



U.S. CONSUMER PRODUCT SAFETY COMMISSION

AMUSEMENT RIDE SAFETY BULLETIN

Inflatable Amusement Devices Residential and Commercial Guidance Updated: August 2015

An inflatable amusement device is “an amusement ride or device designed for use that may include, but not be limited to, bounce, climb, slide, or interactive play. They are made of flexible fabric, kept inflated by continuous air flow by one or more blowers, and rely upon air pressure to maintain their shape.”¹ This guidance applies to all such rides and devices, and refers to these amusements as rides or devices interchangeably.

Since 2001, the U.S. Consumer Product Safety Commission (“CPSC”) has monitored inflatable amusement attractions and their incidents. Users of this type of amusement attraction vary in age, from children to adult. Historically, these portable inflatable rides are used at fairs, carnivals, and festivals; or they are operated at private events through rental companies. In recent years, certain models of inflatable amusement rides have also been marketed and sold to consumers for noncommercial use.

The Commission is aware of 3,991 injuries, including 12 deaths, involving inflatable amusements from 2003 to 2013. Recently, CPSC staff evaluated incident data from the National Electronic Injury Surveillance System (“NEISS”) and estimated that approximately 113,272 emergency department-treated injuries associated with inflatable amusements occurred from 2003 through 2013. The estimated annual average is 16,903.²

The incidents staff reviewed were attributable primarily to improper operation, supervision, and set up. Due to the number of injuries, the severity of the incidents when they occur, and the desire to reduce the number of injuries through a more consistent set-up and operation of all inflatable amusement rides, Commission staff is issuing this Safety Bulletin.

Inspection procedures and guidelines for safe set-up and operation of inflatable rides may vary from ride to ride or from manufacturer to manufacturer. Please follow the manufacturer's requirements. CPSC staff recommends the following additional guidance:

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Inflatables for Commercial Use

Wind Speed Estimation

We request that all state and local amusement ride safety inspectors, insurance inspectors, and private contract inspectors, as well as owners and operators of “Inflatable Amusement Rides” follow and adhere to the guidance detailed above.

¹ ASTM F2374-10 3.1.1 (2010), *Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices*, ASTM International.

² U.S. Consumer Product Safety Commission (2015), *Estimated Number of Injuries and Reported Deaths Associated with Inflatable Amusements 2003-2013*, February 2015, Retrieved from: http://www.cpsc.gov/Global/Research-and-Statistics/Injury-Statistics/Amusement-Rides/Inflatable_Amusements_Deaths_and_Injuries_2015.pdf on March 10, 2015.

For further information contact:

Joseph F. Williams, Compliance Officer
Office of Compliance and Field Operations
U.S. Consumer Product Safety Commission
4330 East West Highway
Bethesda, MD 20814
jfwilliams@cpsc.gov

Residential and Consumer Inflatables

Set-Up Guidance:

- Follow manufacturer's instructions for proper layout, set up, and inflation.
- Use every anchor point, each time the device is set up, and follow the anchoring methods recommended by the manufacturer.
- Check the product and all of its anchorage points before and during every use; and re-secure the product, as appropriate, in accordance with the manufacturer's instructions.
- Check to ensure that the unit is properly inflated before each use. Sagging walls or pillars are an indication that the unit has not been inflated properly.
- Stop using the device if there are signs of air loss.
- To prevent slip and fall incidents, keep the area around the product clean and clear of objects. Make sure that the inflatable's blower has a built-in ground fault circuit interrupter ("GFCI").

