PHILADELPHIA INSURANCE COMPANIES

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Risk Management Services

PUBLIC PLAYGROUND SAFETY

Background:
Each year, more than 200,000 children go to U.S. hospital emergency rooms with injuries associated with playground equipment.

CPSC's public playground guidelines are detailed and are intended to help parks, schools, installers, and others choose the safest equipment. Many local jurisdictions have incorporated this handbook into their building codes. Please download the Public Playground Safety Handbook in English or Spanish at: http://www.cpsc.gov/Safety-Education/Safety-Guides/Sports-Fitness-and-Recreation/Playground-Safety/

Publication of CPSC Public Playground Handbook is stated to be expected to promote greater safety awareness among those who purchase, install, and maintain public playground equipment. Because many factors may affect playground safety, the U.S. Consumer Product Safety Commission (CPSC) staff states that they believe guidelines, rather than a mandatory rule, are appropriate. These guidelines are not being issued as the sole method to minimize injuries associated with playground equipment. However, the Commission states in the handbook that they believe the recommendations in the handbook along with the technical information in the ASTM standards for public playgrounds will contribute to greater playground safety. (http://www.cpsc.gov//PageFiles/122149/325.pdf)

Some states and local jurisdictions may require compliance with the CPSC Public Playground Safety Handbook and/or ASTM voluntary standards. Additionally, risk managers, insurance companies, or others may require compliance at a particular site; check with state/local jurisdictions and insurance companies for specific requirements.

Scope:
What is a public playground?
This refers to equipment for use by children ages six months through 12 years in the playground areas of:

- Commercial (non-residential) child care facilities
- Institutions
- Multiple family dwellings, such as apartment and condominium buildings
- Parks, such as city, state, and community maintained parks
- Restaurants
- Resorts and recreational developments
- Schools
- Other areas of public use

According to the CPSC, age-appropriate playground designs should accommodate differences for toddlers, preschool, and school-age children, with regard to the type, scale, and the layout of equipment. A playground should allow children to develop gradually, and test their skills by providing a series of graduated challenges.

Toddlers: Children ages six months through two years of age
Preschool-age: Children two through five years
School-age: Children five through 12 years

The CPSC Public Playground Safety Handbook does not include guidelines for the following:
These guidelines in this handbook are not intended for amusement park equipment, sports, or fitness equipment normally intended for users over the age of 12 years, soft contained play equipment, constant air inflatable play devices for home use, art and museum sculptures (not otherwise designed, intended, and installed as playground equipment), equipment found in water play facilities, or home playground equipment.

Equipment components intended solely for children with disabilities and modified to accommodate such users are not covered by these guidelines. Child care facilities, especially indoor, should refer to ASTM F2373 — Standard Consumer Safety Performance Specification for Public Use Play Equipment for Children Six Months Through 23 Months, for more guidance on areas unique to their facilities.

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General Playground Considerations:

- Site Selection

Site Factor	Questions to Ask	If yes, then... Mitigation
Travel patterns of children to and from the playground	Are there hazards in the way?	Clear hazards
Nearby accessible hazards such as roads with traffic, lakes, ponds, streams, drop-offs/ cliffs, etc.	Could a child inadvertently run into a nearby hazard? Could younger children easily wander off toward the hazard?	Provide a method to contain children within the playground. For example, a dense hedge or a fence. The method should allow for observation by supervisors. If fences are used, they should conform to local building codes and/or ASTM F-2049/
Sun exposure	Is sun exposure sufficient to heat exposed bare metal slides, platforms, steps & surfacing enough to burn children?	Bare metal slides, platforms, and steps should be shaded or located out of direct sun Provide warnings that equipment and surfacing exposed to intense sun can burn
	Will children be exposed to the sun during the most intense part of the day?	Consider shading the playground or providing shaded areas nearby
Slope and drainage	Will loose fill materials wash away during periods of heavy rain?	Consider proper drainage regrading to prevent wash outs

- Playground layout factors to consider: accessibility, age separation, conflicting activities, sight lines, signage and/or labeling, supervision
- Equipment Selection – Examples of Age Appropriate Equipment:

Toddler - Ages 6-23 months	Preschool - Ages 2-5 years	Grade School - Ages 5-12 years
• Climbing equipment under 32" high • Ramps • Single file step ladders • Slides • Spiral slides less than 360° • Spring rockers • Stairways • Swings with full bucket seats	• Certain climbers • Horizontal ladders less than or equal to 60" high for ages 4 and 5 • Merry-go-rounds • Ramps • Rung ladders • Single file step ladders • Slides • Spiral slides up to 360o • Spring rockers • Stairways • Swings - belt, full bucket seats (2-4 years) & rotating tire	• Arch climbers • Chain or cable walks • Free standing climbing events with flexible parts • Fulcrum seesaws • Ladders - horizontal, rung & step • Overhead rings • Merry-go-rounds • Ramps • Ring treks • Slides • Spiral slides more than one 360° turn • Stairways • Swings - belt & rotating tire • Track rides • Vertical sliding poles

- Surfacing

Appropriate Surfacing	Inappropriate Surfacing
• Any material tested to ASTM F1292, including unitary surfaces, engineered wood fiber, etc. • Pea gravel • Sand • Shredded/recycled rubber mulch • Wood mulch (not CCA-treated) • Wood chips	• Asphalt • Carpet not tested to ASTM F1292 • Concrete • Dirt • Grass • CCA treated wood mulch

PUBLIC PLAYGROUND SAFETY - *continued*

- Equipment Materials

Minimum Compressed loose-fill surfacing depths

Inches Of	(Loose-Fill Material)	Protects to Fall Height (feet)
6*	Shredded/recycled rubber	10
9	Sand	4
9	Pea Gravel	5
9	Wood mulch (non-CCA)	7
9	Wood chips	10

*Shredded/recycled rubber loose-fill surfacing does not compress in the same manner as other loose-fill materials. However, care should be taken to maintain a constant depth as displacement may still occur.

- Assembly & Installation
  Strictly follow all instructions from the manufacturer when assembling and installing equipment. After assembly and before its first use, equipment should be thoroughly inspected by a person qualified to inspect playgrounds for safety. The manufacturer's assembly and installation instructions, and all other materials collected concerning the equipment, should be kept in a permanent file.

  Secure anchoring is a key factor to stable installation, and the anchoring process should be completed in strict accordance with the manufacturer's specifications.

Playground Hazards

This section in the CPSC Playground Safety Handbook provides a broad overview of general hazards that should be avoided on playgrounds. It is noted that many of these hazards have technical specifications and tests for compliance with the ASTM F1487 and F2373.

- Crush and Shearing Points
  Crush and shear points can be caused by parts moving relative to each other or to a fixed part, such as a seesaw. To determine if there is a concern, consider the likelihood a child could get a body part inside the point, and what is the closing force around the point
- Entanglement and Impalement
  Projections on playground equipment should not be able to entangle children's clothing nor large enough to impale. The diameter of the projection should not increase in the direction away from the surrounding surface toward the exposed end. Bolts should not expose more than two threads beyond the end of the nut. All hooks (S and C hooks) should be closed with no gap or space greater than 0.04 inches (the thickness of a dime)
- Strings and Ropes
  Drawstrings on hoods of jackets and sweatshirts can become entangled in equipment and cause death by strangulation
- Entrapment
  Head entrapment by head-first entry and feet-first entry. Bicycle helmets should not be worn while on playground equipment. Certain openings could present an entrapment hazard if the distance between any interior opposing surfaces is greater than 3.5 inches and less than 9 inches. Appropriate testing should be completed as recommended in the Handbook
- Sharp Points, Corners, and Edges
  Exposed open ends of tubing should be covered by caps or plugs that cannot be removed without tools. Wood parts should be smooth and free from splinters. Metal and wood corners should be rounded. Metal edges should be rolled or rounded with capping. No sharp edges on slides. Inspection program should be in place and conducted frequently
- Suspended Hazards
  Suspended components can become hazards when they are within 45 degrees of the horizontal and less than seven feet above the protective surfacing. They should be located away from high traffic, and brightly colored or contrasted, not be able to be looped back on themselves and fastened at both ends unless they are seven inches or less in length or attached to a swing seat
- Tripping Hazards
  Two common causes of tripping are anchoring devices for playground equipment and containment walls for loose-fill surfacing materials. Any change in elevation should be obvious
- Used Tires
  Used tires are often recycled as playground equipment. Steel-belted radials should be closely examined regularly. Care should be taken so that the tire does not collect water and debris. Recycled tire rubber mulch products should be inspected before installation to ensure all metal has been removed

