

Australian Standard[®]

Swimming pool safety

**Part 1: Safety barriers for swimming
pools**



This Australian Standard® was prepared by Committee CS-034, Safety of Private Swimming Pools. It was approved on behalf of the Council of Standards Australia on 17 January 2007. This Standard was published on 12 July 2007.

The following are represented on Committee CS-034:

- Australian Building Codes Board
- Australian Industry Group
- Australian Institute of Building Surveyors
- Australian Safe Communities Foundation
- Australian Wire Industry Association
- Consumers Federation of Australia
- Department of Local Government, Housing and Sport (NT)
- Department of Local Government, Planning, Sport and Recreation (Queensland)
- Kidsafe National
- National Injury Surveillance Unit
- Office of Fair Trading NSW Consumer Protection Agency
- Planning South Australia
- Royal Life Saving Society Australia
- Swimming Pool and Spa Association of NSW
- Swimming Pool and Spa Association of Victoria
- Swimming Pool and Spa Association of Western Australia

A1 |

This Standard was issued in draft form for comment as DR 05245.

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 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Standards may also be withdrawn.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[®]

Swimming pool safety

Part 1: Safety barriers for swimming pools

Originated as AS 1926—1976.
Previous edition 1986.
Revised and redesignated as AS 1926.1—1993.
Second edition 2007.
Reissued incorporating Amendment No. 1 (May 2008).

COPYRIGHT

© Standards Australia

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.

Published by Standards Australia GPO Box 476, Sydney, NSW 2001, Australia
ISBN 0 7337 8286 8

PREFACE

This Standard was prepared by the Standards Australia Committee CS-034, Safety of Private Swimming Pools, to supersede AS 1926.1—1993, *Swimming pool safety, Part 1: Fencing for swimming pools*.

This Standard incorporates Amendment No. 1 (May 2008). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to assist pool owners/users in avoiding pool-related drowning by providing design, construction and performance of various barrier options, which are designed to deny, delay or detect unsupervised entry to the swimming pool area by young children.

This Standard is part of a series dealing with barriers, location of barriers and water recirculation and filtration systems for swimming pools, as follows.

AS

| | |
|--------|--|
| 1926 | Swimming pool safety |
| 1926.1 | Part 1: Safety barriers for swimming pools (this Standard) |
| 1926.2 | Part 2: Location of safety barriers for swimming pools |
| 1926.3 | Part 3: Water recirculation and filtration systems |

This edition incorporates the following major changes to the previous Standard:

- (a) Correction and clarification of some inconsistencies.
- (b) Changes to the effective height of a fence and other barrier measurements.
- (c) Additional requirements for permanent bodies of water.

The revision of this Standard was undertaken to correct technical and diagrammatic errors and to clarify particular safety issues.

Statistical evidence shows that the majority of drowning deaths in private swimming pools involve children under five years of age. For this reason, the requirements established by the Standard are directed at obtaining a barrier that will make it difficult for a young child to gain access to a pool area, whether under, over, or through the barrier.

It should be noted that the provisions of this Standard relate to barriers that are intended to be child resistant but not childproof, as effectiveness of the barrier is very much dependent on its location, installation and maintenance.

The requirements are established with the intention of leaving a high degree of flexibility to the consumer in the choice of barrier, desirable aesthetics and cost.

Requirements for the effective use of barriers in protecting children from pool hazards are given in AS 1926.2, *Swimming pool safety, Part 2: Location of safety barriers for swimming pools*. Requirements for gate units for private swimming pools are set out in AS 2820, *Gate units for private swimming pools*.

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 the Standard, whereas in an 'informative' appendix is only for information and guidance.

Notes to the text contain information and guidance. They are not an integral part of the Standard.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard. All dimensions for all Figures are in millimetres, unless noted otherwise.

CONTENTS

| | <i>Page</i> |
|--|-------------|
| SECTION 1 SCOPE AND GENERAL | |
| 1.1 SCOPE | 4 |
| 1.2 REFERENCED DOCUMENTS | 4 |
| 1.3 DEFINITIONS | 4 |
| SECTION 2 DESIGN AND CONSTRUCTION OF ELEMENTS OF A BARRIER | |
| 2.1 GENERAL | 6 |
| 2.2 MATERIALS AND FINISH | 6 |
| 2.3 FENCING..... | 6 |
| 2.4 GROUND CLEARANCE..... | 11 |
| 2.5 GATES AND FITTINGS | 12 |
| 2.6 RETAINING WALL OR OTHER SUCH BARRIER..... | 15 |
| 2.7 CHILD-RESISTANT OPENABLE PORTION OF WINDOW..... | 17 |
| 2.8 CHILD-RESISTANT DOORSET..... | 18 |
| 2.9 BALCONY..... | 18 |
| 2.10 ABOVEGROUND POOLS | 19 |
| SECTION 3 LOADING REQUIREMENTS | |
| 3.1 STRENGTH AND RIGIDITY OF OPENINGS..... | 21 |
| 3.2 STRENGTH OF POSTS AND FOOTINGS | 21 |
| 3.3 STRENGTH OF FENCING COMPONENTS | 21 |
| 3.4 CLOSING AND LATCHING OF GATES | 22 |
| APPENDICES | |
| A TEST FOR STRENGTH AND RIGIDITY OF FENCING OPENINGS | 23 |
| B STRENGTH TEST FOR POSTS AND FOOTINGS | 27 |
| C STRENGTH TEST FOR RIGID FENCINGS COMPONENTS..... | 29 |
| D EXAMPLES OF POOL FENCES..... | 31 |

STANDARDS AUSTRALIA

Australian Standard Swimming pool safety

Part 1: Safety barriers for swimming pools

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for the design, construction and performance of fences, gates, retaining walls, windows, doorsets and balconies intended to form a barrier that will restrict the access of young children to swimming pools.

NOTES:

- 1 Public swimming pools have different human dynamics, such as access for people with disabilities, increased gate usage, crowd behaviour and supervision, and the duplication of the requirements of this Standard may not always be appropriate.
- 2 Appendix D gives a broad guide to some of the key construction criteria that need to be met by some of the more common types of barriers, in order to comply with the requirements of this Standard.

1.2 REFERENCED DOCUMENTS

The following document is referred to in this Standard:

AS
2820 Gate units for private swimming pools

1.3 DEFINITIONS

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

1.3.1 Arc of operation

The area defined by the movement of a gate from fully open to fully closed.

1.3.2 Barrier

The assembly of components, natural or otherwise, that forms the intended barrier to the pool. The barrier includes items such as posts and panels, gates and doorsets constructed or natural walls, sides of buildings, child-resistant windows, balustrades on a balcony, where they form part of the intended barrier.

1.3.3 Child-resistant doorset

A doorset that comprises a door, door frame, self-closing device and self-latching device, and designed to provide an access way from the building to the swimming pool.

1.3.4 Fencing

A barrier comprising a fence and associated gate or gates.

1.3.5 Fencing height

The height perpendicular to the finished ground level at any point along the length of the fencing, measured on the outside of the fencing (see Figure 2.1).

1.3.6 Finished ground level

A permanent stable surface.

1.3.7 Gate

Any portion of the barrier, other than a child-resistant doorset, that is designed to provide an access way through the barrier.

1.3.8 Inside of the fencing

That side of a fence or gate that faces the pool area.

1.3.9 Non-climbable zone (NCZ)

A zone consisting of a barrier as well as the associated space within 900 mm of the barrier, intended to inhibit climbing of the barrier by children. This includes any point along the length of the barrier and its associated space.

1.3.10 Outside of the fencing

That side of a fence or gate that faces away from the pool area.

1.3.11 Pool area

The area that surrounds the pool that is separated from the rest of the allotment by a safety barrier.

1.3.12 Swimming pool (referred to as ‘pool’ in this Standard)

A1 | Any excavation or structure containing water to a depth greater than 300 mm and used primarily for swimming, wading, paddling or the like, including a bathing or wading pool, or spa.

NOTE: The definition of a swimming pool may vary from State to State and Territory to Territory. Refer to appropriate regulatory authority.

1.3.13 Young child

A child under the age of five years.

SECTION 2 DESIGN AND CONSTRUCTION OF ELEMENTS OF A BARRIER

2.1 GENERAL

A barrier shall be designed and constructed so that it will restrict access by young children.

The barrier shall be a permanent structure.

The effective barrier height shall be not less than 1200 mm and shall include a continuous non-climbable zone.

- A1 | The non-climbable zone (NCZ) may be located anywhere on the vertical face of the barrier. In this zone the distance between any hand and foot hold shall be not less than 900 mm. (Refer to Figure 2.1 for generic examples.)

2.2 MATERIALS AND FINISH

Barriers may be constructed from any type of material, provided the finished barrier complies with the requirements of this Standard.

The barrier shall be free of sharp edges, sharp projections, entrapping spaces and similar hazards.

2.3 FENCING

2.3.1 General

- A1 | The location of the NCZ shall be on the outside of the fencing, except for a boundary fence. A boundary fence shall be not less than 1800 mm high. The NCZ may be located at the top on the inside of the fencing (see Figures 2.1, 2.2(a) to 2.2(c), 2.3(A) and 2.3(B)).

The fence shall be designed and installed to be vertical or, where specifically designed to lean away from the pool, it shall not do so by more than 15° to the vertical and shall be maintained at a minimum height of 1200 mm, measured vertically from the top of the fence.

