

Australian Standard[®]

Amusement rides and devices

Part 4.2: Specific requirements— Contained play facilities



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- Australian Amusement Association
 - Australian Amusement Leisure and Recreation Association
 - Consumers Federation of Australia
 - Department of Commerce, Worksafe Division, WA
 - Department of Justice and Attorney General, Qld
 - Department of the Premier and Cabinet, SA
 - Engineers Australia
 - Kidsafe
 - Safety Institute of Australia
 - University of Technology Sydney
 - WorkCover New South Wales
 - WorkSafe Victoria
-

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Australian Standard[®]

Amusement rides and devices

Part 4.2: Specific requirements— Contained play facilities

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PREFACE

This Standard was prepared by the Australian members of Joint Standards Australia/Standards New Zealand Committee ME-051, Amusement Rides and Devices, to complement the general requirements for amusement rides and devices given in AS 3533.1 and AS 3533.2.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

This Standard is Part 4.2 of the AS 3533 series designed to cover aspects of safety for amusement rides and devices. Parts 1 and 2 address the general aspects of safety common to all kinds of amusement rides and devices and are intended to be used in conjunction with the specific requirements for the particular type of ride. While some ride-specific requirements have been included in Parts 1 and 2, these are now being progressively moved into individual Standards in a new AS 3533.4 series. Standards in the AS 3533.4 series relate to particular rides or devices and give requirements and guidance tailored to the particular kinds of hazards relevant for that ride or device.

In preparation of this Standard, the Committee took into account the approaches taken by BS 8409, *Soft indoor play areas. Code of practice*, and EN 1176-10, *Playground equipment and surfacing*, Part 10: *Fully enclosed play equipment*.

This Standard makes provisions for those involved in the contained play facility industry to provide safe, yet challenging, contained play facilities. It covers the facility as a whole, because it is the combination of good design, materials and management that creates a safe facility. The Standard specifies requirements that will protect a child from hazards he or she may be unable to foresee when using equipment as intended in contained play facilities.

While other Australian Standards cover equipment commonly found within contained play facilities, including AS 3533.1, AS 3533.2, AS 3533.4.1 and the AS 4685 series, this Standard has been developed to provide requirements and guidelines that specifically suit contained play environments because of the unique aspects of such facilities, notably—

- (a) appropriate supervision;
- (b) operation within a contained space; and
- (c) the required presence of carers.

It should be noted that compliance with this Standard alone does not necessarily ensure that all legal obligations are being fulfilled.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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FOREWORD

Children discover and learn about the world in which they live via play, which provides an essential element of children's development and growth.

Contained play facilities are areas designed for children's play, including the site and any equipment. The term does not include sites and equipment intended for use in formal sport and therapy. Generally, contained play facilities are commercial premises and can be free access or paid access. Contained play facilities should provide some supervision but the level may vary from facilities where the children are fully supervised to those where the parent or carer is principally responsible for the child's behaviour and actions. Contained play facilities are not childcare facilities.

The same hazards face a child in a contained play environment whether it is operated by a commercial organization, such as a chain of international centres or a small local family owned business, or by a voluntary group, such as a service group or a parent organization, or by a single individual. The requirements of this Standard therefore apply to all contained play environments.

It is important for the rounded development of children that, through the medium of play, they arrive at an understanding of danger, which provides the basis for assessing safety in a variety of situations. The balance between challenge and safety is an important consideration for all play providers. The best facilities are those that, through careful design, management, inspection, cleaning and maintenance, offer children high quality play experiences without compromising their safety.

Contained play facilities that children find attractive are generally those that present various levels of difficulty and challenge. Children can explore solutions to these challenges and practice their newly acquired abilities in carefully designed settings, where the levels of risk have been assessed and are managed by adopting supervisory or design techniques.

Precautions need to be taken by play providers to reduce the severity of injuries if children make the wrong judgment but the possibility of harm cannot be completely removed. This Standard aims to ensure that play providers develop facilities that children find enjoyable but where the probability of injury has been minimized. This Standard does not purport to address all the hazards associated with contained play facilities.

The Standard's existence alone will not necessarily prevent injuries. Like other physical activities, the use of contained play facilities involves the risk of injury. However, developing and maintaining contained play facilities in accordance with this Standard will help minimize the risk of injury occurring and the severity of any injury that may occur.

STANDARDS AUSTRALIA

Australian Standard

Amusement rides and devices

Part 4.2: Specific requirements—Contained play facilities

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out the minimum safety requirements for the design, development, installation, inspection, maintenance, supervision levels and operation of contained play facilities (see Clause 1.5.9).

This Standard does not apply to sites and equipment intended for use in formal sport and therapy.

This Standard does not apply to licensed childcare facilities.

1.2 OBJECTIVE

The objective of this Standard is to provide requirements and guidance specific to the design, construction, operation and maintenance of contained play facilities that will protect the health and safety of both operating staff and patrons.

1.3 APPLICATION

This Standard is intended to be used in conjunction with AS 3533.1 and AS 3533.2, which provide requirements and recommendations on matters common to all amusement rides and devices. Specific requirements in this Standard take precedence over corresponding requirements in AS 3533.1 and AS 3533.2. Contained play facilities shall be classified as a Class 2 device in accordance with AS 3533.1. If the requirements of any part of this Standard conflict with any National, State or Territory regulations, the appropriate statutory regulations shall apply.

While this Standard has been developed for contained play facilities in commercial premises, it may be used for guidance for similar facilities in educational institutions and hospitals. Additionally, this Standard was not developed to cover use of the facilities by patrons over 12 years of age in a private hire situation but may be used as guidance when conducting a risk assessment for such operations.

1.4 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
2316	Artificial climbing structures and challenge courses
2316.1	Part 1: Fixed and mobile artificial climbing and abseiling walls
2321	Short-link chain for lifting purposes
3533	Amusement rides and devices
3533.1	Part 1: Design and construction
3533.2	Part 2: Operation and maintenance

AS

- 3533.3 Part 3: In-service inspection
- 3533.4.1 Part 4.1: Specific requirements—Land-borne inflatable devices
- 4685 Playground equipment
- 4685.2 Part 2: Particular safety requirements and test methods for swings
- 4685.3 Part 3: Particular safety requirements and test methods for slides
- 4685.4 Part 4: Particular safety requirements and test methods for runways
- 4989 Trampolines—Safety aspects

AS ISO

- 1302 Geometrical product specifications (GPS)—Indication of surface texture in technical product documentation

AS/NZS

- 2512 Methods of testing protective helmets
- 2512.1 Part 1: Definitions and headforms
- 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules)

AS/NZS ISO

- 8124 Safety of toys
- 8124.1 Part 1: Safety aspects related to mechanical and physical properties
- 31000 Risk management—Principles and guidelines

ISO

- 6487 Road vehicles—Measurement techniques in impact tests—Instrumentation

1.5 DEFINITIONS

For the purposes of this Standard, the definitions below apply.

