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Australian Standard[®]

Design for access and mobility

**Part 1: General requirements for
access—New building work**



This Australian Standard® was prepared by Committee ME-064, Access for People with Disabilities. It was approved on behalf of the Council of Standards Australia on 18 November 2009.

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- AUSTRROADS
- Association of Consultants in Access Australia
- Australian Association of Occupational Therapists
- Australian Building Codes Board
- Australian Industry Group
- Australian Institute of Architects
- Australian Institute of Building
- Australian Institute of Building Surveyors
- Blind Citizens Australia
- Consumers Federation of Australia
- Deafness Forum of Australia
- Disabled Persons Assembly New Zealand
- Housing Industry Association
- Human Rights and Equal Opportunity Commission
- Independent Living Centres Australia
- Master Builders Australia
- Mobility Research Centre New Zealand
- Physical Disability Australia
- Property Council of Australia

Additional Interests:

- Attorney General's Department
-

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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.

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Australian Standard[®]

Design for access and mobility

Part 1: General requirements for access—New building work

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PREFACE

This Standard was prepared by the Standards Australia Committee ME-064, Access for People with Disabilities, to supersede AS 1428.1—2001.

This Standard incorporates Amendment No. 1 (November 2010). 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.

This Standard is part of a series that is comprised of the following:

AS

- 1428 Design for access and mobility
- 1428.1 Part 1: General requirements for access—New building work (this Standard)
- 1428.2 Part 2: Enhanced and additional requirements—Buildings and facilities
- 1428.3 Part 3: Requirements for children and adolescents with physical disabilities
- 1428.5 Part 5: Communication for people who are deaf or hearing impaired

AS/NZS

- 1428 Design for access and mobility
- 1428.4.1 Part 4.1: Means to assist the orientation of people with vision impairment—Tactile ground surface indicators

The objective of this Standard is to provide building designers and users (architects, property owners and regulators) with the minimum design requirements for new building work to enable access for people with disabilities.

Because of the variety of situations which may need to be addressed when designing buildings and facilities, it is seen as necessary for the Standard to provide a range of data so that the requirements for access can be met and allow for flexibility in design where limitations are imposed by other building conditions. The intention is to make the Standard a practical reference document for designers, particularly with regard to problem areas such as doorways and sanitary facilities.

The Building Code of Australia and *Disability (Access to Premises—Buildings) Standards* define where access for people with a disability is required and reference a number of Australian Standards (including this Standard) to provide technical solutions to meet deemed-to-satisfy provisions.

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.

The use of Notes in this Standard are of an advisory nature only to give explanation or guidance to the user on recommended design considerations or technical procedures, or to provide an informative cross-reference to other documents or publications. Notes to clauses in this Standard do not form a mandatory part for compliance with this Standard.

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

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FOREWORD

This Standard describes basic minimum technical details for accessible buildings.

The Building Code of Australia (BCA) and *Disability (Access to Premises—Buildings) Standards* (Premises Standards) provides information on which classes of buildings are to be made accessible and prescribes the specific areas within those buildings where access must be provided. The BCA and Premises Standards refer to this Standard and other Standards as a means of compliance with the deemed-to-satisfy access provisions of the BCA and Premises Standards.

STANDARDS AUSTRALIA

Australian Standard Design for access and mobility

Part 1: General requirements for access—New building work

1 SCOPE

This Standard specifies the design requirements for new building work, as required by the Building Code of Australia (BCA) and the *Disability (Access to Premises—Buildings) Standards* (Premises Standards), to provide access for people with disabilities. Particular attention is given to—

- (a) continuous accessible paths of travel and circulation spaces for people who use wheelchairs;
- (b) access and facilities for people with ambulatory disabilities; and
- (c) access for people with sensory disabilities.

NOTE: The BCA and Premises Standards set out requirements for other features of the accessible built environment not covered in this Standard, such as lifts, hearing augmentation, tactile ground surface indicators, signage, glazing, lighting, car parking and toilet numbers, and distribution.

This Standard does not include requirements for—

- (i) wheelchairs that have dimensions exceeding those shown in Figure 1; or
- (ii) motorized scooters.

2 APPLICATION

This Standard is referenced by the BCA and the Premises Standards for the provision of access for people with disabilities. As a BCA and Premises Standards referenced document, it is applicable to buildings as and when specified in the BCA and Premises Standards.

NOTE: Compliance with this Standard may also be required by other regulatory authorities.

This Standard provides the technical detail required to achieve the level of access for a deemed-to-satisfy solution.

The requirements specified in this Standard are intended to permit general use of buildings and facilities by people with disabilities acting independently, or where a person's usual method of operation is with an assistant, in the company of that assistant.

NOTE: The Standard is based on data resulting from empirical testing of persons aged between 18 and 60 years and may not be appropriate when applied to persons outside this age range.

The dimensions stated in this Standard, relevant to the use of wheelchairs, relate to the 80th percentile wheelchair size and user (see Figure 1), except at the following locations where the 90th percentile dimensions are required:

- (a) On an accessway, at the location of a turn greater than 60°.
- (b) New accessible sanitary facilities.

- (c) At doorways, including door width and circulation space.

NOTE: The majority of the dimensions relevant to the 90th percentile in this Standard are based on the findings of research undertaken by J. Bails, 1983 (see Bibliography).

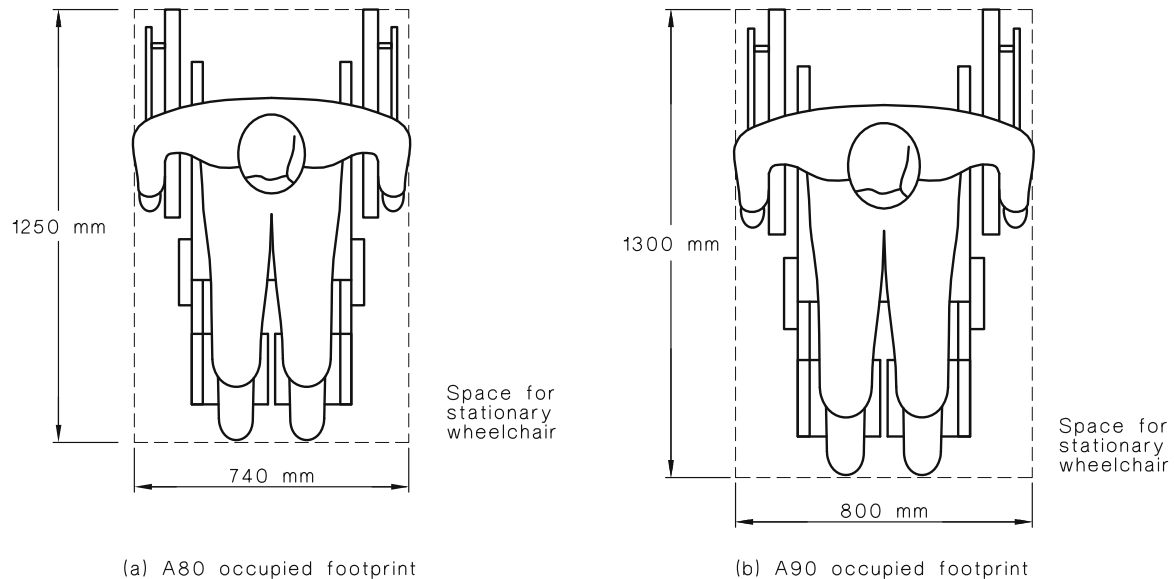


FIGURE 1 FOOTPRINT FOR AN OCCUPIED WHEELCHAIR

3 NORMATIVE REFERENCES

The following are the normative documents referenced this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS

2700 Colour standards for general purposes

1735 Lifts, escalators and moving walks

1735.12 Part 12: Facilities for persons with disabilities

AS/NZS

1428 Design for access and mobility

1428.4.1 Part 4.1: Means to assist the orientation of people with vision impairment—Tactile ground surface indicators

ABCB

BCA Building Code of Australia

4 DEFINITIONS

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

4.1 Accessible

Having features to enable use by people with a disability.

4.2 Active leaf

In a door with two leaves, the leaf that carries the latching or locking mechanism and typically has an operable handle.

4.3 Angle of approach

The angle between the centre-line of one continuous accessible path of travel and the centre-line of an intersecting continuous accessible path of travel.

4.4 Braille

A system of touch reading for the blind, which employs raised dots that are evenly arranged in quadrangular letter spaces or cells.

4.5 Circulation space

A clear unobstructed area, to enable persons using mobility aids to manoeuvre.

4.6 Continuous accessible path of travel

An uninterrupted path of travel to, into or within a building providing access to all accessible facilities.

4.7 Encroachment

The intrusion of a building component, fixture or fitment into a continuous accessible path of travel or circulation space.

4.8 Hazard

Any area or fixed object in or immediately adjacent to a direction of travel, which may place people at risk of injury.

4.9 Kerb

A side barrier to a trafficable or accessible pedestrian surface.

4.10 Landing

A resting place on a path of travel.

4.11 Luminance contrast

The light reflected from one surface or component, compared to the light reflected from another surface or component.

4.12 Luminance factor

The ratio of luminance of a surface to that of a perfect reflector, identically illuminated.

4.13 People with ambulant disabilities

People who have a mobility disability but are able to walk.

4.14 Rail

4.14.1 Grabrail

A rail used to give a steadying or stabilizing assistance to a person engaged in a particular function.

4.14.2 Handrail

A rail used in circulation areas such as corridors, passageways, ramps and stairways to assist in continuous movement.

4.15 Ramp

An inclined surface on a continuous accessible path of travel between two landings with a gradient steeper than 1 in 20 but not steeper than 1 in 14.

4.16 Ramp, kerb

An inclined surface on a continuous accessible path of travel with a maximum rise of 190 mm, a length not greater than 1520 mm and a gradient not steeper than 1 in 8, located within or attached to a kerb.

4.17 Ramp, step

An inclined surface on a continuous accessible path of travel with a maximum rise of 190 mm, length not greater than 1900 mm and a gradient not steeper than 1 in 10.

4.18 Ramp, threshold

An inclined surface on a continuous accessible path of travel with a maximum rise of 35 mm, length not greater than 280 mm and a gradient not steeper than 1 in 8.

4.19 Sensory impairment

Any significant loss of hearing or vision.

4.20 Slip resistant

A property of a surface having a frictional force-opposing movement of an object across a surface.

4.21 Sole occupancy unit

A room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant or other occupier and includes—

- (a) a dwelling;
- (b) a room or suite of rooms in a Class 3 building, as defined in the BCA, which includes sleeping facilities;
- (c) a room or suite of associated rooms in a Class 5, 6, 7, 8 or 9 building, as defined in the BCA; or
- (d) a room or suite of associated rooms in a Class 9c aged care building, as defined in the BCA, which includes sleeping facilities and any area for the exclusive use of a resident.

4.22 Tactile ground surface indicator (TGSi)

Truncated cones and/or bars installed on the ground or floor surface, designed to provide pedestrians who are blind or vision-impaired with warning or directional orientation information.

NOTE: For requirements for TGSi, see AS 1428.4.1.

4.23 Tactile signs

Signage incorporating raised text, and/or symbols and Braille to enable touch reading by people who are blind or who are vision-impaired.

4.24 Walkway

Any surface on a continuous accessible path of travel with a gradient not steeper than 1 in 20.

5 DIMENSIONS

The dimensions given throughout this Standard are in millimetres unless shown otherwise. All dimensions are net and shall not be reduced by projecting skirtings, kerbs, handrails or other fixtures.

Dimensions refer to finished surfaces (e.g., face of wall tiles and floor finishes).

Unless otherwise indicated, limiting dimensions for an inclined surface on a continuous accessible path of travel shall be taken as horizontal and vertical only.

6 CONTINUOUS ACCESSIBLE PATHS OF TRAVEL

6.1 General

A continuous accessible path of travel shall not include a step, stairway, turnstile, revolving door, escalator, moving walk or other impediment.

6.2 Heights of a continuous accessible path of travel

The minimum unobstructed height of a continuous accessible path of travel shall be 2000 mm or 1980 mm at doorways (see Figure 2).

6.3 Width of a continuous accessible path of travel

Unless otherwise specified (such as at doors, curved ramps and similar), the minimum unobstructed width (see Figure 2) of a continuous accessible path of travel shall be 1000 mm and the following shall not intrude into the minimum unobstructed width of a continuous accessible path of travel:

- (a) Fixtures and fittings such as lights, awnings, windows that, when open, intrude into the circulation space, telephones, skirtings and similar objects.
- (b) Essential fixtures and fittings such as fire hose reels, fire extinguishers and switchboards.
- (c) Door handles less than 900 mm above the finished floor level.

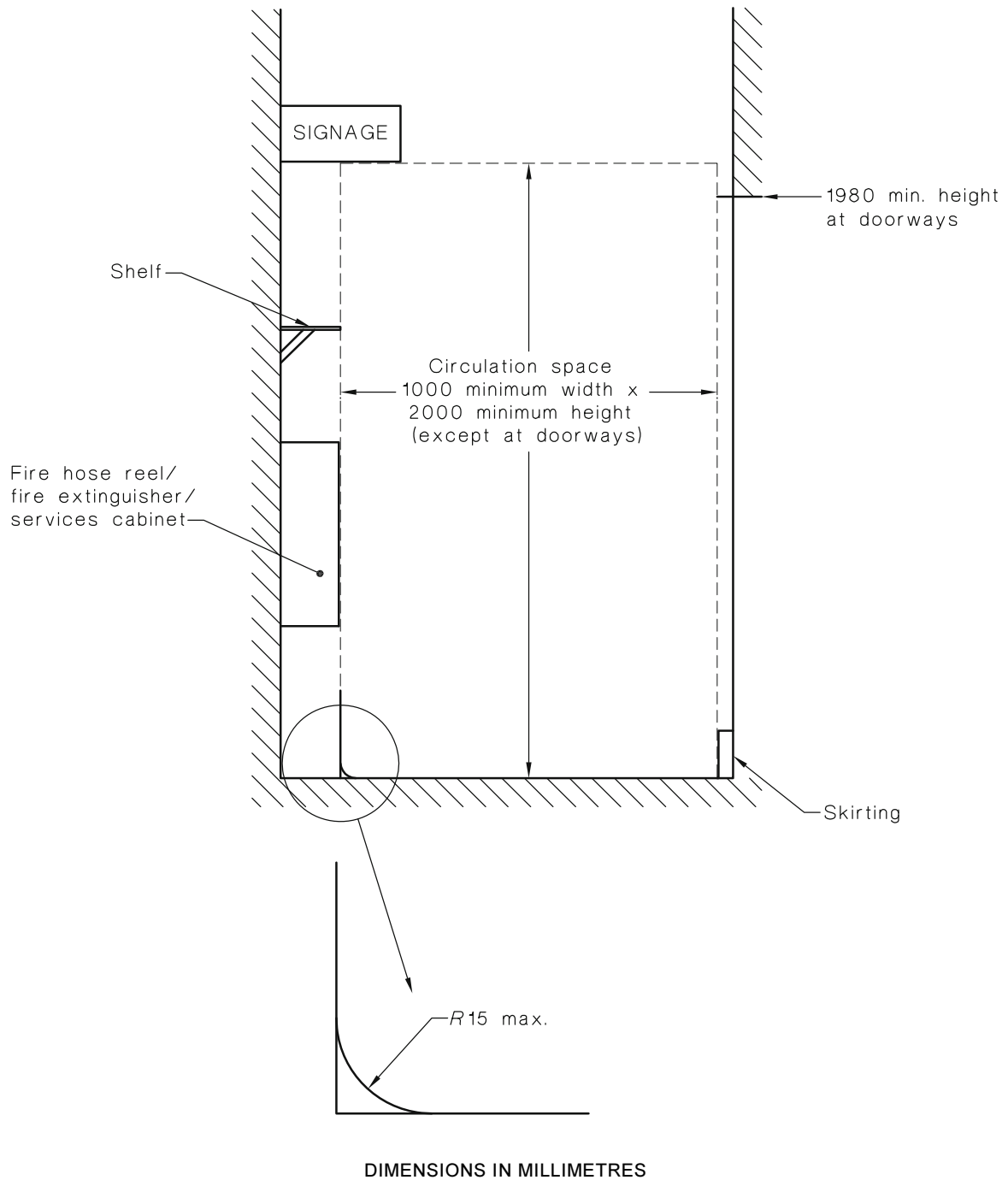
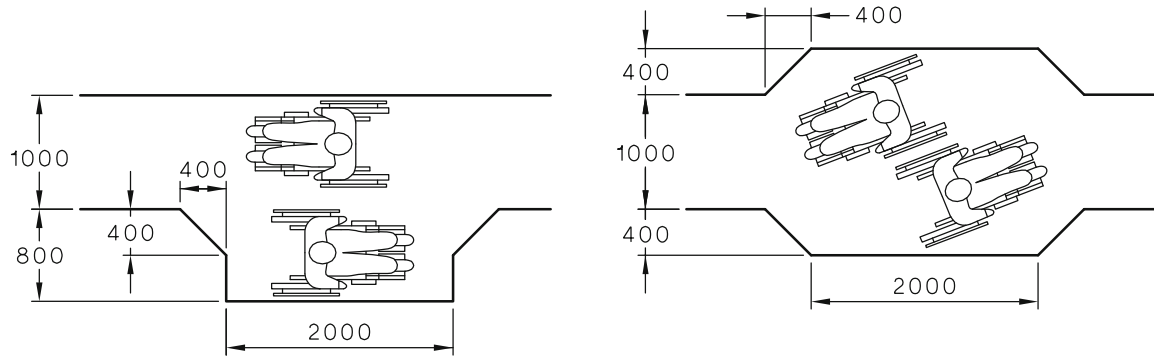


FIGURE 2 CONTINUOUS ACCESSIBLE PATH OF TRAVEL—MINIMUM HEIGHT AND WIDTH

6.4 Passing space for wheelchairs

Passing space for 2 persons using wheelchairs shall be a minimum width of 1800 mm for a minimum length of 2000 mm.

NOTE: For examples see Figure 3.



DIMENSIONS IN MILLIMETRES

FIGURE 3 EXAMPLES FOR PASSING SPACE FOR WHEELCHAIRS

6.5 Circulation space for wheelchair turn

6.5.1 60° to 90° turn

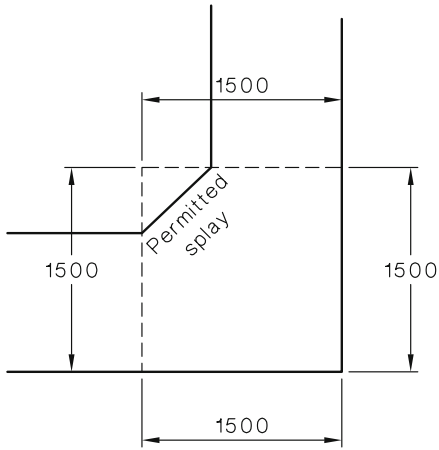
The space required for a wheelchair to make a 60° to 90° turn shall have a gradient no steeper than 1 in 40 and shall be not less than 1500 mm wide and 1500 mm long in the direction of travel. The space may be splayed across the internal corner as shown in Figure 4.

6.5.2 30° to <60°

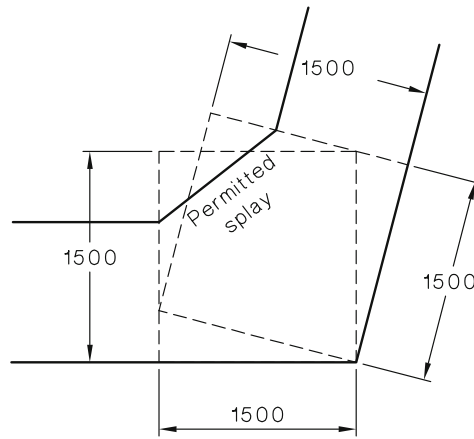
A1

Where the angle of turn is 30° to less than 60° and the width of the path of travel is less than 1200 mm, a splay of at least 500 mm × 500 mm shall be made on the internal corner, as shown in Figure 4.

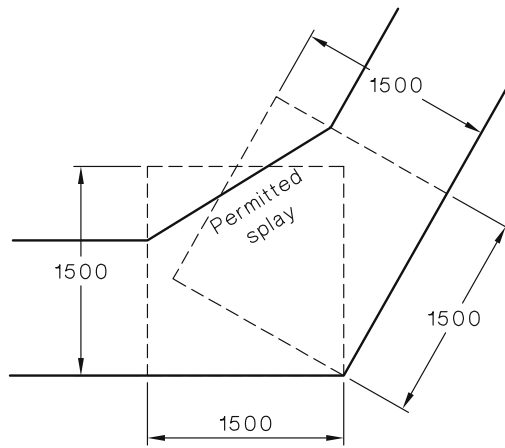
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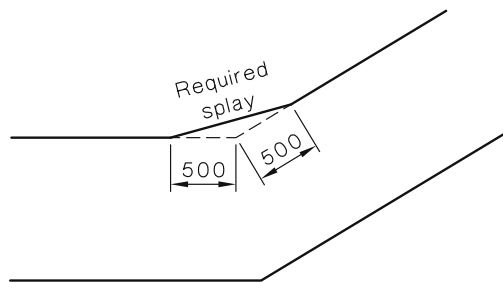
Turn 90° in path of travel
Corridor less than 1500 mm wide
requires widening at turn



Turn 75° in path of travel
Corridor less than 1500 mm wide
requires widening at turn



Turn 60° in path of travel
Corridor less than 1500 mm wide
requires widening at turn



Turn 30° to <60° in path of travel
less than 1200 mm wide

DIMENSIONS IN MILLIMETRES

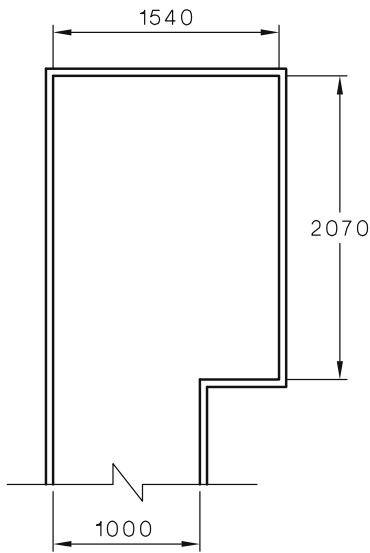
FIGURE 4 SPACE REQUIRED FOR A 30° TO 90° DEGREE TURN

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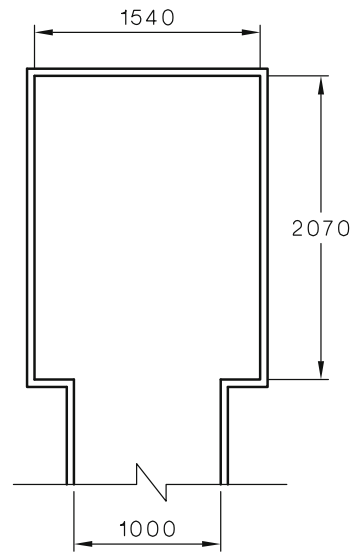
6.5.3 >90° to 180°

The space required for a wheelchair to make a >90° to 180° turn shall be not less than 2070 mm in the direction of travel and not less than 1540 mm wide, as shown in Figure 5.

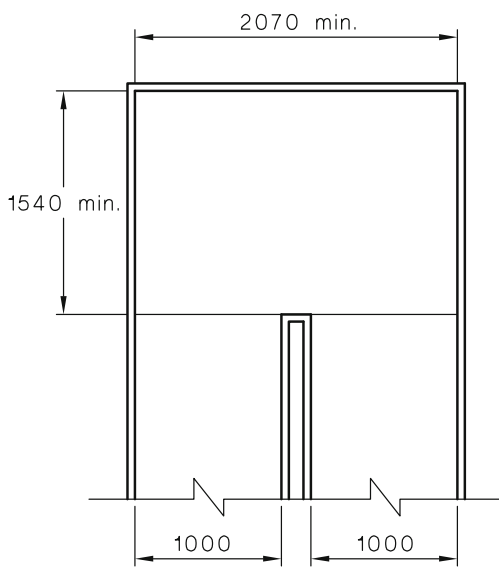
NOTE: For landing dimensions, see Clause 10.8.