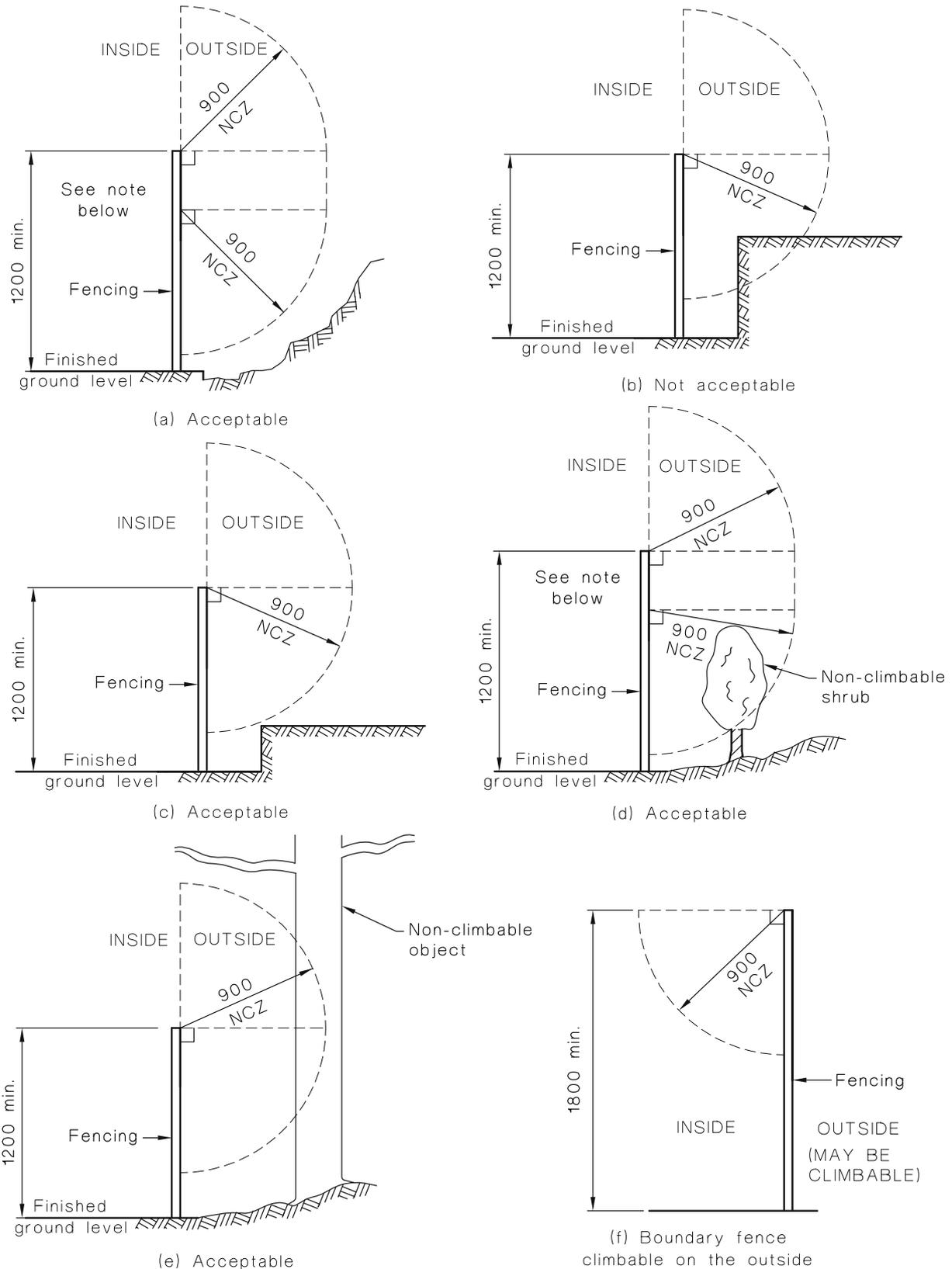
2.3.2 Perforated material or mesh

Fencing using perforated materials or mesh with apertures not greater than 13 mm shall have an effective fencing height not less than 1200 mm.

Fencing using perforated material or mesh with apertures greater than 13 mm but not greater than 100 mm shall have an effective fencing height of not less than 1800 mm.

Perforated material with apertures greater than 100 mm shall not be used.

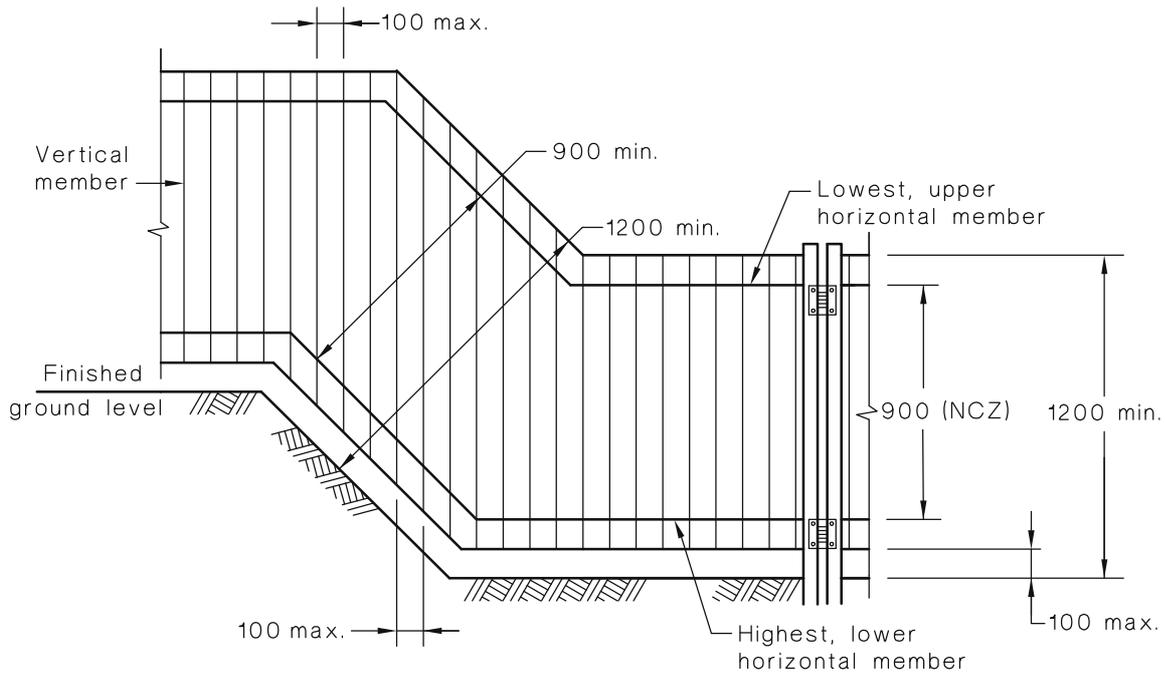
Fencing using mesh shall include a strainer wire or rail at the top and the bottom of the fencing.



NOTE: The lower radius point may be anywhere on the fence at least 900 mm above the ground or the highest lower rail or foothold.

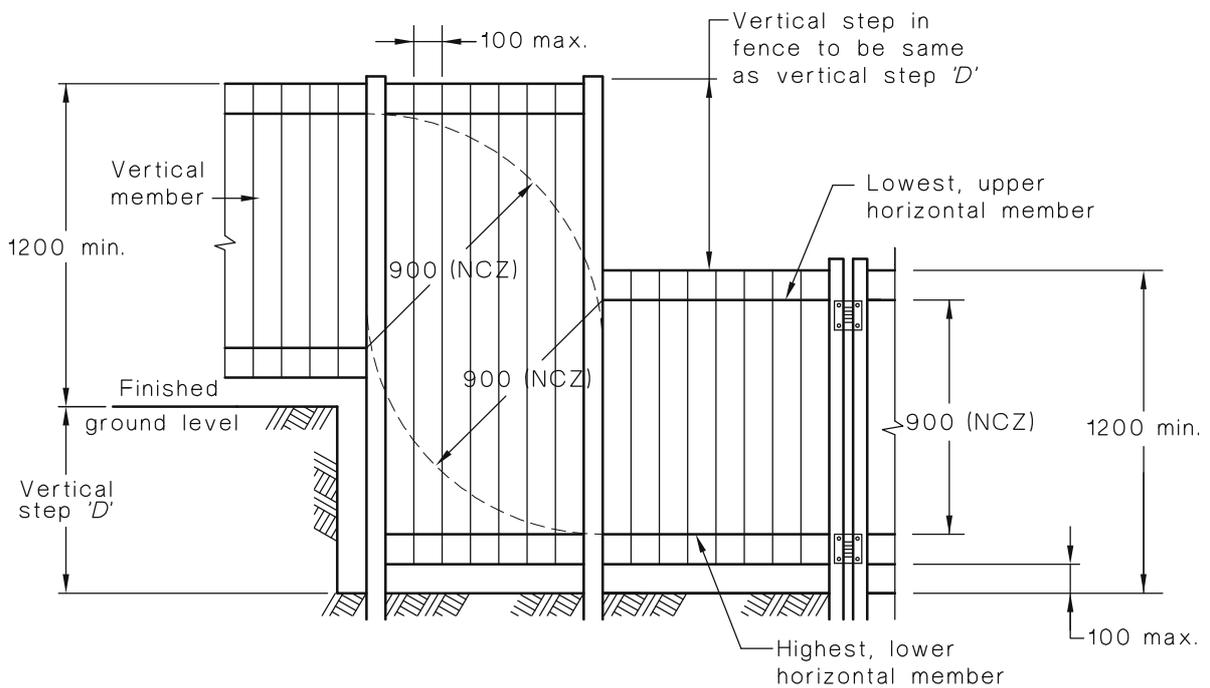
DIMENSIONS IN MILLIMETRES

FIGURE 2.1 EXAMPLES OF NON-CLIMBABLE ZONES/NCZs



NOTE: On sloping sites, the fence height is to be measured perpendicular to the ground line.