1.5.1 Access ramp

A means of access incorporating an inclined surface up to 15° on which the user can ascend and descend.

NOTE: Structures with inclines above 15° are deemed to be climbing equipment or slides.

1.5.2 Annual comprehensive inspection

An inspection completed to establish the overall safety of equipment, foundations and surfaces. This inspection also assesses any change in the safety of the equipment resulting from repairs made, or added or replaced items.

1.5.3 Ball-pool

An enclosure designed to contain a depth of balls within which children can play.

1.5.4 Burmeeze bridge

A non-rigid suspended pathway with a primary containment system, such as cargo nets, that lead from one platform to another.

1.5.5 Carer

Parent, guardian, childminder, relative or other responsible person, who accompanies the patron.

1.5.6 Circulation space

The area around the equipment that allows movement to, from and between the equipment, in a safe manner.

1.5.7 Climbing

Where the intended body support is a combination of feet/legs and hands, e.g. climbing ropes or sliding poles. Devices such as balance beams are not considered climbing devices.

1.5.8 Competent person

A person who has acquired, through training, qualifications or experience, or a combination of these, the knowledge and skills enabling that person to perform a specified task.

1.5.9 Contained play facility

Composite of children's play equipment and associated facilities within commercial premises (e.g. pubs, shopping centres, fast food outlets and pay-for-play centres) which may be free access or paid access.

1.5.10 Daily routine inspection

This inspection is completed to identify obvious hazards that may result from use, vandalism or weather conditions (if relevant).

1.5.11 Enclosed play structure

Components and constructional elements with, or on which, patrons can play that are within a three-dimensional enclosure with specified entrances and exits.

1.5.12 Falling space

Space in, on or around the equipment that can be occupied by a user falling from an elevated part of the equipment. The falling space commences at the free height of fall.

1.5.13 Fall zone

The surface that can be hit by a user falling from the equipment.

1.5.14 Family of products

Modular systems or components that can be assembled in different ways.

1.5.15 Fireman's pole

A forced movement device that consists of a vertical pole that is used for sliding.

1.5.16 Forced movement

The displacement of a user that is forced, restricted or limited by the construction of the equipment.

1.5.17 Free height of fall

The greatest vertical distance between a part of the equipment that is a point of an intended body support and the ground surface or part of equipment beneath.

1.5.18 Free space

Space in, on or around the equipment that can be occupied by a user undergoing a movement forced by the equipment (e.g. sliding, swinging, rocking), see Figures 3.2 and 3.3).

1.5.19 G

The acceleration due to the earth's gravity at surface.

1.5.20 $G_{\max}$

The maximum acceleration experienced during the impact test.

1.5.21 Head injury criteria (HIC)

A measure of impact severity that considers the duration over which the most critical section of the acceleration pulse persists as well as the peak level of that acceleration.

1.5.22 HIC duration

The time interval over which the HIC was calculated.

1.5.23 Inflatable structure or device

A structure or device on or in which patrons may play that is inflated by means of an air supply.

1.5.24 $j_{\max}$

The maximum jerk (rate of change of acceleration with respect to time) experienced during the impact test.

1.5.25 Monthly operational inspections

This inspection is completed to check the operation and stability of the equipment, especially for any wear, rust, corrosion and faulty equipment.

1.5.26 Patron

A child up to and including 12 years of age using the facility.

1.5.27 Play area

Any defined part or area of the facility that is used by the patrons solely for the purpose of play, including the circulation space.

1.5.28 Shall

Indicates a statement is mandatory.

1.5.29 Should

Indicates a recommendation.

1.5.30 Slides

1.5.30.1 Slide

Structure with inclined surface(s) that contains and guides the user sliding in a defined track.

NOTE: Inclined planes, designed primarily for other purposes, such as roofs, do not constitute slides.

1.5.30.2 Wave slide

Slide with one or more variation(s) in the slope of its sliding section.

1.5.30.3 Free-fall slide

Any slide where sliding section exceeds 60°.

1.5.30.4 Embankment slide

Slide in which the majority of the sliding section follows the contour of the land.

NOTE: Access to the starting section is usually direct from the mound or via an access ladder, stairs or ramps.

1.5.30.5 Attachment slide

Slide for which access to the starting section is possible only by passing via other equipment or parts of equipment.

NOTE: Such equipment includes climbing nets, bridges, platforms, inclined planes, other climbing devices.

1.5.30.6 *Spiral slide*

Slide where the sliding section follows spirals.

1.5.30.7 *Curved slide*

Slide where the sliding section follows curves.

1.5.30.8 *Free-standing slide*

Slide that is separate from any other piece of equipment with its own means of access from the ground directly to the starting section.

1.5.30.9 *Tunnel slide*

Slide where the sliding section has a rigid tubular cross-section.

1.5.30.10 *Mixed tunnel slide*

Slide for which only the upper section of the sliding section has an enclosed cross-section.

1.5.30.11 *Multi-track slide*

Slide with several defined tracks separated by dividers.

1.5.30.12 *Starting section*

Section on which the user is enabled to get into sliding position.

NOTE: The starting section can be a platform or an extension of a platform.

1.5.30.13 *Sliding section*

Section on which the user is undergoing forced movement.

1.5.30.14 *Run-out section*

Section on which the user's speed is reduced to enable a safe departure from the slide.

1.5.30.15 *Guarding section*

Additional component of a slide, which serves the function of a barrier, to protect users from falls from the starting section.

NOTE: The guarding section can extend into the region of the sliding section.

1.5.30.16 *Lateral protection*

Side of the starting section or sliding section that retains and guides the user.

1.5.31 **Toddler**

A patron up to and including the age of three years.

1.5.32 **Track ride**

A rigid forced movement devices where the user is supported by either hanging or seated from a guided carriage that is constrained to move horizontally.

1.5.33 **Trampoline**

A device that provides a rebound force sufficient for bouncing activities. This consists of a taut fabric stretched within a frame that uses sprung devices to propel the user vertically so the user loses contact with the surface.

1.5.34 **Upper body equipment**

Indoor play equipment or part of the equipment from which suspension is intended using the hand/s without foot support.

SECTION 2 PLANNING AND DEVELOPMENT

2.1 FACILITY PROFILE

The design parameters for the facility shall be decided in consideration of the following:

- (a) The facility location and type, e.g. within an existing building, within its own purpose-built area or part of an existing business.
- (b) Whether the facility is to be single- or multi-level.
- (c) The type of equipment to be provided.
- (d) The intended age groups.
- (e) Whether different age groups are to be provided with separate areas.
- (f) How special needs and disabilities of children and adults are to be addressed.
- (g) Supervision requirements.
- (h) Whether the facility is to be used for functions and private events.
- (i) How adults are to be accommodated.
- (j) The intended opening hours.
- (k) The arrangements for customer access and parking, including access and egress for emergency vehicles.

NOTE: If the contained play facility is to be part of a supervised early childhood setting requiring local authority registration, the relevant legislation will apply.