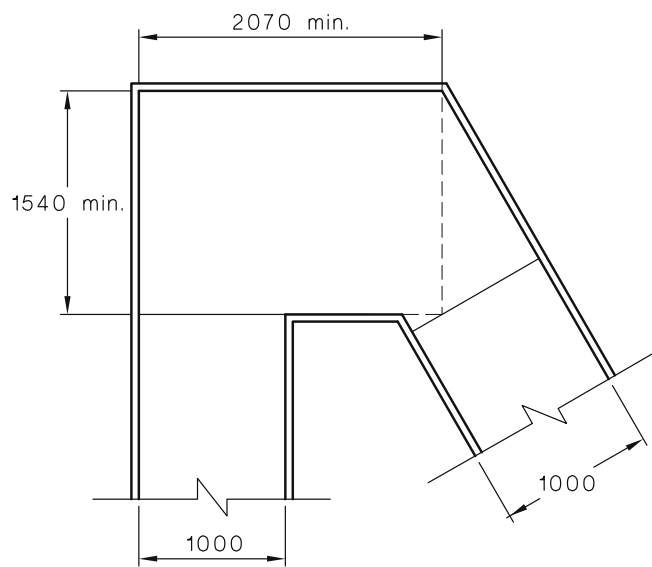
(a) Space required in corridor



(b) Space required in corridor



(c) Space required at ramp landing



(d) Space required at ramp landing

DIMENSIONS IN MILLIMETRES

FIGURE 5 SPACE REQUIRED FOR A >90° TO 180° TURN

6.6 Visual indicators on glazing

A1

Where there is no chair rail, handrail or transom, all frameless or fully glazed doors, sidelights, including any glazing capable of being mistaken for a doorway or opening, shall be clearly marked for their full width with a solid and non-transparent contrasting line. The contrasting line shall be not less than 75 mm wide and shall extend across the full width of the glazing panel. The lower edge of the contrasting line shall be located between 900 mm and 1000 mm above the plane of the finished floor level.

Any contrasting line on the glazing shall provide a minimum of 30% luminance contrast when viewed against the floor surface or surfaces within 2 m of the glazing on the opposite side.

NOTE: For method of testing luminance contrast, see Appendix B.

7 FLOOR OR GROUND SURFACES ON CONTINUOUS ACCESSIBLE PATHS OF TRAVEL AND CIRCULATION SPACES

7.1 General

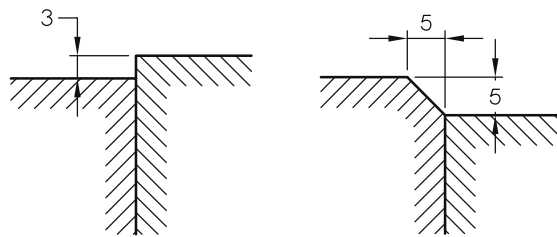
A continuous accessible path of travel and any circulation spaces shall have a slip-resistant surface. The texture of the surface shall be traversable by people who use a wheelchair and those with an ambulant or sensory disability.

7.2 Construction tolerances for abutment of surfaces

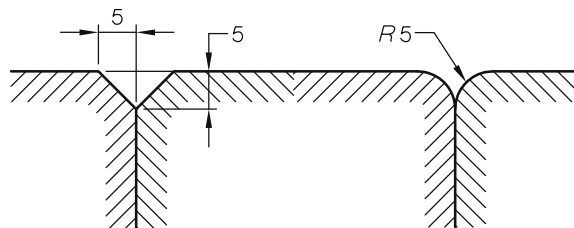
Abutment of surfaces shall have a smooth transition. Design transition shall be 0 mm. Construction tolerances shall be as follows:

- (a) 0 ±3 mm vertical, as shown in Figure 6(a).
- (b) 0 ±5 mm, provided the edges have a bevelled or rounded edge to reduce the likelihood of tripping, as shown in Figure 6(b).

Tolerances for raked joint pavers shall be as shown in Figure 7.



(a) Change in level

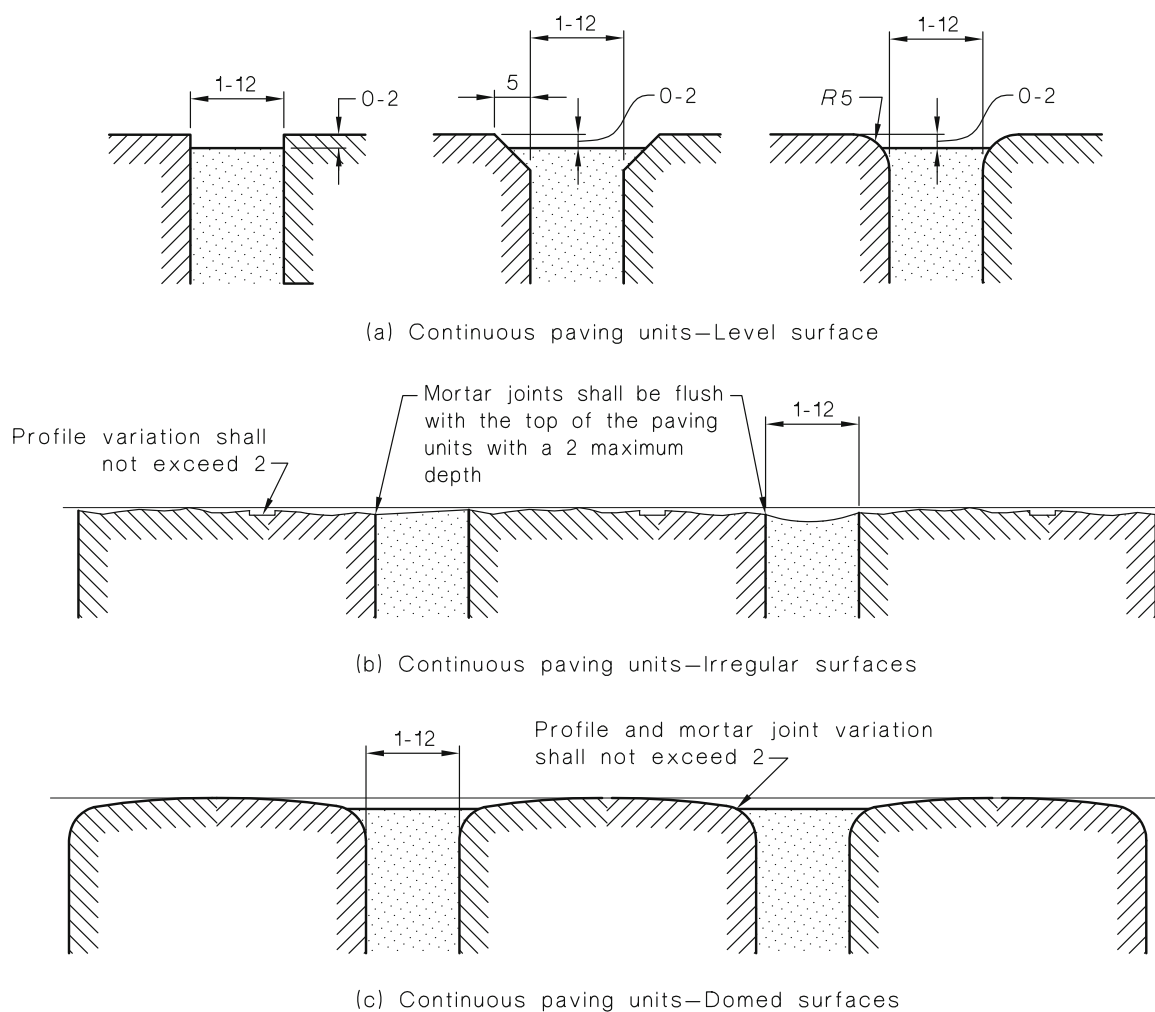


(b) Continuous paving units—flush-jointed with level surfaces

DIMENSIONS IN MILLIMETRES AND ARE MAXIMUM

FIGURE 6 ACCEPTABLE CONSTRUCTION TOLERANCES FOR ABUTMENT OF SURFACES

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DIMENSIONS IN MILLIMETRES AND ARE MAXIMUM

FIGURE 7 RAKED JOINT PAVERS

7.3 Changes in level

When a vertical change of not more than 5 mm occurs between the abutment of two surfaces along a continuous accessible path of travel, such change in surface level shall comply with the tolerances given in Clause 7.2.

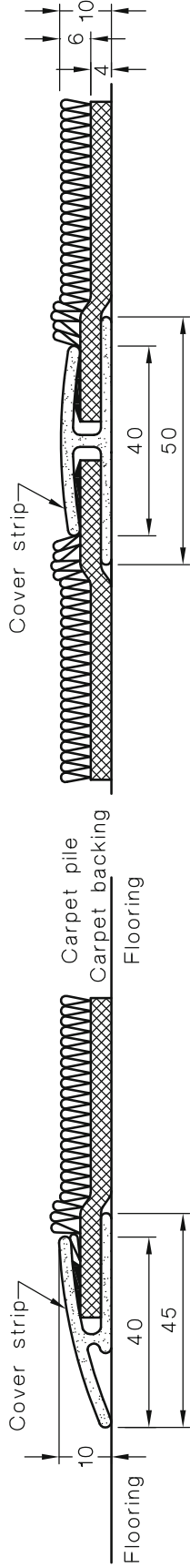
7.4 Fixed or recessed floor coverings—Soft floor coverings

7.4.1 Carpets and other soft flexible materials

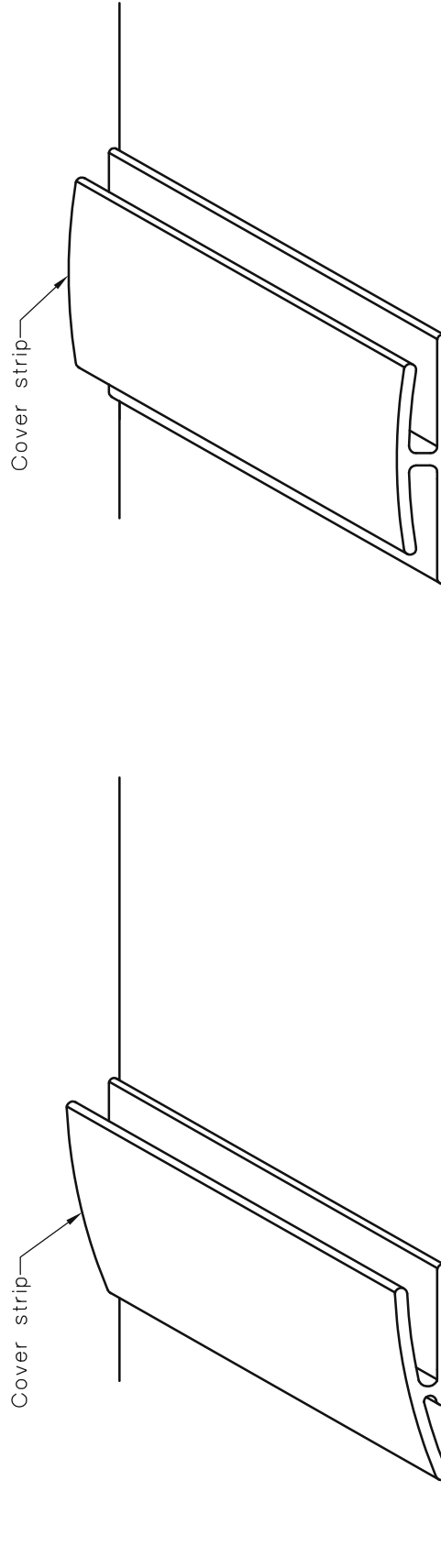
Where carpets or any soft flexible materials are used on the ground or floor surface—

- A1
- the pile height or pile thickness shall not exceed 6 mm and the carpet backing thickness shall not exceed 4 mm;
 - exposed edges of floor covering shall be fastened to the floor surface and shall have a trim along the entire length of any exposed edge; and
NOTE: An example is given in Figure 8.
 - at the leading edges, carpet trims and any soft flexible materials shall have a vertical face no higher than 3 mm or a rounded bevelled edge no higher than 5 mm or above that height a gradient of 1 in 8 up to a total maximum height of 10 mm.

A1



SECTIONS



AXONOMETRIC VIEW

DIMENSIONS IN MILLIMETRES

FIGURE 8 EXAMPLE OF ABUTTING FLOOR COVERINGS ON A CONTINUOUS ACCESSIBLE PART OF TRAVEL

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7.4.2 Recessed matting

Matting recessed within a continuous accessible path of travel—

- (a) where of metal and bristle type construction or similar, its surface shall be no more 3 mm if vertical or 5 mm if rounded or bevelled, above or below the surrounding surface; and
- (b) where of a mat or carpet type material, shall have the fully compressed surface level with or above the surrounding surface with a level difference no greater than 3 mm if vertical or 5 mm if rounded or bevelled.

7.5 Grates

Grates shall comply with the following:

- (a) Circular openings shall be not greater than 13 mm in diameter.
- (b) Slotted openings shall be not greater than 13 mm wide and be oriented so that the long dimension is transverse to the dominant direction of travel.

NOTE: Where slotted openings are less than 8 mm, the length of the slots may continue across the width of paths of travel.

8 SIGNAGE

8.1 Form of signs

The BCA contains requirements for Braille and tactile signage in Specification D3.6.

Where signs are required, the form of signs shall be as follows:

- (a) Where required, raised tactile and/or Braille signage shall be provided as follows:
 - (i) Sanitary facilities shall be identified with the following:
 - (A) Raised and visual versions of the international symbol of access.
 - (B) Raised and visual versions of the male and female symbols.
 - (C) Raised text that shall be in title case (e.g. Male Toilet).

NOTE: Title case has the first letter of each word capitalized and the rest are lower case. Short articles, prepositions and conjunctions are not capitalized.
 - (D) Braille that fully describes the visual information displayed by symbols and raised text.

NOTES:

 - 1 For example, a sign for a male accessible toilet will include the words Male Toilet as visual, raised text and Braille as well as the raised visual male symbol.
 - 2 An example of a sign is given in Figure 9(a).
 - (ii) Signs for unisex accessible facilities shall be provided with the letters LH or RH to indicate a left-hand or right-hand side transfer onto the WC pan. The minimum font size shall be 20 mm san serif.

NOTES:

 - 1 An example of right-hand side (RH) transfer is shown on Figure 9(a).
 - 2 Helvetica and Arial are san serif fonts.
 - (iii) Entry doors to airlocks serving areas containing sanitary facilities shall be identified by the use of raised text and Braille, together with raised and visual symbols identifying each sanitary facility within.

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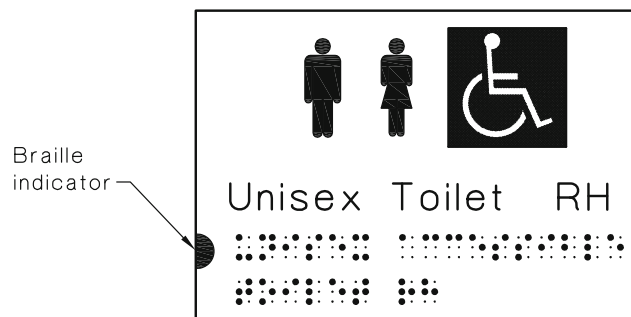
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NOTES:

- 1 One symbol for each facility need only be used.
 - 2 Where the facilities for male and female are separate, a dividing line should be placed between each symbol.
- (b) Elements of a sign shall be set out singularly, or in a modular form.
NOTE: Examples of modular form are shown in Figures 9(a), 9(d), 9(e) and 9(f).
- (c) Elements of a sign shall be arranged horizontally or vertically and shall include raised text and Braille, together with raised and visual symbols. Where words are used, they shall be displayed horizontally.
NOTE: Other symbols may be used in association with the text.
- (d) Facilities shall be identified by the use of raised text, Braille, and symbols if required. The identification shall be between 1200 mm and 1600 mm above finished floor levels.
- (e) A sanitary compartment for people with ambulant disabilities shall be identified in accordance with Figure 9(c).

Braille shall be Unified English Braille (UEB), Grade 1, uncontracted, and shall be in accordance with the technical specifications set out by the Australian Braille Authority (ABA). Braille numerals shall be preceded by a Braille numerical sign.

The International Symbol of Access and the International Symbol for Deafness (see Clause 8.2.2) may be used without raised explanatory text such as 'accessible' or 'hearing loop installed'.



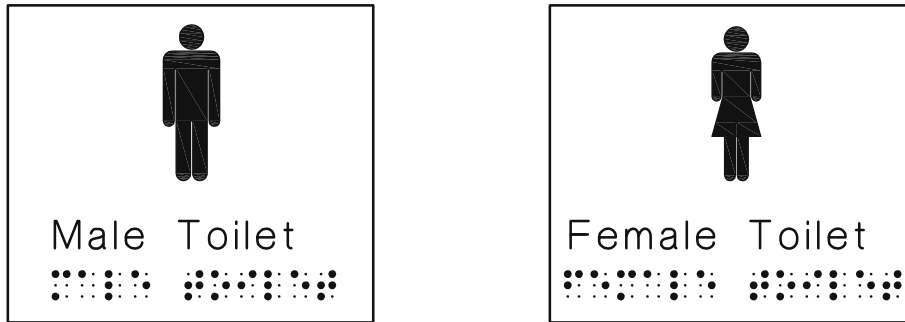
(a) Example of identification sign for a unisex accessible toilet with a right-hand (RH) transfer

NOTES:

- 1 The Braille indicator is only used where there are multiple lines of text. It indicates the location of the first line of Braille.
- 2 Visual message: The sign displays a unisex accessible toilet with right-hand (RH) transfer.
- 3 Minimum required raised tactile message: 'Unisex Toilet RH' in raised tactile print and symbols.
- 4 Minimum required Braille message: 'Unisex accessible toilet RH' for right-hand transfer.

FIGURE 9 (in part) MODULAR FORM OF SIGNS

A1

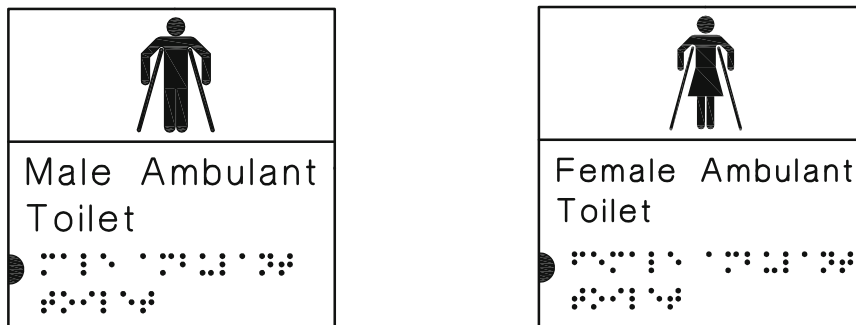


(b) Example of identification signs for male and female toilets

NOTES:

- 1 Visual message: The signs display male toilet and female toilet.
- 2 Minimum required raised tactile message: 'Male Toilet', 'Female Toilet' in raised tactile print and symbols.
- 3 Minimum required Braille message: 'Male Toilet', 'Female Toilet'.

FIGURE 9 (in part) MODULAR FORM OF SIGNS



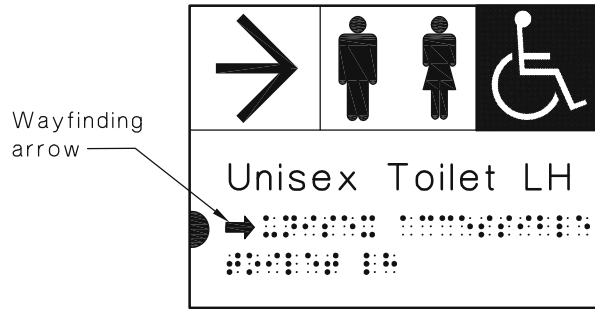
(c) Example of identification signs for ambulant accessible male and female toilets

NOTES:

- 1 Visual message: The signs display ambulant accessible male and female toilets.
- 2 Minimum required raised tactile message: 'Ambulant Male Toilet', 'Ambulant Female Toilet' in raised tactile print and symbols.
- 3 Minimum required Braille message: 'Male Ambulant Toilet', 'Female Ambulant Toilet'.

FIGURE 9 (in part) MODULAR FORM OF SIGNS

A1

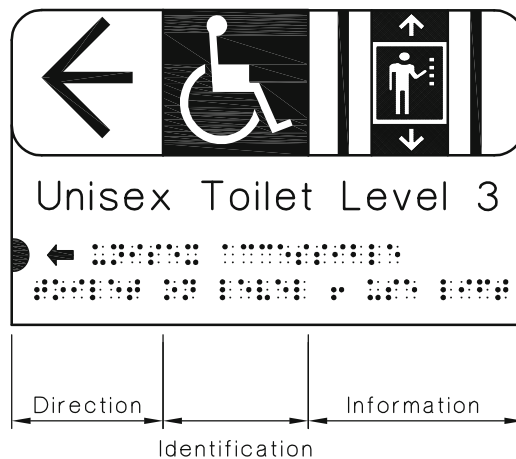


(d) Example of wayfinding sign to a unisex accessible toilet with left-hand (LH) transfer

NOTES:

- 1 Visual message: The sign displays the direction to a unisex accessible toilet with left-hand (LH) transfer.
- 2 Minimum required tactile message: 'Unisex Toilet LH' with raised tactile wayfinding arrow, print and symbols.
- 3 Minimum required Braille message: 'Unisex accessible toilet LH' with a wayfinding arrow of Braille cell proportion.

FIGURE 9 (in part) MODULAR FORM OF SIGNS



(e) Example of wayfinding sign to a unisex accessible toilet

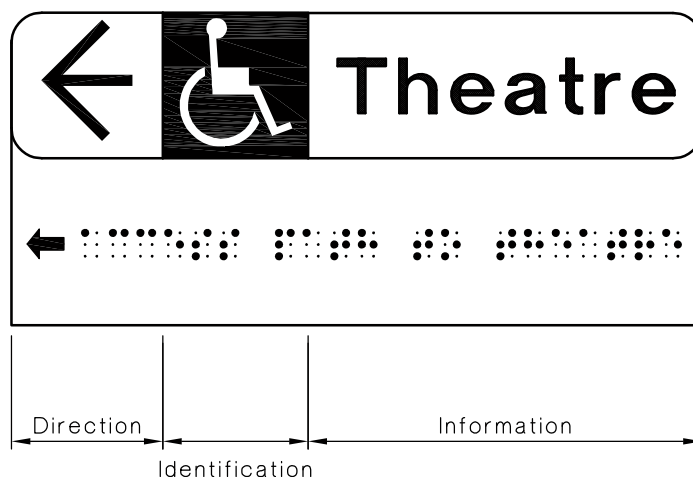
NOTES:

- 1 Visual message: The sign displays an accessible path of travel using a lift to level 3 to a unisex accessible toilet.
- 2 Minimum required tactile message: 'Unisex Toilet Level 3' with raised tactile symbols and print.
- 3 Minimum required Braille message: 'Unisex accessible toilet on Level 3' with a wayfinding arrow of Braille cell proportion.

FIGURE 9 (in part) MODULAR FORM OF SIGNS

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A1



(f) Example of wayfinding sign to identify facilities for persons with mobility disabilities

NOTES:

- 1 Visual message: The sign displays the direction of an accessible path of travel to a theatre.
- 2 Minimum required tactile message: Raised tactile wayfinding arrow, print and symbols.
- 3 Minimum required Braille message: 'Access path to theatre' with a wayfinding arrow of Braille cell proportion.

FIGURE 9 (in part) MODULAR FORM OF SIGNS

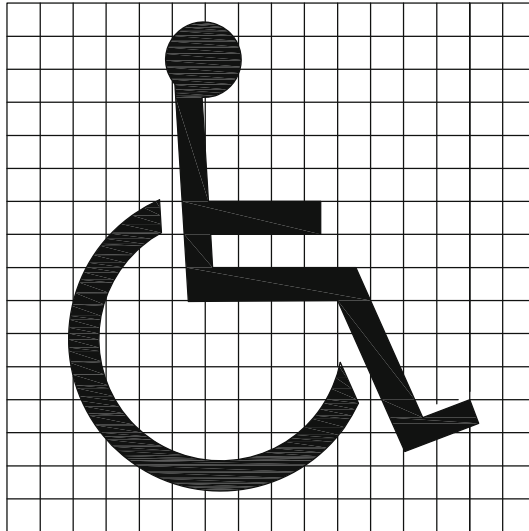
8.2 Symbols indicating access for people with disabilities

8.2.1 International symbol of access

The form of the international symbol of access shall be as follows:

- (a) The symbol of access shall consist of two elements: a stylized figure in a wheelchair pointing to the right on a plain square background.
- (b) The proportional layout of the symbol of access shall be in accordance with Figure 10.
- (c) The colour of the Figure shall be white on a blue background in accordance with Figure 11. The blue shall be B21, ultramarine, of AS 2700, or similar.
- (d) For signs indicating the direction to a facility, an arrow shall be used in combination with the international symbol of access.

NOTE: Signs identifying a facility may be used either with or without directional arrows.



NOTE: The grid is for positional purposes only.