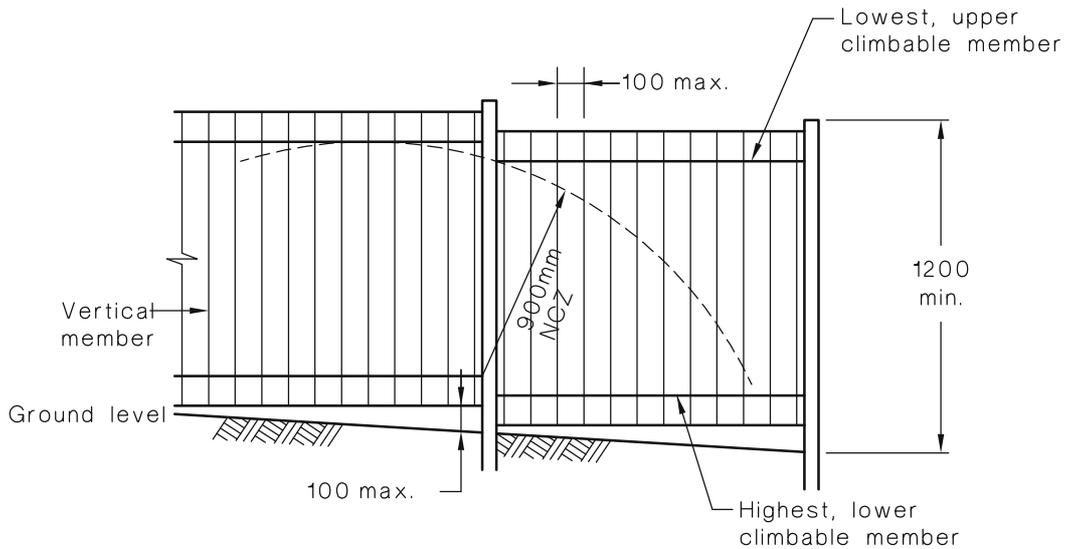
(a) Sloping ground



(b) Stepped ground

DIMENSIONS IN MILLIMETRES

FIGURE 2.2 (in part) PERPENDICULAR FENCING DIMENSIONS



(c) Slightly sloping ground

DIMENSIONS IN MILLIMETRES

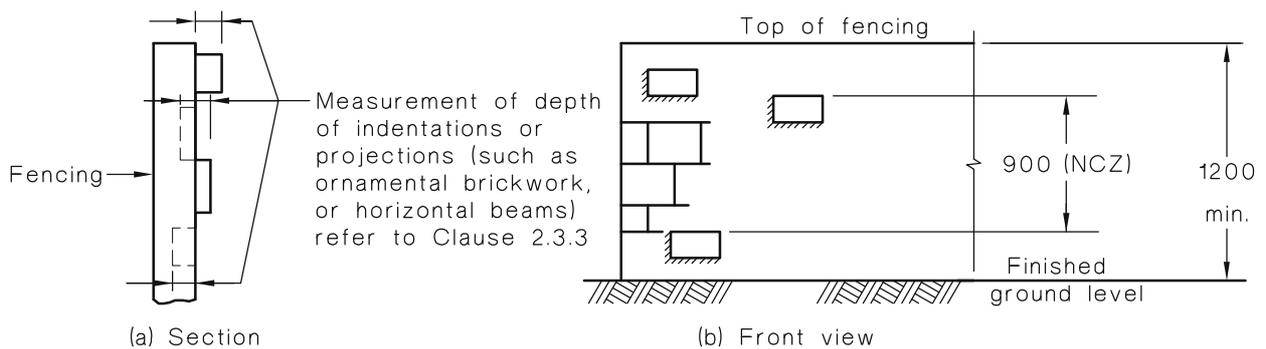
FIGURE 2.2 (in part) PERPENDICULAR FENCING DIMENSIONS

2.3.3 Surface projections and indentations

A1 | Projections and indentations, or any combination thereof, within the NCZ, shall not form a substantially horizontal surface with a depth greater than 10 mm (see Figure 2.3(A)).

Projections or indentations that form a substantially horizontal surface do not act as a hold for climbing if they comply with Figure 2.3(A) and 2.3(B).

The fence shall be designed to be vertical or, where specifically designed to lean away from the pool, it shall not do so by more than 15° to the vertical.



NOTE: The 900 NCZ may be between any two (2) points at any level on the outer face of the wall.

FIGURE 2.3(A) FENCING WITH PROJECTIONS SUCH AS ORNAMENTAL BRICKWORK OR STONEMWORK

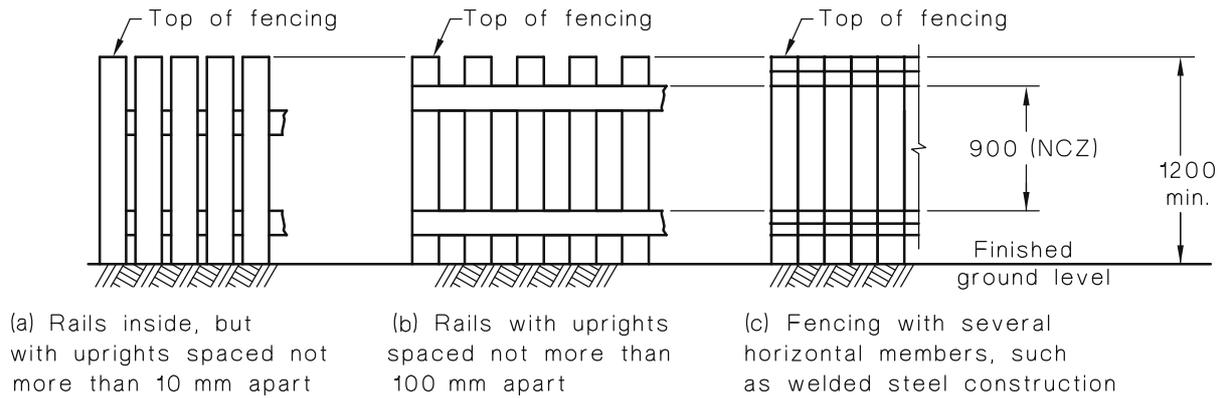


FIGURE 2.3(B) SPACING OF ACCESSIBLE HORIZONTAL MEMBERS, OR PROJECTIONS INDENTATIONS

2.3.4 Horizontal climbable members

For fences less than 1800 mm in height, which include components such as rails, rods, wires, bracings or gate hinges that are located on the outside of the fencing and which could be used as holds for climbing, or where vertical members are spaced such that they provide clear openings more than 10 mm in width, then the following shall apply:

- (a) Horizontal members shall not be within the non-climbable zone. Where the fence is for a sloping site, the non-climbable zone shall be parallel to the top of the fence (see Figure 2.2(a)).
- (b) For fences with rails, the top surface of the highest lower horizontal member shall be at least 1000 mm below the top of the fence (see Figures 2.2 and 2.3(B)).

NOTE: For fences less than 1800 mm in height, substantially horizontal surfaces such as rails, rods, wires or bracings that could be used as holds for climbing, and which comply with the Items (a) and (b), should be located on the inside of the fence.

2.3.5 Horizontal non-climbable members

As an alternative to Clause 2.3.4, substantially horizontal members, such as rails located on the outside of fencing less than 1800 mm high, shall not be considered to act as a hold for climbing provided they comply with the following:

- (a) Horizontal members shall comply with Figure 2.4.
and
- (b) Vertical members shall be spaced to provide a clear opening of not more than 10 mm.

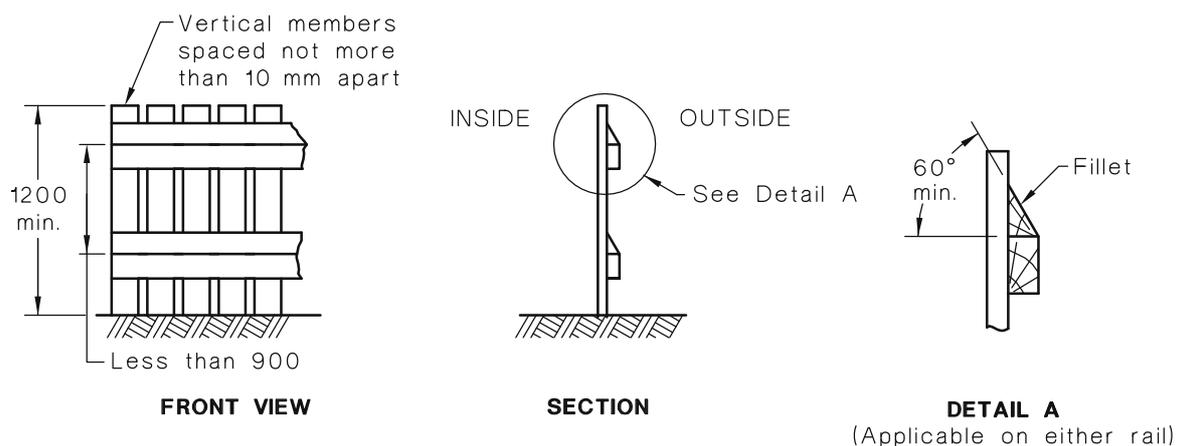


FIGURE 2.4 FENCE WITH HORIZONTAL MEMBERS PROJECTIONS OR INDENTATIONS NOT ACTING AS A HOLD FOR CLIMBING

2.3.6 Horizontal surfaces inside the fencing

- A1 For fences less than 1800 mm in height, where any nearby horizontal surfaces that could be used as holds for climbing are permanently located near the inside of the fencing adjacent to the NCZ, and where the spacing between vertical members is greater than 10 mm, such surfaces shall be separated from the fencing by a distance of not less than 300 mm (see Figure 2.5).

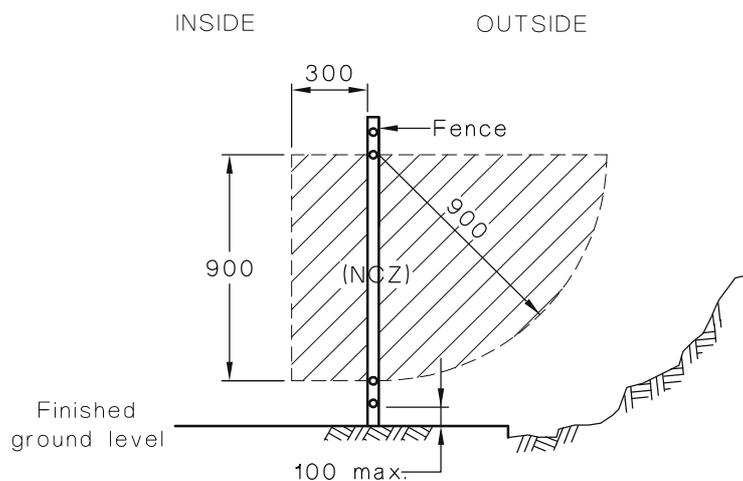


FIGURE 2.5 FENCING WITH HORIZONTAL MEMBER PROJECTIONS OR INDENTATIONS THAT MAY ACT AS A HOLD FOR CLIMBING

2.3.7 Vertical members

The clear space between any adjacent vertical members (see Figure 2.2), such as palings, rods or wires, shall not exceed 100 mm at any point.

