



Trampolines for domestic use—Safety aspects



This Australian Standard® was prepared by Committee CS-100, Trampolines for Domestic Use. It was approved on behalf of the Council of Standards Australia on 26 May 2015. This Standard was published on 17 June 2015.

The following are represented on Committee CS-100:

- Australian Chamber of Commerce and Industry
 - Australian Competition and Consumer Commission
 - Australian Industry Group
 - Australian Toy Association
 - CHOICE
 - Consumer Federation of Australia
 - Department of Education and Communities NSW
 - Engineers Australia
 - Kidsafe
 - Monash University
 - National Retailers Association
 - NSW Office of Fair Trading
 - The Children's Hospital Westmead
-

This Standard was issued in draft form for comment as DR AS 4989:2014.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting www.standards.org.au

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.org.au, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard[®]

Trampolines for domestic use—Safety aspects

Originated as AS 4989—2003.
Revised and redesignated as AS 4989:2015.

COPYRIGHT

© Standards Australia Limited

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 1 76035 065 9

PREFACE

This Standard was prepared by the Standards Australia Committee CS-100, Trampolines for Domestic Use, to supersede AS 4989—2006, *Trampolines—Safety aspects*.

In the preparation of this Standard cognizance was taken of ASTM F381-13, *Standard Safety Specification for Components, Assembly, Use, and Labelling of Consumer Trampolines*, ASTM F2225-09b, *Standard Safety Specification for Consumer Trampoline Enclosures*, and ASTM F2774-09, *Standard Practice for Manufacturing Quality Control of Consumer Trampoline Bed Material*.

This revision introduces requirements for enclosure systems, structural integrity, and entrapment and updates the existing requirements for impact attenuation and UV degradation.

Statements expressed in mandatory terms in notes to figures are deemed to be requirements of this Standard.

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

CONTENTS

	<i>Page</i>
FOREWORD.....	4
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE.....	6
1.2 OBJECTIVE	6
1.3 REFERENCED DOCUMENTS.....	6
1.4 DEFINITIONS.....	7
SECTION 2 COMPONENTS AND DESIGN	
2.1 COMPONENTS	10
2.2 DESIGN	10
APPENDICES	
A INFORMATION AND MARKING REQUIREMENTS.....	20
B SAMPLE USER INSPECTION CHECKLIST.....	28
C TEST METHOD FOR ULTRA VIOLET (UV) RESISTANCE.....	30
D TEST METHOD FOR FRAME-EDGE IMPACT ATTENUATION SYSTEMS.....	31
E TEST METHOD FOR ENCLOSURE SYSTEM STRUCTURAL INTEGRITY	36
F TEST METHODS FOR USER CONTAINMENT AND ENTRAPMENT.....	39
G TEST METHOD FOR STRUCTURAL INTEGRITY	46
H TEST FOR PROTRUSIONS	48
I BASIC SKILLS	50

FOREWORD

A trampoline is a piece of recreational equipment used for fun, exercise and physical development by children and adults. Injuries associated with trampoline use are common and are increasing. For example, 1500 people are treated for trampoline-related injuries in hospitals each year in Victoria alone. Of particular concern is the increasing trend in injuries among children less than five years of age (approximately 10% per year) and in injuries associated with multiple users. Trampolining injuries can be severe, especially for children less than 14 years of age. Fractures are the most common trampoline-related injuries treated in the hospital system. While there have been no deaths in Australia, the more serious injuries include head and neck injuries; therefore, there is the potential for fatal injury to occur.

Similar issues have been noted in the United States, where the American Academy of Pediatrics has called for the restriction of trampoline use to supervised training programs.

A trampoline should encourage development of gross motor skills and provide a stimulating environment that presents trampoline users with manageable challenges, through which they can find and test their limits. In order to provide these challenges, a balance needs to be found between risk and safety.

This Standard was first published in 2003, and there is no evidence that rates of trampoline injury have declined since then, nor is there evidence that the specific requirements of the Standard (such as padding for the springs and frame) have had any substantial impact on the severity and frequency of injuries.

In industry safety, there is a recognized hierarchy of hazard control measures, based on the principle that hazards should be removed by 'engineering out' and that personal protective equipment is the last line of defence.