FIGURE 10 PROPORTIONAL LAYOUT FOR INTERNATIONAL SYMBOL OF ACCESS

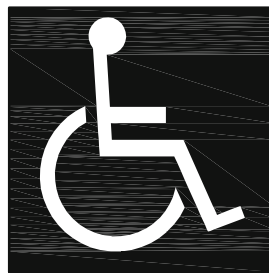
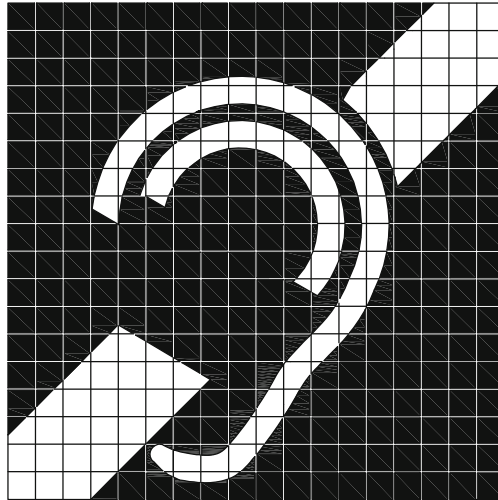


FIGURE 11 COLOUR CONTRAST FOR SYMBOL OF ACCESS

8.2.2 *International symbol for deafness*

The form of the international symbol for deafness shall be as follows:

- (a) The symbol for deafness shall consist of two elements: a stylized ear and diagonal slash on a plain square background.
- (b) The proportional layout of the symbol for deafness shall be in accordance with Figure 12.
- (c) The colour of the symbol shall be white on a blue background. The blue shall be B21, ultramarine, of AS 2700, or similar.



NOTE: The grid is for positional purposes only.

FIGURE 12 PROPORTIONAL LAYOUT FOR INTERNATIONAL SYMBOL FOR DEAFNESS

9 TACTILE GROUND SURFACE INDICATORS (TGSIs)

TGSIs to warn people of hazards shall comply with AS/NZS 1428.4.1

10 WALKWAYS, RAMPS AND LANDINGS

10.1 General

Walkways, ramps and landings that are provided on a continuous accessible path of travel shall be as follows:

- A1 |
- (a) Sharp transitions shall be provided between the planes of landings and ramps, as shown in Figure 14.
 - (b) Landings shall be provided at all changes in direction in accordance with Clause 10.8.
 - (c) Landing or circulation space shall be provided at every doorway, gate, or similar opening.
 - (d) For walkways and landings having gradients in the direction of travel shallower than 1 in 33, a camber or crossfall shall be provided for shedding of water and shall be no steeper than 1 in 40, except that bitumen surfaces shall have a camber or crossfall no steeper than 1 in 33.

NOTE: For requirements for ground surfaces, see Clause 7.

NOTE: A summary of requirements for walkways, ramps and landings is provided in Appendix C.

10.2 Walkways

Walkways shall comply with the following:

- (a) The floor or ground surface abutting the sides of the walkway shall provide a firm and level surface of a different material to that of the walkway at the same level of the walkway, follow the grade of the walkway and extend horizontally for a minimum of 600 mm unless one of the following is provided:
 - (i) Kerb in accordance with Figure 18.
 - (ii) Kerb rail and handrail in accordance with Figure 19.

- (iii) A wall not less than 450 mm in height.
- (b) Walkways shall be provided with landings, as specified in Clause 10.8, at intervals not exceeding the following:
 - (i) For walkway gradients of 1 in 33, at intervals no greater than 25 m.
 - (ii) For walkway gradients of 1 in 20, at intervals no greater than 15 m.
 - (iii) For walkway gradients between 1 in 20 to 1 in 33, at intervals that shall be obtained by linear interpolation.

For walkways shallower than 1 in 33, no landings are required.

The intervals specified above may be increased by 30% where at least one side of a walkway is bounded by—

- (A) a kerb or kerb rail as specified in Clause 10.3(j) and a handrail as specified in Clause 12; or
- (B) a wall and a handrail as specified in Clause 12.

10.3 Ramps

Ramps shall comply with the following:

- (a) The maximum gradient of a ramp exceeding 1900 mm in length shall be 1 in 14.
- (b) The gradient of a ramp shall be constant throughout its length with a maximum allowable tolerance of 3% provided no section of the ramp is steeper than 1 in 14.
- (c) Ramps shall be provided with landings, as specified in Clause 10.8, at the bottom and at the top of the ramp and at intervals not exceeding the following:
 - (i) For ramp gradients of 1 in 14, at intervals not greater than 9 m.
 - (ii) For ramp gradients steeper than 1 in 20, at intervals not greater than 15 m.
 - (iii) For ramp gradients between 1 in 14 and steeper than 1 in 20, at intervals that shall be obtained by linear interpolation.

- (d) Where ramps are constructed with a change in direction, the angle of approach shall create a 90° angle to the line of transition between the ramp surface and the landing surface, as shown in Figure 13.

- (e) Ramps shall have a handrail complying with Clause 12 on each side of the ramp, as shown in Figure 14.

NOTE: Figures 15(A) and 15(B) show examples of suitable ramp handrail terminations.

- (f) Where the intersection is at the property boundary, the ramp shall be set back by a minimum of 900 mm so that the handrail (complying with Clause 12) and TGSIs do not protrude into the transverse path, as shown in Figure 16.

TGSIs shall be installed in accordance with AS 1428.4.1.

- (g) Where the intersection is at an internal corridor, the ramp shall be set back by a minimum of 400 mm so that the handrail complying with Clause 12 does not protrude into the transverse path of travel as shown in Figure 17.

- (h) The handrail shall extend a minimum of 300 mm horizontally past the transition point at the top and bottom of the ramp except where the inner handrail is continuous at an intermediate landing.

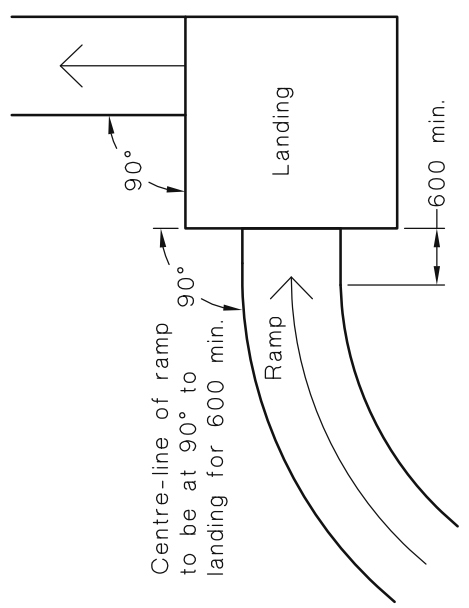
- (i) Ramps and intermediate landings shall have kerbs or kerb rails on both sides that comply with the following:
- (i) The minimum height above the finished floor shall be 65 mm.
 - (ii) The height of the top of the kerb or kerb rail shall not be within the range 75 mm to 150 mm above the finished floor, as shown in Figure 18.
 - (iii) There shall be no longitudinal gap or slot greater than 20 mm in the kerb or kerb rail within the range 75 mm to 150 mm above the finished floor.

NOTES:

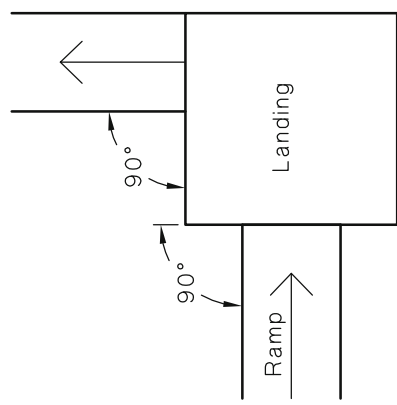
A1 |

- 1 For details on kerbs and kerb rails, see Figure 18.
- 2 For location of kerb or kerb rail, see Figure 19.
- 3 Examples of kerb rail configuration are shown in Appendix A.

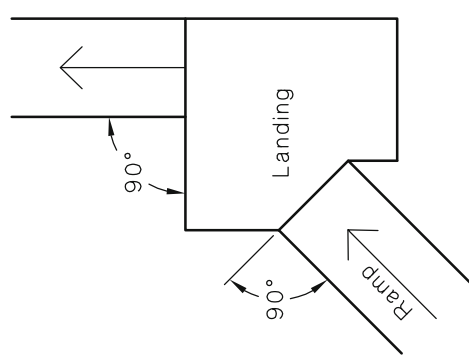
- (j) Kerbs or kerb rails shall—
- (i) be located so that the ramp-side face is either flush with the ramp-side face of the handrail or no greater than 100 mm away from the ramp-side face of the handrail, as shown in Figure 19;
 - (ii) where the handrail is supported on a vertical post, the height of the top of the kerb or kerb rail shall be not less than 150 mm above the finished floor, as shown in Figures 19(a), 19(b) or 19(c); and
 - (iii) where the kerb is at a height of 65 mm to 75 mm, the support posts shall be set back a minimum of 200 mm from the face of the kerb or kerb rail, as shown in Figure 19(d).



(c) Curved approach



(b) Straight approach



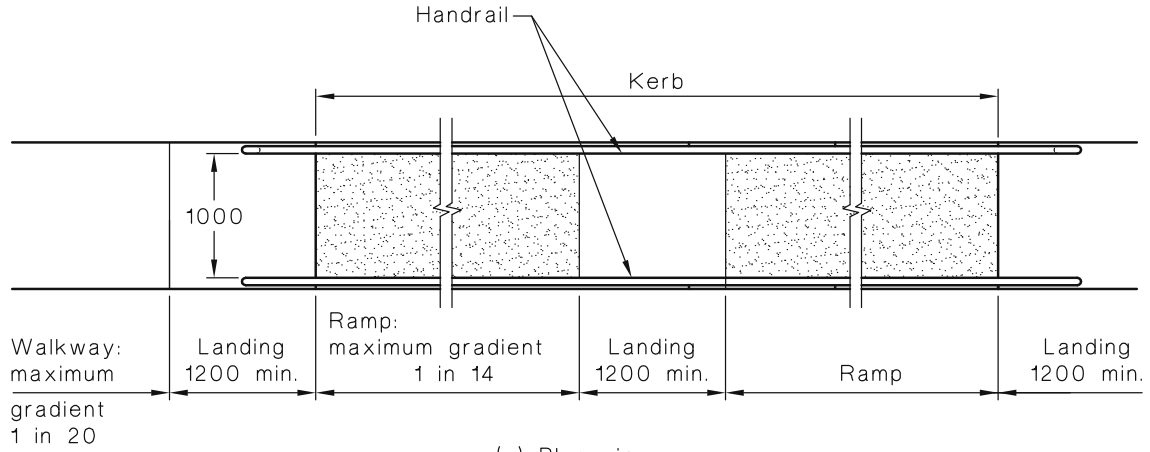
(a) Angled approach

DIMENSIONS IN MILLIMETRES

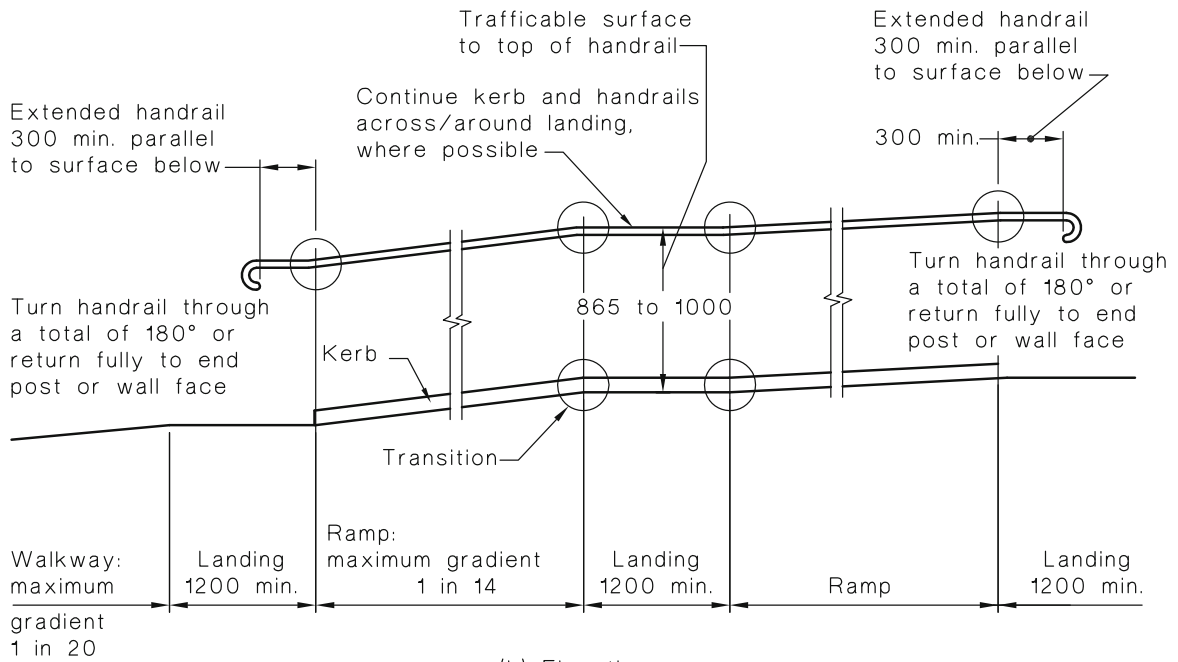
FIGURE 13 ANGLE OF APPROACH BETWEEN RAMP AND LANDING

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A1



(a) Plan view



(b) Elevation

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FIGURE 14 RAMP HANDRAILS

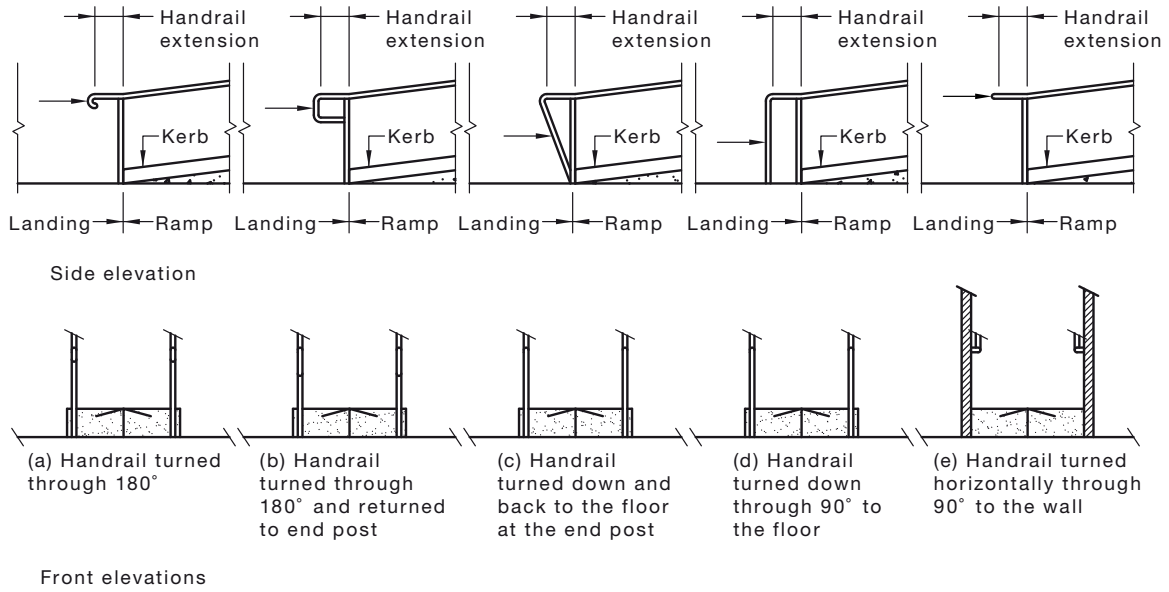
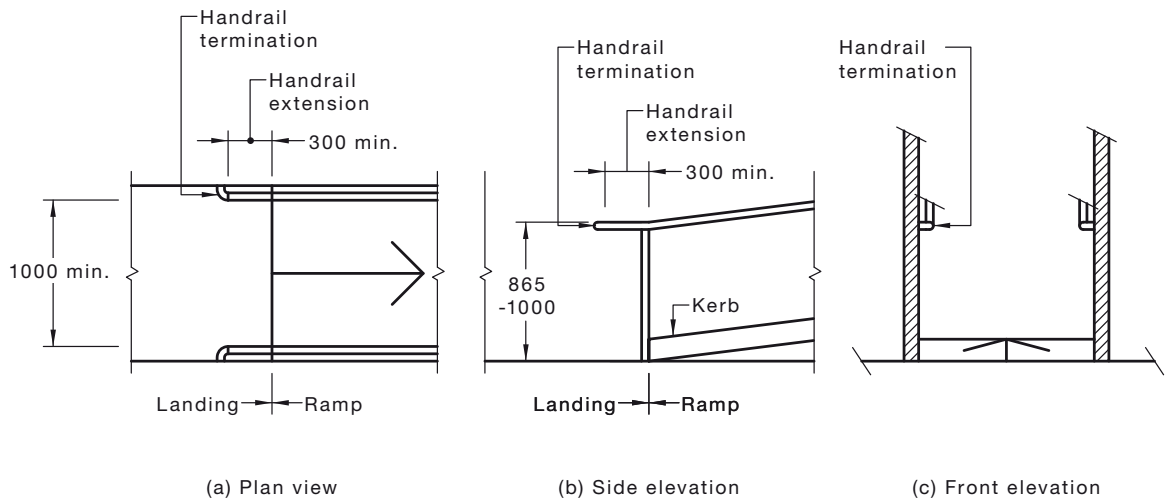


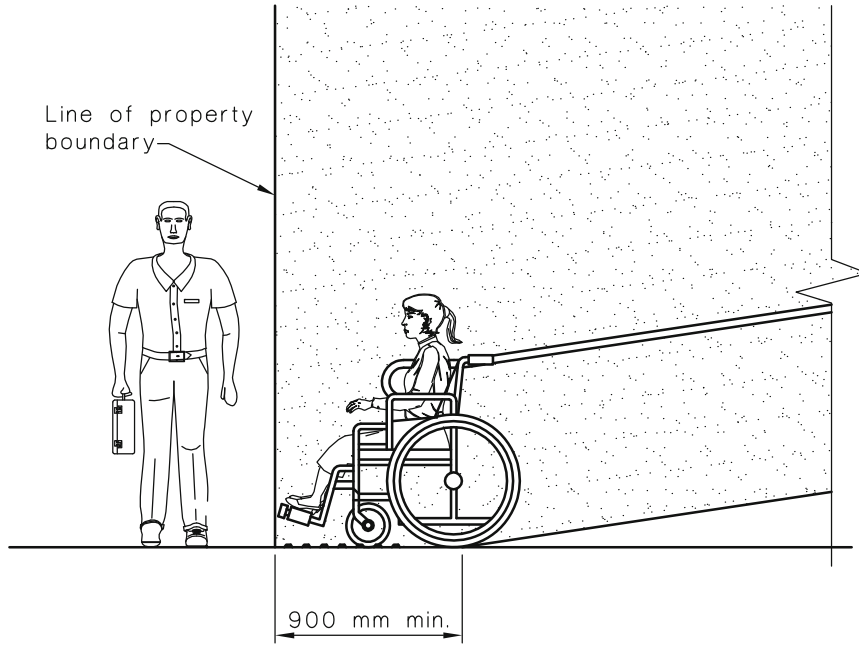
FIGURE 15(A) RAMP HANDRAILS—EXAMPLES OF HANDRAIL TERMINATIONS



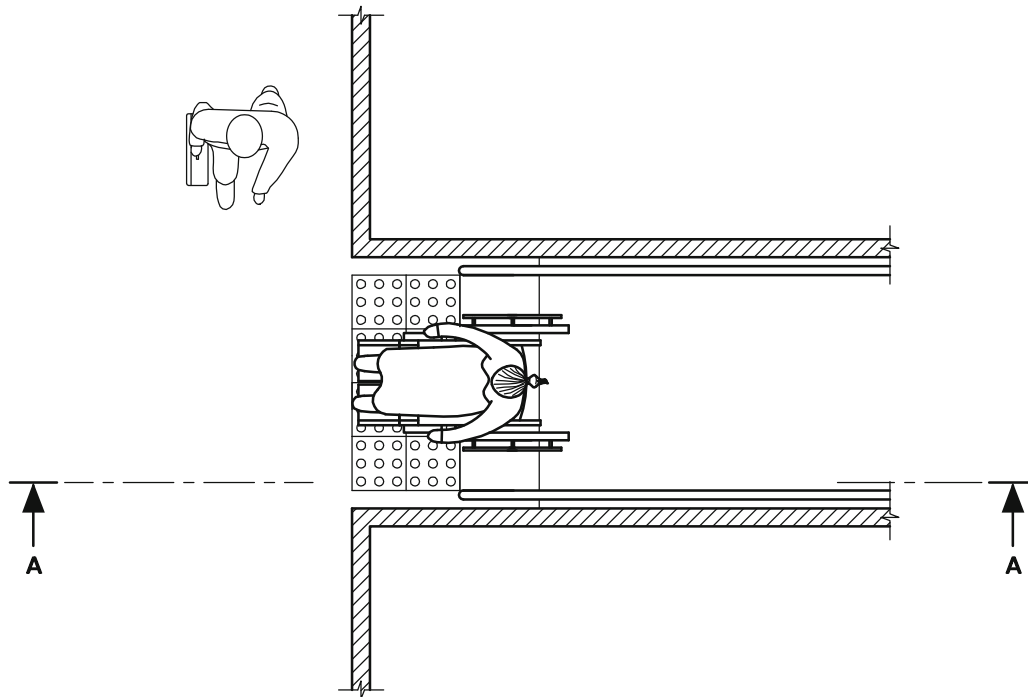
DIMENSIONS IN MILLIMETRES

FIGURE 15(B) RAMP HANDRAILS—DETAIL FOR HANDRAILS TERMINATED BY TURNING HORIZONTALLY THROUGH 90° TO THE WALL

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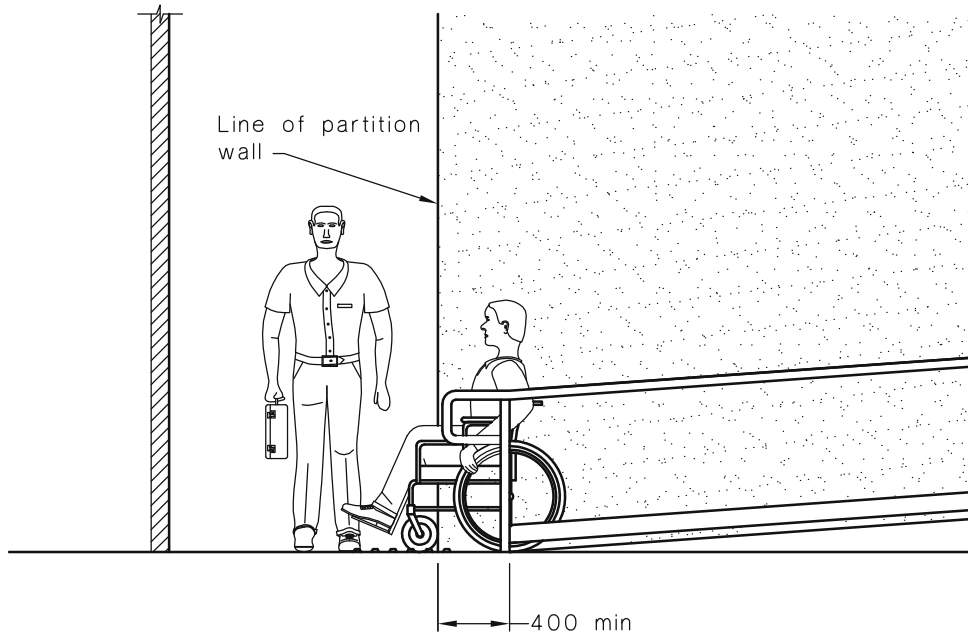
SECTIONAL ELEVATION A-A



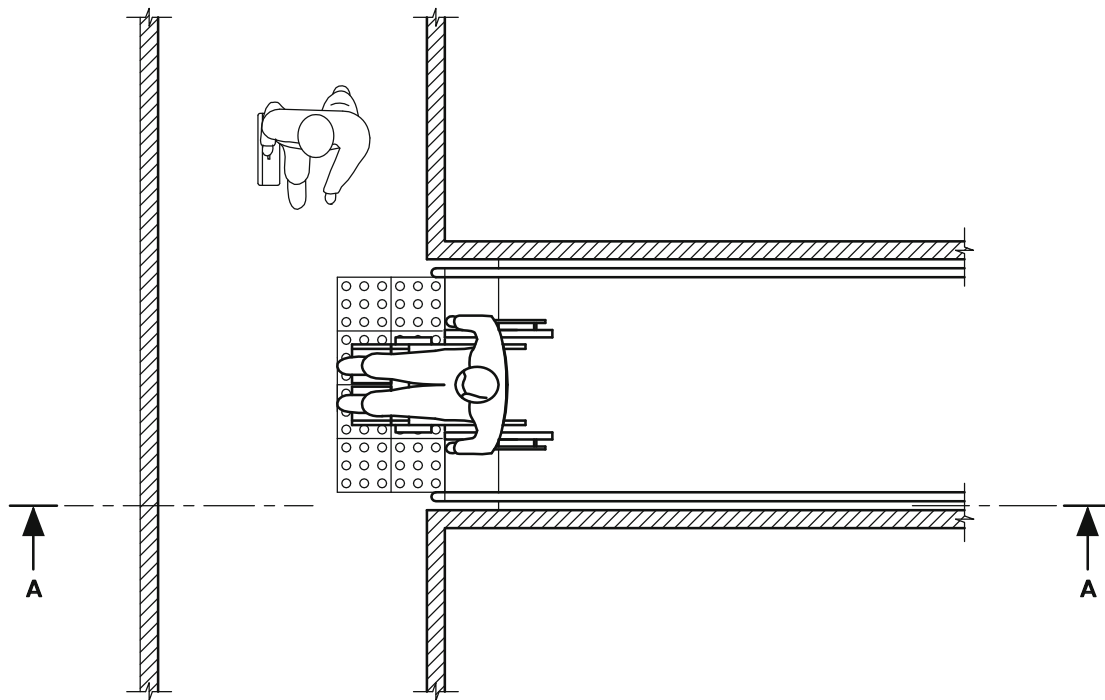
Plan

NOTE: TGSIs to be installed within the property boundary.

