.3.2 Position the product on a smooth 20 degree inclined surface as shown in Fig. 5 (swing direction). Attach a 1 by 1 in. (25 by 25 mm) angle or equivalent device to the inclined surface to prevent the swing from sliding, but not prevent it from tipping.

7.4 *Unintentional Folding Test*

7.4.1 With the unit in the manufacturer's recommended use position, apply a force of 10 lbf (45 N) at the end of a leg in the direction normally associated with folding, while holding

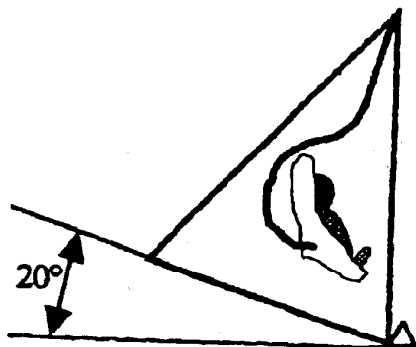


FIG. 5

opposite leg(s) stationary. Gradually apply the force over 5 s and maintain for an additional 10 s. Repeat this test on each leg.

7.5 Restraint System Test

7.5.1 Secure the swing seat so that it cannot move.

7.5.2 Apply a force of 35 lbf (156 N) to a single attachment point of the restraint system in the normal use direction(s) in which stress would be applied to that attachment. Gradually apply the force within 5 s and maintain for an additional 10 s. Repeat a total of five times with a maximum interval of 2 s between tests. Repeat for each attachment point of the restraint system and each fastening device.

7.5.3 Place the CAMI Infant Dummy, Mark II in the swing seat with the restraining system engaged according to the manufacturer's instructions. Tighten the restraint system in such a manner that you can comfortably slide your little finger between the strap and the test dummy. Perform the following test without readjusting the restraining system. Gradually apply a pull force of 35 lbf. (156 N) horizontally to either leg of the test dummy. Gradually apply the force within 5 s and maintain for an additional 10 s. Repeat this procedure a total of 5 times with a maximum of 2 s between test.

7.6 Cradle Swing Orientation Test

7.6.1 *Dynamic Angle*—Place the CAMI Newborn Dummy (7.5 lb) into the cradle with its back on the support surface in the most disadvantageous position. The dummy's head-to-toe centerline must remain parallel to the head-to-toe centerline of the support surface.

7.6.1.1 Start the swing in motion in accordance with the manufacturer's instructions. Measure the angle of the bed surface along the CAMI's head-to-toe axis relative to the horizontal. The angle shall be less than 5 degrees as shown in Fig. 6.

7.6.2 *Static Angle*—Place the CAMI newborn dummy into the cradle swing with its back on the support surface in the most disadvantageous position. Measure the angle of the bed surface along the CAMI's head-to-toe axis relative to the horizontal. The angle shall be less than 5 degrees as shown in Fig. 6.

7.7 Permanency of Labels and Warnings

7.7.1 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

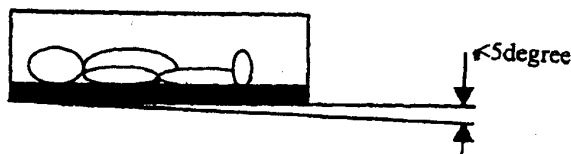


FIG. 6 Cradle Swing Angle Measurement

tear into pieces upon removal, or such action damages the surface to which it is attached.

7.7.2 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.

7.7.3 A warning label attached by a seam shall be considered permanent if it does not detach when subjected to a 15 lbf (67 N) pull force applied in the direction most likely to cause a failure using a 3/4 in. (19 mm) diameter clamp surface. Apply the force evenly over 5 s and maintain for an additional 10 s.

7.8 Adhesion Test for Warnings Applied Directly onto the Surface of the Product

7.8.1 Apply the tape test defined in Test Method B—Cross-Cut Tape Test of ASTM Standard D 3359 eliminating parallel cuts.

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

7.8.3 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.

7.9 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.

8. Marking and Labeling

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

8.1.1 Name, and place of business (city, state and zip code), or telephone number of manufacturer, importer, distributor, or seller.

8.1.2 Model number, stock number, catalog number, item number, or other symbol expressed numerically, or otherwise, such that only articles of identical construction, composition, and dimensions shall bear identical markings. The manufacturer shall change the model number whenever a significant structural or design modification is made that affects its conformance with this consumer safety specification.

8.1.3 Code mark or other means that identifies the date (month and year as a minimum) manufactured.

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

8.3 Each product shall have warning statements. The warning statements shall be in contrasting colors, permanent, conspicuous, and in sans serif style font.

8.3.1 In warning statements, the safety alert symbol "Δ" and the word "WARNING" shall not be less than 0.2 in. (5 mm) high. The remainder of the text shall be characters whose upper case shall be at least 0.1 in. (2.5 mm) high.

8.3.1.1 The hazard identification statement shall precede the warning statements and address the following: To prevent serious injury or death from children falling or being strangled in straps {insert warning statements from 8.3.2}.

8.3.2 The warning statements shall address the following at a minimum:

8.3.2.1 Always use the seat belt provided.

8.3.2.2 Never leave infant unattended in swing.

8.3.2.3 Discontinue use of swing when child attempts to climb out.

8.3.3 Cradle swing units shall replace the warnings in 8.3.1.1 and 8.3.2 with the warnings in 8.3.3.1. Combination swings that have a cradle mode and a seated mode shall provide both sets of warnings in 8.3.1.1 and 8.3.3.1.

8.3.3.1 The hazard identification statement shall precede the warning statements and address the following. To help prevent falls:

(1) Discontinue use of cradle swing when infant can roll over or push up on hands and knees.

(2) Never leave infant unattended in swing.

8.3.4 Swings that are powered by a wind-up spring mechanism shall have a warning that addresses attempting to open or take apart the mechanism may result in serious injury.

8.4 Swings that have more than one battery powering the swing shall have information in or immediately adjacent to the battery compartment that address the following at a minimum.

8.4.1 Old and new batteries should not be mixed.

8.4.2 Alkaline, standard carbon-zinc, and rechargeable nickel-cadmium batteries should not be mixed.

8.4.3 Remove batteries before putting swing into storage for a prolonged period of time.

9. Instructional Literature

9.1 Instructions shall be provided with the swing in written form and shall be easy to read and understand. These instructions shall clearly include information regarding assembly, maintenance, cleaning, and use.

9.2 The instructions must include the warnings in 8.3.

10. Keywords

10.1 swing

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).