Once the profile of the facility has been decided, a risk assessment in accordance with AS/NZS ISO 31000 shall be carried out and documented, covering the construction, operation, inspection, cleaning, maintenance and staffing of the facility.

2.2 REGULATIONS

Any regulations covering the following aspects shall be taken into account:

- (a) Child welfare.
- (b) Environmental health.
- (c) Food hygiene.
- (d) Health and safety.
- (e) Noise.
- (f) Planning and building controls.
- (g) Heating and airconditioning/ventilation (mechanical and electrical) considerations.
- (h) Fire precautions, fire safety management and means of evacuation.

SECTION 3 DESIGN

3.1 GENERAL

Many problems can be avoided in any kind of contained play facility if it is carefully designed. A well-designed facility requires careful and thorough planning of its layout related to the system of management and patron age. Certain aspects of the design will be dependent on the particular management and supervision of each individual facility.

3.2 SAFETY REQUIREMENTS

3.2.1 General

Contained play facilities usually contain several types of play equipment. General requirements for equipment are provided in this Clause. Requirements for specific types of equipment are provided in Section 4. See Clause 3.3 for requirements and guidance concerning installation issues such as spacing between different types of equipment.

There may be particular problems with the use of exterior equipment indoors. Prior to use, confirmation should be obtained from the supplier regarding its suitability. Particular note should be taken of the need for assessment of equipment finishes to determine their fire retardant performance.

All structural features of the play structure should be designed to minimize injury, in particular from impact and entrapment.

Equipment shall be designed to ensure that adults are able to gain access to assist children within the equipment.

Enclosed parts of the equipment such as tunnels and playhouses, with an internal distance greater than 2 m from an entry point shall have at least two access openings that are independent of one another. These openings shall not be capable of being locked and shall be accessible without the need for additional aids (e.g. a ladder that is not an integral part of the equipment). These access openings shall have no dimension less than 500 mm.

Due to the risk of fire, these two openings shall allow the user to leave the equipment by different routes.

Solid walls over 1200 mm high should be kept to a minimum throughout the facility as they will impede the clear vision lines needed for parental supervision.

Floor coverings outside of food areas should be non-slip dry surfacing, such as carpet.

3.2.2 Assessment for fire egress

During the design risk assessment, the following shall be taken into consideration to ensure the safe egress of patrons in the event of a fire:

- (a) Materials of construction.
- (b) Flammability of materials.
- (c) Effects on patrons of gases, retardants and fumes.
- (d) Time for patron to exit structure.
- (e) Exit paths.

3.2.3 Facility entry and exit

The facility shall have a system in place to control entry and exit, such as a child-resistant fence and gate.

The entry and exit system should address the possibility of situations such as patrons exiting either accidentally without their carer or being taken from the facility by an unauthorized person.

NOTE: A method of achieving this is by using an identification system matching patrons to a carer, so the only person with whom they can exit the facility is the appropriate carer while monitoring all emergency egress points.

3.2.4 Structural integrity

3.2.4.1 Assessment

Structural integrity, including stability, of the equipment shall be assessed by an appropriately qualified competent person using one of the following:

- (a) Calculation, carried out in accordance with Appendices A and B.
- (b) Physical testing, in accordance with Appendix C.
- (c) A combination of Items (a) and (b).

For equipment where the specific calculations or tests in these Appendices are not appropriate, the structural integrity shall be assessed to be at least equivalent. For a family of products, the structural integrity shall be proven for the worse case of the intended combinations.

3.2.4.2 Calculations

When calculations are carried out in accordance with Appendix B, no limit states shall be exceeded at combinations of loads as given in Paragraph B2.

3.2.4.3 Testing

When tested in accordance with Appendix C, the equipment shall show no cracks, damage, or permanent deformation and no loosened connections. Each structure shall resist both permanent and variable loads acting on the equipment and parts of the equipment in accordance with Appendix C. Structural parts shall resist the worst case loading condition.

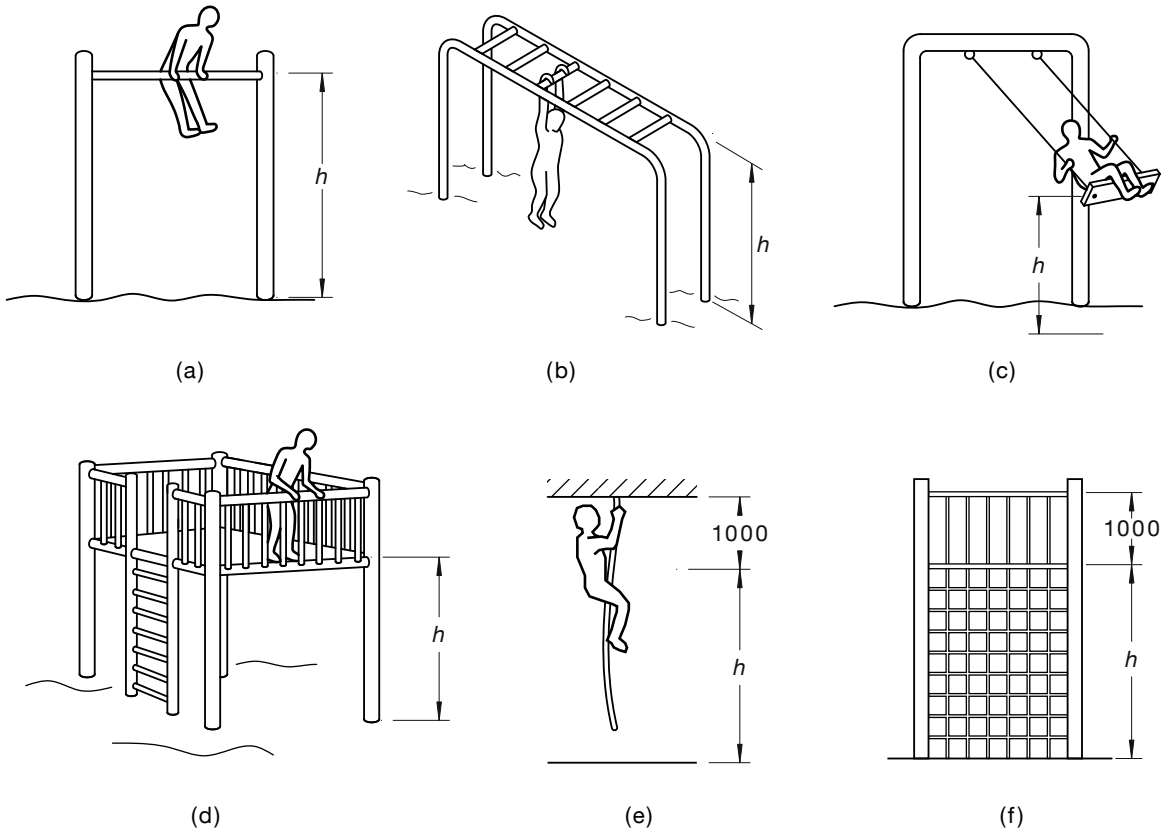
3.2.5 Free height of fall

In toddler areas, the free height of fall shall not exceed 1.5 m. In all other areas, the free height of fall shall not exceed 3 m.