FIGURE 16 LOCATION OF RAMP AT A BOUNDARY TO PREVENT PROTRUSION OF HANDRAILS AND TACTILE GROUND SURFACE INDICATORS (TGSIs) INTO A TRANSVERSE PATH OF TRAVEL



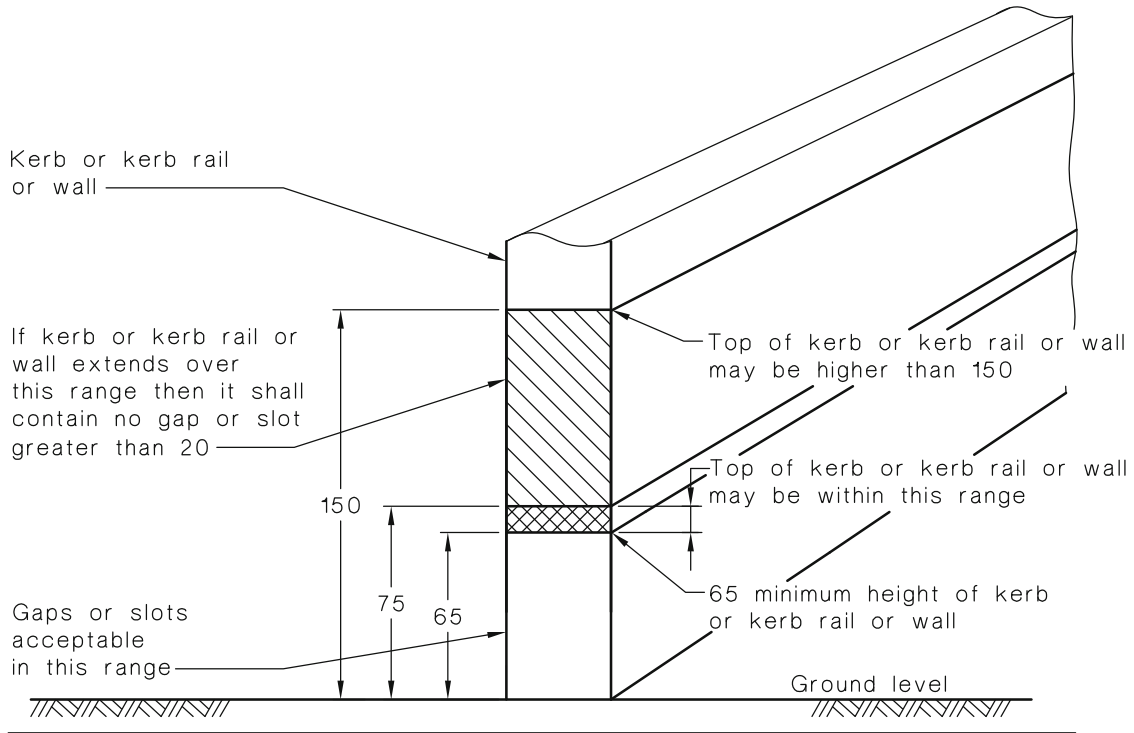
SECTIONAL ELEVATION A-A



Plan

FIGURE 17 LOCATION OF RAMP TO PREVENT PROTRUSION OF HANDRAILS INTO A TRANSVERSE PATH OF TRAVEL OTHER THAN AT BOUNDARIES

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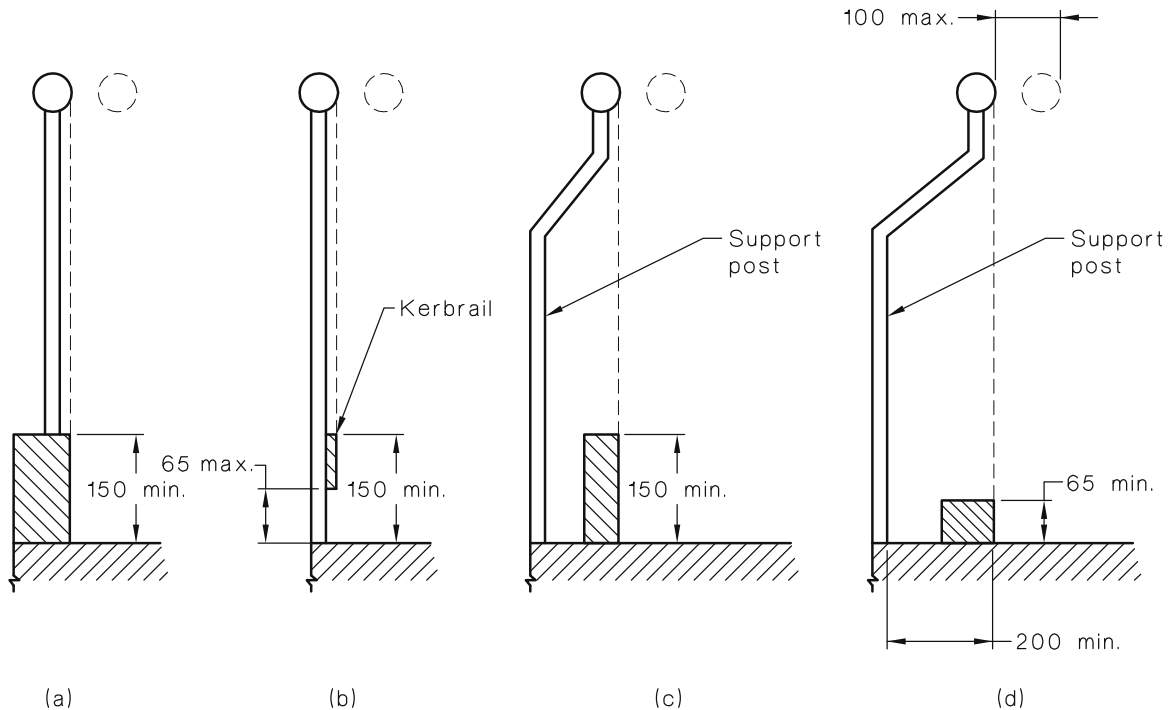


DIMENSIONS IN MILLIMETRES

FIGURE 18 KERB

A1

A1



NOTE: See Appendix A for further clarification.

DIMENSIONS IN MILLIMETRES

FIGURE 19 SECTION SHOWING LOCATION OF KERB OR KERB RAIL IN RELATION TO HANDRAIL WITH VERTICAL SUPPORT

10.4 Curved walkways, ramps, and landings

Curved ramps, walkways and landings shall comply with the following:

- The gradient of curved ramps and walkways shall comply with Figure 20.
- Landings shall comply with Clause 10.8.
- The length of a curved ramp shall be measured horizontally along its centre-line.
- Curved ramps and walkways shall have a width of not less than 1500 mm.
- Any crossfall shall be towards the centre of curvature.

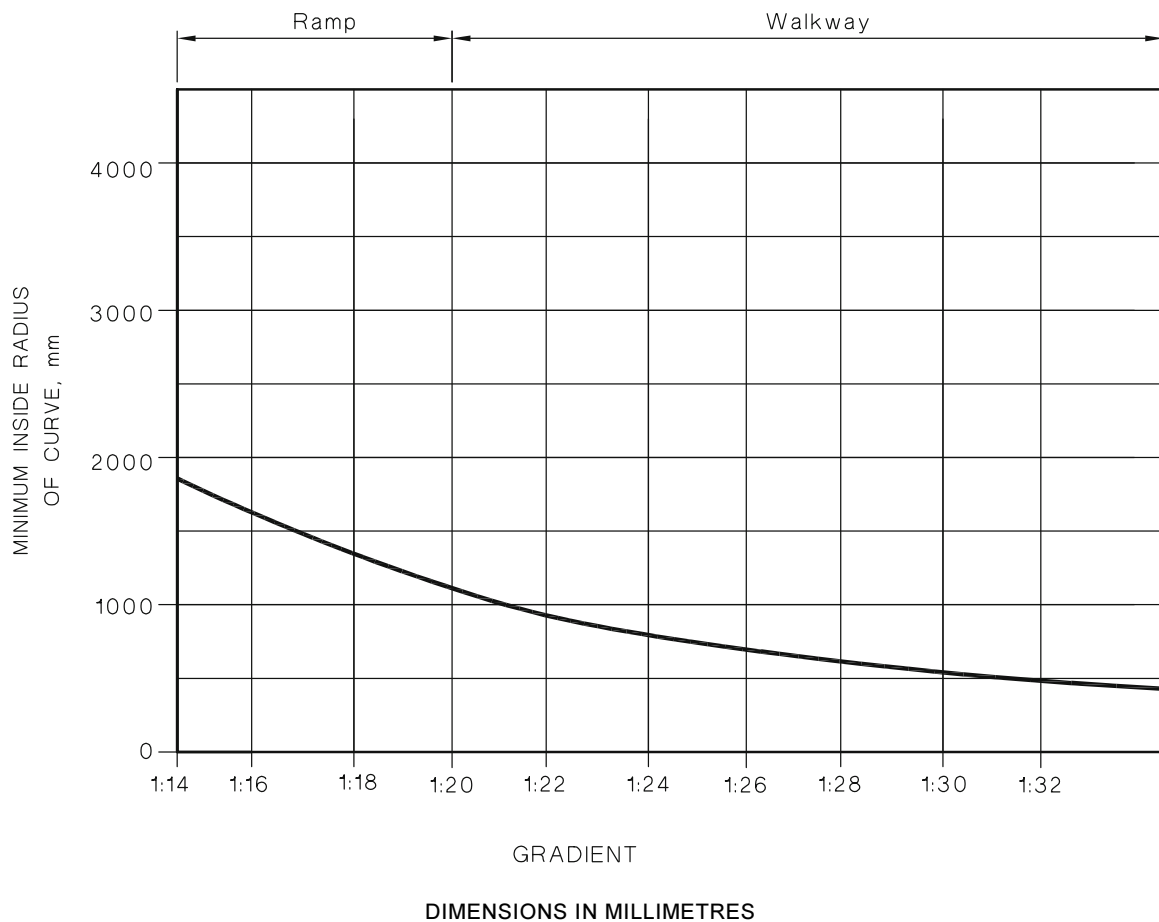


FIGURE 20 CURVED RAMP AND WALKWAY GRADIENTS

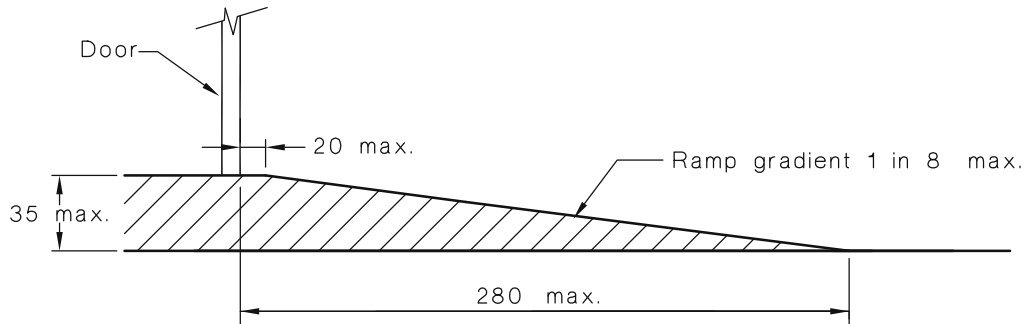
10.5 Threshold ramps

Threshold ramps at doorways on a continuous path of travel shall have—

- a maximum rise of 35 mm;
- a maximum length of 280 mm;
- a maximum gradient of 1:8; and
- be located within 20 mm of the door leaf which it serves, as shown in Figure 21.

The edges of the threshold ramp shall be tapered or splayed at a minimum of 45° where the ramp does not abut a wall.

NOTE: For door controls, see Clause 13.5.



DIMENSIONS IN MILLIMETRES

FIGURE 21 THRESHOLD RAMP

10.6 Step ramps

10.6.1 General

Step ramps shall have—

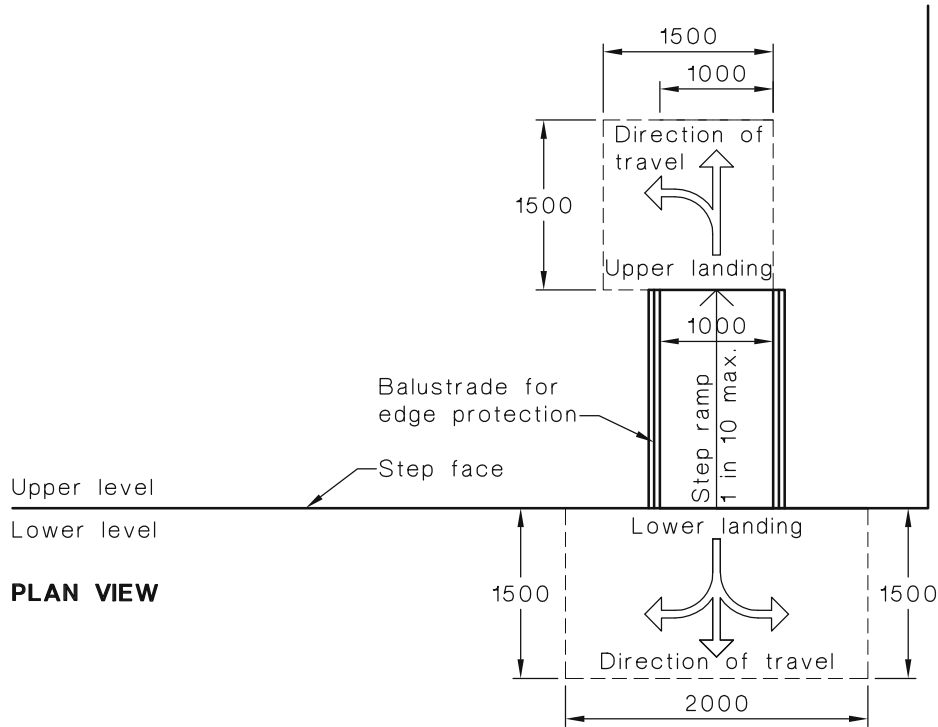
- a maximum rise of 190 mm;
- a length not greater than 1900 mm; and
- a gradient not steeper than 1 in 10.

Step ramps shall be as shown in Figures 22(A) and 22(B), as appropriate.

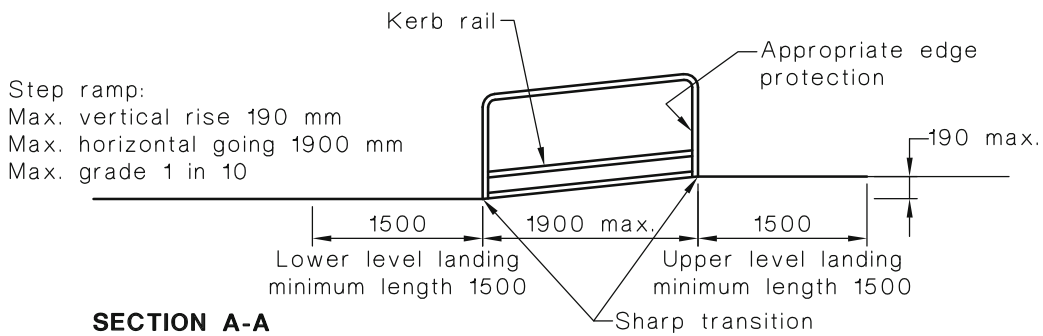
The edges of step ramp shall have a 45° splay where there is pedestrian cross-traffic. Otherwise, it shall be protected by a suitable barrier, as shown in Figure 22(B), such as—

- a wall or suitable barrier with a minimum height of 450 mm; or
- where an open balustrade is provided a kerb or kerb rail shall be provided.

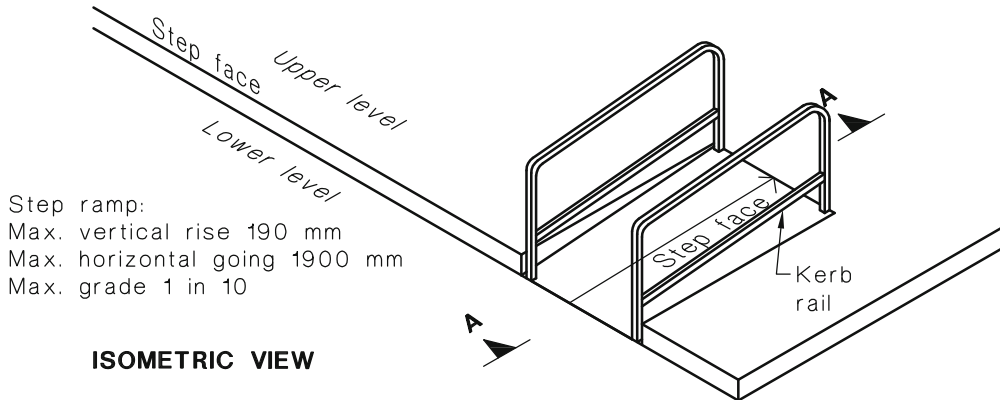
A1



PLAN VIEW



SECTION A-A



ISOMETRIC VIEW

NOTES:

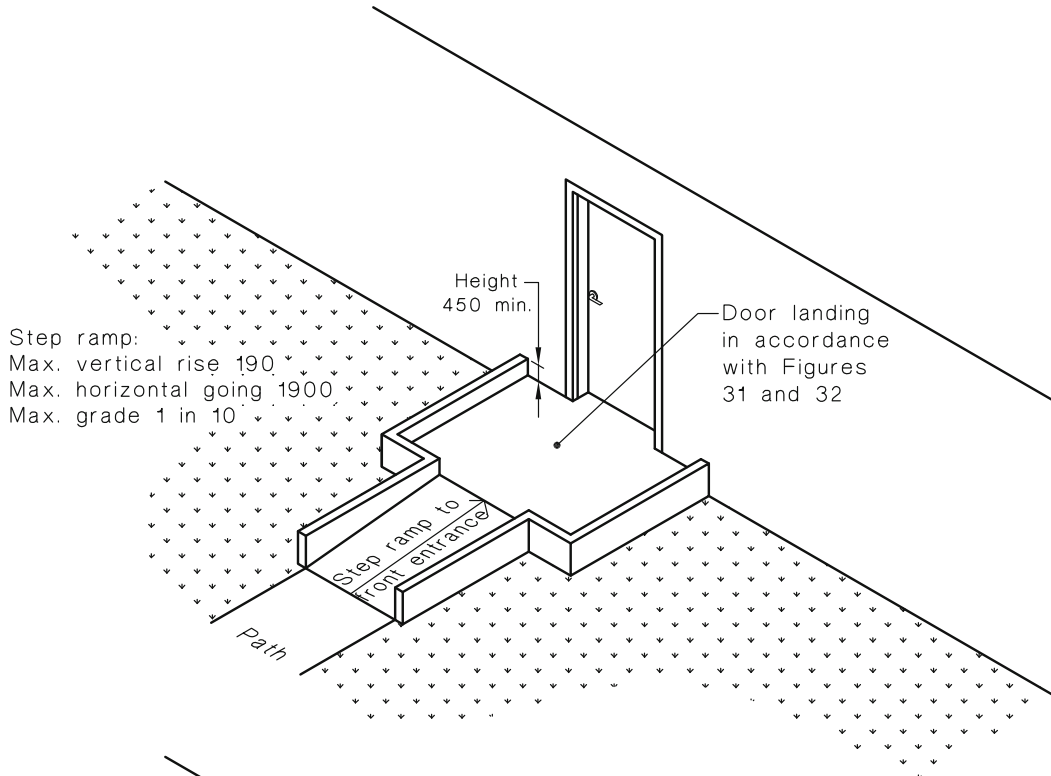
- 1 Where there is no turn involved, top and bottom landing may be reduced to 1200 mm min. in length.
- 2 Kerbs or kerb rails shall be provided in accordance with Clause 10.6.1 except where splayed sides are provided at a 45° angle.

DIMENSIONS IN MILLIMETRES

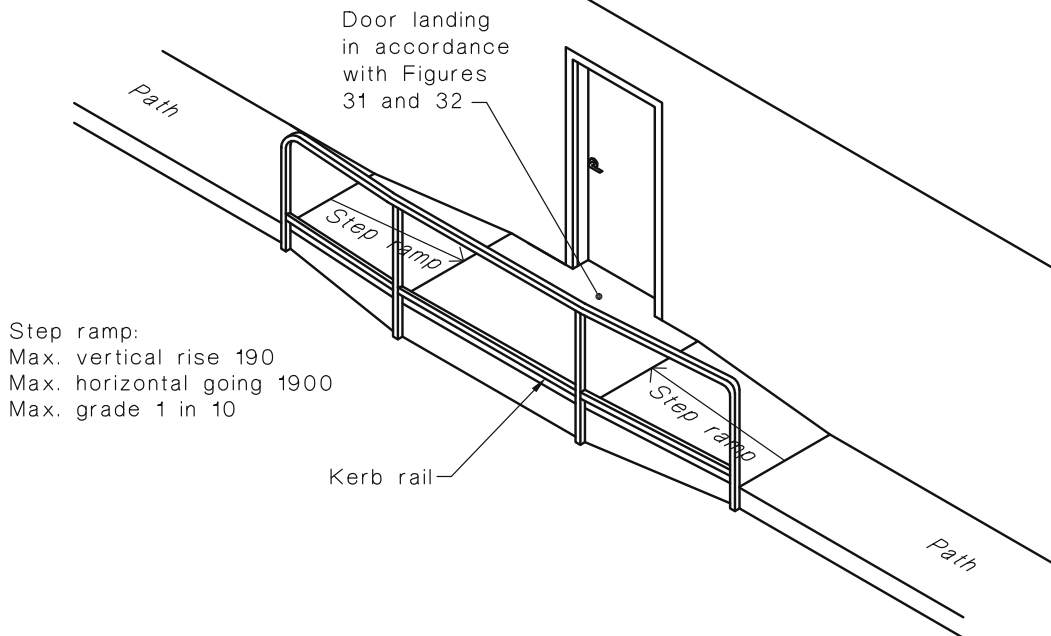
FIGURE 22(A) STEP RAMP—INSERTED

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A1



EXTERNAL STEP RAMP
AT ENTRANCE TO BUILDING



EXTERNAL STEP RAMP
AT ENTRANCE TO BUILDING

DIMENSIONS IN MILLIMETRES

FIGURE 22(B) EXTERNAL STEP RAMPS AT ENTRANCE TO BUILDING

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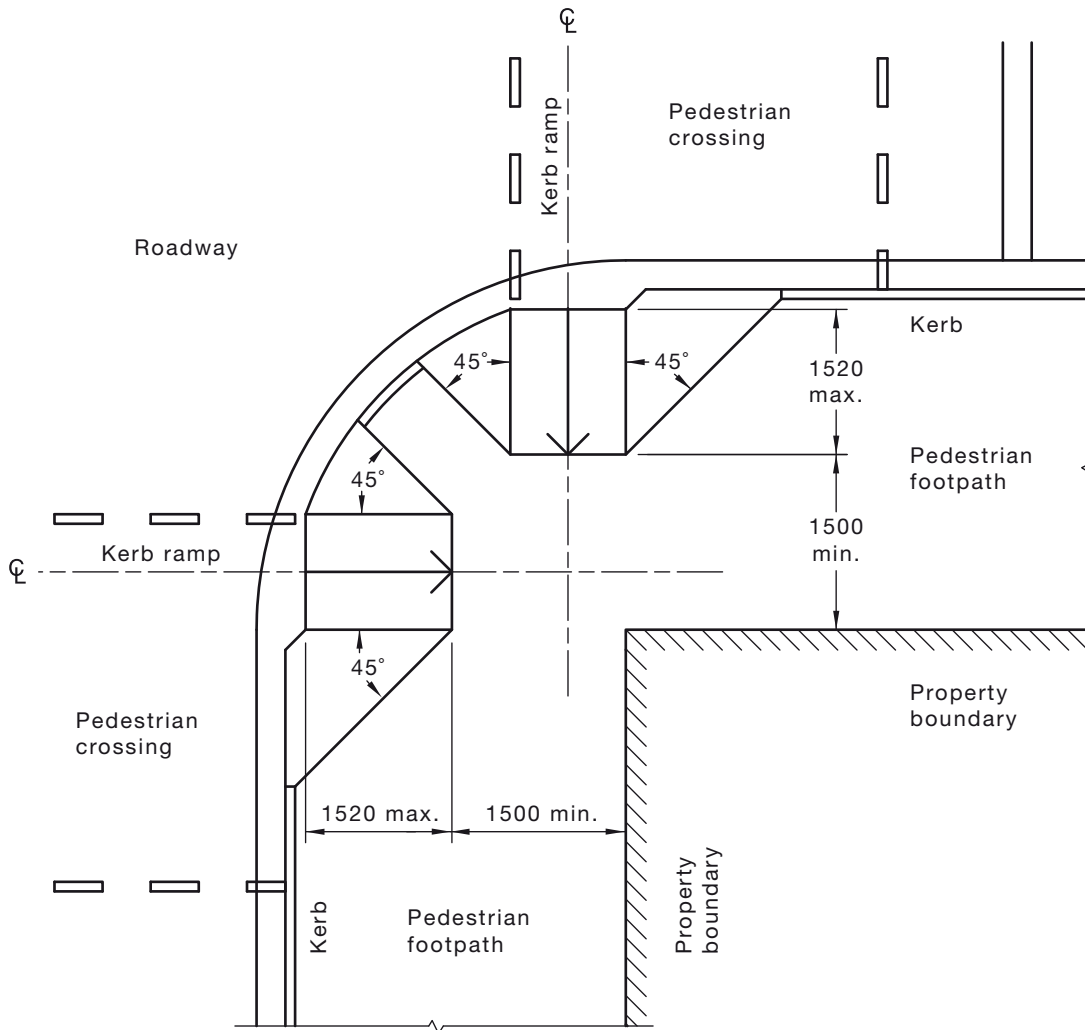
10.6.2 Finishes

Step ramps shall have a slip-resistant surface.