Operational Guidance:

- **Active adult supervision of children and other young users is necessary at all times.**
- Do not use the product if wind speeds exceed 20 mph. Use great care when operating and wind speeds begin to rise, or when wind gusts may suddenly exceed 20 mph. Know the warning signs. See "*Wind Speed Estimation*" attachment.
- Review all warning labels before using the product.
- Instruct children on proper use of the product.
- At any given time, all participants should be similar in size (*e.g.*, Do not mix toddlers with 8 year olds).
- Shoes and glasses should be removed before playing on any inflatable amusement device. Additionally, make sure there are no sharp objects in pockets or on clothing because these items may puncture the bouncing surface.
- Toys and other objects should never be allowed inside the bouncer, unless provided by the manufacturer.
- DO NOT exceed the manufacturer's requirements for maximum loads, and adhere to occupancy limits.
- Any accidents involving inflatables that result in injuries should be reported to your local or state authority and to the U.S. Consumer Product Safety Commission at: www.SaferProducts.gov.

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Inflatables Intended for Commercial Use

Rental Companies, Owners, and/or Operators of Commercial Units

Set-Up Guidance:

- Follow the owner/operator's manual for site layout with proximity to overhead wires and/or objects, inflation procedures, ropes, tethers, tie-downs, anchors, use temperature range, maximum number of riders, size of riders, electrical codes, daily operation, daily inspection, disinfecting repair, deflation, drying, storage, and transportation.
 - ALWAYS anchor rides per manufacturer's requirements and instructions, including the number and type of anchors to be used for both indoor and outdoor use. In the absence of manufacturer's instructions, see the section for Anchoring Guidance below. These anchors can be straight stakes, screw stakes, ground weights, sandbags, ballasts, ground anchors, depending on the manufacturer.
 - When manufacturer's instructions permit the use of sand bags or ballasts in place of stakes, ensure that the proper weight stated in the manufacturer's instructions is used.
- Identify and use the number and location of tie-downs specified by the manufacturer. Anchor ropes, tethers, or tie-downs should be attached to an appropriate anchor device or permanent structure and attached so that they cannot slip off the top of their stake during use. DO NOT attach anchors to motor vehicles or other nonstationary objects and DO NOT use non-load-bearing positioning loops as tie-downs or anchor points. Ropes, tethers, and tie-downs should be sufficiently strong to resist breaking during use. In the absence of manufacturer provided tie-downs, CPSC staff recommends that the owner/operator use ½-inch diameter solid-braided polypropylene rope with a minimum tensile strength of 3,700 lbs. or 370 lbs. working load.

Operational Guidance:

- Minimum number of operators on a large inflatable slide (over 15 feet tall) is two (2). Operators should maintain a direct line of sight for all riders; there should be no blind spots (this may require additional operators).
- Minimum number of operators on an inflatable bounce or small slide (under 15 feet tall), is one (1). Operators should maintain a direct line of sight for all users, and there should be no blind spots (this may require additional operators).
- Minimum number of operators on inflatables designed for younger children is two—one attendant to monitor the capacity of the ride—and one to actively monitor riders. CPSC staff recommends using multiple operators if there are blind spots on the device, or if there is a high volume of participants.
- DO NOT exceed manufacturer's requirements for maximum loads (*e.g.* number of participants or weight of individual participants);
- Adhere to manufacturer's recommended maximum weight per passenger;
- DO NOT use the inflatable ride when wind speeds exceed the manufacturer's recommendation. Various manufacturers recommend maximum wind speeds from 15 to 25 mph, depending on the ride. However, when wind speeds (including the speed of gusts) exceed 25 mph, it is dangerous to operate ***any*** inflatable ride. Unload and deflate the device immediately. For more information on estimating wind speed, see "*Wind Speed Estimation*" attachment.
- Any ride accidents that result in injuries should be reported to your local or state authority and to the U.S. Consumer product Safety Commission at: www.SaferProducts.gov.

Anchoring Guidance

In the absence of manufacturer's instructions on anchors, owner/operators should use every anchor point, every time the ride is set up. Generally, there are two types of anchors commonly used; stakes and weights. Stakes use a rod driven into the ground, and weights use the weight of sand, water, or other materials to anchor the device. When selecting the proper stakes to use, stakes with a larger surface area have greater holding power. Therefore, longer stakes with a wider diameter, set deeper into the ground, will have a much greater holding power than smaller versions.