2.4 GROUND CLEARANCE

The height of any opening between the bottom of the barrier and the finished ground level shall not exceed 100 mm.

NOTE: The surrounding area of the pool shall be stable and remain intact at all times. Loose sand is not acceptable.

2.5 GATES AND FITTINGS

2.5.1 Direction of opening

Gates shall be hung so that they only swing outwards, i.e., away from the pool area.

2.5.2 Operation of gate

The gate shall have sufficient clearance to enable it to swing freely through its arc of operation.

A1 | The maximum gap under the gate shall not to exceed 100 mm at any point when in a closed position.

2.5.3 Self-closing device

All gates shall be fitted with a device that will return the gate to the closed position and operate the latching device from any position with a stationary start without the application of a manual force.

The self-closing device shall be capable of complying with these requirements with the gate at any position from resting on the latching mechanism to fully open.

NOTES:

- 1 The self-closing device may require a cushioned back-checking operation to prevent shock when the gate is closing.
- 2 Self-closing devices subject to wind loading (which may prevent their closing) may require special consideration.

2.5.4 Latching device

2.5.4.1 General

Gates shall be fitted with a latching device that will automatically operate on the closing of the gate and will prevent the gate from being re-opened without being manually released.

The latching device shall not be able to be—

- (a) inadvertently adjusted during operation;
- (b) able to be locked in the 'open' position; and
- (c) able to be adjusted without the use of tools.

When in the closed position, the latching mechanism shall not be able to be released by the insertion of any implement in the 10 mm gap shown in Figure 2.6(a).

2.5.4.2 Location of the latching device (see Figure 2.6)

Where the release to the latching device or the latch is located at a height less than 1500 mm above the finished ground level and 1400 mm above the highest lower horizontal member and is capable of being released at the latching mechanism, the location of the release of the latching device shall—

- (a) not be on the outside of the fencing;
- (b) be in such a position that to release the latching device from the outside it will be necessary to reach over or through the fencing at a height of not less than 1200 mm above the finished ground level or not less than 1000 mm above the highest lower horizontal member; and
- (c) be at least 150 mm below the top of the gate if a hand-hole is not provided, or at least 150 mm below the edge of any hand-hole opening if a hand-hole is provided.

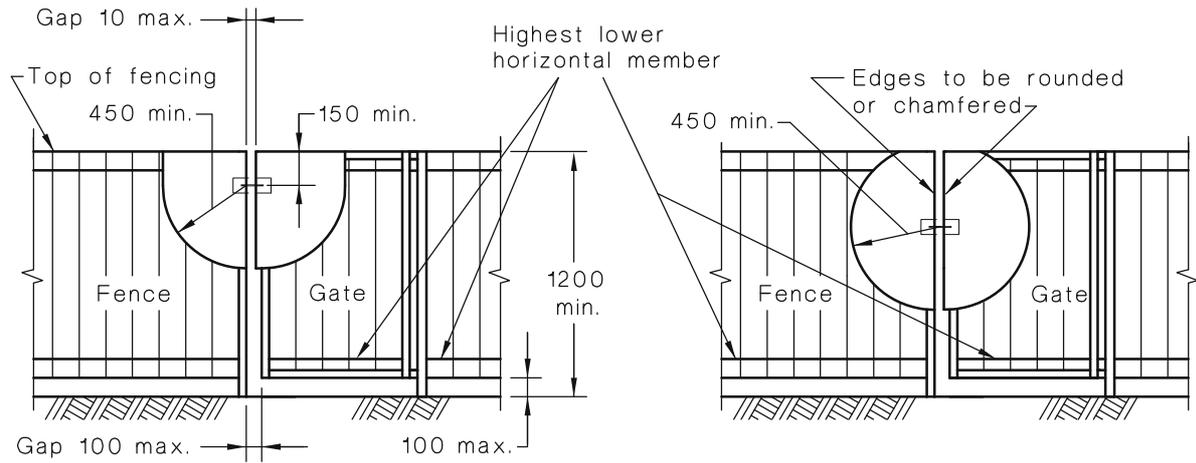
2.5.4.3 Shielding of latching device (see Figure 2.6)

A1 | Where the release to either the latching device or the latch is located at a height less than 1500 mm above the finished ground level and 1400 mm above the highest lower horizontal member and is capable of being released at the mechanism, the latch and its release shall be so shielded that no opening greater than 10 mm occurs within an area bounded by—

- (a) an effective radius of 450 mm from the operating parts of the latch; and
- (b) the top of the fence, if this intersects the area described in Item (a).

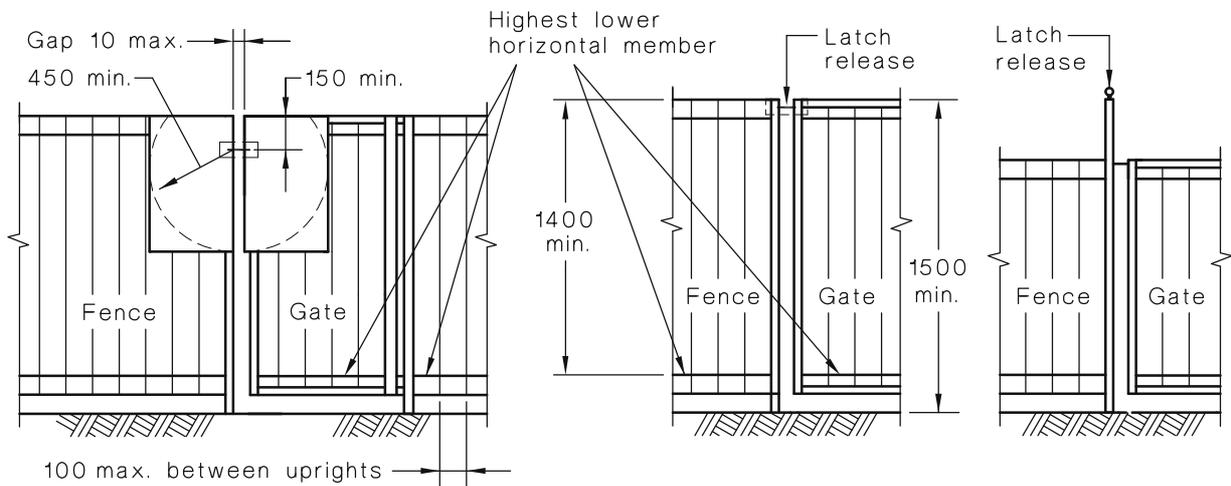
Where it is necessary to have a hand-hole in a gate, the bottom of the opening shall be not less than 1200 mm above the finished ground level and 1000 mm above the highest lower horizontal member, and the shielding shall be extended up to a horizontal line through the top of the hand-hole, or 150 mm above the top of the latch, whichever is the higher.

The shield shall be free of sharp edges and the edges of the adjacent parts of the shield on the gate and the fence shall be rounded or chamfered to prevent a hazard when the gate closes.



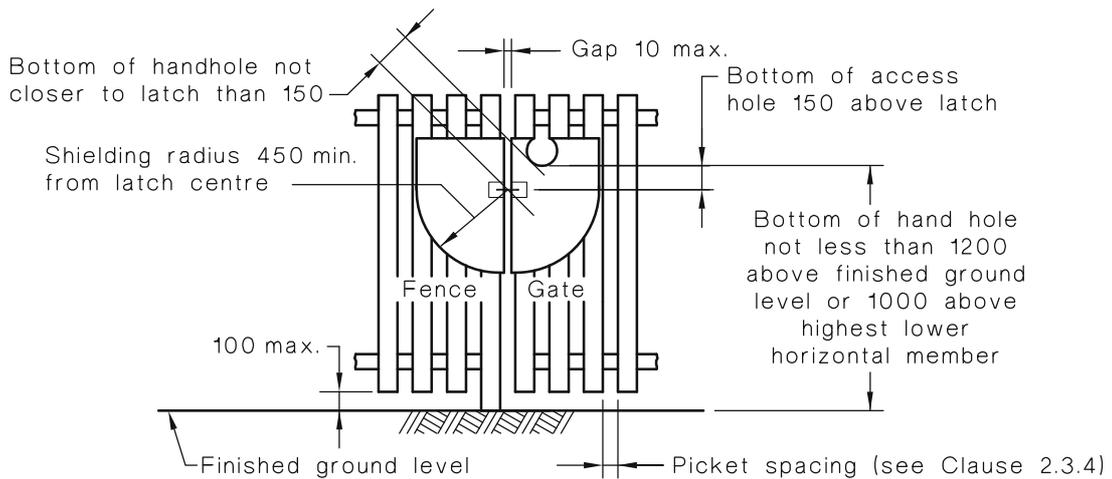
(a) Basic requirements

(b) Latch more than 150 below top of fence (shielding is centred on latch)



(c) Shield larger than minimum size

(d) Shield not required for latch or release located at 1500 or higher



(e) Hand hole provided in fence or gate

NOTE: Main dimensional requirements are also shown.

DIMENSIONS IN MILLIMETRES

FIGURE 2.6 ALTERNATIVE LATCH SHIELDING OPTIONS FOR GATES OF OPEN CONSTRUCTION

2.6 RETAINING WALL OR OTHER SUCH BARRIER

2.6.1 Retaining wall above the pool level

A retaining wall or other such barrier above the pool level (see Figure 2.7(a)) shall comply with the following:

- (a) It shall have an effective height of not less than 1800 mm including the non-climbable zone.
- (b) It shall not slope away from the pool by more than 15° to the vertical.