Unless stated otherwise in this Standard for a particular application, the free height of fall shall be measured as given in Table 3.1. In determining the free height of fall, the possible movements of the equipment and of the patron shall be taken into account. In general, this means that the maximum distance shall be taken.

TABLE 3.1
FREE HEIGHT OF FALL FOR DIFFERENT TYPES OF USE

Type of use (see Figure 3.1)	Vertical distance
Standing. See (d)	From the surface of foot support to surface below
Sitting. See (c)	From the surface of seat to surface below
Hanging (when full body support is provided by the hands only). See (a) and (b)	From the surface of hand support to surface below (foot support)
Climbing (when body support is a combination of feet/legs and hands, e.g. climbing ropes or sliding poles). See (e) and (f)	From maximum hand support height minus 1 m to surface below



LEGEND:
 h = Free height of fall

DIMENSIONS IN MILLIMETRES

FIGURE 3.1 EXAMPLES SHOWING FREE HEIGHT OF FALL

3.2.6 Free space

Free space applies to equipment where there is forced movement. Free space may be represented as a series of cylindrical spaces (see Figure 3.2) along the forced path of the user. For sitting/standing equipment the cylinder will originate from and be perpendicular to the bearing surface. For equipment that requires hand support only the cylinder will be plumb relative to the hand support. The cylindrical space is shown in Figure 3.3, and its dimensions shall be as set out in Table 3.2. In determining the free space, the possible movements of the equipment and the user shall be taken into account.

There shall be no objects or surfaces in the free space except where a suitable enclosure, impact attenuating padding system, barrier or restraint is in place. This ensures that a patron is prevented from contacting objects likely to cause injury or from becoming entrapped in adjoining structures. The surface of any enclosure or barrier shall be such that there is minimal risk of injury from entrapment, impact or abrasion.

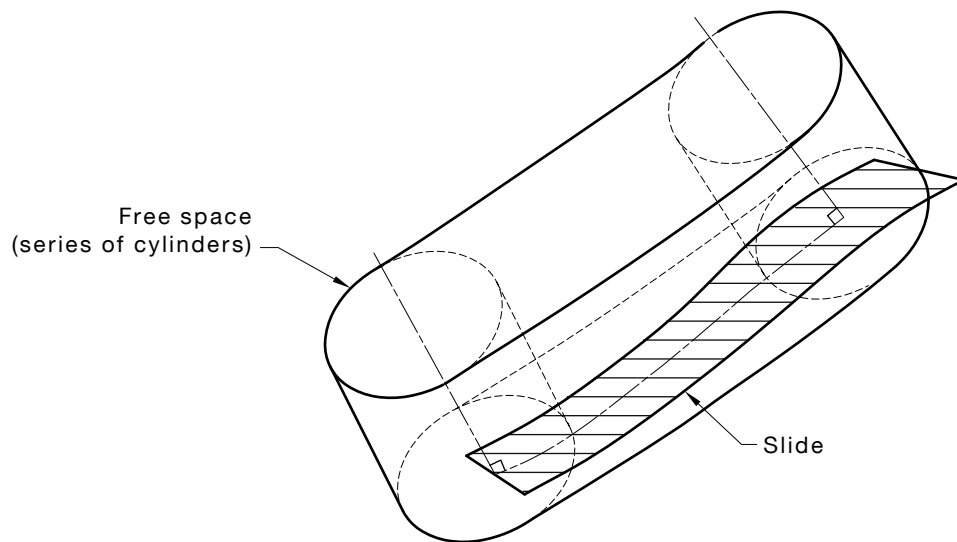


FIGURE 3.2 DETERMINATION OF THE FREE SPACE—EXAMPLE OF A SLIDE

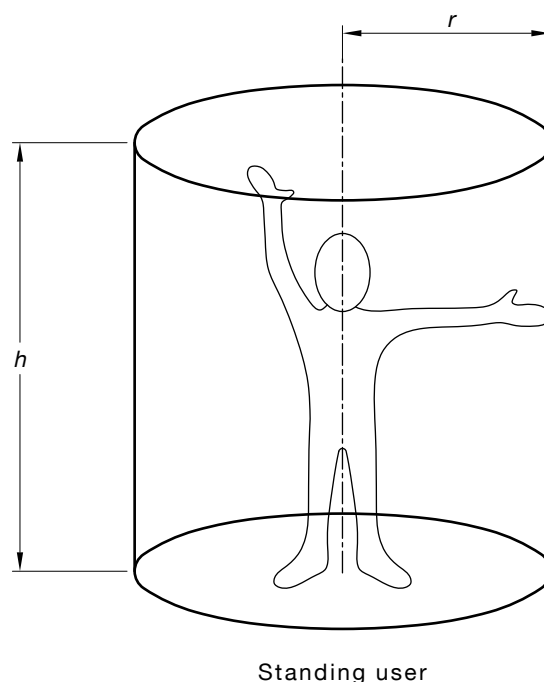


FIGURE 3.3 FREE SPACE CYLINDER

TABLE 3.2
DIMENSIONS OF THE CYLINDER FOR
THE DETERMINATION OF THE FREE SPACE

millimetres		
Usage	Radius (r)	Height (h)
Standing	1000	1800
Sitting	1000 (450 track ride pommel)	1500
Hanging	500	300 above 1800 below

NOTE: In hanging usage, $h = 300$ mm above because the user may lift themselves (see Figure 3.3). For track ride pommel devices, $r = 450$ mm because the user requires hand support (see Clause 4.7.6).

3.2.7 Fall zones

3.2.7.1 Dimensions

Where dimensions of the fall zone are not specified in Section 4 for the particular type of equipment, the following minimum dimensions shall apply:

- (a) For a toddler area, see Figure 3.4.
- (b) In all other cases, see Figure 3.5.

NOTE: The fall zone is measured from the outer perimeter of the equipment.

In determining the fall zone, the possible movements of the equipment and the user shall be taken into account. In certain cases, such as a spinner (see Figure 4.1) which gives the user a horizontal velocity, the impact area may need increased impact attenuation to provide adequate protection against falling injuries. Refer to Section 4 for specified fall zone requirements.