In drafting this Standard, Committee CS-100 (the Committee) was cognizant of finding a balance between the known hazards of trampoline use and the benefits to be obtained from their use. The Committee also recognized that they had a duty of care to protect children from hazards that may not be obvious to the child or carer. With these factors in mind, the Committee agreed that the standard should minimize the design and product-related hazards known to cause injury.

In Australia, UV degradation is a common problem for fabric components and while the Committee would have preferred that all components of a trampoline be tested to 840 h UV exposure, the added cost of the increased testing for the enclosure and padding systems would have created a cost-prohibitive product. To align the UV degradation testing of trampoline enclosures and padding systems with testing being conducted for the international market, the Committee set the minimum UV degradation test for trampoline enclosures and padding systems at 500 h. The ongoing performance of the enclosure and padding systems is integral to trampoline safety. The Committee agreed to monitor the UV performance of trampolines exposed to Australian climatic conditions and increase the minimum UV degradation test duration should 500 h prove to be inadequate. The minimum UV degradation test for the trampoline bed remains at 5000 h, which is consistent with testing for the North American market. The Committee also flagged that the UV test may need to be reviewed in the future.

The Committee would have preferred that openings in enclosure barriers be self-closing or of such a design that manual closing is not necessary, since falls from trampolines are the leading cause of injury. However, in recognition of the extent of change that would currently be required to meet such a requirement, this has instead been noted as a strong recommendation. The Committee may seek to require self-closing openings, or those that do not need manual closing, in the future.

The Committee also considered the inclusion of a padding attachment retention test as there was concern that current padding attachment systems did not adequately secure the padding for the expected life of the product; and if the padding moved, the user would be exposed to dangerous impacts on the rigid member. The Committee may add a padding attachment retention test in the future should there be evidence that manufacturers have failed to provide adequate padding retention.

Trampoline designers, manufacturers, distributors and retailers need to take every possible care to identify and minimize unacceptable trampoline risks and other hazards associated with domestic trampolines.

This Standard does not purport to address all of the hazards associated with trampolines. The Standard's existence alone will not necessarily prevent injuries. Like other physical activities, trampoline use involves the risk of injury, particularly if the equipment is used improperly.

Committee CS-100 concluded that the best way to reduce risk of injury to users was to specify minimum acceptable design standards and to include appropriate consumer information requirements.

STANDARDS AUSTRALIA

Australian Standard**Trampolines for domestic use—Safety aspects**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies minimum design requirements for trampolines for domestic use and provides test methods to ensure compliance. The Standard also contains requirements and recommendations for the marking of domestic trampolines and the provision of consumer information.

The requirements in this Standard do not apply to mini-trampolines (rebounders), in-ground trampolines, gymnastic trampolines, inflatable trampolines solely for water borne usage, trampolines intended for therapeutic purposes only and trampolines installed in trampoline parks.

1.2 OBJECTIVE

The objective of this Standard is to provide manufacturers and/or suppliers with minimum design requirements for trampolines to reduce the frequency and severity of injuries related to domestic trampoline use.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS/NZS ISO

8124 Safety of toys

8124.1:2013 Part 1: Safety aspects related to mechanical and physical properties
(ISO 8124.1:2012)

ASTM

F2774-09 Standard Practice for Manufacturing Quality Control of Consumer Trampoline Bed Material

ISO

4892 Plastics—Methods of exposure to laboratory light sources

4892-3:2013 Part 3: Fluorescent UV lamps

6487 Road vehicles—Measurement techniques in impact tests—Instrumentation

9227 Corrosion tests in artificial atmospheres—Salt spray tests

13934 Textiles—Tensile properties of fabrics

13934-1 Part 1: Determination of maximum force and elongation at maximum force
using the strip method

13934-2 Part 2: Determination of maximum force using the grab method

1.4 DEFINITIONS

For the purposes of this Standard the definitions below apply.

1.4.1 Acceleration

A vector that specifies the time-derivative (rate of change) of velocity.

1.4.2 Acceleration pulse

A non-oscillatory acceleration of a short duration.

1.4.3 Accelerometer

A transducer (sensor) whose electrical output is proportional to acceleration for a specified axis and frequency range.

1.4.4 Attachment system

The complete manner in which certain components are connected.

1.4.5 Bed

A flexible surface which the user contacts in the course of bouncing on a trampoline.

1.4.6 Bouncing

The action, consisting of vertical jumping, considered as normal use of a trampoline.