10.7 Kerb ramps

10.7.1 Alignment

Kerb ramps shall be aligned in the direction of travel, as shown in Figure 23.



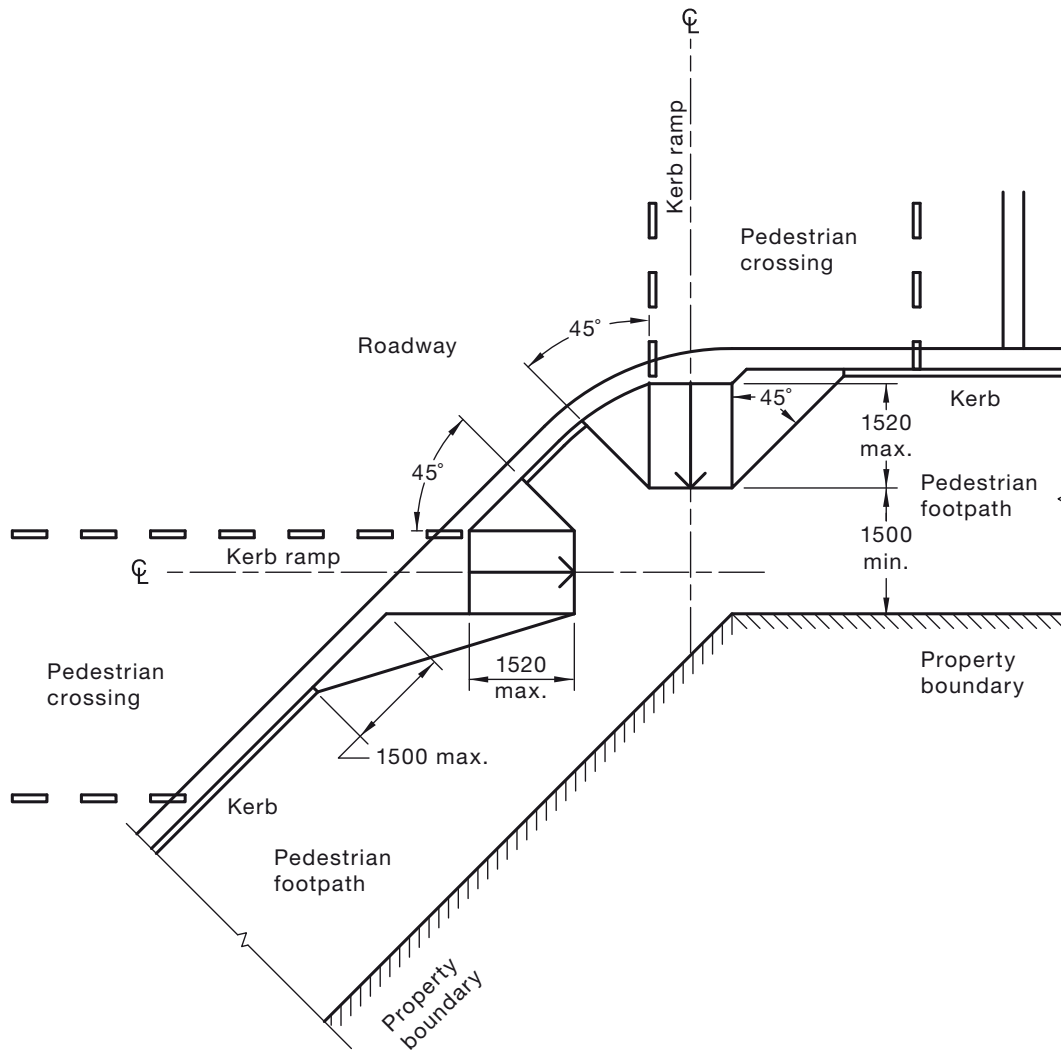
NOTES:

- A1 | 1 Centre-line of kerb ramps and pedestrian refuges shall align across the road or vehicular driveway within the building/property allotment.
- 2 Top and bottom of kerb ramps shall be aligned at 90° to path of travel.
- 3 Top and bottom of kerb ramps shall have a sharp gradient transition.
- 4 For requirements for tactile ground surface indicators see AS 1428.4.1.
- 5 For requirements for pedestrian lights and push-button assemblies see AS 1742.14.

(a) 90° road intersection

DIMENSIONS IN MILLIMETRES

FIGURE 23 (in part) ALIGNMENT OF KERB RAMPS



NOTES:

- A1 |
- 1 Centre-line of kerb ramps and pedestrian refuges shall align across the road or vehicular driveway within the building/property allotment.
 - 2 Top and bottom of kerb ramps shall have a sharp gradient transition.
 - 3 For requirements for tactile ground surface indicators see AS 1428.4.1.
 - 4 For requirements for pedestrian lights and push-button assemblies see AS 1742.14.

(b) 45° road intersection

DIMENSIONS IN MILLIMETRES

FIGURE 23 (in part) ALIGNMENT OF KERB RAMPS

10.7.2 Profile

Kerb ramps shall have—

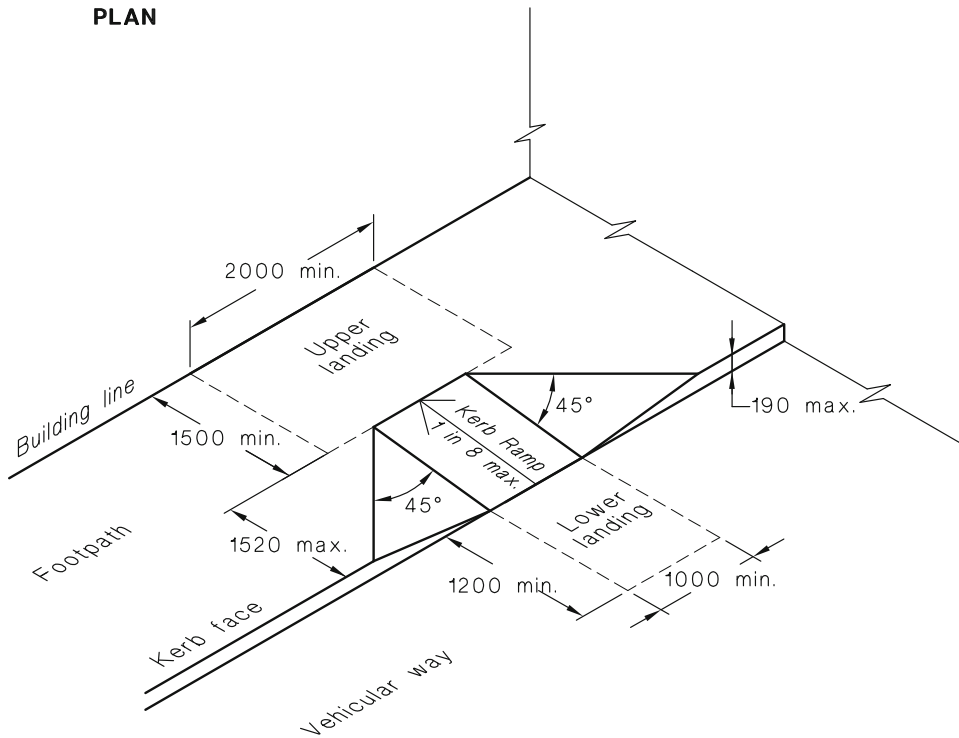
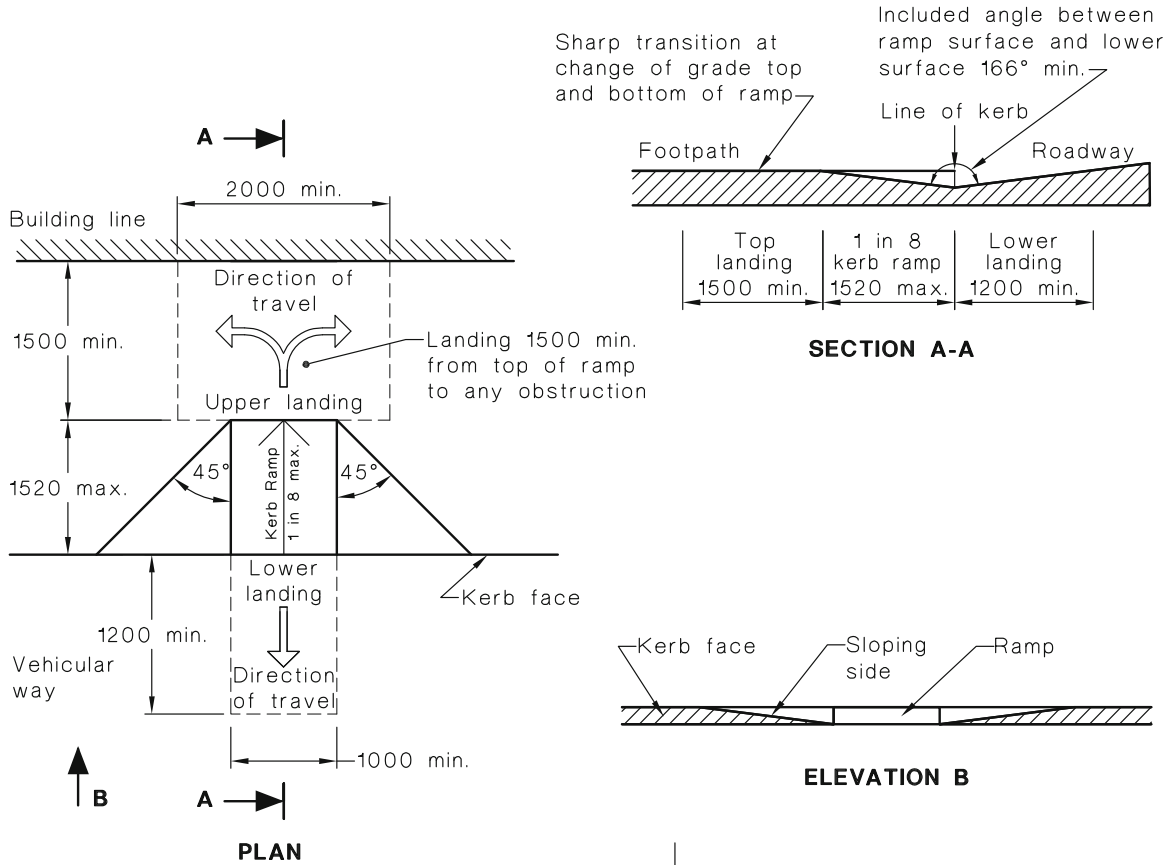
- (a) a maximum rise of 190 mm;
- (b) a length not greater than 1520 mm; and
- (c) a gradient not steeper than 1 in 8, located within or attached to a kerb.

The profile of ramps shall comply with the following:

- (i) The design and construction of kerb ramps shall be as shown in Figures 24(A), 24(B) and 24(C).
- (ii) The sloping sides of a kerb ramp shall be tapered or splayed as indicated in Figures 24(A) and (24(B).
- (iii) The angle at the base of the kerb ramp shall be a minimum of 166° as shown in Figures 24(A) and 24(B).

10.7.3 *Finishes*

Kerb ramps shall have a slip-resistant surface.



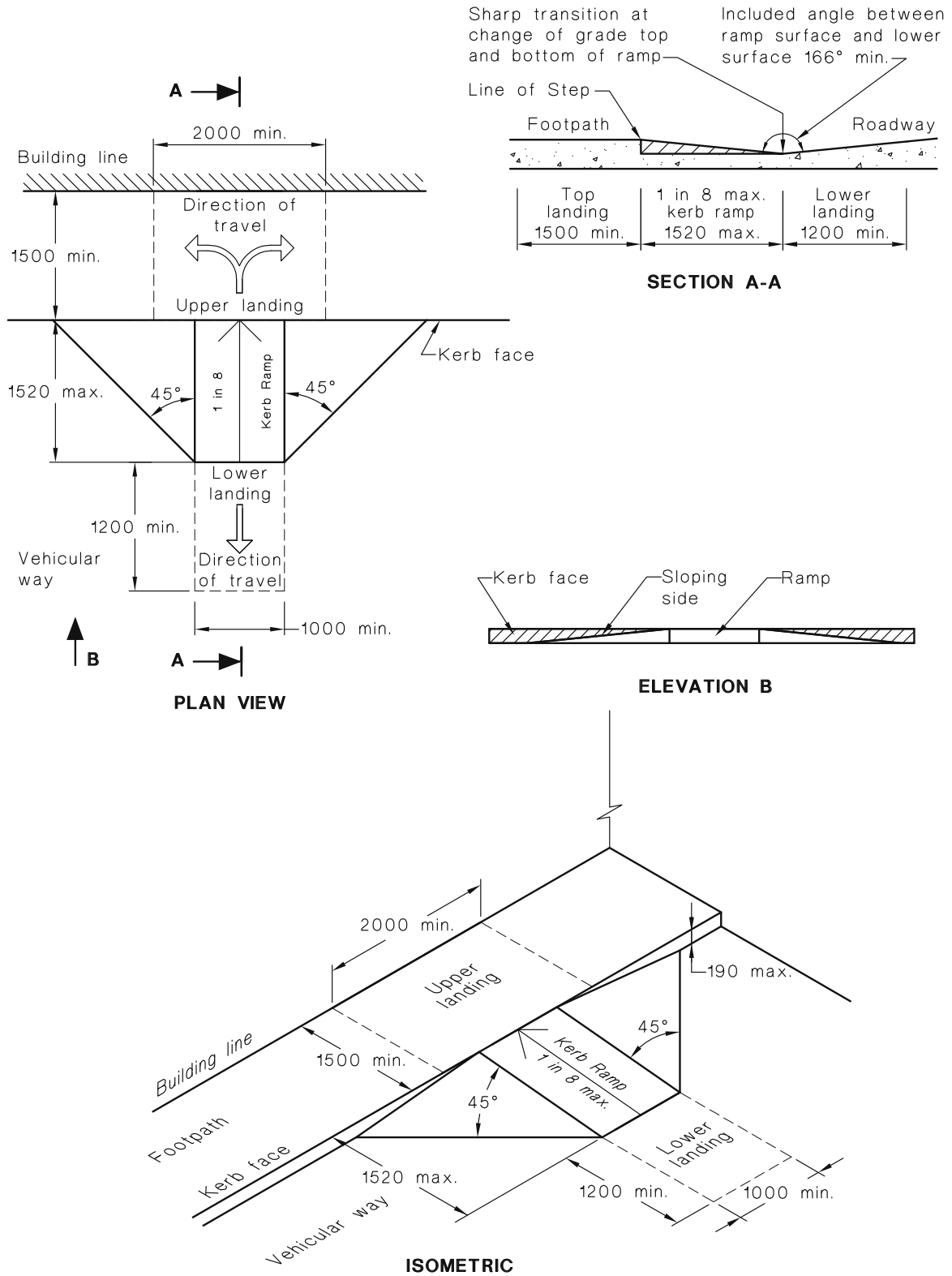
ISOMETRIC VIEW

NOTE: Where there is no turn involved, top landing may be reduced to 1200 mm min. in length.

DIMENSIONS IN MILLIMETRES

FIGURE 24(A) INSERTED KERB RAMP

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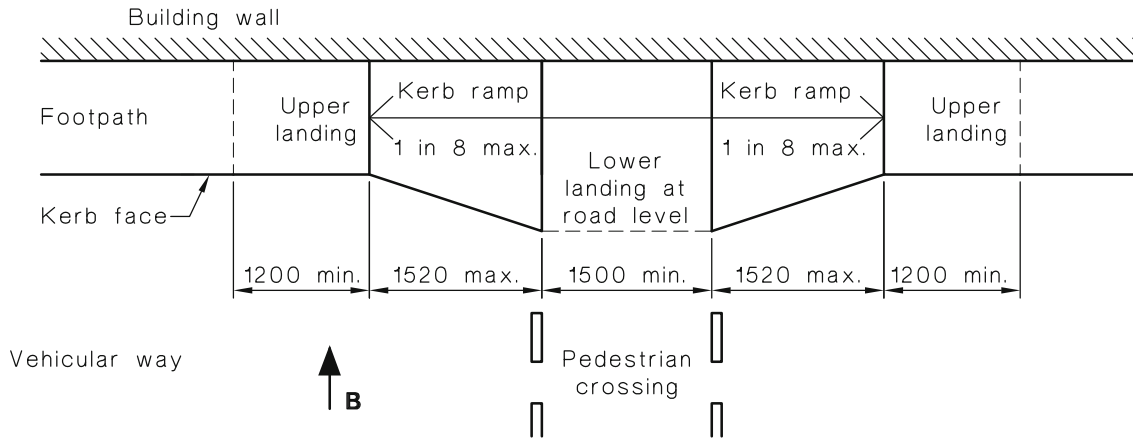
NOTE: Where there is no turn involved, top landing may be reduced to 1200 mm min. in length.

DIMENSIONS IN MILLIMETRES

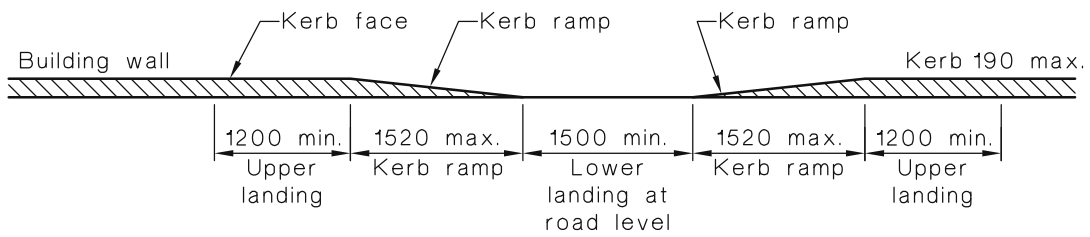
FIGURE 24(B) ATTACHED KERB RAMP

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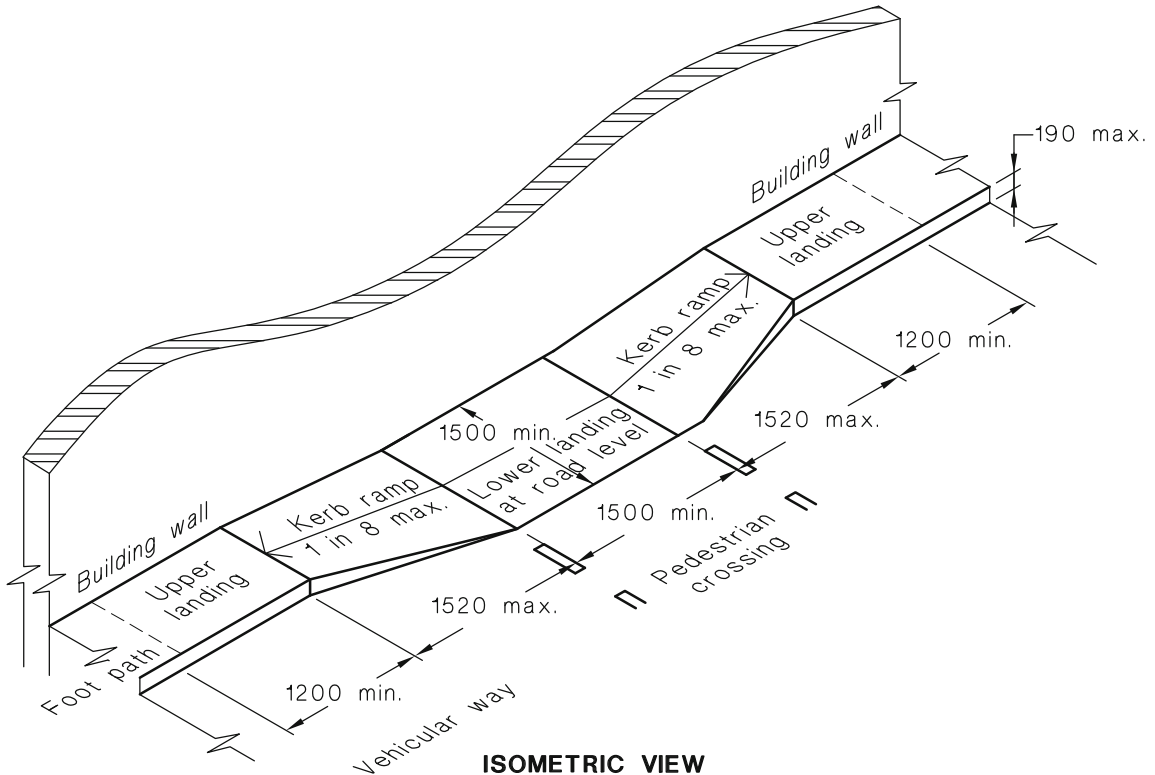
A1



PLAN



ELEVATION B



ISOMETRIC VIEW

DIMENSIONS IN MILLIMETRES

FIGURE 24(C) IN LINE KERB RAMPS—NARROW FOOTPATHS

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10.8 Landings

10.8.1 *Walkways and ramps*

The length of landings at walkways (up to a gradient of 1 in 33) and ramps shall comply with one of the following:

- (a) Where there is no change in direction, the length shall be not less than 1200 mm, as shown in Figure 25(A).
- (b) Where there is a change of direction not exceeding 90°, the landing shall be not less than 1500 mm. The internal corner shall be truncated for a minimum of 500 mm in both directions, as shown in Figure 25(B).
- (c) For a 180° turn, the landing shall be as shown in Figure 25(C),

10.8.2 *Step ramps*

The length of landings at step ramps shall be not less than 1200 mm in the direction of travel, as shown in Figures 22(A) and 22(B).

Where a change in direction is required, the length of step ramp landings shall be a minimum of 1500 mm, as shown in Figure 22(A).

