



# Standard Safety Specification for Consumer Trampoline Enclosures<sup>1</sup>

This standard is issued under the fixed designation F 2225; 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 approval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

<sup>ε1</sup> NOTE—Sections 1.2, 2.1, 3.1.5, 6.2., and 6.2.4 were editorially updated in February 2003.

## 1. Scope

1.1 This safety specification covers the components, assembly, use, labeling, and performance requirements of consumer trampoline enclosures (see Specification F 381).

1.2 This specification is applicable to trampoline enclosures to be sold as an accessory to or packaged with trampolines of (1) a minimum bed size of 3300 in.<sup>2</sup> (2.1 m<sup>2</sup>), (2) a minimum height of 20 in. (510 mm), (3) intended for the purpose of continuous, vertical jumping activities, and (4) intended for consumer use.

1.3 This specification includes the following sections and selected subsections:

|                               | Section |
|-------------------------------|---------|
| Scope                         | 1       |
| Referenced Documents          | 2       |
| Terminology                   | 3       |
| Components                    | 4       |
| General Requirements          | 5       |
| Performance Requirements      | 6       |
| Performance Tests             | 6       |
| Information Packet            | 7       |
| Product Marking               | 8       |
| Packaging and Package Marking | 9       |

1.4 This standard does not purport to address all of the hazards that may be associated with trampolines or trampoline enclosures, or both. The standard's existence alone will not necessarily prevent injuries. Like other physical activities, trampoline use involves the risk of injury, particularly if the equipment is used improperly. Similarly, the use of a trampoline enclosure alone will not necessarily prevent all injuries.

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

1.6 The following precautionary caveat pertains only to the test methods portion of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this*

*standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

### 2.1 ASTM Standards:

D 2240 Test Method for Rubber Property—Durometer Hardness<sup>2</sup>

F 381 Safety Specification for Components, Assembly, Use, and Labeling of Consumer Trampolines<sup>3</sup>

F 1077 Guide for the Selection of Committee F16 Fastener Specifications<sup>4</sup>

### 2.2 ANSI Standard:

Z535.4 Product Safety Signs and Labels<sup>5</sup>

### 2.3 Federal Standards:

16 CFR 1500 Hazardous Substances Act Regulations<sup>6</sup>

16 CFR 1500.48 Technical Requirements for Determining a Sharp Point in Toys and Other Articles Intended for Use by Children Under 8 Years of Age<sup>6</sup>

16 CFR 1500.49 Technical Requirements for Determining a Sharp Metal or Glass Edge in Toys and Other Articles Intended for Use by Children Under 8 Years of Age<sup>6</sup>

## 3. Terminology

### 3.1 Definitions of Terms Specific to This Standard:

3.1.1 *attachment system, n*—the complete manner in which certain components are connected.

3.1.2 *barrier, n*—an enclosing device constructed of netting, fabric, or other material that is intended to prevent both inadvertent and deliberate attempts to pass through the device.

3.1.3 *barrier height, n*—the distance from the bed surface at rest to the upper edge of the barrier measured at a support.

<sup>2</sup> Annual Book of ASTM Standards, Vol 09.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 15.07.

<sup>4</sup> Annual Book of ASTM Standards, Vol 01.08.

<sup>5</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

<sup>6</sup> Available from Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F08 on Sports Equipment and Facilities and is the direct responsibility of Subcommittee F08.17 on Trampolines and Related Equipment.

Current edition approved Jan. 10, 2003. Published February 2003.