PUBLIC PLAYGROUND SAFETY - *continued*

Maintaining a Playground

Routine inspection and maintenance issues

☐	Broken equipment such as loose bolts, missing end caps, cracks, etc.
☐	Broken glass & other trash
☐	Cracks in plastics
☐	Loose anchoring
☐	Hazardous or dangerous debris
☐	Insect damage
☐	Problems with surfacing
☐	Displaced loose-fill surfacing (see Section 4.3)
☐	Holes, flakes, and/or buckling of unitary surfacing
☐	User modifications (such as ropes tied to parts or equipment rearranged)
☐	Vandalism
☐	Worn, loose, damaged, or missing parts
☐	Wood splitting
☐	Rusted or corroded metals
☐	Rot

APPENDIX A: SUGGESTED GENERAL MAINTENANCE CHECKLISTS

Surfacing (§2.4)

- ☐ Adequate protective surfacing under and around the equipment.
  - ☐ Install/replace surfacing
- ☐ Surfacing materials have not deteriorated.
  - ☐ Replace surfacing
  - ☐ Other maintenance: _____
- ☐ Loose-fill surfacing materials have no foreign objects or debris.
  - ☐ Remove trash and debris
- ☐ Loose-fill surfacing materials are not compacted.
  - ☐ Rake and fluff surfacing
- ☐ Loose-fill surfacing materials have not been displaced under heavy use areas such as under swings or at slide exits.
  - ☐ Rake and fluff surfacing

Drainage (§2.4)

- ☐ The entire play area has satisfactory drainage, especially in heavy use areas such as under swings and at slide exits.
  - ☐ Improve drainage
  - ☐ Other maintenance: _____

General Hazards

- ☐ There are no sharp points, corners or edges on the equipment (§3.4).
- ☐ There are no missing or damaged protective caps or plugs (§3.4).
- ☐ There are no hazardous protrusions (§3.2 and Appendix B).
- ☐ There are no potential clothing entanglement hazards, such as open S-hooks or protruding bolts (§2.5.2, §3.2, §5.3.8.1 and Appendix B).
- ☐ There are no crush and shearing points on exposed moving parts (§3.1).
- ☐ There are no trip hazards, such as exposed footings or anchoring devices and rocks, roots, or any other obstacles in a use zone (§3.6).

Security of Hardware (§2.5)

- ☐ There are no loose fastening devices or worn connections.
  - ☐ Replace fasteners
  - ☐ Other maintenance: _____
- ☐ Moving parts, such as swing hangers, merry-go-round bearings, and track rides, are not worn.
  - ☐ Replace part
  - ☐ Other maintenance: _____

Durability of Equipment (§2.5)

- ☐ There are no rust, rot, cracks, or splinters on any equipment (check carefully where it comes in contact with the ground).
- ☐ There are no broken or missing components on the equipment (e.g., handrails, guardrails, protective barriers, steps, or rungs).
- ☐ There are no damaged fences, benches, or signs on the playground.
- ☐ All equipment is securely anchored.

Leaded Paint (§2.5.4)

- ☐ Paint (especially lead paint) is not peeling, cracking, chipping, or chalking.
- ☐ There are no areas of visible leaded paint chips or accumulation of lead dust.
  - ☐ Mitigate lead paint hazards

General Upkeep of Playgrounds (§4)

- ☐ There are no user modifications to the equipment, such as strings and ropes tied to equipment, swings looped over top rails, etc.
  - ☐ Remove string or rope
  - ☐ Correct other modification
- ☐ The entire playground is free from debris or litter such as tree branches, soda cans, bottles, glass, etc.
  - ☐ Clean playground
- ☐ There are no missing trash receptacles.
  - ☐ Replace trash receptacle
- ☐ Trash receptacles are not full.
  - ☐ Empty trash

NOTES:

DATE OF INSPECTION:

INSPECTION BY:

PUBLIC PLAYGROUND SAFETY - *continued*

Parts of the Playground

Platforms, guardrails, and protective barriers:
Platforms may be layered or stepped and space between should follow recommendations to minimize entrapment. Guardrails and protective barriers are used to minimize the likelihood of accidental falls from elevated platforms. Section 5 of the handbook provides the details for each age grouping.