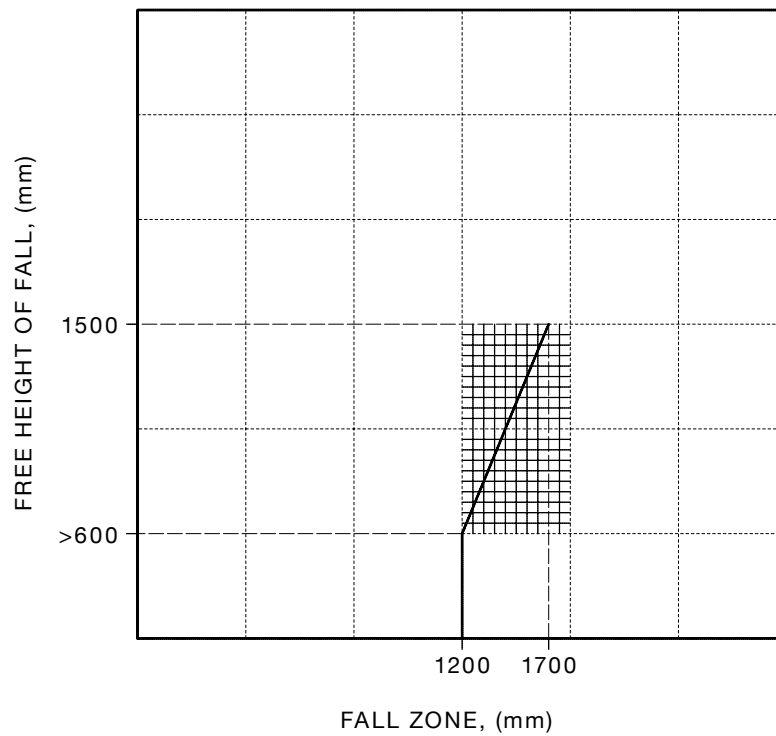


FIGURE 3.4 MINIMUM EXTENT OF FALL ZONE—TODDLER AREAS

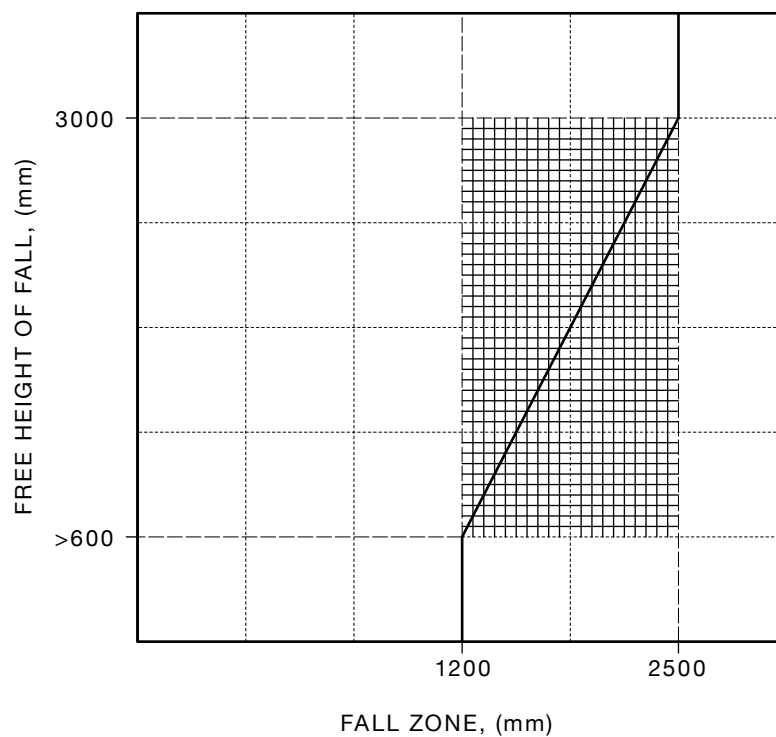


FIGURE 3.5 MINIMUM EXTENT OF FALL ZONE—OTHER CASES

3.2.7.2 *Objects and surfacing in fall zone*

3.2.7.2.1 *General*

Inflatable devices shall comply with the impact attenuating surface requirements contained within AS 3533.4.1. For all other situations Clauses 3.2.7.2.2 and 3.2.7.2.3 shall apply.

3.2.7.2.2 *Free height of fall less than or equal to 600 mm*

Where the free height of fall is less than or equal to 600 mm and the equipment is not used for climbing or forced movement, there are no specific surface requirements.

Where the free height of fall is less than or equal to 600 mm and the equipment is used for climbing or forced movement, any object or surface within 1200 mm of the equipment shall have an impact attenuating surface or covering. The surface/covering when tested in accordance with Appendix D at a fall height of 600 mm shall—

- (a) limit the $G_{\max}$ value to less than 200G;
- (b) limit the head injury criteria (HIC) to less than 1000;
- (c) have an impact HIC event duration (i.e. $t_2 - t_1$) of not less than 5 m/s;
- (d) not exhibit any multi-peaked acceleration pulses with peak to valley differences greater than 10G; and
- (e) limit the maximum jerk, $j_{\max}$, to less than 40 000G per second.

3.2.7.2.3 *Free height of fall greater than 600 mm*

Where the free height of fall is greater than 600 mm, there shall be no objects in the potential fall zone and the surface of the potential fall zone shall be covered with an impact attenuating system that, when tested in accordance with Appendix D at the relevant maximum height of fall shall—

- (a) limit the $G_{\max}$ value to less than 200G;
- (b) limit the head injury criteria (HIC) to less than 1000;
- (c) have an impact HIC event duration (i.e. $t_2 - t_1$) of not less than 5 m/s;
- (d) not exhibit any multi-peaked acceleration pulses with peak to valley differences greater than 10G; and
- (e) limit the maximum jerk, $j_{\max}$, to less than 40 000G per second.

3.2.8 **Protection against entrapment**

3.2.8.1 *General*

The entrapment hazards that can occur through distortion of materials during use shall be taken into account when choosing materials. Bound openings (see Figure 3.6) should have no parts that converge in the downward direction at an angle of less than 60°. All contained play equipment shall be tested and meet the requirements in accordance with Appendix E. Figure E12 depicts examples of possible entrapment situations.

3.2.8.2 *Entrapment of the head and neck*

Equipment shall be constructed so that any openings do not create head and neck entrapment hazards either by head first or feet first passage. Hazardous situations in which this type of entrapment can be encountered include the following:

- (a) Completely bound openings (see Figure 3.6) through which a user can slide head first or feet first.
- (b) Partially bound openings (see Figure 3.7) including V-shaped openings.
- (c) Shearing or moving openings.