- Stakes
 - Traditional straight stakes should:
 - range from a minimum of 18 inches (for use in hard or compact soil conditions, and the stake should be fully driven into the ground) to 42 inches in length, with at least 75 percent or more of the length in the ground after it is installed;
 - be installed in the vertical position;
 - if installed in sandy or loose soils, a longer stake is required to generate the same holding power as shorter stakes installed in hard or compact soil. Wet soil also reduces friction, and therefore, a longer stake may be required; and
 - have exposed ends of the anchors covered after installation to prevent a tripping hazard.
 - Auger style stakes provide extra holding power in sandy or loose soil conditions;
- Weights
 - Sandbags or ballasts should not be used if manufacturer's instructions do not permit their use, or if no manufacturer's instructions are available; and
- Anchor ropes, tethers, or tie-downs should be attached to a properly installed stake, weight, or permanent structure, and be attached so that they cannot slip off the top of their stake during use. DO NOT anchor an inflatable to any vehicle or motor vehicle equipment (e.g., motor vehicle, ATV, ROV, trailer, recreational vehicle, tractor).

Manufacturers:

CPSC staff recommends that manufacturers:

- Use adequate permanent labeling for safety, instructions for use, and include manufacturer and brand information, as well as individual serial numbers for the units.
- Begin, or continue to offer, manufacturer's instructions in electronic formats that can be easily distributed to customers, if a replacement is needed, and maintain original copies of instructions for each model manufactured;
- Manufacturers should design products to minimize blind spots on inflatables, where users may not be able to be seen by the operator(s).
- Consider including devices to help operators estimate wind speeds (e.g., flags with instructions on how to estimate wind speeds based on relative flag positions or other surroundings).
- Consider the use of a sealed chamber or other method to prevent the rapid collapse of ceilings and walls onto the riders if the electric power to the blower(s) fails. Inflatable slides more than 15 feet tall should not deflate in a manner that results in collapse that may present a hazard to riders still on the slide.
- Any ride accidents that result in injuries should be reported to the U.S. Consumer Product Safety Commission at: www.SaferProducts.gov.

The CPSC recommends that state, local, and private inspectors provide this bulletin on inflatable rides to rental companies within their state and that rental companies provide renters with the following materials:

1. a training program for the renter for the proper operation of the inflatable ride
2. a copy of the operation manual (and/or videos, training manuals) for each rental
3. a brief training on how to estimate wind speed. See Wind Speed Estimation attachment for guidance
4. a copy of this Safety Bulletin
5. a written statement signed by the renter documenting that he has received and understands all applicable installation and operating procedures applicable to the inflatable being rented.

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Wind Speed Estimation

Special Note: Occupants may be in immediate danger if the inflatable amusement device is unanchored or is improperly anchored. At very low wind speeds, inflatables can begin to move and may even become airborne as wind speed increases. Appropriate anchoring is essential to safe operation of any inflatable amusement device.

Adapted Beaufort Wind Scale (Estimated wind speeds)³		
Wind speeds (mph)	Description	Land conditions
0-3	Calm, Light Air	Calm. Wind not felt on skin. No wind visible in trees.
4-7	Light breeze	Wind felt on exposed skin. Leaves rustle.
8-12	Gentle breeze	Leaves and smaller twigs in constant motion.
13-18	Moderate breeze	Dust and loose paper is raised. Small branches begin to move. - <i>Immediately evacuate and deflate any inflatables not designed for use in wind speeds above 15mph. Check your owner's manual for more information.</i>
19-24	Fresh breeze	Smaller trees sway. - <i>Immediately evacuate and deflate any inflatables not designed for use in wind speeds of up to 25mph. Check your owner's manual for more information.</i>
25-31	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. – <i>Immediately evacuate and deflate <u>any</u> inflatable amusement device.</i>

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³ NOAA and the National Weather Service. Beaufort Wind Chart publication. Retrieved from: http://www.crh.noaa.gov/images/iwx/publications/Beaufort_Wind_Chart.pdf on September 15, 2014.