1.4.7 Enclosure barrier

The netting fabric or other material that surrounds the trampoline bed to reduce the likelihood of the user falling off.

1.4.8 Enclosure barrier exit/entry system

A safety system that allows users to access or egress from the trampoline bed while also preventing users falling off the trampoline.

1.4.9 Enclosure height

The distance from the bed surface at rest to the lowest point of the top edge of the enclosure barrier.

1.4.10 Enclosure support and attachment system

The framework from which the enclosure system is suspended and/or attached, and the manner in which components are connected.

1.4.11 Enclosure system

A device, normally constructed of netting, fabric or other material, that surrounds the perimeter of the trampoline bed and rises above the level of the bed, intended to reduce the likelihood of the user falling off the trampoline, including its support and attachment system.

1.4.12 Folding-type trampoline

A trampoline with a frame that can be folded when not in use (see Clause 1.4.28).

1.4.13 Frame

A structure from which the bed is suspended directly or indirectly.

1.4.14 Frame-edge impact attenuating system

Impact-attenuating protective device(s) such as frame-padding attached to the frame and/or suspension system.

1.4.15 G

The acceleration due to the earth's gravity at sea level, which varies with the latitude and elevation of the observer.

NOTE: By international agreement, the value 9.80665 m/s^2 is the nominal international standard acceleration due to gravity.

1.4.16 $G_{\max}$

The maximum acceleration experienced during an impact test.

1.4.17 Gymnastic trampoline

A trampoline that is specifically designed for the purpose of sport and or competition and not intended for domestic use.

NOTE: Gymnastic trampolines are normally used under the supervision of a competent person such as a Level 1—Intermediate Coach accredited by Gymnastics Australia or equivalent.

1.4.18 Impact attenuation

The property, which through localized deformation or displacement, transforms the impact energy in a way that reduces the magnitudes of the peak impact force and peak acceleration.

1.4.19 Impact height

The distance between the uppermost surface of the trampoline test position and the lowest boundary of the missile.

1.4.20 Impact point

The test location that is hit by the missile during an impact test.

1.4.21 Impact test

A series of impact measurements carried out from a specified impact height.

1.4.22 Inflatable trampoline

A trampoline where the frame and/or suspension system uses compressed air. See also 'Trampoline', Clause 1.4.32.

1.4.23 In-ground trampoline

A trampoline with a bed that is designed to be at the same level as the surrounding ground surface, at all points around the perimeter.

1.4.24 Mat

A common (though non-preferred) term referring to a bed. See also 'Bed', Clause 1.4.5.

1.4.25 Maximum user weight

The maximum weight of a single user nominated by and marked on the trampoline by the manufacturer and/or supplier.

1.4.26 Mini-trampolines (rebounders)

A small trampoline that has a vertical distance equal to or less than 360 mm from the bottom of the trampoline bed surface to the ground immediately below the bed surface when the trampoline is positioned on a flat level surface and which also has a bed surface area of equal to or less than 1 m^2 .

1.4.27 Pole cap

Covering cap on exposed enclosure support frame or enclosure support ends, to prevent injury to the user, such as cuts, abrasion or impalement.

1.4.28 Portable

Able to be easily moved without disassembly, though usually requiring the assistance of devices such as roller stands.

NOTE: Folding-type trampolines are often intended to be portable.

1.4.29 Suspension system

An arrangement of a set of elastic devices that connects the bed to the frame to provide support and to allow free movement.

NOTE: An example of a suspension system is steel extension springs, including components such as webbings or straps.

1.4.30 Test position

A position on the trampoline to be tested, located vertically below the centre of the missile.

1.4.31 Therapeutic trampoline

A trampoline that is prescribed for therapeutic use under supervision by a health care professional such as an occupational therapist or physiotherapist.

1.4.32 Trampoline

A rebound jumping device that uses sprung components to propel the user vertically so the user loses contact with a taut fabric bed surface which has a vertical distance greater than 360 mm from the bottom of the bed surface to the ground immediately below the bed surface when the device is positioned on a flat level surface and which also has a bed surface area greater than 1 m².

1.4.33 UV

Ultraviolet radiation from sunlight, which is the element of sunlight that degrades certain trampoline components such as plastics, fabrics and paints.

NOTE: UV stabilizers are commonly used to extend the life of affected components.