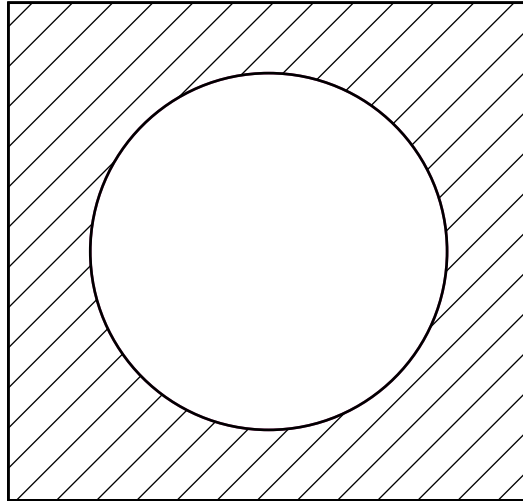


FIGURE 3.6 BOUND OPENING EXAMPLE

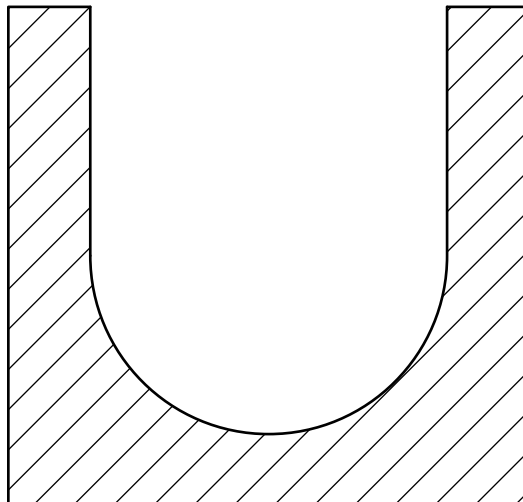


FIGURE 3.7 PARTIALLY BOUND OPENING EXAMPLE

When tested in accordance with Paragraph E4.1 and if accessible, completely bound openings with a lower edge more than 600 mm above the ground or standing surface that allow the passage of the small probe, the large probe shall also be able to pass through the opening.

Partially bound and V-shaped openings with an entrance at 600 mm or more above the ground or standing surface shall be constructed so that either—

- (i) the opening is not accessible when tested in accordance with Paragraph E4.2; or
- (ii) if accessible, when tested in accordance with Paragraph E4.2—
 - (A) the template apex contacts the base of the opening during the test [see Figure E4(b)]; or
 - (B) the template contacts the sides of the opening at a height of less than 600 mm above the ground or standing surface [see Figure E4(c)].

Rigid circular openings shall not have an internal diameter of between 130 mm and 230 mm. Non-rigid members (e.g. ropes) shall not overlap if, by doing so, they create openings that do not conform to the requirements for completely bound openings.

Openings between the flexible parts of suspended bridges and any rigid side members shall allow for the insertion of the large head probe under the worst case condition of loading. Both fully loaded and unloaded situations shall be considered.

3.2.8.3 *Entrapment of clothing*

Equipment shall be constructed so that hazardous situations of clothing entrapment, which may result in strangulation, are not created. All hazardous situations shall be tested using the toggle test device (see Paragraph E5).

Examples of such situations include the following:

- (a) Gaps or V-shaped openings in which a part of clothing can become trapped while or immediately before the user is undergoing a forced movement.
- (b) Protrusions.
- (c) Spindles and rotating parts.

Special consideration shall be given to avoiding clothing entanglement within the falling space when using elements of circular cross section. This can be achieved by use of spacers or similar devices.

See Figure 3.8 for an example of the use of a spacer.

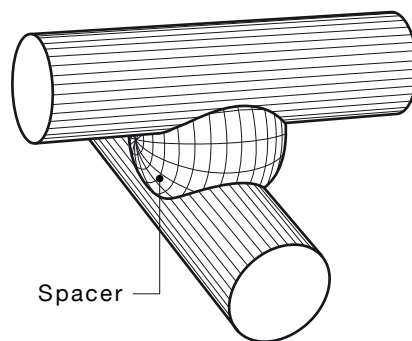


FIGURE 3.8 EXAMPLE OF THE USE OF A SPACER TO REDUCE CLOTHING AND HAIR ENTRAPMENT

Slides and fireman's poles shall be constructed so that openings located within the free space do not allow the entrapment of clothing including cords and toggles, when tested in accordance with Paragraph E5.

Roofs shall be constructed so that they do not allow entrapment of clothing (including cords and toggles when tested in accordance with Paragraph E5).

Rotating parts shall have means of preventing entanglement of clothing or hair. This may be achieved by use of suitable covering or shields.

3.2.8.4 *Entrapment of the whole body*

Equipment shall be constructed so that hazardous situations of body entrapment are not created.

Examples of such situations include the following:

- (a) Tunnels into which children can crawl with their whole body and become trapped.
- (b) Suspended parts which are heavy or have rigid suspension, in which entrapment of the whole body can be encountered.

Tunnels other than tunnel slides shall conform to the requirements given in Table 3.3. Tunnel slides shall be in accordance with AS 4685.3.

TABLE 3.3
REQUIREMENTS FOR TUNNELS

Description	Open one end	Open both ends			
Inclination	≤5° and upwards only when entering	≤20°		20° > inclination ≤ 45° NOTE: Optimum 30° to 38°	
Minimum internal dimensions*, mm	≥750	≥750		≥750	
Length, mm	≤2000	≤5000	>5000	≤5000	>5000
Other requirements, mm	None	None	Provision of additional access or egress every 5000	Provision to assist climbing and prevent sliding, e.g. steps or handles	Provision of additional access or egress every 5000 and provision to assist climbing and prevent sliding, e.g. steps or handles

* Measured at the narrowest point.

3.2.8.5 Entrapment of the foot or leg

Equipment shall be constructed so that hazardous situations in which entrapment of the foot or leg can be encountered are not created, such as—

- (a) completely bound rigid openings in surfaces on which children can run or climb; and
- (b) footholds, handholds and the like extending from these surfaces.

NOTE: In the case of (b) the entrapped foot or ankle can be severely injured if the user falls.

To avoid foot or leg entrapment, level surfaces and those inclined at up to 45° intended for running or walking shall not contain any gaps greater than 30 mm, when measured in the direction of travel as shown in Figure 3.9. This requirement does not apply to Burmese bridges and suspension bridges (see Figure 4.1 and Clause 4.4.2.5).

A physical barrier shall be provided at the edge of the surface to prevent lateral movement or entrapment of the foot or leg, e.g. kick rail.

Level surfaces intended for running or walking shall not contain any gaps likely to cause foot or leg entrapments.

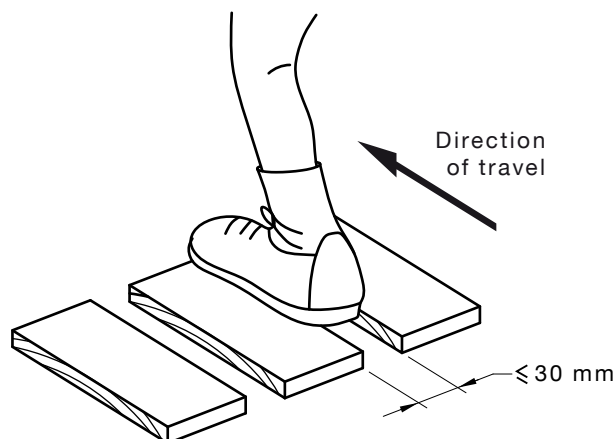


FIGURE 3.9 MEASUREMENT OF 30 mm SURFACE GAP LIMIT

3.2.8.6 *Entrapment of fingers*

Equipment shall be constructed so that hazardous situations in which entrapment of fingers can be encountered, are not created.