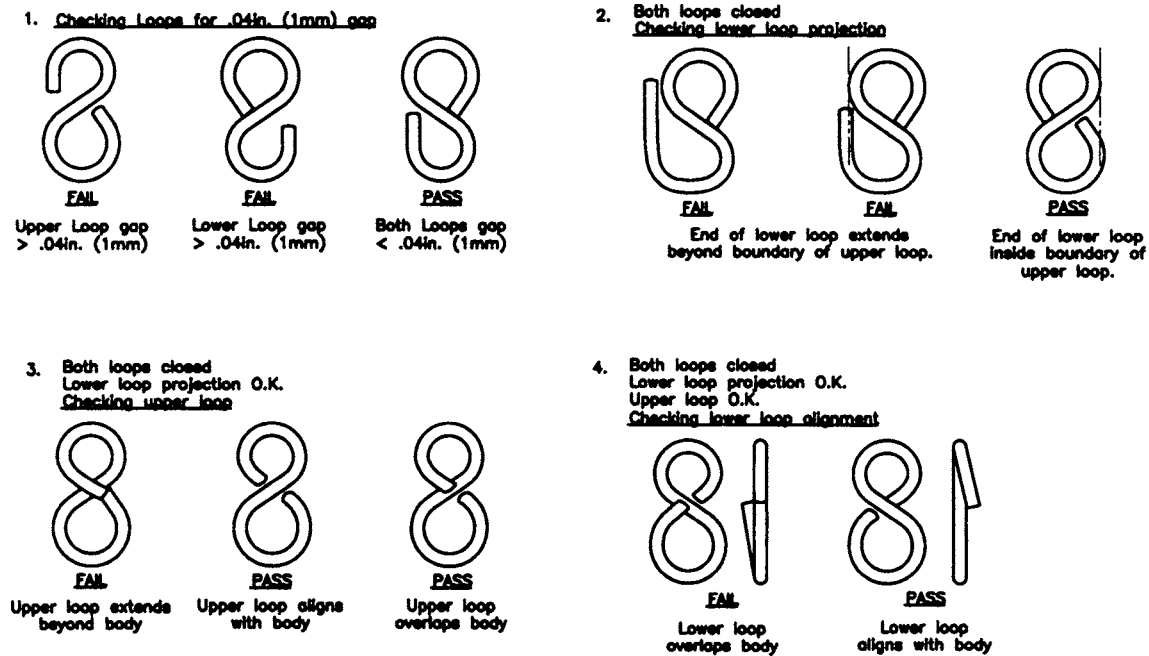


FIG. 1 Requirements for Connecting Devices

3.1.4 *barrier system, n*—an enclosing device that is intended to prevent both inadvertent and deliberate attempts to pass through the device forming the enclosure suspended from or attached, or both, to enclosure support (frame).

3.1.5 *enclosure, n*—equipment which reduces the risk of the user falling off the trampoline.

3.1.6 *enclosure support (frame) attachment system, n*—the framework constructed of supportive materials from which the enclosure barrier is suspended or attached, or both, and the manner in which components are connected.

3.1.7 *upright pole caps, n*—covering cap on exposed enclosure support (frame) pole ends to prevent cuts, abrasion or impalement.

#### 4. Components

4.1 A trampoline enclosure system when offered for sale shall include the following components:

- 4.1.1 Enclosure support system padding and upright pole caps,
- 4.1.2 Enclosure support (frame) and attachment system,
- 4.1.3 Enclosure barrier,
- 4.1.4 Enclosure barrier attachment system,
- 4.1.5 Information packet/user manual, and
- 4.1.6 Suitable on-product and on-package warnings.

#### 5. General Requirements

5.1 The barrier height shall have the following minimums:

- 5.1.1 For round trampolines with bed diameter at less than 10 ft (2.5 m) – 60 in. (1.5 m).
- 5.1.2 For round trampolines with a bed diameter of 10 ft (2.5 m) (or more) – 72 in. (1.8 m).
- 5.1.3 For rectangular trampolines—one-half the length of the longest bed dimension, but not less than 60 in. (1.5 m) minimum barrier height.

5.2 The enclosure support (frame) system and barrier materials shall be of sufficient strength and rigidity to hold the enclosure barrier in place and withstand the loads outlined in Performance Requirement Test #1.

5.3 Support attachment system and hardware shall be subject to ready assembly by the original retail consumer and shall meet the requirements set forth in 6.1 (Performance Requirement Test #1).

5.4 All fasteners shall be manufactured in accordance with Guide F 1077, Section 5.4.2. All fasteners, connecting, and covering devices shall be inherently corrosion resistant or be provided with corrosion resistant coating.

5.4.1 When installed in accordance with the manufacturer's instructions, fasteners, lock washers, self-locking nuts, or other locking means shall be provided for all nuts and bolts to protect them from unintentional loosening. Hardware in moving joints shall also be secured against unintentional loosening.

5.4.2 There shall be no accessible sharp points or edges on fasteners. A cut-off bolt end projecting beyond the face of the nut shall be free of burrs, sharp points, and sharp edges. An accessible bolt end shall not extend more than two full threads beyond the face of a nut.

5.5 Connecting devices such as but not limited to S-hooks and C-hooks shall be properly closed. These connectors are considered closed when there is no gap or space greater than 0.04 in. (1 mm) when measured with a feeler gage.

5.5.1 S-hook connectors are subject to the following additional requirements: (1) No portion of the closed end of an S-hook upper loop may project beyond the vertical boundary established by the upper loop; (2) an S-hook upper loop may align with, may partially overlap, or may completely overlap the connector body. If the upper loop completely overlaps the connector body, it must not extend past the connector body, or

(3) an S-hook lower loop must align with the connector body and not overlap in any way. (See Fig. 1.)

5.6 The enclosure barrier shall be a durable weather resistant fabric suitable for extended outdoor life.

5.7 Support (frame) members exposed to contact during foreseeable usage shall be padded. The top end of such support (frame) members shall be capped.

5.8 The barrier attachment system shall include (1) upper attachment to upright supports (frame), and (2) lower attachment to trampoline bed or trampoline frame top rails. The barrier attachment system shall be of sufficient strength and durability to withstand tearing, deformation or failure as a result of the loads outlined in 6.1 (Performance Requirement Test #1).