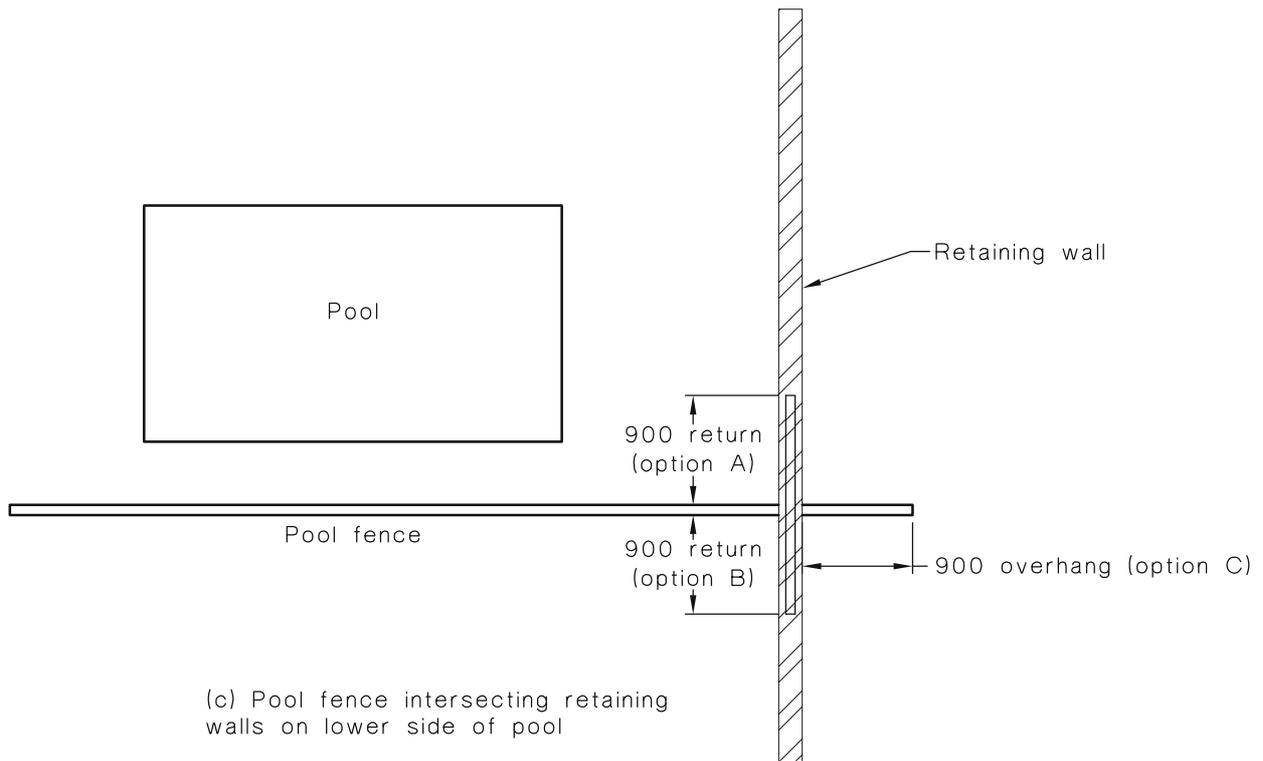
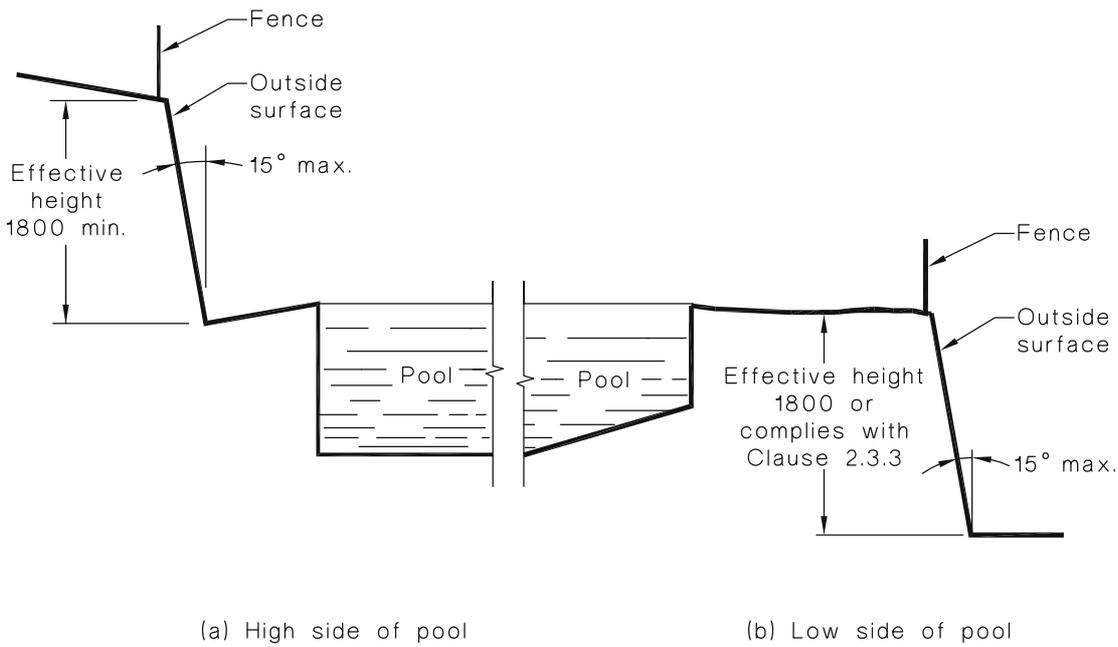
NOTE: It is recommended that a fence that will prevent people from falling off the retaining wall or some other such barrier be installed on top of the wall or barrier. (This fence or barrier does not have to comply with the requirements of this Standard but has to comply with the requirements of the BCA, refer to Figure 2.7.)

2.6.2 Retaining wall below the pool level

A retaining wall or other such barrier below the pool level (see Figure 2.7(b)) shall not slope towards the pool by more than 15° from the vertical and shall either have—

- (a) an effective height complying with Clause 2.1 and a surface complying with Clause 2.3.3; or
- (b) an effective height of not less than 1800 mm including the NCZ.

Where a fence intersects a retaining wall, the fence shall extend to the outer edge of the retaining wall and either overhang the retaining wall by 900 mm or return 900 mm along the retaining wall in either direction as shown as option A and option B in Figure 2.7(c)).



DIMENSIONS IN MILLIMETRES

FIGURE 2.7 RETAINING WALL OR OTHER SUCH BARRIER

2.6.3 Permanent bodies of water

Permanent bodies of water such as canals, lakes, rivers with a depth of water not less than 300 mm at the edge of the pool area shall be considered as an effective barrier.

NOTE: Refer to relevant authorities for the minimum water depths of a waterway.

2.7 CHILD-RESISTANT OPENABLE PORTION OF WINDOW

Where the height (h_1) from the sill of the lowest opening panel of the window to the pool area is less than 1800 mm (see Figure 2.8), the openable portion of the window shall comply with one of the following requirements:

- (a) Where a height (h_2) from the sill of the lowest opening panel of a window to the floor is not greater than 900 mm, then either one of the following shall apply:
- (i) The openable portion of the window shall be totally covered by bars or a mesh screen that complies with the test for strength and rigidity of fence openings and the strength test for fence components of Clauses 3.1 and 3.3. The bars or mesh screen shall be fixed to the building with fasteners that can only be removed by the use of a tool, e.g., a screwdriver or spanner.
- NOTE: Covering a window with bars or a mesh screen limits egress from the building in an emergency, and rescuers from entering the building.
- or*
- (ii) Windows shall be fixed to the building with fasteners that can only be removed by the use of a tool, e.g., a screwdriver or spanner, and will only open to a maximum of 100 mm and comply with the test for strength and rigidity of fencing openings of Clause 3.1.
- (b) Where a height (h_2) from the sill of the lowest opening panel of a window to the floor is greater than 900 mm and less than 1200 mm, then the openable portion of the window shall comply with Item (a) above or shall be fitted with a securely fixed flyscreen. The flyscreen shall be fixed to the window or building with fasteners that can only be removed by the use of a tool, e.g., a screwdriver or spanner.
- (c) A window not complying with Items (a) or (b) shall be located at such a height (h_2) that the distance from the floor to the sill of the lowest opening panel is 1200 mm or greater.

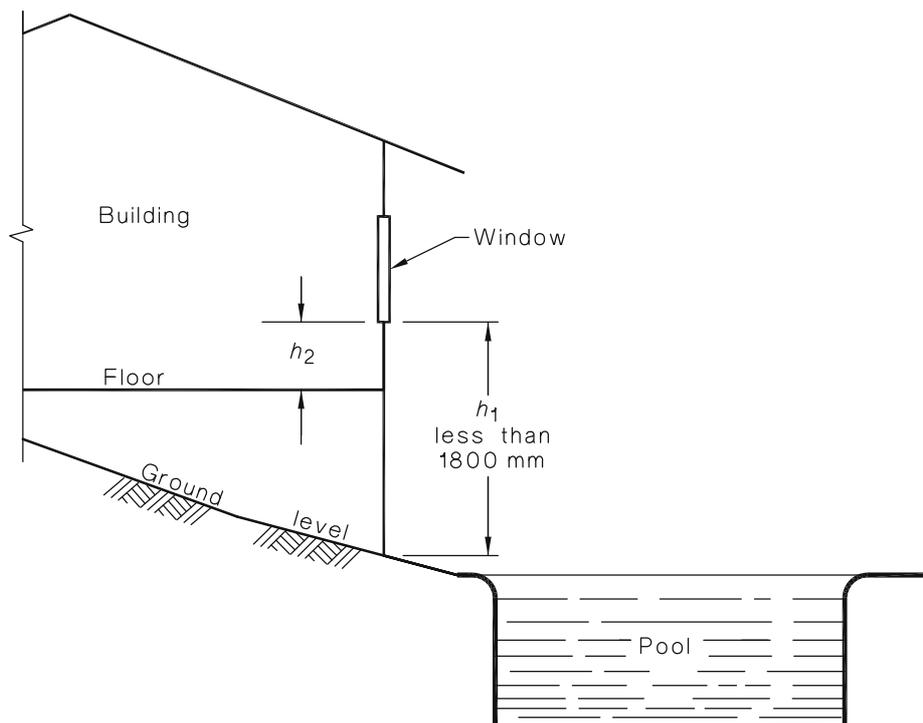


FIGURE 2.8 HEIGHT LIMITATIONS ON CHILD-RESISTANT WINDOWS

2.8 CHILD-RESISTANT DOORSET

Child-resistant doorsets shall comply with the following:

- (a) Doors shall be fitted with a self-latching device that will automatically operate on the closing of the door and will prevent the door from being re-opened without manually releasing the device.
- (b) Doors shall be fitted with a self-closing device that will activate immediately after use and will return the door to the closed position and operate the latching device from any position with a stationary start without the application of a manual force.
The self-closing device shall be capable of complying with these requirements with the door at any position from resting on the latching mechanism to fully open.
- (c) The release for the latching device on the internal (building) side of the door shall be located not less than 1500 mm above the floor.
- (d) There shall be no footholds wider than 10 mm on the door or its frame between the floor and 1000 mm above the floor.
- (e) The closing and latching of the door shall comply with Clause 3.4.
- (f) Horizontal members, vertical members, perforated materials or mesh, and finish shall comply with this Standard.
- (g) The doorset shall comply with the performance requirements for a gate for strength and rigidity of openings and strength of gate (see Clauses 3.1 to 3.3).

NOTES:

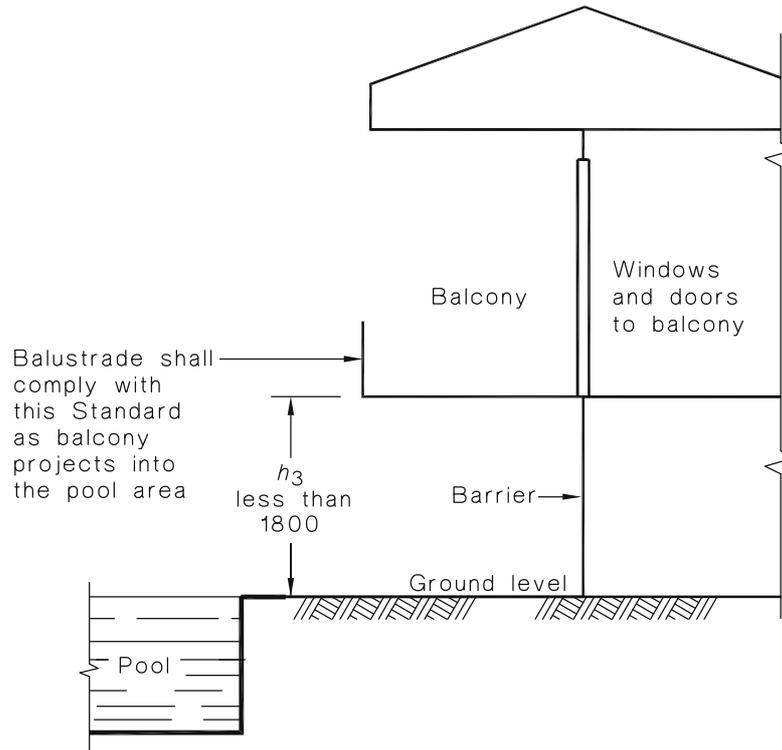
- 1 In most circumstances allowing direct access to the pool area from a building, even via child-resistant doorsets, compromises safety as the doorset may be treated as a normal door and not maintained as a purpose-built safety device to form a barrier that will consistently restrict the access of young children to the swimming pool. Accordingly, this option should only be used with caution primarily where physical circumstances preclude any other acceptable solution.
 - 2 Garage doors are acceptable only if they comply with the above requirements. All garage doors are to be fitted with a fail safe requirement in the event of a malfunction or power failure.
- (h) Pet doors shall not be placed in a child-resistant doorset.

2.9 BALCONY

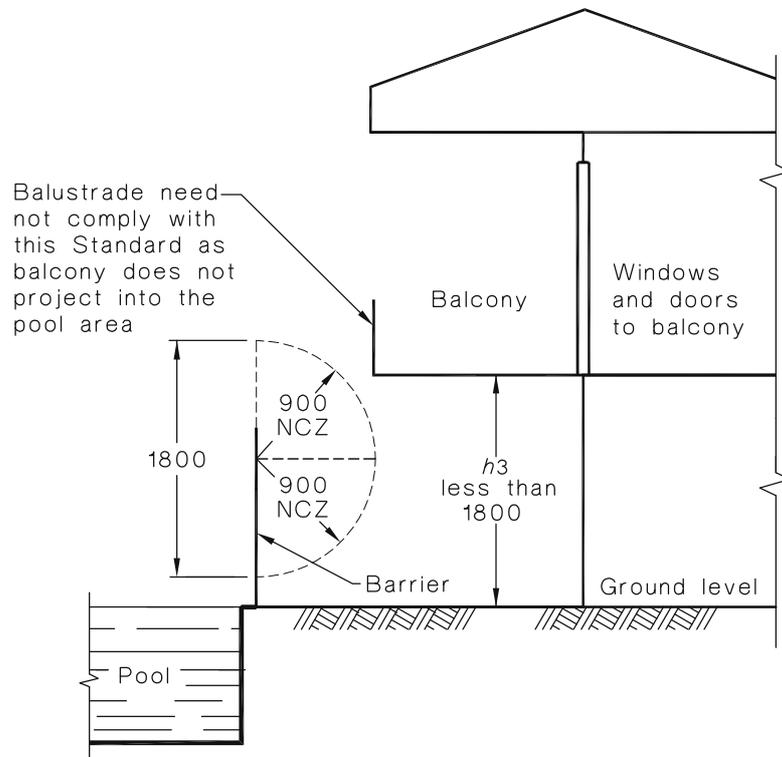
A balcony shall include a balustrade that complies with the requirements for a barrier in this Standard, where—

- A1 (a) the balcony projects into the pool area, and where the distance (h_3) from the floor of the balcony to the finished ground level of the pool area is less than 1800 mm, measured vertically below the perimeter balcony (see Figure 2.9(a)); or
- (b) any part of the perimeter of the balcony floor is within 900 mm of the top of the barrier (see Figure 2.9(b)).

A1



(a) Balcony projecting into pool area



(b) Balcony adjacent pool area

NOTE: The lower radius point may be anywhere on the fence at least 900 mm above the ground or the highest lower rail or foothold.

DIMENSIONS IN MILLIMETRES

FIGURE 2.9 BALCONY AT POOL AREAS

2.10 ABOVEGROUND POOLS

For aboveground pools, including inflatable pools, the walls of the pool shall be considered an effective barrier provided they comply with Clauses 2.3.1, 2.3.3, 2.3.4 and 2.3.5.

A barrier shall be placed around ladders at the access point to an aboveground pool.

Ladders and filters shall be located away from the non-climbable zone (NCZ) so as not to compromise the barrier.

NOTE: Aboveground pools pose a particular hazard because of the tendency to install climbable objects against the pool, which may be used for access into the pool.

SECTION 3 LOADING REQUIREMENTS

3.1 STRENGTH AND RIGIDITY OF OPENINGS

Openings in the fencing shall have sufficient strength and rigidity such that 105 mm diameter cone can not pass through the opening under the application of a 150 N force.

When any opening in the fencing is tested in accordance with Appendix A, the test object shall not pass through.

3.2 STRENGTH OF POSTS AND FOOTINGS

Each post and footing shall withstand a horizontal 330 N force at 1200 mm above finished ground level. After loading, there shall be no permanent damage to any post, the footings shall not loosen to impair the effectiveness of the barrier and any gate shall meet the requirements of Clauses 2.5.3, 2.5.4 and 3.4.

NOTES:

- 1 For guidance for a method to test posts and footings, see Appendix B.
- 2 330 N is approximately 33 kg. This test can be conducted in the field by fastening one end of a calibrated spring balance to the post 1200 mm above ground level and pulling on the other end of the balance until a load of 33 kg is achieved. After application of the load, inspect the post and footing for any looseness or damage.

3.3 STRENGTH OF FENCING COMPONENTS

3.3.1 Rigid components

Structural components, such as panel infills, top and bottom rails, rods, palings, pickets, and the like, shall be capable of—

- (a) sustaining a force of 250 N (see Note) without any component becoming permanently deformed; and
- (b) sustaining a force of 330 N (see Note) without any component—
 - (i) breaking;
 - (ii) showing signs of fracture;
 - (iii) loosening; or
 - (iv) becoming permanently deformed by more than 10 mm over its length.

NOTE: For guidance on a method for testing fencing components, see Appendix C.

3.3.2 Flexible material and components

Flexible fencing material and components shall be capable of withstanding the dynamic force imparted by a solid metal sphere of not less than 9 kg being dropped three times from rest through an angle of not less than 40° about a radius of not less than 1800 mm, as shown in Figure 3.1. The test shall be carried out from either side of the fencing component and at the component's weakest points. After testing, the component shall be free of breakage, tearing, signs of fracture, and loosening of any components or fixings.