NOTES:

- 1 Not all openings in which a finger can be placed will be hazardous.
- 2 The spaces between decking boards on rigid bridges, ramps and platforms are exempt from finger entrapment provisions, unless they are within the free space requirements of adjacent or attached equipment.

Examples of such hazardous situations include the following:

- (a) Gaps in which fingers can be trapped whilst the remainder of the body is moving or continues in motion involuntarily, for example sliding, swinging, falling.
- (b) Open-ended tubes or pipes.
- (c) Variable gaps (excluding chains).

Openings within the free space, where the user is subjected to forced movement, and holes which have a lower edge more than 1200 mm above the potential impact area, when tested in accordance with Paragraph E6, shall conform to either of the following requirements:

- (i) The 8 mm finger rod (see Figure E8), when applied with a force of 30 N, shall not pass through the minimum cross-section of the opening and the profile of the opening shall be such that the rod cannot be locked in any position when set in motion as given in Paragraph E6.2.
- (ii) If the 8 mm finger rod passes through the opening, the 25 mm finger rod (see Figure E8), when applied with a force of 30 N, shall also pass through the opening, provided that the opening does not permit access to another finger entrapment site.

The ends of tubes and pipes shall be closed off to prevent the risk of finger entrapment. The closures shall not be removable without the use of a tool.

Gaps whose dimensions change during use of the equipment (e.g. suspension bridges and gates hinges) shall have a minimum dimension in any position of 12 mm when loaded and unloaded.

3.2.9 **Materials**

3.2.9.1 *Flammability*

The flammability requirements of materials used in play equipment shall be in accordance with Clause 3.5 of AS 3533.1—2009.

3.2.9.2 *Barriers, netting and mesh*

Equipment should be designed so that hazardous situations where climbing can occur are not created taking into consideration supervision, the increased danger associated with reduced visibility and other safety interventions.

The strand diameter of the material from which any netting or mesh used to contain patrons is made shall be of a size that minimizes the potential for it to cut patrons' extremities.

Any flexible barriers, netting or mesh in a contained play structure that is able to be stretched by a force of 220 N applied with the large probe identified in Figure E1 shall not be placed close enough to potential impact hazards such as sharp objects, projections, glass windows or furniture to allow the probe to contact the hazard.

Barriers, netting and mesh shall comply with the flammability requirements of Clause 3.2.9.1.

Barriers, netting and mesh shall be tested in accordance with the test method described in Appendix J for structural integrity and attachment (fixing) performance.

3.2.10 Finish of equipment

3.2.10.1 General

All exposed surfaces shall be of a finish that is able to be sanitized.

3.2.10.2 Hard surfaces

Where patrons can make head contact with structural elements of the equipment, such elements shall be padded to minimize the severity of injuries.

3.2.10.3 Protrusions and sharp edges

There shall be no protruding fasteners, projecting wire rope terminations or pointed or sharp-edged components. Protruding bolt threads within any accessible part of the equipment shall be permanently covered, e.g. dome-headed nuts. Nuts and bolt heads that project less than 8 mm shall be free from burrs. Corners, edges and projecting parts within any accessible part of the equipment that project more than 8 mm, and which are not shielded by adjacent areas that are not more than 25 mm from the end of the projecting part, shall be rounded off. The minimum radius of the curve shall be 3 mm. There shall be no sharp-edged parts within any accessible part of the equipment.

3.2.10.4 Rough surfaces

Rough surfaces shall be designed and manufactured to minimize risk of injury.

3.2.10.5 Upholstery

Hardware, staples, or fastening devices used in the construction of padding or upholstered equipment shall not have hidden sharp points or hazards when the surface of the pad or upholstered construction is fully compressed by a user.

Securing ties for foam padding shall be cut back and fitted so the loose end does not present a hazard to patrons.

3.3 LAYOUT AND INSTALLATION

3.3.1 General

Playing areas should be clearly identified and kept separate from refreshment, seating and other social areas.

Measures, such as cover strips, should be used to avoid finger and foot entrapment in doors. Handles should be chamfered or rounded and, where children need to use a door, the handle should be fixed to a height of 600 mm from the standing surface.

Fire exits from the facility should be alarmed so that if a customer opens them, either intentionally or unintentionally, there will be a loud audible warning to both deter them from exiting and to warn staff.

All electrical general purpose outlets (i.e. electrical powerpoints) in the facility shall have safety plugs inserted when not in use.

All electrical leads in publicly accessible areas (e.g. for blowers associated with inflatable devices) shall be unable to be disconnected by patrons or their carers. This may be achieved by mechanical or physical means.

Electrical leads shall not present a tripping hazard.

Operators need to be mindful of the location of water play devices in relation to electrical devices and supply points.

3.3.2 Kitchen, café service and café seating

Café seating areas should be located as close as practicable to the café area to minimize the distance that hot drinks and food need to be carried by customers and staff.

Café seating areas should have a floor covering that is easily cleaned, e.g. vinyl or painted concrete.

The café kitchen, preparation and serving area should have means to restrict access by patrons, e.g. a latched gate.

Tables and chairs should be stable with rounded corners and chamfered edges.

3.3.3 Toilets

The toilet areas should—

- (a) be easily accessible and well signposted; and
- (b) have minimal impediments, to offer clear vision for parental supervision.

3.4 INFORMATION TO BE PROVIDED BY THE MANUFACTURER AND SUPPLIER

3.4.1 General product information

Information supplied by the manufacturer/supplier shall be in accordance with the requirements of this Clause (3.4).

Instructions shall be provided in the appropriate language(s) of the country in which the equipment is to be installed and used. The instructions shall comply with the following:

- (a) Instructions shall be printed legibly and in a simple form.
- (b) Illustrations shall be used, where possible.
- (c) Instructions shall include at least the following information:
 - (i) Details of the installation, operation, inspection and maintenance of the equipment.
 - (ii) A statement drawing the operator's attention to the need to increase inspection/maintenance if the equipment is subject to heavy use and/or the stability of the equipment relies on one post.
 - (iii) Advice to take care, in relation to specific hazards to children, due to incomplete installation or dismantling, or during maintenance.

Where requested, copies of the test report shall be provided.

3.4.2 Pre-information

Information concerning the safety of the installation prior to acceptance of the order shall be provided, e.g. a catalogue data sheet.

This information shall include at least the following, where relevant:

- (a) The minimum space.
- (b) Surfacing requirements (including free height of fall and extent of surfacing)
- (c) The overall dimensions of the largest part(s).
- (d) The mass of the heaviest part/section, in kilograms.
- (e) Guidance regarding the target user group for the equipment.
- (f) If the equipment is intended only for indoor use or under supervised conditions.
- (g) The availability of spare parts.
- (h) Reference to this Standard, i.e. AS 3533.4.2.

3.4.3 Installation information

An equipment delivery part list with the equipment shall be supplied.

Installation instructions for the correct assembly, erection and placing of the equipment shall be supplied.