## 6. Performance Requirements

6.1 *Barrier Impact and Enclosure Support Pole (Frame) Impact Tests*—Performance Requirement Test #1 requires four impacts of the maximum specified user weight limit applied as a dynamic side load according to the following procedures. Two of the impacts are to be directed at a point on the barrier midway between the support poles (frame) at a height mid-distance between the top and bottom of the enclosure barrier. The other two impacts are to be applied against the enclosure support poles (frame) at a height mid-distance between the top and bottom of the enclosure barrier. The impacts against the enclosure barrier and barrier attachment system shall not produce permanent deformation, tearing or breaking of any component of the enclosure barrier and barrier attachment system. The impacts against the enclosure support (frame) shall not produce permanent deformation, tearing or breaking of any component of the enclosure support (frame) or the support (frame) attachment hardware.

6.1.1 *Procedure for Performance Requirement Test #1*—The load shall be of mass equal to the maximum specified user weight limit. It should be composed of a bag approximately 16 in. (410 mm) in diameter by 36 in. (910 mm) tall, such as a large duffel bag filled with loosely compacted material such as sand. Alternating small bags of sand and wood chips can be used to fill the bag. The center of gravity of the duffel bag should be at the mid-point (approximately 18 in. (460 mm) from the bottom). The dynamic side load shall be applied in a pendulum motion against the enclosure barrier at the specified points (see 6.1).

6.1.1.1 Secure one side of the trampoline so that the trampoline cannot be moved or cannot slide along the surface on which the trampoline rests.

6.1.1.2 Suspend the bag (load) on a chain so that the distance to the top of the chain (pivot point) to the center of mass of the bag is 120 in. (3.0 m).

6.1.1.3 Position the bag (load) so that it hangs against the side of the enclosure barrier at a point midway between the enclosure support poles (frame) at a height mid-distance between the top and bottom of the enclosure barrier. The pivot point of the pendulum created by the load and chain should be positioned directly above the top of the enclosure barrier. The contact point of the bag (load) to the enclosure barrier should be on the opposite side of the enclosure from the point that secures the trampoline from movement.

6.1.1.4 Pull the bag (load) back until the load support chain is at a 30° angle.

6.1.1.5 Release the bag (load) into the enclosure barrier.

6.1.1.6 Repeat the test in 6.1.1.1-6.1.1.5.

6.1.1.7 Repeat the set up in 6.1.1.1 and 6.1.1.2 in preparation for impact tests against the enclosure support poles (frame) at a height mid-distance between the top and bottom of the support pole. Position the bag (load) so that it hangs against the enclosure support pole (frame) on the inside of the enclosure. The pivot point of the pendulum created by the load and chain should be positioned directly above the top of the enclosure support pole (frame). The contact point of the bag (load) should be on the opposite side of the enclosure from the secured point established in 6.1.1.1.

6.1.1.8 Pull the bag (load) back until the load support chain is at a 30° angle.

6.1.1.9 Release the bag (load) into the enclosure support pole (frame).

6.1.1.10 Repeat the test in 6.1.1.6-6.1.1.9.

NOTE 1—The results should meet or exceed the guidelines set forth in Performance Requirement Test #1.

6.2 Performance Requirement Test #2 requires that, following assembly of the trampoline enclosure in accordance with the instructions provided to the consumer, there shall be no sharp edges or points on any portion of the trampoline enclosure capable of inflicting a cut on a child during normal use or reasonably foreseeable abuse. All points and edges on the trampoline enclosure shall be tested for sharpness in accordance with the federal technical requirements in 16 CFR 1500.48 and CFR1500.49 referenced in 2.3.

6.3 Performance Requirement Test #3 requires that there shall be no pinch, crush, or shear points caused by junctures of two components moving relative to one another, or at an opening present in the enclosure support (frame) attachment system or the enclosure barrier attachment system while the enclosure system is in normal use. Pinch, crush, or shear points shall be deemed to be any point that allows a 3/16 in. (5 mm) diameter neoprene rod to enter at one or more positions or entraps a 1/2-in. (13-mm) diameter neoprene rod. Entrapment shall mean that a force of more than 2 lbf (9 N) is required to pull out the rod. The neoprene rods shall have a hardness reading between 50 and 60 as determined by a Type A durometer in accordance with Test Method D 2240.

6.4 *Head and Neck Entrapment*—Performance Requirement Test #4 requires that a trampoline enclosure shall be designed and constructed so that when assembled, there shall be no accessible opening that presents the risk of accidental head or neck entrapment by either a head first or feet first entry into the opening. Openings between the ground and the bottom edge of the equipment (such as rails and the base of the frame, etc.) are exempt from this requirement.

6.4.1 *Accessible Openings*—Any completely bounded opening that completely accepts the torso test probe. A completely bounded opening is accessible when a torso test probe (see Fig. 2) may be inserted into the opening to a depth of 4 in. (100 mm) using the following test method.

6.4.2 *Test Procedure for Completely Bounded Rigid Openings*—Place the torso probe in the opening, tapered end