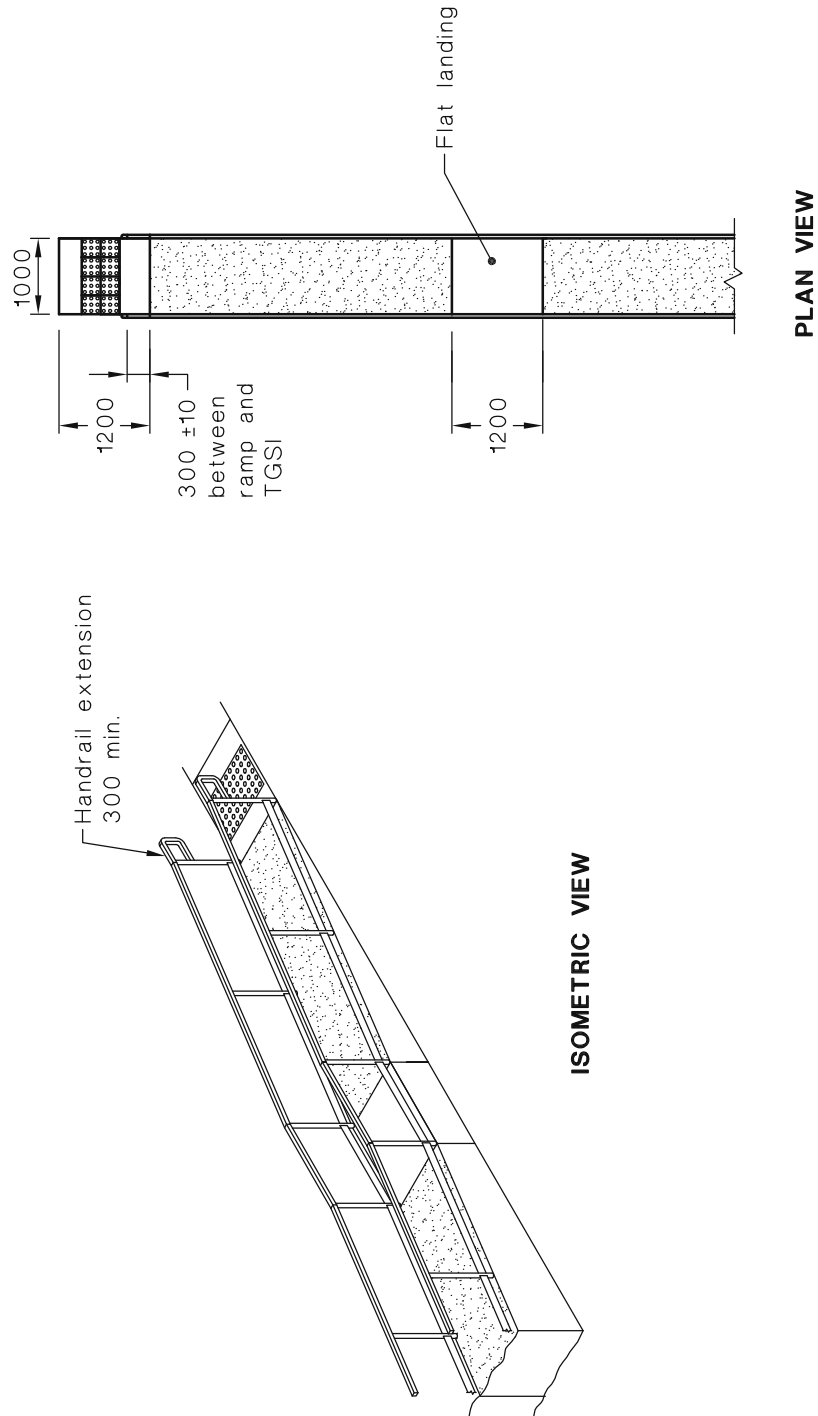
Where doorways are at landings, the dimensions of the landings shall be in accordance with the requirements of Clause 13.3 for circulation spaces at doorways shown in Figure 25(D).

10.8.3 *Kerb ramps*

The length of landings at kerb ramps shall be not less than 1200 mm in the direction of travel.

Where a 'T' junction occurs, the kerb ramp landing shall be a minimum of 1500 × 2000 mm, as shown in Figure 24(B).

Where a single change in direction is required, the ramp landings shall be a minimum of 1500 mm × 1500 mm.



DIMENSIONS IN MILLIMETRES

FIGURE 25(A) RAMPS AND LANDINGS—WITH NO CHANGE IN DIRECTION

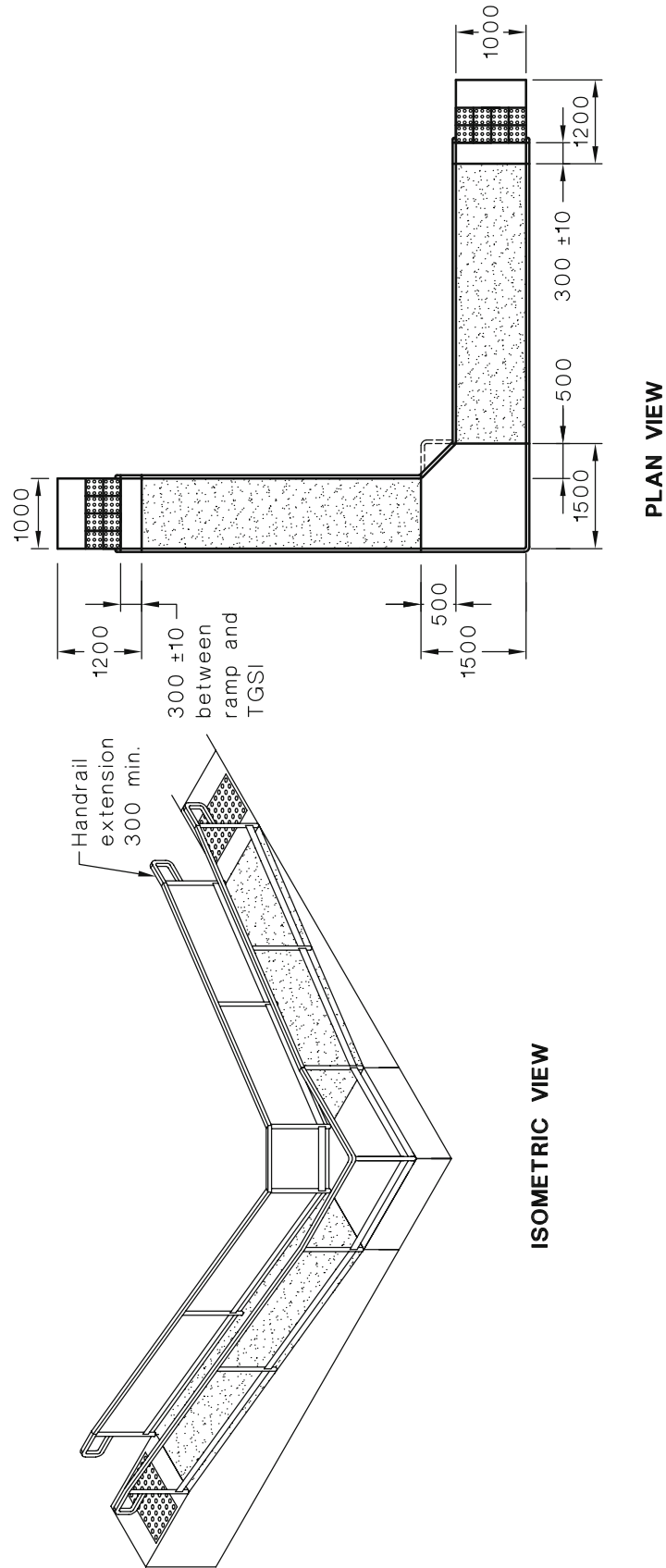
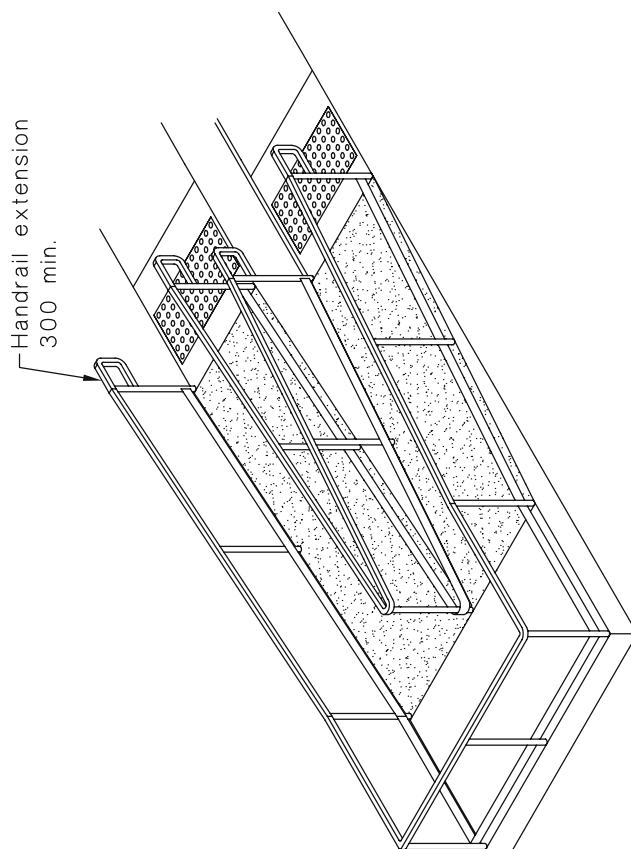
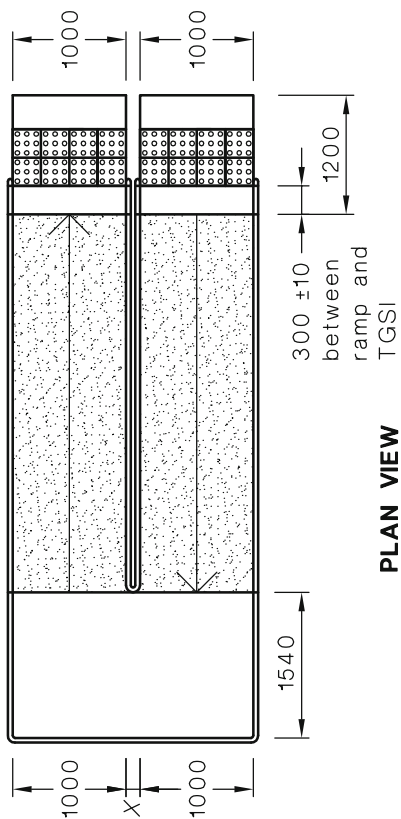


FIGURE 25(B) RAMPS AND LANDINGS—90° LANDING—INTERNAL



ISOMETRIC VIEW



PLAN VIEW

DIMENSIONS IN MILLIMETRES

FIGURE 25(C) RAMPS AND LANDINGS—180° LANDING

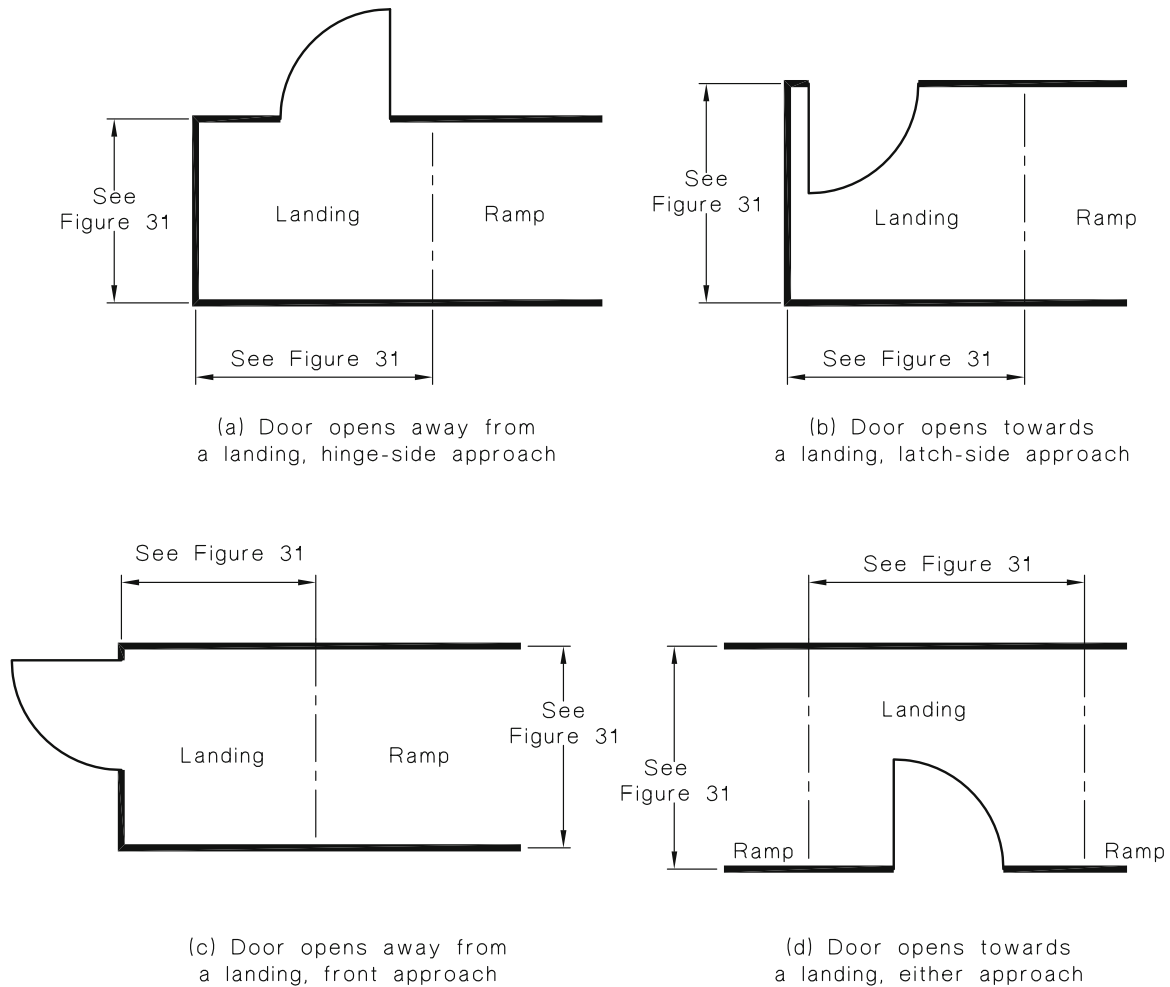


FIGURE 25(D) DOORWAYS AT LANDINGS

11 STAIRWAYS

11.1 Stair construction

Where required, stairs shall be constructed as follows:

- (a) Where the intersection is at the property boundary, the stair shall be set back by a minimum of 900 mm so that the handrail (complying with Clause 12) and TGSIs do not protrude into the transverse path of travel, as shown in Figure 26(A).
- (b) Where the intersection is at an internal corridor, the stair shall be set back in accordance with Figure 26(B).
NOTE: Examples of stair handrail terminations are given in Figures 26(C) and 26(D).
- (c) Stairs shall have opaque risers.
- (d) Stair nosings shall not project beyond the face of the riser and the riser may be vertical or have a splay backwards up to a maximum 25 mm, as shown in Figures 27(A) and 27(B).
- (e) Stair nosing profiles shall—
 - (i) have a sharp intersection;
 - (ii) be rounded up to 5 mm radius; or
 - (iii) be chamfered up to 5 mm × 5 mm.

- (f) At the nosing, each tread shall have a strip not less than 50 mm and not more than 75 mm deep across the full width of the path of travel. The strip may be set back a maximum of 15 mm from the front of the nosing. The strip shall have a minimum luminance contrast of 30% to the background. Where the luminous contrasting strip is affixed to the surface of the tread, any change in level shall comply with Clause 7.2 and Clause 7.3.
- (g) Where the luminance contrasting strip is not set back from the front of the nosing then any area of luminance contrast shall not extend down the riser more than 10 mm.
- (h) TGSIs shall be installed in accordance with AS 1428.4.1.

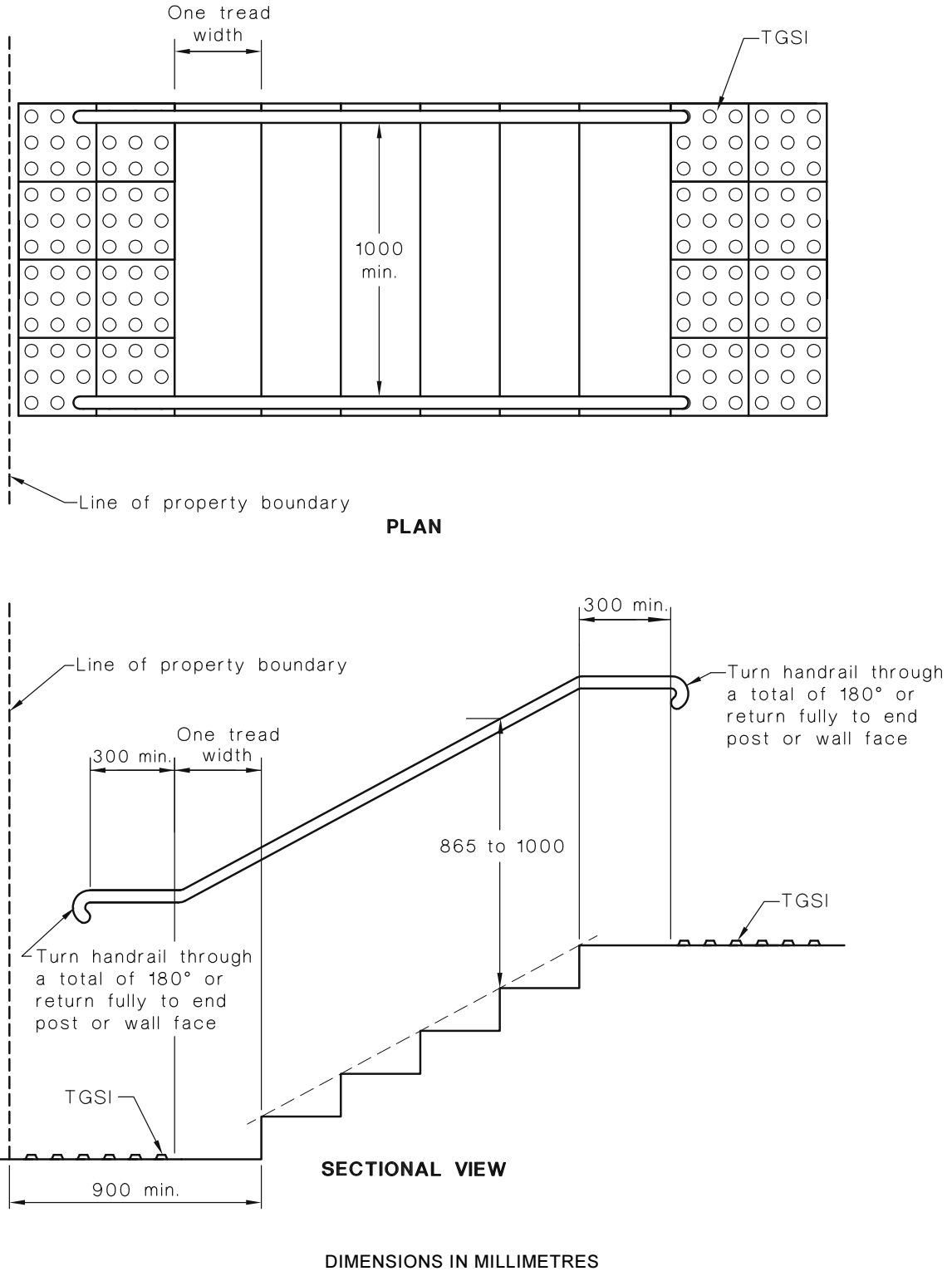
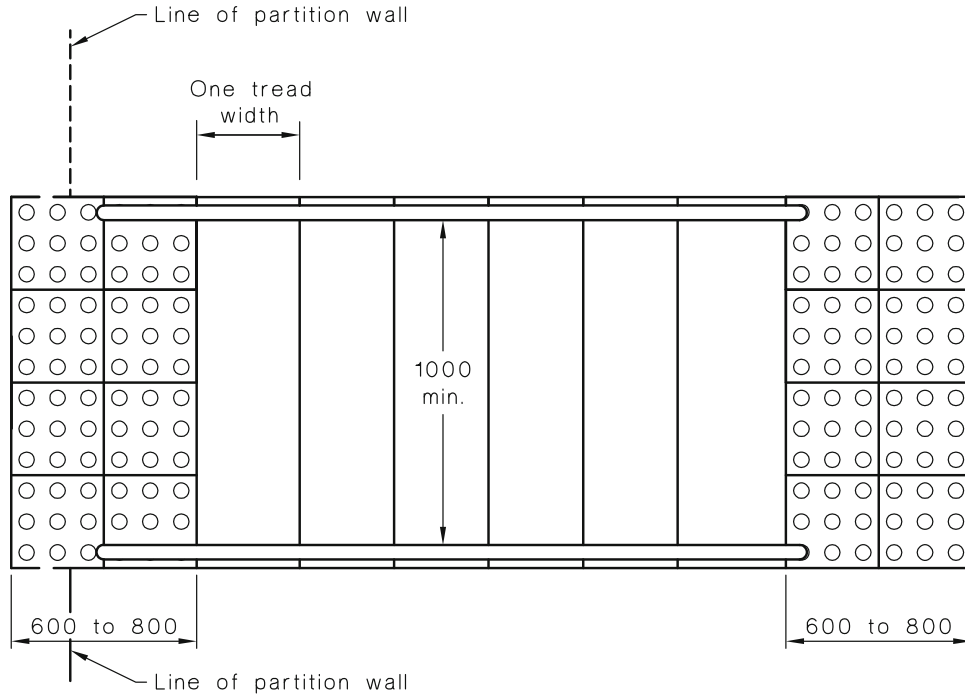
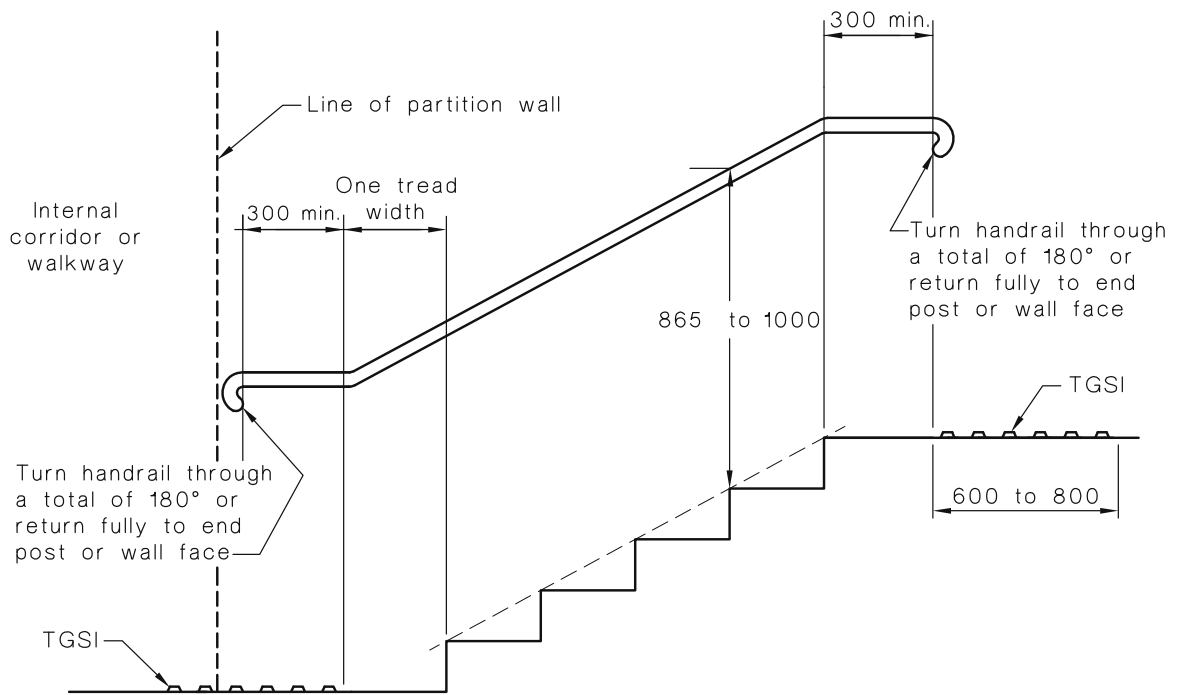