The information shall include at least the following:

- (a) Minimum space requirements and safety clearances.
- (b) Equipment and parts identification.
- (c) Erection sequence (assembly instructions and installation details).
- (d) Matching aids where necessary, e.g. signs on parts accompanied by appropriate instructions.
- (e) The need for any special tools, lifting devices, templates or other assembly aids to be used and any precautionary measures to be taken
NOTE: Where necessary, torque values should be given.
- (f) The constructional space required to install the item of equipment.
- (g) The orientation, where necessary, in relation to sun and wind.
- (h) Details of the required foundation, under normal conditions, anchorage in the ground and the design and location of the foundation (with a note that care needs to be taken concerning abnormal conditions).
- (i) Specific instructions if a particular landscape profile is necessary for safe operation, e.g. falling height.
- (j) Free height of fall (for impact attenuation surfacing needs).
- (k) The need for and details of the application of any painting or treatment.
- (l) The removal of assembly aids before the equipment is used.

Drawings and diagrams shall clearly specify the principal dimensions of the equipment and the relevant space, height and areas required for installation.

The details necessary for inspection of the playground equipment prior to its first use shall be supplied.

NOTE: Appendix F contains inspection information and schedules.

3.4.4 Inspection and maintenance information

Instructions for maintenance and inspection (marked with the number of this Standard) shall be supplied. Refer to Section 6 for full details of the contents of maintenance and inspection information supplied by manufacturers of play equipment.

3.5 INFORMATION TO BE PROVIDED BY THE MANUFACTURER OR SUPPLIER OF IMPACT ATTENUATING SURFACING

3.5.1 General

Information supplied by the manufacturer/supplier of impact attenuating surfacing shall be in accordance with the requirements of this Clause (3.5).

3.5.2 Pre-information

Prior to the acceptance of the order, information on the critical fall height of the impact attenuating surfacing as tested shall be provided.

3.5.3 Installation

Instructions on the correct installation shall be provided.

3.5.4 Inspection and maintenance

Instructions on maintenance and inspection procedures shall be provided.

3.6 MARKING

The equipment shall be marked legibly and permanently in English with at least the following:

- (a) Name and address of manufacturer or supplier.
- (b) Name and address of distributor, importer or supplier (as applicable).
- (c) Date of manufacture.
- (d) Serial number and, if different, model number.
- (e) Classification of the device in accordance with AS 3533.1
- (f) The number of this Standard, i.e. AS 3533.4.2.

NOTE: Manufacturers making a statement of compliance with this Australian Standard on a product, packaging or promotional material related to that product are advised to ensure that compliance is capable of being verified.

SECTION 4 SPECIFIC PLAY EQUIPMENT REQUIREMENTS

4.1 GENERAL

In addition to the relevant general requirements specified in this Standard, the specific requirements for certain types of equipment set out in this Section shall be applied as minimum requirements and take precedence over general requirements, where necessary.

Specific equipment requirements have been grouped in the following manner:

- (a) Inflatable devices, see Clause 4.2.
- (b) Ball-pools, see Clause 4.3.
- (c) Contained play structures, see Clause 4.4. This Clause provides requirements for a range of components often included in a play structure, including decks, nets/mesh, vertical and horizontal squeeze rollers, Burmese bridges, punching bags, clamber ups, ramps, roof nets, spider's webs, tunnels, framework (poles, cable ties, access openings for cleaning, emergencies or storage using zips or other closures), obstacles, clamber nets and climbing ropes.
- (d) Other play areas, see Clause 4.5.
- (e) Toddler area, see Clause 4.6.
- (f) Forced movement devices such as slides, swings, track rides, fireman's poles, trampolines and rotating seats or poles, see Clause 4.7.
- (g) Mechanical rides, such as merry-go-rounds, see Clause 4.8.
- (h) Air play devices, such as ball cannons, air fountains, ball showers and vacuums, see Clause 4.9.
- (i) Climbing structures, such as climbing walls and boulders, see Clause 4.10.

For general coverage of aspects such as materials, paint and decorations, flow path, see Section 3.

4.2 INFLATABLE DEVICES

4.2.1 General

Inflatable devices that are used in a contained play facility shall comply with AS 3533.4.1 and the requirements specified in this Clause (4.2).

Where an inflatable device is used as an integral part of a play structure and there is direct access to the device from an elevated platform, the following shall apply:

- (a) Transition between the play structure and the inflatable playing surface shall be continuous, i.e. patrons are not required to step across any openings that may be a foot entrapment hazard.
- (b) The height differential between the playing surfaces of a play structure and an inflatable device shall not exceed 700 mm.
- (c) In the event of unintended deflation, the design of a play structure and inflatable device shall allow safe transition of patrons from a fixed item, such as an elevated access platform, to the designated exit of the inflatable.
- (d) The collapse of an inflatable device shall not subject patrons to a fall exceeding 700 mm unless there is an impact attenuating surface to suit the actual fall height.

4.2.2 Containment

Where an inflatable device is sited on a raised structure higher than the surrounding building floor level, it shall be roofed in a manner that contains patrons. The inflatable device shall also have a secondary means of containment so that patrons are not put at risk of falls in the event of unintended collapse.

NOTE: This may be achieved by a separate, netted structure around the outside of the inflatable device.

4.2.3 Inflatable slides

The width of the sliding surface of an inflatable slide shall be no greater than 1500 mm unless measures are in place to prevent uncontrolled descent by multiple patrons.

4.2.4 Anchorage

Where the device is positioned permanently within a building and not subject to wind loads, the anchorage system may be varied from the requirements of Clause 6 of AS 3533.4.1—2005. It shall be designed by a competent person with consideration of the intended purpose of the device, including live and static loads, to prevent movement or overturning. Such a device shall be clearly and permanently marked as compliant with this Standard (i.e. AS 3533.4.2) and being for indoor use only.

4.2.5 Blowers

Blowers driven by internal combustion engines shall not be used.

The electrical power shall be unable to be disconnected by patrons and carers and this can be achieved by mechanical or physical means.

4.2.6 Supervision

Where an inflatable device is not directly supervised in accordance with AS 3533.4.1, either—

- (a) the inflatable shall be fitted with a roof to contain patrons; or
- (b) impact attenuating material appropriate to the free height of fall from the top of the inflatable wall to the ground shall be provided on the ground outside the walls.

Supervision of the inflatable shall be determined by a risk assessment. This should take into account the number of patrons and carers and consider the supervision issues identified in AS 3533.4.1.

4.3 BALL-POOLS

4.3.1 Design

Balls shall be of a material of mass and density that is not likely to cause an injury to a patron struck by one. Balls that can absorb fluid, such as those made of fabric or open cell foams shall not be used.

When tested in accordance with Appendix H balls in ball-pools shall not pass entirely through the specified template.

The depth of the balls in ball-pools shall not exceed 400 mm as measured when there are no patrons are in the pool.

Ball-pools should be designed to minimize ball spillage during normal play.

The ball-pool base shall be designed to prevent objects that might present a hazard from being lodged in gaps.