Designation: F2374 – 24

Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices[1]

This standard is issued under the fixed designation F2374; 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.

1. Scope

1.1 This practice establishes criteria for the Design, Manufacture, Installation, Operation, Maintenance, Inspection, Training, Auditing and Major Modification of commercial use Inflatable Amusement Devices. These devices are made of flexible fabric, inflated by one or more blowers, and rely upon air pressure to maintain their shape. These devices are designed for patron activities that include, but are not limited to, bouncing, climbing, sliding, obstacle course running and interactive play.

1.1.1 Amusement devices covered by this standard are used primarily in amusement, entertainment or recreational applications. Such applications include, but are not limited to, amusement parks, theme parks, water parks, family entertainment centers, rental companies, fitness centers, gyms, gymnastics facilities, jump centers, sports facilities, skate parks, camps, schools, shopping centers, temporary special events, carnivals, fairs, festivals and municipal parks.

1.1.2 This practice includes land-based inflatable amusement devices that are designed for dry use, wet use, or a combination of wet/dry use.

1.1.3 Inflatable amusement devices covered by this standard have inflation systems that:

1.1.3.1 Require air to be constantly supplied in order to maintain structure, form, shape or integrity (continuous air inflatable amusement device); or

1.1.3.2 Maintain inflation without the need for constant air supply (captured air inflatable amusement device); or

1.1.3.3 Incorporate both methods of inflation into a single device.

1.1.4 The design and manufacturing requirements in Sections 5 and 6 of this standard shall not apply to inflatable amusement devices manufactured before the publication date of this standard practice.

1.1.5 The modification requirements in Section 5.3 of this standard shall not apply to major modifications performed before the publication date of this standard practice.

1.2 This practice specifically excludes the following types of inflatable devices:

1.2.1 Inflatable devices marketed directly to consumers for private home use by children. Those devices are covered under a separate standard, Consumer Safety Specification F2729-18.

1.2.2 Inflatable devices that are used for professional exhibition or stunt work; safety and rescue activities; aerial or aviation structures or devices; exhibit floats; or similar inflatable devices.

1.2.3 Inflatables that do not have a floor affixed to the inflatable structure (that is, the ground is exposed inside an inflated perimeter).

1.2.4 Inflatable devices that require a sudden loss of air to perform their intended function (for example, stunt bag style inflatable impact attenuation devices).

1.2.5 Inflatable devices that are designed primarily as floating devices to be installed in or on bodies of water.

1.2.6 Stand-alone captured air inflatable devices that are designed to contain the patron within the elevated pressure space; are designed to be mobile during its intended use; or contain less than 270 ft^3 of air and do not include an anchoring or ballasting system. Examples include, but are not limited to: a water walking ball, a sports ball, a hamster ball, a hill-rolling ball.

1.2.7 Constant air membranes that incorporate a permanent sub-terrain box or pit to form the bottom and sides of the pressure vessel (for example, jumping pillow devices).

1.2.8 Air inflated devices designated to decompress or redistribute foam cubes contained in a trampoline court foam pit.

1.3 This practice includes an annex (mandatory), which provides additional information (for example, rationale, background, interpretations, drawings, commentary, and so forth) to improve the user's understanding and application of the criteria presented in this practice. The annex information shall be interpreted as mandatory criteria.

1.4 This practice includes an appendix (non-mandatory), which provides additional information (for example, rationale,

[1] This practice is under the jurisdiction of ASTM Committee F24 on Amusement Rides and Devices and is the direct responsibility of Subcommittee F24.61 on Adventure Attractions.

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background, interpretations, drawings, commentary, and so forth) to improve the user's understanding and application of the criteria presented in this practice. The appendix information shall not be interpreted as mandatory criteria.

1.5 The text of this standard references notes and footnotes which provide explanatory materials. These notes and footnotes shall not be considered requirements of the standard.

1.6 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D3787 Test Method for Bursting Strength of Textiles—Constant-Rate-of-Traverse (CRT) Ball Burst Test

D5446 Practice for Determining Physical Properties of Fabrics, Yarns, and Sewing Thread Used in Inflatable Restraints

D6951/D6951M Test Method for Use of the Dynamic Cone Penetrometer in Shallow Pavement Applications

F355 Test Method for Impact Attenuation of Playing Surface Systems, Other Protective Sport Systems, and Materials Used for Athletics, Recreation and Play

F747 Terminology Relating to Amusement Rides and Devices

F1193 Practice for Quality, Manufacture, and Construction of Amusement Rides and Devices

F1292 Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment

F1772 Specification for Harnesses for Rescue and Sport Activities

F2291 Practice for Design of Amusement Rides and Devices

F2375 Practice for Design, Manufacture, Installation and Testing of Climbing Nets and Netting/Mesh used in Amusement Rides, Devices, Play Areas and Attractions

F2397 Specification for Protective Headgear Used in Combative Sports

F2729 Consumer Safety Specification for Constant Air Inflatable Play Devices for Home Use

2.2 *ASCE Standards (American Society for Civil Engineers):*[3]

ASCE 7 Minimum Design Loads for Buildings and Other Structures

2.3 *NFPA Standards (National Fire Protection Association):*[4]

NFPA 70 National Electric Code (NEC)

NFPA 701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

3. Terminology

3.1 For terms associated with amusement rides and devices, the definitions are in accordance with Terminology F747-15. The terms in this section are contained in that terminology standard.

3.2 *Definitions:*

3.2.1 *designer/engineer, n*—party(s) that establishes and describes the configuration of the amusement ride or device, establishes strength and fatigue life, designs and develops electrical/electronic control systems, and defines inspection criteria.

3.2.2 *major modification, n*—any change in either the structural or operational characteristics of the ride or device which will alter its performance from that specified in the manufacturer's design criteria.

3.2.3 *serious injuries/illnesses, n*—a personal injury/illness that results in death, dismemberment, significant disfigurement, permanent loss of the use of a body organ, member, function, or system, a compound fracture, or other significant injury/illness that requires immediate admission and overnight hospitalization and observation by a licensed physician.

4. Significance and Use

4.1 The purpose of this practice is to delineate information regarding the design, manufacture, installation, operation, and maintenance of inflatable amusement devices.

5. Design

5.1 This section establishes information and procedures for the design of inflatable amusement devices and major modifications to inflatable amusement devices.

5.2 Inflatable amusement devices with platforms or play areas higher than 25 ft (7.6 m) above the ground shall also require compliance with the applicable parts of Practice F2291-20.

5.3 *Parts of the Inflatable Device:*

5.3.1 *Obstacle*—An inflated component that is intended for patrons to climb over, run through, etc., as they progress through the inflatable amusement device.

5.3.2 *Platform*—A horizontally-oriented inflated surface on which a user is permitted to stand or traverse (for example, the transition landing area on a slide).

5.3.3 *Playing Area*—Space in or on the inflatable that is intended for patron play.

5.3.4 *Ramp or Step*—An inclined section or section of intermediate height aiding patrons as they enter and exit the

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American Society of Civil Engineers (ASCE), 1801 Alexander Bell Dr., Reston, VA 20191, http://www.asce.org.

[4] Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, http://www.nfpa.org.