FIGURE 26(A) STAIRWAY LOCATION AND HANDRAIL EXTENSIONS AT BOUNDARY

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PLAN



SECTIONAL VIEW

DIMENSIONS IN MILLIMETRES

FIGURE 26(B) STAIRWAY LOCATION AND HANDRAIL EXTENSIONS AT END OF STAIRWAY OTHER THAN AT LINE OF BOUNDARY

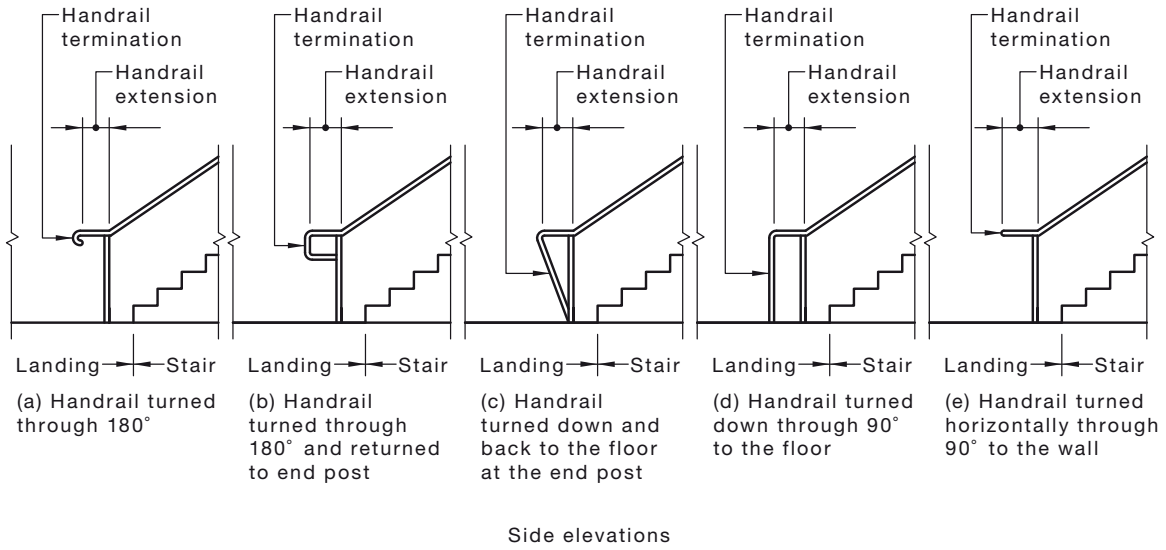


FIGURE 26(C) STAIR HANDRAILS—HANDRAIL TERMINATIONS

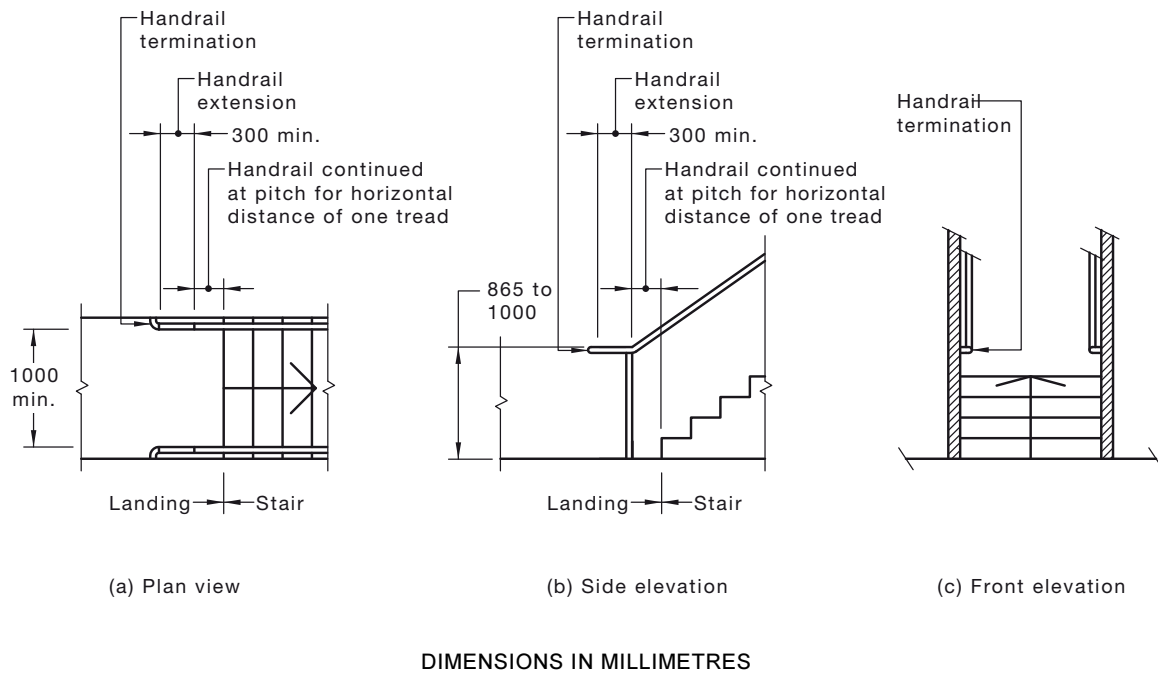
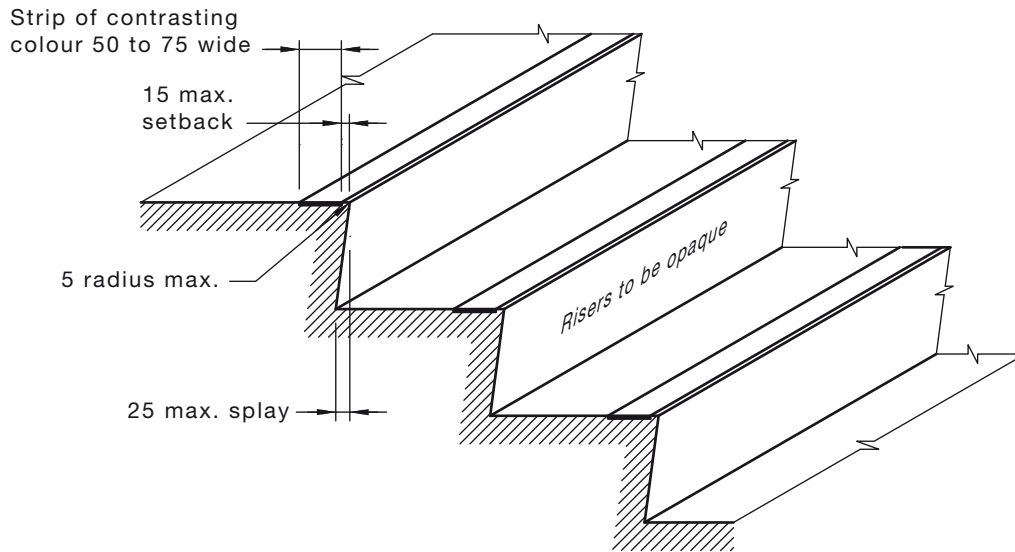


FIGURE 26(D) DETAIL FOR HANDRAILS TERMINATED BY TURNING HORIZONTALLY THROUGH 90° TO THE WALL

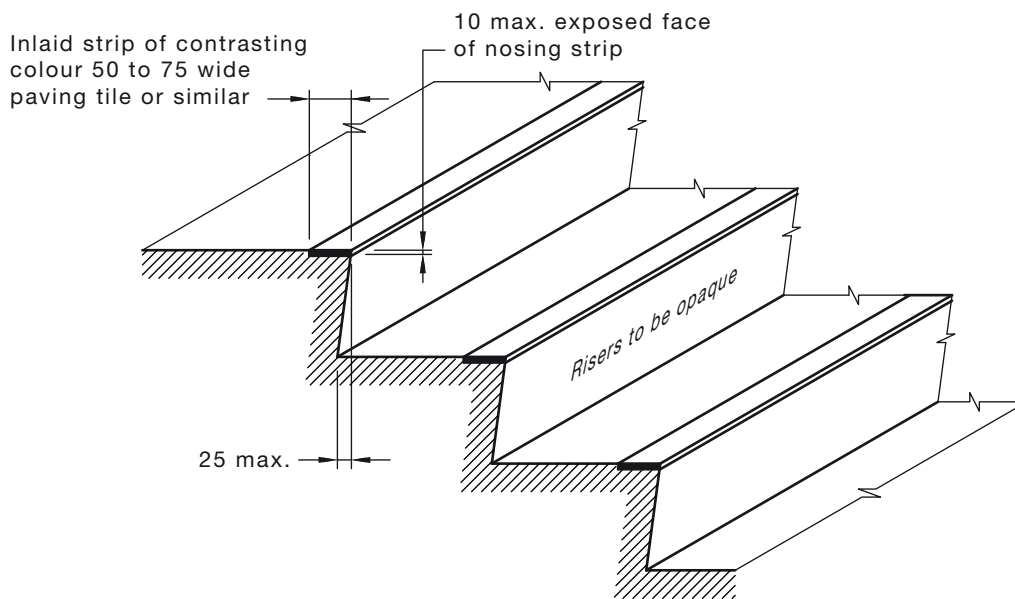
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NOTE: A chamfered nosing 5 × 5 mm may be used.

DIMENSIONS IN MILLIMETRES

FIGURE 27(A) A TYPICAL STAIR NOSING PROFILE WITH NOSING STRIP



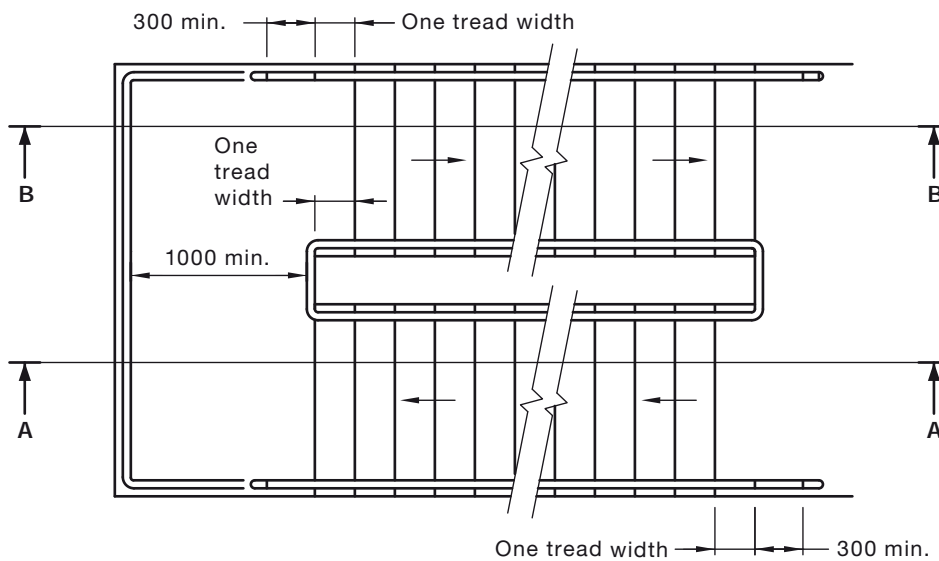
DIMENSIONS IN MILLIMETRES

FIGURE 27(B) A TYPICAL STAIR NOSING PROFILE WITH EXPOSED NOSING STRIP

11.2 Stairway handrails

Handrails shall be continuous throughout the stair flight and, where practicable, around landings (see Figure 28) and have no obstruction on or above up to a height of 600 mm and as follows:

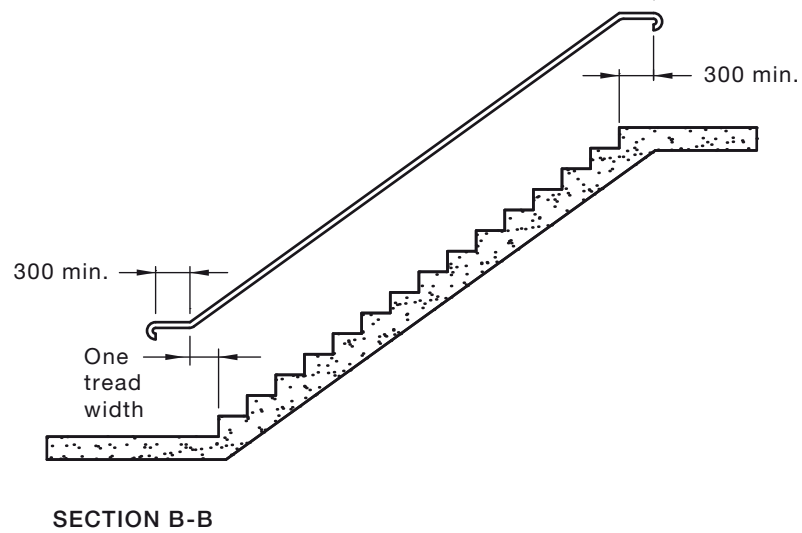
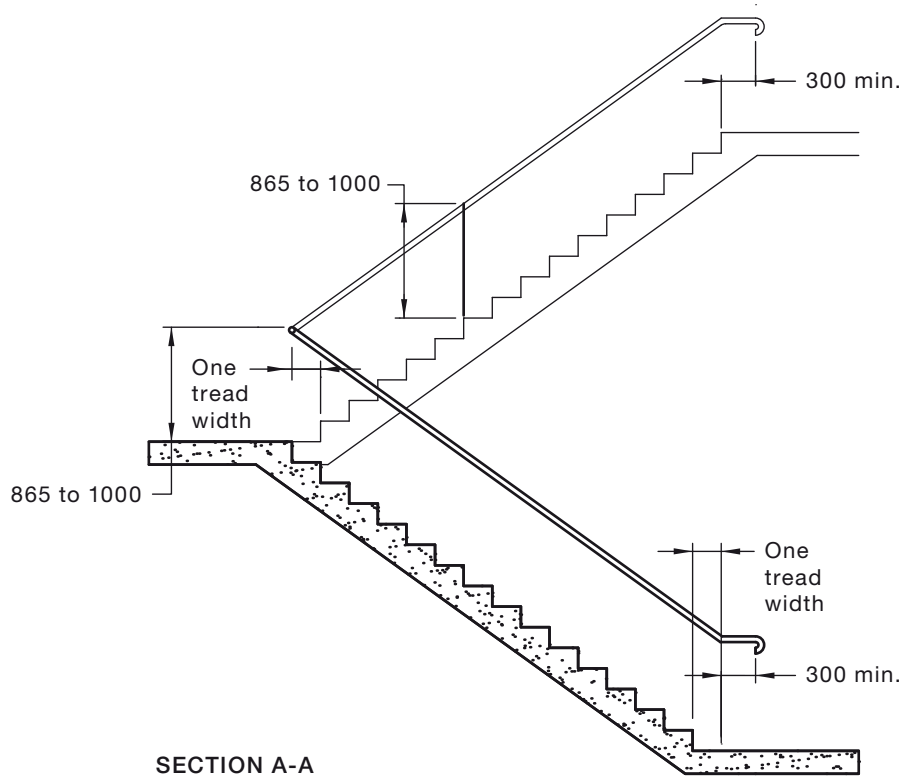
- The design and construction of handrails shall comply with Clause 12.
- Handrails shall be installed on both sides of the stairs and as shown in Figures 26(A) and 26(B).
- Handrails shall have no vertical sections and shall follow the angle of the stairway nosings, as shown in Figure 28(b).
- Where a handrail terminates at the bottom of a flight of stairs, the handrail shall extend at least one tread depth parallel to the line of nosings plus minimum of 300 mm horizontally from the last riser (see Figure 28(b)).
- The handrail shall extend a minimum of 300 mm horizontally past the nosing on the top riser.
- Where the handrail is continuous, the 300 mm extension is not required in the inner handrail at intermediate landings as shown in Figure 28(a).
- The dimensions indicating the heights of handrails shall be taken vertically from the nosing of the tread to the top of the handrail or from the landing to the top of the handrail.



(a) Plan

DIMENSIONS IN MILLIMETRES

FIGURE 28 (in part) HANDRAILS TO STAIRS WITH INTERMEDIATE LANDINGS



(b) Sections

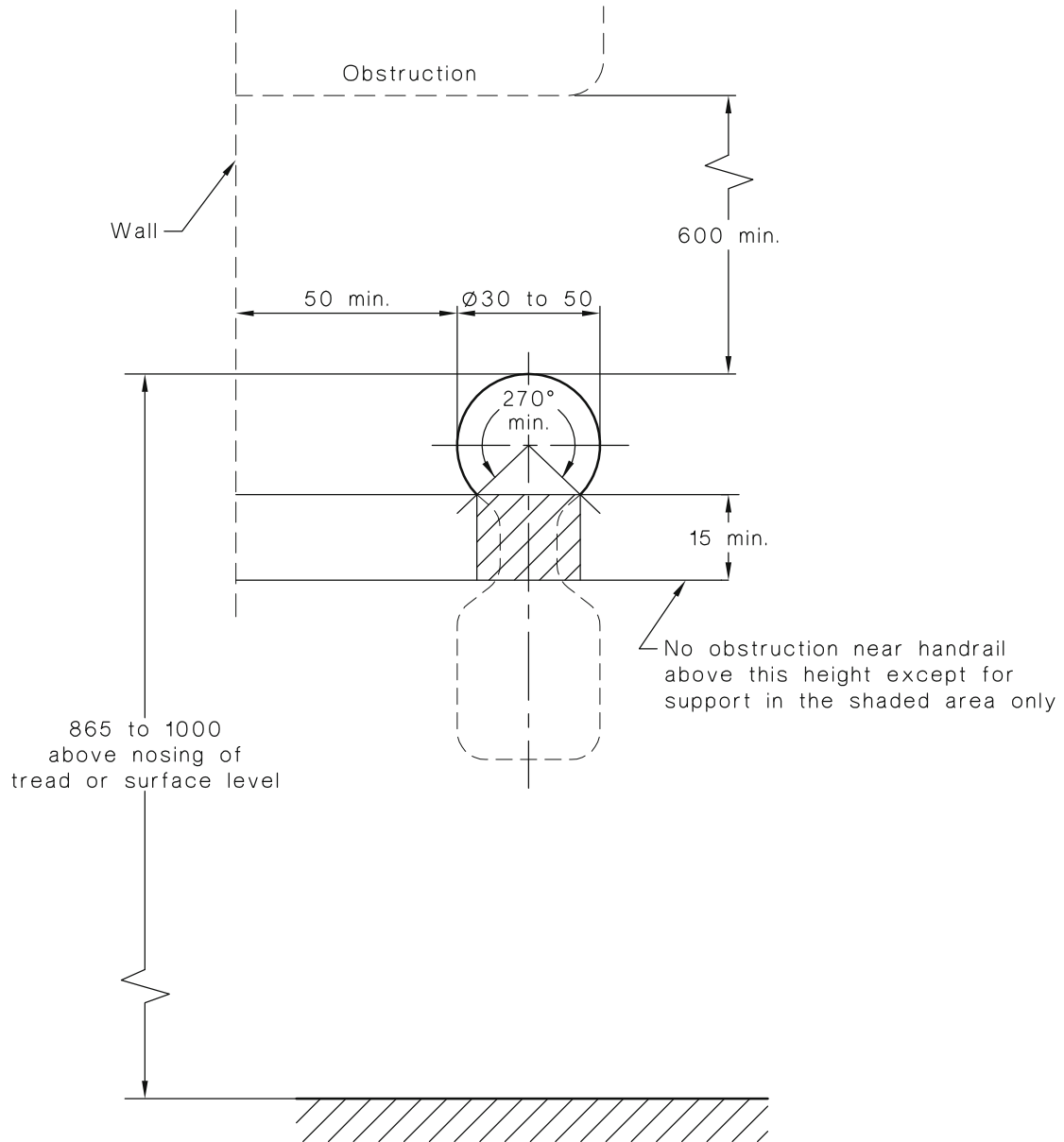
DIMENSIONS IN MILLIMETRES

FIGURE 28 (in part) HANDRAILS TO STAIRS WITH INTERMEDIATE LANDINGS

12 HANDRAILS

The design and construction of handrails shall comply with the following:

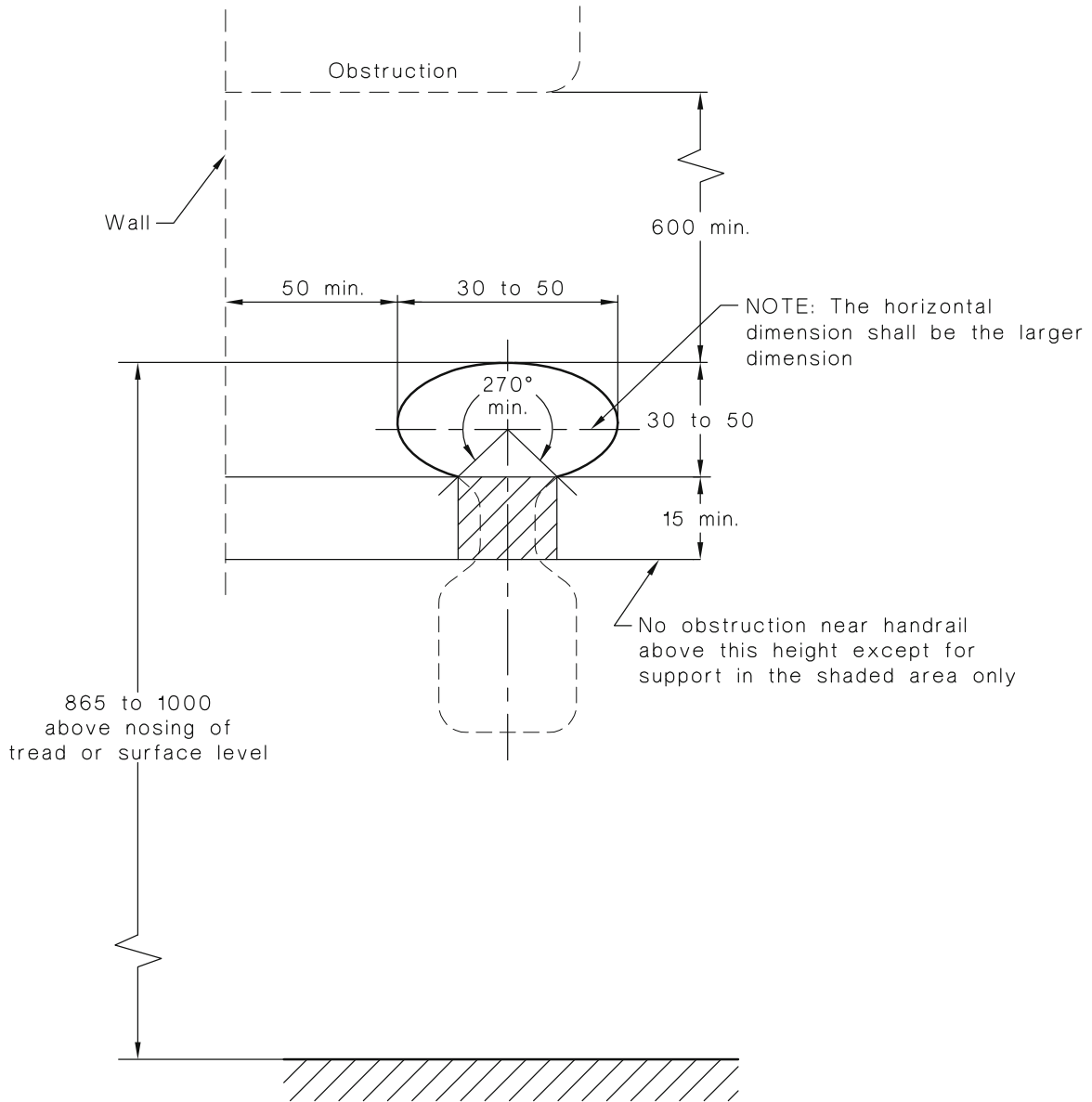
- (a) Handrails and balustrades shall not encroach into required circulation spaces.
- (b) The cross-section of handrails shall be circular or elliptical, not less than 30 mm or greater than 50 mm in height or width for not less than 270° around the uppermost surface as shown in Figures 29(a) and 29(b). Elliptical handrails shall have the greater dimension in the horizontal axis as shown in Figure 29(b).
- (c) Exposed edges at ends and corners of handrails shall have a radius of not less than 5 mm.
- (d) The top of handrails shall be not less than 865 mm nor more than 1000 mm above the nosing of stairway tread or the plane of the finished floor of the walkway, ramp or landing.
- (e) The height of the top of the handrail, measured in accordance with Item (d), shall be consistent through the ramp (or stairs) and any landings.
- (f) If a balustrade is required at a height greater than the handrail, both shall be provided.
- (g) Handrails shall be securely fixed and rigid, and their ends shall be turned through a total of 180°, or to the ground, or returned fully to end post or wall face, as shown in Figures 26(C) and 26(D).
- (h) The clearance between a handrail and an adjacent wall surface or other obstruction shall be not less than 50 mm. This clearance shall extend above the top of the handrail by not less than 600 mm.
- (i) Handrails shall have no obstruction to the passage of a hand along the rail, as shown in Figures 29(a) and 29(b).
- (j) The inside handrail at landings shall always be continuous, as shown in Figure 28(a).