SECTION 2 COMPONENTS AND DESIGN

2.1 COMPONENTS

A trampoline shall include the following as a minimum:

- (a) A frame that provides structural integrity and stability in accordance with Clauses 2.2.2 and 2.2.3.
- (b) A bed.
- (c) A frame-edge impact attenuation system in accordance with Clause 2.2.7.
- (d) An enclosure system in accordance with Clause 2.2.8.
- (e) No sharp edges or points in accordance with Clause 2.2.9.
- (f) No pinch, crush or shear locations in accordance with Clause 2.2.10.
- (g) An information packet in accordance with Appendix A, Paragraph A1.
- (h) Suitable product markings in accordance with Appendix A, Paragraph A4.

2.2 DESIGN

2.2.1 General

The trampoline shall comply with the following:

- (a) It shall be designed and manufactured so that no part of the frame or legs can be impacted by the user while bouncing.
- (b) The maximum height of the bed from the ground shall not exceed 1160 mm.
- (c) When installed in accordance with the manufacturer's instructions, fasteners, lock washers, self-locking nuts, or other locking means shall be provided for all nuts and bolts to protect them from unintentional loosening. Hardware in moving joints shall also be secured against unintentional loosening.

2.2.2 Structural integrity

2.2.2.1 General

All trampolines shall be designed and constructed so that they maintain their structural integrity. When tested in accordance with Appendix G, the trampoline shall show no signs of any permanent deformation of rigid components or fracture or rupture of any component. The suspension system shall not show permanent deformation to any element in the system.

NOTE: In this case the failure criteria is not looking for minor distortions (i.e. proof load distortions) but major deformations that would be indicative of likely failure under normal usage leading to an unsafe product.

2.2.2.2 Enclosure system structural integrity

All trampolines shall be designed and constructed so that the enclosure barrier, enclosure support and attachment system and enclosure barrier exit/entry system maintain their structural integrity for the expected life of the product. When tested in accordance with Appendix E, the trampoline and the enclosure barrier, enclosure pole or frame and enclosure barrier exit/entry system shall show no signs of permanent deformation of rigid components or fracture or rupture of any component.

2.2.2.3 *Assembly verification*

The trampoline shall be capable of being assembled without modification in accordance with the manufacturer's/supplier's instructions.

The construction of the trampoline shall ensure that during play or movement, the trampoline components cannot become dislodged.

NOTES:

- 1 This requirement may be achieved by the use of locking pins or bolts.
- 2 Domestic trampolines need to retain their structural integrity after relocation for other activities, e.g. lawn mowing.

2.2.3 **Structural stability**

Trampolines shall be designed and constructed so that they are stable.

NOTES:

- 1 Wind loads, maximum user weight and foreseeable unintended usage, such as a user running and jumping against the enclosure, should all be taken into account.
- 2 Stability may be enhanced by lowering the centre of gravity of the frame and/or by anchoring the frame to the ground such as with sand bags or stakes.

2.2.4 **UV degradation**

2.2.4.1 *General*

A laboratory sample for testing shall consist of a trampoline either in the form in which it is marketed, or in the form in which it is intended to be marketed.

NOTE: The requirement does not preclude the taking of test portions from materials used to manufacture the trampoline, provided they are representative of the final trampoline.

2.2.4.2 *Trampoline bed fabric*

The trampoline bed fabric shall be UV stabilized to extend its life.

The trampoline bed fabric shall meet the requirements of ASTM F2774, including the 5000 h UV test.

2.2.4.3 *Bed attachment and suspension system components exposed to sunlight*

The bed attachment and suspension system components that are exposed to sunlight, such as springs, bed straps, bed connectors and bed stitching, shall be UV stabilized to extend their life and shall be tested in accordance with Appendix C.

When tested in accordance with Appendix C, the bed attachment and suspension system components that are exposed to UV shall retain 80% or more of the pre-test strength properties at not less than 1000 h.

2.2.4.4 *All other components exposed to sunlight*

All other components that are exposed to sunlight shall be UV stabilized to extend their life and shall be tested in accordance with Appendix C.

When tested in accordance with Appendix C, all other components that are exposed to sunlight shall retain 80% or more of the pre-test strength properties at not less than 500 h.

NOTE: UV radiation in Australia is more severe than at equivalent latitudes in the northern hemisphere.

2.2.5 Maximum user weight

All trampolines shall be marked with a maximum user weight expressed in kilograms.