	Guardrail	**Barrier**
Protects against accidental falls from platform	Yes	Yes
Discourages climbing over	No	Yes
Protects against climbing through	No	Yes
Toddlers A Top edge distance from platform B Bottom edge distance from platform H Recommended when platform fall height is:	 Not recommended Not recommended Not recommended	 A = 24″ or higher B < 3″ H = 18″ or higher
School A Top edge distance from platform B Bottom edge distance from platform H Recommended when platform fall height is:	 A = 38″ or higher 9″ < B < 28″ 30″ < H ≤ 48″	 A = 38″ or higher B < 3.5″ H = 48″

Access and Egress to Playground Equipment

Methods of access and egress

Method of Access	**Challenge Level**	**Appropriate for**
Ramps	Easiest	Toddlers +
Straight stairways	Easy	Toddlers +
Spiral stairways	Moderate	Toddlers* +
Step ladders	Moderate	15 months* +
Rung ladders	Moderate	Preschool* +
Arch climbers	Difficult	Preschool* +
Flexible climbers (nets, tires)	Difficult	Preschool* +

*only if an easy egress method is also provided

PUBLIC PLAYGROUND SAFETY - *continued*

Recommended dimensions for access ladders, stairs, and ramps*

	AGE OF INTENDED USER		
Type of Access	**Toddler**	**Preschool-age**	**School-age**
Ramps (not intended to meet ADA/ABA specifications)			
Slope (certical:horizontal)	< 1:8	≤ 1:8	≤ 1:8
Width (single)	≥ 19″	≥ 12″	≥ 16″
Width (double)	≥ 30″	≥ 30″	≥ 36″
Stairways			
Slope	≤ 35°	<50°	<50°
Tread width (single)	12-21″	≥ 12″	≥ 16″
Tread width (double)	≥ 30″	≥ 30″	≥ 36″
Tread depth (open riser)	Not appropriate	≥ 7″	≥ 8″
Tread depth (closed riser)	≥ 8″	≥ 7″	≥ 8″
Vertical rise	≤ 7″	≤ 9″	≤ 12″
Step ladders			
Slope	35 ≤ 65°	50 - 75°	50 - 75°
Tread width (single)	12-21″	≥ 12″	≥ 16″
Tread witdh (double)	Not appropriate	≥ 30″	≥ 36″
Tread depth (open riser)	Not appropriate	≥ 7″	≥ 3″
Tread depth (closed riser)	8″	≥ 7″	≥ 6″
Vertical rise	>5″ and ≤ 7″	≤ 9″	≤ 12″
Rung ladders			
Slope	Not appropriate	75 - 90°	75 - 90°
Rung width	Not appropriate	≥ 12″	≥ 16″
Vertical rise	Not appropriate	≤ 12″	≤ 12″
Rung diameter	Not appropriate	0.95″ - 1.55″	0.95″ - 1.55″

*entrapment recommendations apply to all openings in access components

Additional details are listed in the CPSC Handbook for the following:

- Balance beams
- Climbing and upper body equipment
- Arch climbers/Flexible climbers
- Overhead ladders/Overhead rings
- Sliding poles
- Track rides
- Log rolls
- Merry-go-rounds
- Seesaws
- Slides
- Spring rockers
- Swings

Playground testing details are provided in Appendix B of the CPSC Playground Safety Handbook.

PUBLIC PLAYGROUND SAFETY - *continued*

Additional details are listed in the CPSC Handbook for the following:

1. Make sure surfaces around playground equipment have at least 12 inches of wood chips, mulch, sand, pea gravel, or mats made of safety-tested rubber or rubber-like materials.
2. Check that protective surfacing extends at least 6 feet in all directions from play equipment. For swings, be sure surfacing extends, in back and front, twice the height of the suspending bar.
3. Make sure play structures more than 30 inches high are spaced at least 9 feet apart.
4. Check for dangerous hardware, like open "S" hooks or protruding bolt ends.
5. Make sure spaces that could trap children, such as openings in guardrails or between ladder rungs, measure less than 3.5 inches or more than 9 inches.
6. Check for sharp points or edges in equipment.
7. Look out for tripping hazards, like exposed concrete footings, tree stumps, and rocks.
8. Make sure elevated surfaces, like platforms and ramps, have guardrails to prevent falls.
9. Check playgrounds regularly to see that equipment and surfacing are in good condition.
10. Carefully supervise children on playgrounds to make sure they're safe.

References & Resources:

http://www.nrpa.org
http://www.cpsc.gov/en/Safety-Education/Safety-Guides/Sports-Fitness-and-Recreation/Playground-Safety/
http://www.cpsc.gov/en/Search/?query=playgrounds&filters=all

1. ASTM F1487-11: Standard Consumer Safety Performance Specification for Playground Equipment for Public Use

ASTM F2223-10: Standard Guide for ASTM Standards on Playground Surfacing

Consumer Product Safety Handbook (CPSC) Public Playground Safety Handbook:
Link: http://www.cpsc.gov//PageFiles/122149/325.pdf

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