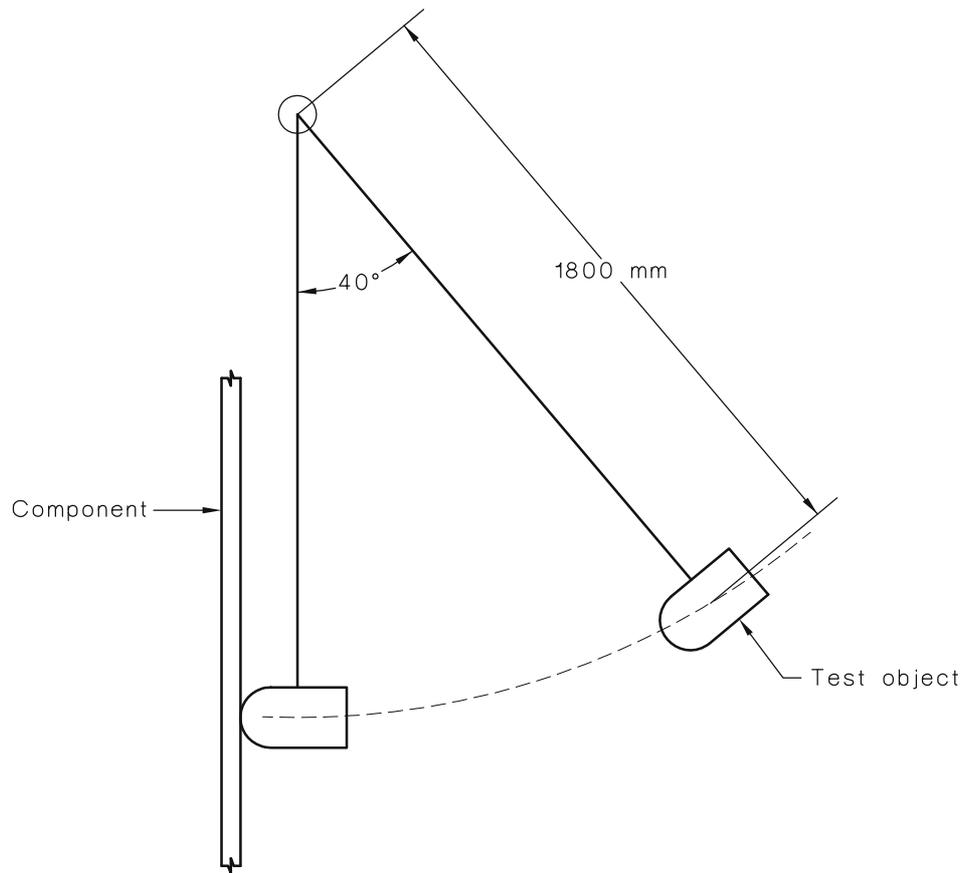


FIGURE 3.1 TEST ARRANGEMENT

3.4 CLOSING AND LATCHING OF GATES

Each gate shall comply with AS 2820, or with the following:

- (a) The gate shall close and latch from any position from resting on the latching mechanism to fully open, under both of the following conditions:
 - (i) Under the natural weight of the gate.
 - (ii) After a mass of 25 kg supported by the top rail is placed at a point 100 mm from the outer edge of the locking stile of the gate.

NOTE: This requirement is intended to indicate whether the automatic closing and latching mechanism is likely to remain effective after the gate has been subject to deflection, either under its own weight or as a result of children swinging on it.

- (b) The latching device and posts of the fencing to which the gate is attached shall be capable of retaining the gate in a closed position when tested in accordance with Item (a).

APPENDIX A
TEST FOR STRENGTH AND RIGIDITY OF FENCING OPENINGS
(Normative)

A1 SCOPE

This Appendix sets out a method for determining that fencing is sufficiently strong and rigid to prevent an opening from being forced to a size that would allow a young child to gain entry.

A2 PRINCIPLE

A horizontal force is applied to the test object in an attempt to force it through the openings in the fence.

A3 APPARATUS

The following apparatus is required:

- (a) A cylindrical solid-faced test object 105 ± 1 mm in diameter with a body length of 300 ± 2 mm, as shown in Figure A1.

One end shall be conical and may be truncated to a diameter of 20 mm to provide a flat base for the attachment of fittings, as shown in Figure A1.

The test object shall be made from a rigid material having a smooth surface, such as hardwood or metal.

- (b) A force-measuring device such as a spring balance to measure the force applied.
- (c) A stable supporting structure to suspend the conical test object from and to hold the fence panel in a vertical position, as shown in Figure A1.
- (d) A means of attaching the force-measuring device to the conical test object, as shown in Figure A1.

A4 PROCEDURE

The procedure shall be as follows:

- (a) Secure the fence panel into the supporting structure (jig) in the vertical position.
- (b) Hang the test object from the supporting structure. The test object will be horizontally level with the conical end facing the panel's midspan. The test object will be suspended at two points by using a suspension method that minimizes the effects of friction and allows free movement, as shown in Figure A1.
- A1 | (c) Attach a spring balance to the conical end of the test object, as shown in Figure A1. The spring balance or other force-measuring device should weigh less than 0.5 kg and able to read increments of 50 g. Connect the other end of the spring balance to a pulling device, such as a rotating winch.
- (d) Place the conical end of the test object into the opening being tested and steadily apply a force by rotating the winch, in an attempt to force the object through the opening.
- (e) Record the force required to pull the test object through the fence panel. Each fence panel will need to be tested in three locations, across the width of the panel at the middle of each third of the panel.

A5 REPORT

The report shall include the information shown in Figure A2 and clearly show the following:

- (a) The pull-through force required to pass the conical test object through the fence openings in the three locations specified in Paragraph A4(e).
- (b) Reference to this test method, i.e., AS 1926.1, Appendix A.
- (c) The conclusion of whether the panel has passed or failed the test. The fence panel is deemed to comply with this Standard if the test results at all three test locations show a minimum pulling force of 150 newton (N).

Date:

Test Report No.:

Product: Name of product

Source Name of manufacturer/supplier/consumer

Specifications: AS 1926.1, Swimming pool safety—Safety barriers for swimming pools, Appendix A, Test for strength and rigidity of fencing openings

| Wire-based fence panel | | | | | | | | | | |
|------------------------|--------------|----------------|------------------|-------------------------------|---|---|-------------------------------|--------------------------------|-----|-----|
| Fence panel dimensions | | | | Panel height (mm) | | | Panel width (mm) | | | |
| Item No. | Product | Wire size (mm) | | Horizontal wire spacings (mm) | | | Upright wire spacings CC (mm) | Results—Pull-through force (N) | | |
| | | Upright wires | Horizontal wires | 1 | 2 | 3 | | (1) | (2) | (3) |
| 1 | Product name | | | | | | | | | |

| Tubular fence panel | | | | | | | | | | |
|------------------------|--------------|----------------|------------------|-------------------------------|---|---|-------------------------------|--------------------------------|-----|-----|
| Fence panel dimensions | | | | Panel height (mm) | | | Panel width (mm) | | | |
| Item No. | Product | Tube size (mm) | | Horizontal rail spacings (mm) | | | Upright tube spacings CC (mm) | Results—Pull-through force (N) | | |
| | | Upright tubes | Horizontal rails | 1 | 2 | 3 | | (1) | (2) | (3) |
| 1 | Product name | | | | | | | | | |

Conclusion and comments:

.....

Name of individual conducting the test:

Individual's title:

NATA authorized signatory:

Name and location of laboratory:

.....

FIGURE A2 EXAMPLE TEST REPORT—FENCE PANEL

APPENDIX B
STRENGTH TEST FOR POSTS AND FOOTINGS
(Informative)

B1 SCOPE

This Appendix sets out a method for testing whether fencing posts have adequate strength and have been correctly installed.

B2 PRINCIPLE

A force is applied to the fencing post and it is then inspected for signs of fracture, loosening of footings or any damage to the gate that would prevent it from closing and latching from any position.

B3 APPARATUS

The following apparatus is required:

- (a) A cylindrical test object of diameter 105 ± 1 mm, having at least one solid flat-faced end.
- (b) A means of measuring the force being applied.

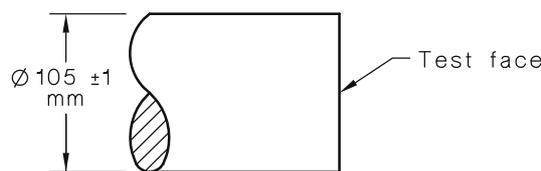


FIGURE B1 TEST OBJECT

B4 PROCEDURE

The procedure shall be as follows:

- (a) Place the flat end of the test object against the post under test at a height of 1.2 m above finished ground level.
- (b) Apply a horizontal force of 330 N, without shock, to the test object so as to load the post in the desired direction.
- (c) Inspect the post for damage or loosening of the footings.
- (d) For gate posts, check that the gate will close and latch when released from various positions including fully open and with the gate resting on the latching mechanism.

B5 REPORT

The report shall include the following information:

- (a) Breakage or sign of fracture of any post.
- (b) Loosening of any component.
- (c) Any damage to the gate that would prevent it from closing and latching from any position.

- (d) Whether the post or gate passed or failed the test.
- (e) Reference to this test method, i.e., AS 1926.1, Appendix B.

APPENDIX C
STRENGTH TEST FOR RIGID FENCINGS COMPONENTS
(Informative)

C1 SCOPE

This Appendix sets out a method for testing whether fencing components have adequate strength.

C2 PRINCIPLE

A force is applied to the component or components of the fencing and it is then inspected for signs of fracture, permanent deformation or loosening of components.

C3 APPARATUS

The following apparatus is required:

- (a) A cylindrical test object of diameter 105 ± 1 mm, having at least one solid flat-faced end (see Figure C1).
- (b) A means of measuring the force being applied.

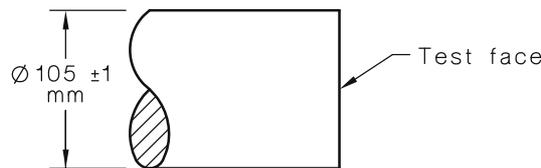


FIGURE C1 TEST OBJECT

C4 PROCEDURE

The procedure is as follows:

- (a) Place the flat end of the test object against the component [or several components of such size or spacing (or both) that they will be covered by the 105 mm diameter] under test. Carry out from either side of the fencing component and at the component's weakest points.
- (b) Apply a force of 250 N, without shock, to the test object to load the component in the desired direction.
- (c) Remove the test force and inspect the component for permanent deformation.
- (d) Apply a force of 330 N, without shock, to the test object in order to load the component in the desired direction.
- (e) Remove the test force and inspect the component for the following:
 - (i) Breakage or sign of fracture of any component.
 - (ii) Loosening of any component.
- (f) Measure and record the amount of deformation of the component, in millimetres.