The maximum user weight shall be not more than 0.2 multiplied by the weight to displace the bed to 80% of its possible deflection to the flat level ground when loaded using the loading device specified in Appendix G, Figure G1.

NOTE: For a diagram depicting 80% deflection, refer to Figure 2.1.

The maximum user weight used for testing to the requirements of this Standard shall be that specified by the supplier.

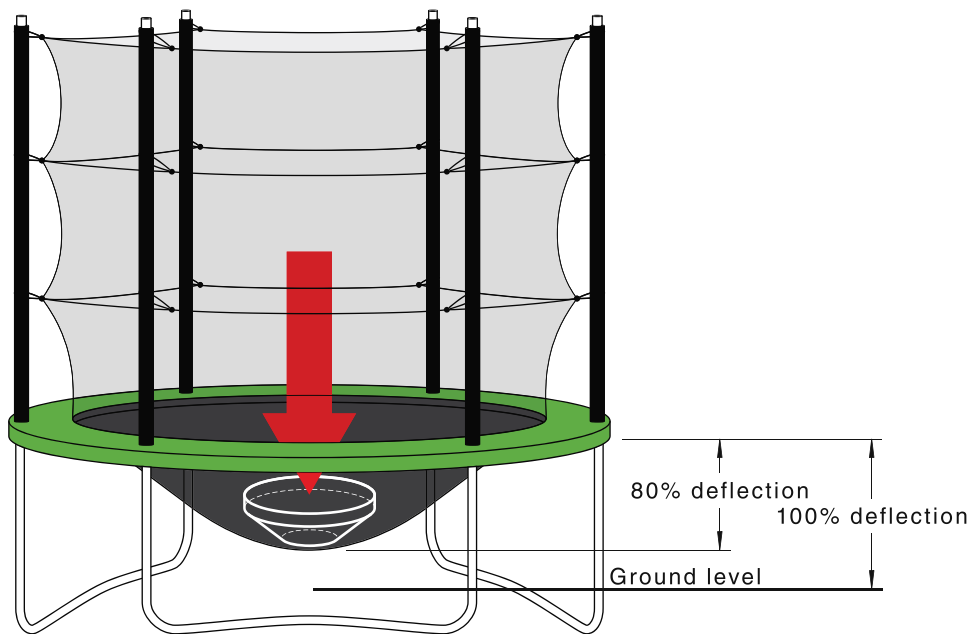


FIGURE 2.1 DIAGRAM DEPICTING 80% DEFLECTION

2.2.6 Protection against entrapment

2.2.6.1 General

The entrapment hazards that can occur through distortion of materials during use shall be taken into account when choosing materials. The requirements of Clause 2.2.6.2 shall apply to both rigid and non-rigid openings.

2.2.6.2 Entrapment of the head, neck and torso

Trampolines shall be designed and constructed so that any openings that are more than 600 mm above the ground, either inside or outside of the trampoline, do not create head, neck or torso entrapment hazards either by head-first or feet-first passage.

The following situations in which this type of entrapment can be encountered shall be considered when evaluating this requirement:

- (a) Partially bound or V-shaped openings.
- (b) Completely bound openings through which a user may slide feet first or head first.
- (c) Enclosure barrier and attachments.
- (d) The enclosure barrier exit/entry system.
- (e) Other openings such as shearing or moving openings where the head, neck or torso can become trapped.

When tested in accordance with Appendix F, Paragraph F5, if accessible openings with a lower edge more than 600 mm above the ground allow passage of the small probe, the opening shall also allow passage of the large probe.

Partially bound and V-shaped openings with a lower edge more than 600 mm above the ground shall be constructed so that either—

- (i) the opening is not accessible as illustrated in Figure F3 when tested in accordance with Appendix F, Paragraph F6.3(a); or
- (ii) the tip of the template contacts the base of the opening when tested in accordance with Appendix F, Paragraph F6.3(b).

2.2.6.3 *Entrapment of clothing*

Trampolines shall be constructed so that hazardous situations in which clothing entrapment, which may result in strangulation, are not created; and shall be tested in accordance with Appendix F, Paragraph F7.

The following situations in which this type of entrapment can be encountered while or immediately before the user is undergoing a forced movement or falling shall be considered when evaluating this requirement:

- (a) Gaps or V-shaped openings in which part of clothing can become trapped.
- (b) Enclosure barrier and attachments in which part of clothing can become trapped.
- (c) The enclosure barrier exit/entry system in which part of clothing can become trapped.
- (d) Protrusions and projections such as bolts and access ladders in which part of clothing can become trapped.

2.2.7 **Frame-edge impact attenuation system**

2.2.7.1 *General*

A trampoline shall have a frame-edge impact attenuation system that meets the performance requirements of Clause 2.2.7.2.

NOTE: This may be achieved by using frame padding, by other engineering means such as using a non-rigid edge, or a combination of these methods.

2.2.7.2 *Performance requirements*

The impact-attenuating material or impact attenuation system shall have the following properties:

- (a) The $G_{\max}$ shall be less than 200 G when the frame-edge impact attenuation system is tested in accordance with Appendix D.
- (b) It shall be designed to withstand direct impact of the user's body without allowing any limbs to penetrate into the suspension system.
- (c) It shall retain the following physical integrity at completion of the impact test:
 - (i) The post-test thickness shall be at least 50% of the pre-test thickness when measured at the impact point 30 ± 5 min after the impact test.
 - (ii) There shall be no evidence of cutting or puncture of the impact attenuating material. The impact attenuating material shall be visually examined by dissection at the impact point to verify the post-test physical integrity after the final impact and noted.

2.2.7.3 *Frame-padding*

If supplied, frame-padding shall cover the entire top surface of the frame, and the entire top surface of the suspension system and frame hardware in the unloaded state, and be securely attached to the frame.

NOTE: Frame hardware may include bolts, spring hooks, frame joiners, rivets, enclosure system mounting brackets, ladder mounting brackets and any other components connected to the frame.

The frame-padding attachment system shall not break or separate from the pad or frame throughout the test procedure given in Appendix D when fitted in accordance with the manufacturer's instructions.

At the completion of the impact test of Appendix D, the frame padding system shall retain the following physical integrity:

- (a) The post-test thickness shall be at least 50% of the pre-test thickness when measured at the impact point 30 ± 5 min after the impact test.
- (b) There shall be no evidence of cutting or puncture of the frame-padding system. The frame-padding system shall be visually examined by dissection at the impact point to verify the post-test physical integrity after the final impact and noted.

2.2.7.4 *Colour*

The frame-edge impact attenuation system shall contrast with the colour of the trampoline bed or include a band of colour that contrasts with the colour of the trampoline bed.

2.2.8 **Enclosure system**

2.2.8.1 *Components*

A trampoline enclosure system shall include the following components:

- (a) Enclosure barrier.
- (b) Enclosure barrier support and attachment system.
- (c) Enclosure barrier exit/entry system.
- (d) Poles that pose no hazard to the user.

NOTE: For example, these may be padded poles, flexible poles or inaccessible poles.

2.2.8.2 *General requirements*

The general requirements for the enclosure system are as follows:

- (a) The enclosure support and attachment system and enclosure system materials shall be of sufficient strength and rigidity to hold the enclosure system in place and withstand the loads outlined in Appendix E. The enclosure height shall be verified after the trampoline has been tested in accordance to Appendix E and a fail recorded if the enclosure height does not meet the minimum enclosure height required of Item (b) below.
- (b) For trampolines with an outer frame area less than 5.2 m^2 , the enclosure height shall be 1.5 m or higher when measured relative to the bed. For all other trampolines, the enclosure height shall be 1.8 m or higher when measured relative to the bed.
- (c) Connecting devices shall be closed and not overlap (see Note 1).

NOTES:

- 1 Connecting devices are considered closed when the gap or space is less than 1 mm.
- 2 Figure 2.2 shows examples of connecting devices that pass and fail this requirement.

- (d) Rigid components of the enclosure support and attachment system exposed to contact during foreseeable usage shall be padded.

- (e) Rigid upright components of the support and attachment system shall have a device to protect against impalement. An example of this is a capping with a minimum cross-sectional area of more than 2000 mm² and an edge radius of greater than 3 mm.
- (f) The enclosure support and attachment system shall consist of the following:
 - (i) Upper attachment to the support frame.
 - (ii) Lower attachment to trampoline bed or trampoline frame top rails. The attachment of the enclosure system shall be of sufficient strength and durability to withstand tearing, deformation or failure as a result of the loads outlined in Appendix E.
- (g) The enclosure barrier shall include an opening to allow entry and exit of the user from the trampoline bed. The enclosure barrier exit/entry system shall comply with the following:
 - (i) It shall be provided with a means of closing.
 - (ii) When closed according to the manufacturer's instructions, it shall be of sufficient strength and durability to withstand tearing, deformation or failure as a result of the loads outlined in Appendix E.