C5 REPORT

The report is to include the following information:

- (a) Whether the component permanently deformed under a load of 250 N.
- (b) For a load of 330 N, whether there was—
 - (i) breakage or sign of fracture of any component; and
 - (ii) loosening of any component.
- (c) For a load of 330 N, the amount of deformation of any component, in millimetres.
- (d) Whether the component passed or failed the test.
- (e) Reference to this test method, i.e., AS 1926.1, Appendix C.

APPENDIX D
EXAMPLES OF POOL FENCES
(Informative)

D1 GENERAL

The information given in this Appendix is intended to serve as a broad guide to some of the main constructional criteria that some of the more common types of fencing will have to meet in order to satisfy this Standard.

The examples are given as a simplified guide to commonly available fencing; they are not a recommendation for any style of fencing and do not preclude the necessity for the fencing to meet other requirements of this Standard.

D2 TYPICAL FENCES LESS THAN 1800 mm HIGH

The following examples serve to identify the significant dimensional requirements that need to be met to enable a fence to comply with this Standard.

- (a) *Post-and-rail construction* For fences constructed of palings, galvanized steel, fibre cement (fibro), aluminium or similar profiled or flat wall material, the significant dimensions are as follows:
- (i) The rails, if located on the outside of the fencing, are to be not less than 900 mm apart when measured between the top surfaces of the rails.
 - (ii) The top surface of the lower rail is to be at least 1000 mm from the top of the fencing.

The effect of the similar provisions in Items (c), (d) and (e) is that there should be a height of at least 900 mm clear of any potential handholds or footholds, and that any foot-hold at the bottom of this clear distance should be at least 1000 mm from the top of the fencing.

Picket fences also meet these provisions if pickets are spaced more than 10 mm apart or the rails are on the outside. In any event, pickets should not be spaced more than 100 mm apart.

- (b) *Perforated materials, wire mesh or fabric fences* For fences of this type, the significant dimensions are as follows:
- (i) Where the material has openings greater than 13 mm, the fence height is to be increased in accordance with Clause 2.3.2.
 - (ii) Materials with openings greater than 100 mm are not to be used.

To meet the requirements of this Standard it will generally be necessary for the material to be firmly fastened and tightly strung and meet the requirements of Clause 2.3.2.

- (c) *Fabricated metal fences* For fences fabricated from small section steel, aluminium or other suitable metals, the significant dimensions are as follows:
- (i) Vertical members are to be spaced not more than 100 mm apart.
 - (ii) Horizontal members are to be spaced a minimum of 900 mm apart vertically. Where there are two or more horizontal members, the 900 mm measurement is made from the top surface of the highest lower member. The top surface of the highest of the lower group of horizontal members is to be at least 1000 mm below the top of the fencing.

NOTE: Where corrugated metal is used for a pool barrier, the corrugations are to be placed vertically.

- (d) *Infill panel fences* For fences constructed of glass-fibre-reinforced plastics, reinforced glass, timber, plywood, exterior grades of hardboard or other sheet products in framed ledge or panel construction, the significant dimensions are as follows:
- (i) Any potential climbing holds are to be at least 900 mm apart vertically.
 - (ii) The lower of any climbing holds between which the vertical distance of 900 mm is measured is to be at least 1000 mm below the top of the fencing.
 - (iii) The width of any openings below a height of 1200 mm is not to exceed 100 mm.

In addition, it will be necessary to ensure that the sheet material is sufficiently rigid and adequately fixed to its frame.

- (e) *Brickwork or masonry fences* For fences constructed of bricks, blocks or masonry, the significant dimensions are as follows:
- (i) Any projections, indentations or combination of these having a depth greater than 10 mm are to be spaced at least 900 mm apart vertically.
 - (ii) The lower of any such projections or indentations is to be at least 1000 mm below the top of the fencing.

Natural features such as rock faces that form part of the fence would be acceptable provided they meet the requirements of the Standard.

- (f) *Brushwood fences* For fences constructed of woven brushwood, the significant requirements are as follows:
- (i) Brushwood has to be tightly packed so that it will meet the performance requirements of Clause 3.1.
 - (ii) Wires on the outside of the fence are to be interwoven with the brushwood in order not to provide a foothold for young children.

It may also be necessary to provide some sort of capping on the top of the fence to prevent birds from picking at the brushwood twigs.

NOTE: Brushwood fences are known to deteriorate quickly in comparison to other types of fencing and therefore should be regularly maintained.

- (g) *Retaining walls* Where a vertical or near-vertical retaining wall not less than 1200 mm high supports the pool and the surface of the wall complies with Clause 2.3.4, a fence complying with this Standard is not required on top of the wall. A fence that will prevent people from falling off the retaining wall should, however, be installed on top of the wall.

D3 TYPICAL FENCES 1800 mm AND HIGHER

Barriers are constructed to be 1800 mm in height, measured on the inside part of the fencing, upon ground that has a surface that is difficult for a young child to dig through or under to gain access to the pool.

Examples of compliant ground are concrete, gravel, lawn or pavers.

The following examples serve to identify the significant dimensional requirements that need to be met to enable a fence to comply with this Standard.

- (a) *Fences—Post-rail palings* For fences constructed using palings, the significant characteristics are as follows:
 - (i) The rails to be located on the outside of the fencing.
 - (ii) The palings to be located on the pool side face of the fence and spaced more than 10 mm apart.
 - (iii) The top rail to be at least 100 mm below the top of the palings.
 - (iv) A non-climbable zone to be provided on the pool side face of the fence, commencing at the top.
- (b) *Fences—Perforated materials, wire mesh or fabric fences* For fences of this type, the significant characteristics are as follows:
 - (i) The material to have openings no greater than 13 mm.
 - (ii) Column and rails if any, to be located on the outside face of the fence.
 - (iii) The material to be fixed to the poolside of the fence.
 - (iv) The horizontal fixing at the top does not compromise or provide handholds or footholds.
 - (v) The material to be firmly fastened and tightly strung and meet Clause 2.3.2.
- (c) *Fences—Fabricated sheet* For fences constructed of sheet material of metal, reinforced glass, exterior grades of plywood or hardboard, glass-fibre-reinforced plastics, aluminium or other similar sheets, the significant characteristics are as follows:
 - (i) Fixings that may provide handholds or footholds to be located on the outside face of the fence.
 - (ii) Horizontal members if any, to be located on the outside face of the fence.
 - (iii) A non-climbable zone to be provided on the pool side face of the fence, commencing at the top.
- (d) *Fences—Brickwork or masonry* For fences constructed of bricks, blocks or masonry, the significant characteristics are as follows:
 - (i) A non-climbable zone to be provided on the pool side face of the fence, commencing at the top.
 - (ii) Natural features such as rock faces that form part of the fence would be acceptable provided they meet the requirements of the Standard.
- (e) *Fences—Brushwood* For fences constructed of woven brushwood, the significant characteristics are as follows:
 - (i) Brushwood to be tightly packed so that it will meet the performance requirements of Clause 3.1.

- (ii) Wires on the pool side of the fence within the non-climbable zone are to be interwoven with the brushwood in order not to provide a foothold for young children.
- (iii) If capping of the fence is necessary to prevent birds from picking at the brushwood twigs, the capping to provide support for climbing.

NOTE: Brushwood fences are known to deteriorate quickly in comparison to other types of fencing and therefore should be regularly maintained.

- (f) *Retaining wall* For retaining walls, the significant requirements are as follows:
 - (i) Where a vertical or near-vertical retaining wall above the pool level is also used as a barrier, no potential handholds or footholds to be located within 900 mm of the top of the wall. A fence complying with this Standard is not required on top of that wall; however, a fence that will prevent people from falling off the retaining wall should be installed on top of the wall.
 - (ii) Where a vertical or near-vertical wall below the pool level is also used as a barrier, a non-climbable zone to be provided on the exposed face, or a fence that complies with this Standard to be installed on top of the wall.

AMENDMENT CONTROL SHEET**AS 1926.1—2007**

Amendment No. 1 (2008)

CORRECTION

SUMMARY: This Amendment applies to the Inside front cover, Preface, Clauses 1.3.12, 2.1, 2.3.1, 2.3.3, 2.3.6, 2.5.2, 2.5.4.3, 2.9, Paragraph A4 and Figure 2.9.

Published on 5 May 2008.

NOTES

Standards Australia

Standards Australia develops Australian Standards® and other documents of public benefit and national interest. These Standards are developed through an open process of consultation and consensus, in which all interested parties are invited to participate. Through a Memorandum of Understanding with the Commonwealth Government, Standards Australia is recognized as Australia's peak non-government national standards body. Standards Australia also supports excellence in design and innovation through the Australian Design Awards.

For further information visit www.standards.org.au

Australian Standards®

Committees of experts from industry, governments, consumers and other relevant sectors prepare Australian Standards. The requirements or recommendations contained in published Standards are a consensus of the views of representative interests and also take account of comments received from other sources. They reflect the latest scientific and industry experience. Australian Standards are kept under continuous review after publication and are updated regularly to take account of changing technology.

International Involvement

Standards Australia is responsible for ensuring the Australian viewpoint is considered in the formulation of International Standards and that the latest international experience is incorporated in national Standards. This role is vital in assisting local industry to compete in international markets. Standards Australia represents Australia at both the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

Sales and Distribution

Australian Standards®, Handbooks and other documents developed by Standards Australia are printed and distributed under license by SAI Global Limited.

For information regarding the development of Standards contact:

Standards Australia Limited

GPO Box 476

Sydney NSW 2001

Phone: 02 9237 6000

Fax: 02 9237 6010

Email: mail@standards.org.au

Internet: www.standards.org.au

For information regarding the sale and distribution of Standards contact:

SAI Global Limited

Phone: 13 12 42

Fax: 1300 65 49 49

Email: sales@sai-global.com



ISBN 0 7337 8286 8