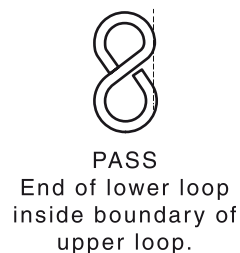
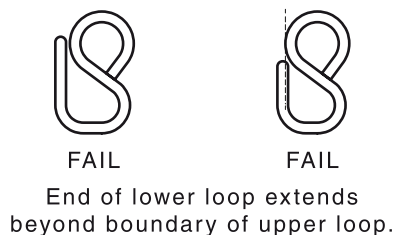
NOTES:

- 1 It is strongly recommended that the opening be self-closing or of such a design that manual closing is not necessary.
- 2 An opening that depends on children to close it, risks having children fall out and sustain injuries.

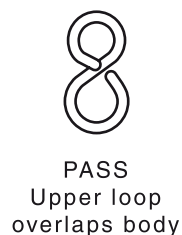
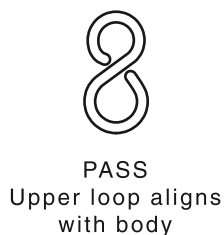
1. Checking loops for 1.0 mm gap.



2. Both loops closed. Checking lower loop projection.



3. Both loops closed. Lower loop projection acceptable. Checking upper loop.



4. Both loops closed. Lower loop projection acceptable. Upper loop acceptable. Checking lower loop alignment.

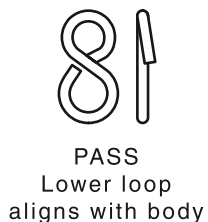


FIGURE 2.2 EXAMPLES OF CONNECTING DEVICES THAT PASS AND FAIL THE REQUIREMENTS FOR CONNECTING DEVICES

2.2.8.3 Enclosure user containment test

The trampoline enclosure shall be designed and constructed so that when it is assembled, and the enclosure barrier exit/entry system is closed, there is no accessible rigid or non-rigid opening from within the enclosure that presents the risk of unintentional user exit.

An opening shall be deemed to fail the containment test if it allows full passage of the small probe, providing access outside the containment of the trampoline enclosure and bed, when tested in accordance with Appendix F, Paragraph F4.

2.2.9 Sharp edges and points

The trampoline shall be designed so that when assembled there are no sharp edges or points on any part of the trampoline capable of inflicting an injury to the user during normal use and foreseeable misuse. All edges and points on the trampoline shall meet the requirements of AS/NZS ISO 8124.1:2013, Clauses 4.6 and 4.7.

2.2.10 Pinch, crush and shear locations

The following requirements apply:

- (a) There shall be no pinch, crush, or shear locations caused by junctures of two or more components moving relative to one another in any accessible area of the trampoline both in the jumping area and outside of it.
NOTE: Consideration should be given to finger, limb, torso and head entrapment.
- (b) Holes, slots and gaps in or between any rigid materials that are accessible while the user is bouncing shall also admit a 12 mm diameter rod if they can admit a 5 mm diameter rod to a depth of 10 mm or more.
- (c) Springs shall meet the requirements of AS/NZS ISO 8124.1:2013, Clause 4.14.

2.2.11 Metallic parts

Metallic parts of trampolines, including fasteners and fixing mechanisms, shall meet the following requirements:

- (a) When tested with a 5% neutral salt spray in accordance with ISO 9227 for a duration of 48 h, all structural metallic parts, coated or non-coated, shall present a surface aspect with less than 8% red-rusted surface.

NOTES:

- 1 White rust is accepted.
 - 2 Suppliers may meet the requirements of this Clause by the provision of a technical file showing that the metal used is of a suitable stainless grade, e.g. aluminium alloy, copper or stainless steel.
- (b) No welds shall be made to any steel frame or accessory component with a thickness of less than 1.5 mm.
 - (c) No 'saddle' welds shall be made to any steel frame or accessory component with a thickness of less than 1.8 mm.
NOTE: An example of a saddle weld is shown in Figure 2.3.
 - (d) Welds should appear fit for purpose with good fusion.