(a) Circular

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FIGURE 29 (in part) HANDRAILS



(b) Elliptical

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FIGURE 29 (in part) HANDRAILS

13 DOORWAYS, DOORS AND CIRCULATION SPACE AT DOORWAYS

13.1 Luminance contrast

All doorways shall have a minimum luminance contrast of 30% provided between—

- (a) door leaf and door jamb;
- (b) door leaf and adjacent wall;
- (c) architrave and wall;
- (d) door leaf and architrave; or
- (e) door jamb and adjacent wall.

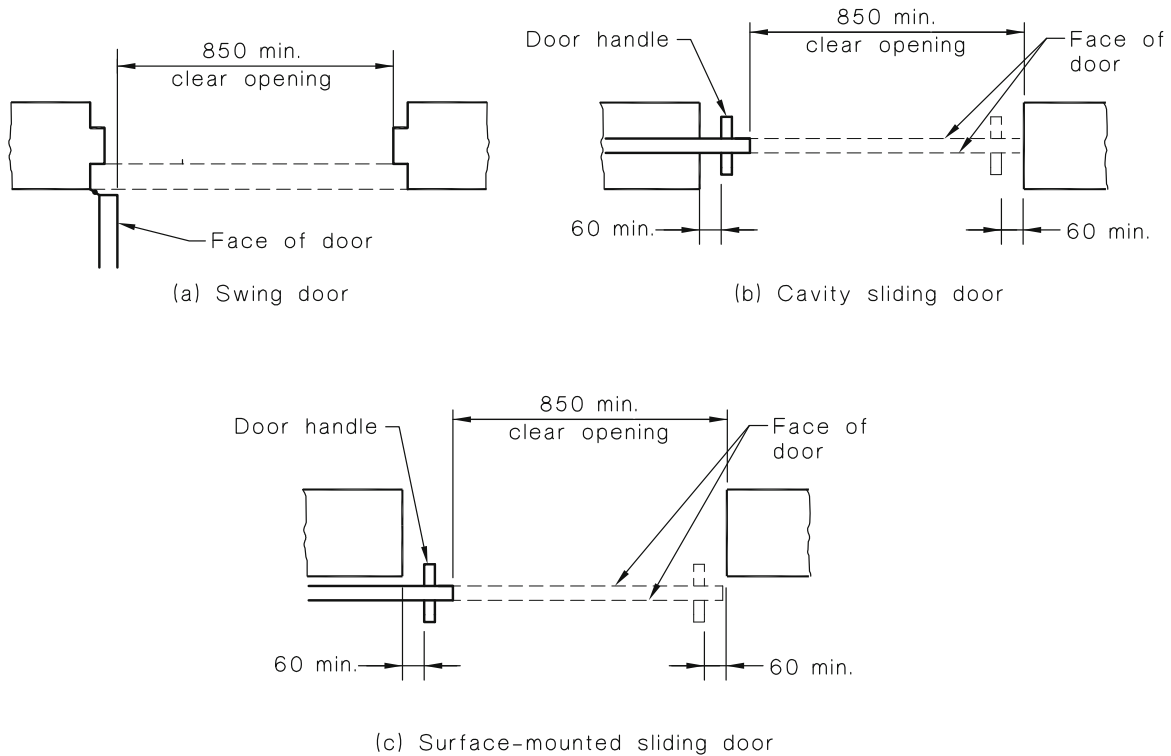
The minimum width of the area of luminance contrast shall be 50 mm.

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13.2 Clear opening of doorways

The minimum clear opening of a doorway on a continuous accessible path of travel shall be 850 mm when measured from the face of the opened door to the doorstop, as shown in Figure 30. Where double doors are used, the 850 mm minimum clear opening shall apply to the active leaf.

NOTE: For door controls, see Clause 13.5.



DIMENSIONS IN MILLIMETRES

FIGURE 30 CLEAR OPENING OF DOORWAYS

13.3 Circulation spaces at doorways on a continuous accessible path of travel

13.3.1 General

Circulation spaces shall be provided at every doorway, gate, or similar entry way, on a continuous accessible path of travel.

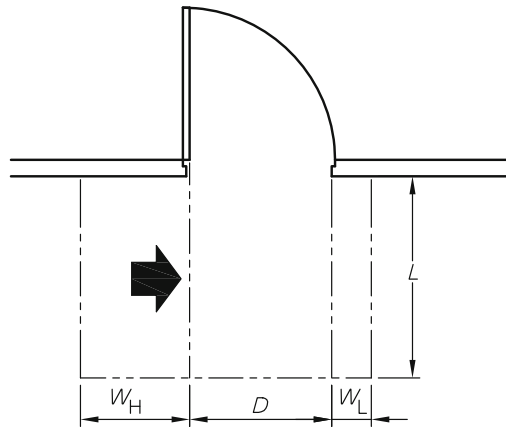
Circulation spaces at doorways shall have a gradient and crossfall not steeper than 1 in 40.

Doorway circulation spaces shall be used in combination to allow access through doorways in both directions, as shown in Figures 31 and 32.

The dimensions shall also apply in mirror image configurations. Where clear doorway openings are intermediate to those shown in Figures 31 and 32 then the required circulation spaces shall be interpolated.

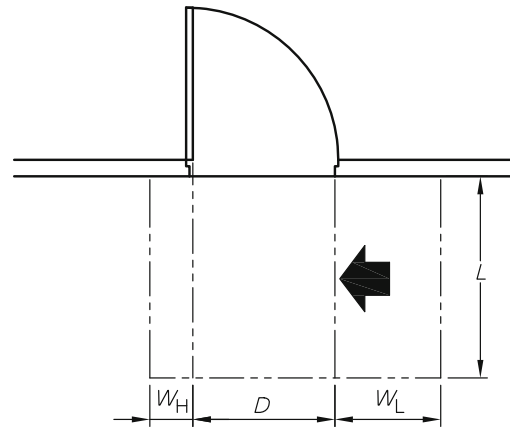
13.3.2 Swinging doors

The clear circulation space at doorways with swinging doors is based on the clear opening width of the doorway (D). The clear circulation space shall be not less than the dimensions specified in the tables of Figure 31 for the appropriate clear opening width.



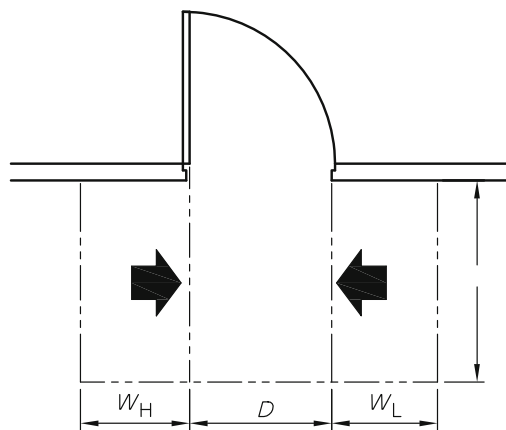
Dimension <i>D</i>	Dimension <i>L</i>	Dimension <i>W_H</i>	Dimension <i>W_L</i>
850	1220	560	340
900	1185	510	340
950	1160	460	340
1000	1140	410	340

(a) Hinge-side approach, door opens away from user



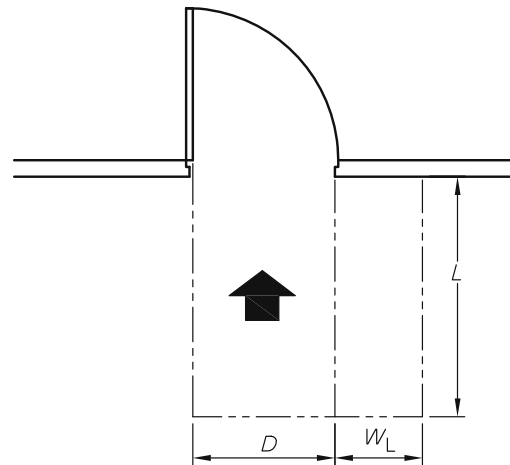
Dimension <i>D</i>	Dimension <i>L</i>	Dimension <i>W_H</i>	Dimension <i>W_L</i>
850	1240	240	660
900	1210	190	660
950	1175	140	660
1000	1155	90	660

(b) Latch-side approach, door opens away from user



Dimension <i>D</i>	Dimension <i>L</i>	Dimension <i>W_H</i>	Dimension <i>W_L</i>
850	1240	560	660
900	1210	510	660
950	1175	460	660
1000	1155	410	660

(c) Either side approach, door opens away from user



Dimension <i>D</i>	Dimension <i>L</i>	Dimension <i>W_H</i>	Dimension <i>W_L</i>
850	1450	0	510
900	1450	0	510
950	1450	0	510
1000	1450	0	510

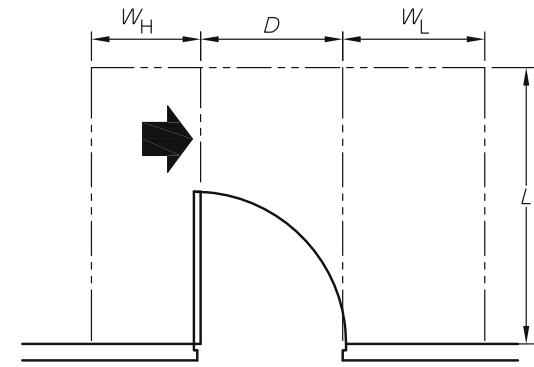
(d) Front approach, door opens away from user

LEGEND:
D = Clear opening of width of doorway
L = Length
W_H = Width—hinge side
W_L = Width—latch side
 = Direction of approach
 ---- = Circulation space

DIMENSIONS IN MILLIMETRES

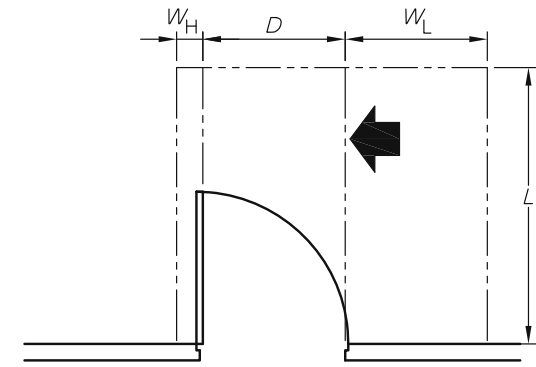
FIGURE 31 (in part) CIRCULATION SPACES AT DOORWAYS WITH SWINGING DOORS

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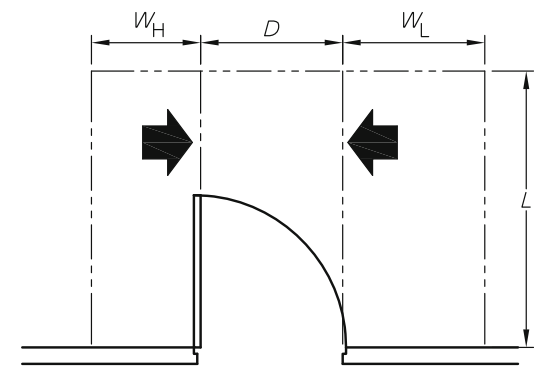
Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1670	660	900
900	1670	610	900
950	1670	560	900
1000	1670	510	900

(e) Hinge-side approach, door opens towards user



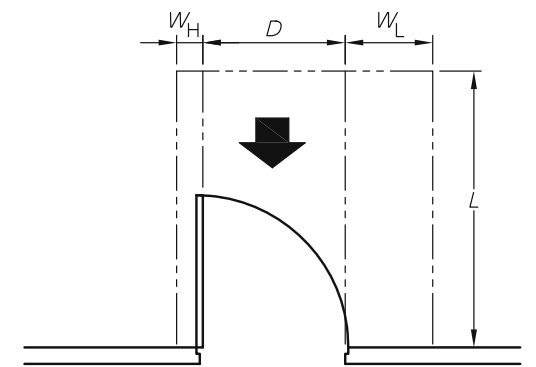
Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1670	110	900
900	1670	110	900
950	1670	110	900
1000	1670	110	900

(f) Latch-side approach, door opens towards user



Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1670	660	900
900	1670	610	900
950	1670	560	900
1000	1670	510	900

(g) Either side approach, door opens towards user



Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1450	110	530
900	1450	110	530
950	1450	110	530
1000	1450	110	530

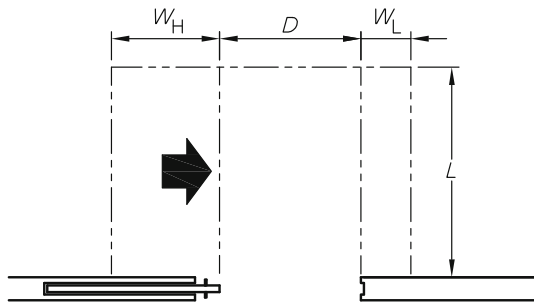
(h) Front approach, door opens towards user

LEGEND:
 D = Clear opening of width of doorway
 L = Length
 W_H = Width—hinge side
 W_L = Width—latch side
 = Direction of approach
 ---- = Circulation space

DIMENSIONS IN MILLIMETRES

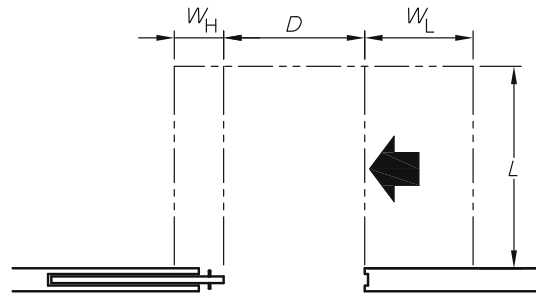
FIGURE 31 (in part) CIRCULATION SPACES AT DOORWAYS WITH SWINGING DOORS

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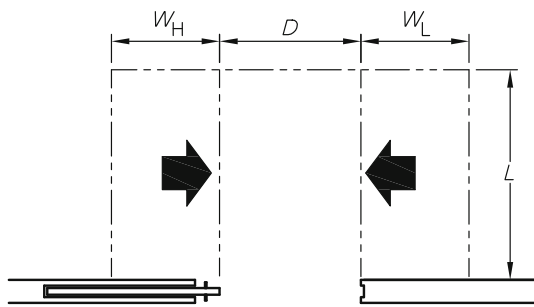
Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1280	660	395
900	1280	610	395
950	1280	560	395
1000	1280	510	395

(a) Slide-side approach



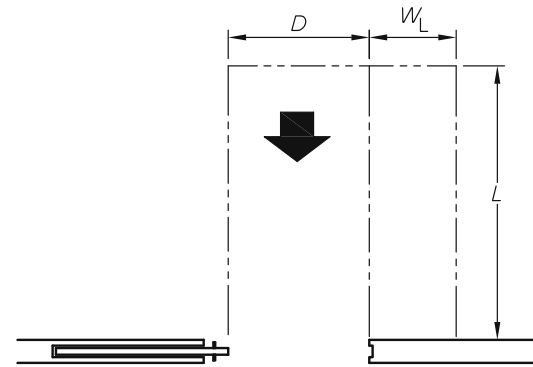
Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1230	185	660
900	1230	180	660
950	1230	180	660
1000	1230	180	660

(b) Latch-side approach



Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1280	660	660
900	1280	610	660
950	1280	560	660
1000	1280	510	660

(c) Either side approach



Dimension D	Dimension L	Dimension W_H	Dimension W_L
850	1450	0	530
900	1450	0	530
950	1450	0	530
1000	1450	0	530

(d) Front approach

LEGEND:

- D = Clear opening of width of doorway
- L = Length
- W_H = Width—hinge side
- W_L = Width—latch side
- ➡ = Direction of approach
- = Circulation space

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FIGURE 32 CIRCULATION SPACES AT DOORWAYS WITH SLIDING DOORS

13.3.3 Sliding doors

13.3.3.1 General

The clear circulation space at doorways with sliding doors is based on the clear opening width of the doorway (D). The clear circulation space shall be not less than the dimensions specified in the tables in Figure 32 for the appropriate clear opening width.

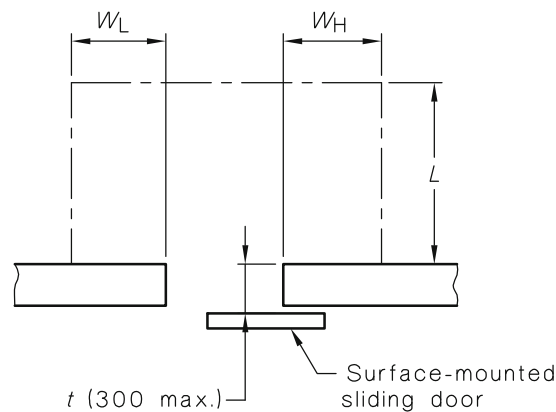
13.3.3.2 Cavity sliding doors

Where a sliding door is within the wall cavity, the circulation space at the doorway shall be not less than that given in the tables of Figure 32 for the appropriate clear opening width (D).

13.3.3.3 Surface-mounted doors

Where a sliding door is surface-mounted, the circulation space at the doorway shall be as follows:

- The circulation space at the door face shall be not less than that given in the tables of Figure 32.
- The circulation space opposite the door face shall be increased from that given in the tables of Figure 32, by the values given in the Table of Figure 33. When a surface-mounted sliding door is automatic, these increases do not apply.



Door approach	Increase from Figure 32
Figure 32(d)	Add dimensions t to dimensions W_L and W_H
Figure 32(a), 32(b), 32(c)	Add dimensions t to dimensions L , W_L and W_H

t = wall thickness to the face of the door

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NOTE: See Clause 13.2 for clear openings of doorways.

FIGURE 33 CALCULATING DIMENSIONS OF THE CIRCULATION SPACE OPPOSITE THE DOOR FACE WHERE A SLIDING DOOR IS SURFACE-MOUNTED

13.3.4 Power operated doors

To permit a wheelchair to turn through a door from a side-on approach, dimension W_L or W_H are required on the approach side only. Where a sliding door is power operated, for a front on approach the W_L and W_H dimensions do not apply.

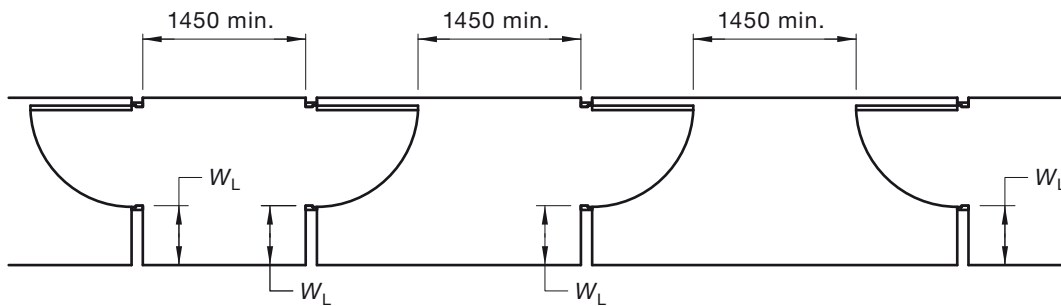
NOTE: For location of manual controls for power operated doors, see Clause 13.5.3.

13.4 Distance between successive doorways in passages in an accessible path of travel

A1

The distance between doorways in vestibules, air locks and other similarly enclosed spaces shall be not less than 1450 mm. Where the doors encroach into space, the distance shall be not less than 1450 mm plus the door leaf width, as shown in Figure 34(a), and shall comply with Figure 31 and 32 as applicable.

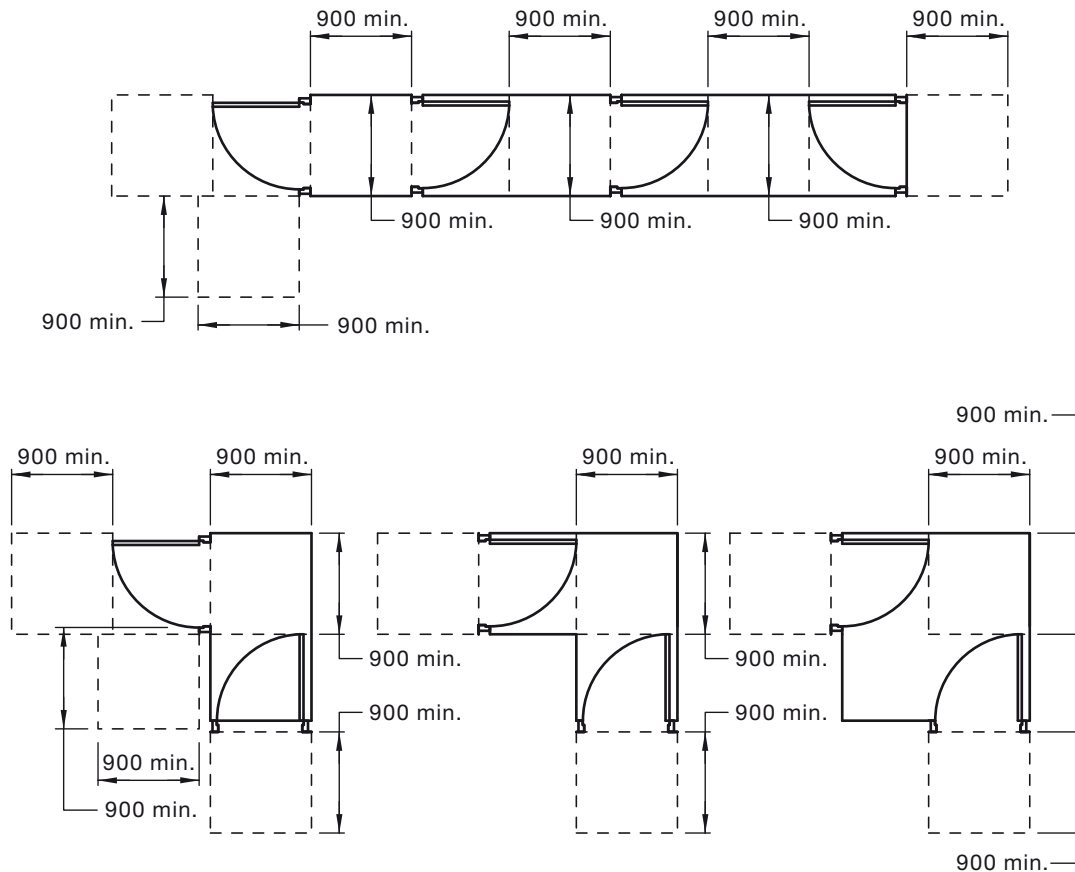
The distances between doorways in vestibules and air locks on a path of travel to ambulant toilets shall be in accordance with Figure 34(B).



(a) Continuous accessible path of travel

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FIGURE 34 (in part) DISTANCE BETWEEN SUCCESSIVE DOORWAYS IN VESTIBULES AND AIR LOCKS



(b) Path of travel to ambulant toilets

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FIGURE 34 (in part) DISTANCE BETWEEN SUCCESSIVE DOORWAYS IN VESTIBULES AND AIR LOCKS ON A PATH OF TRAVEL TO AMBULANT TOILETS

13.5 Door controls

13.5.1 General

Door controls in, or forming part of, the continuous accessible path of travel shall comply with the requirements of this Clause.

13.5.2 Design and performance

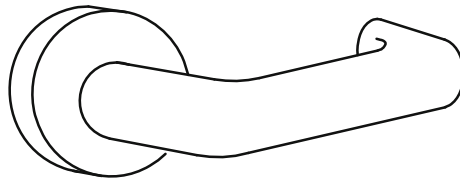
Door handles and related hardware and accessories shall comply with the following:

- (a) The door handle and related hardware shall be of the type that allows the door to be unlocked and opened with one hand. The handle shall be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch.

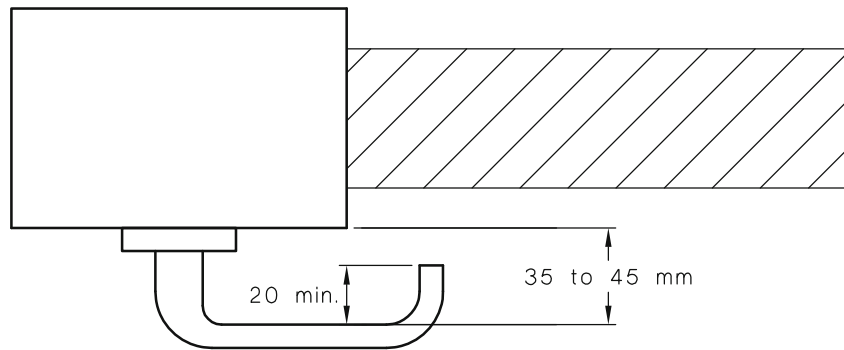
NOTES:

- 1 Figure 35(A) shows an example of a suitable hinged door handle. Figure 35(B) shows an example of a suitable door handle for sliding doors.
 - 2 Door handles of 'D' lever type provide an adequate grip for people with hand impairments.
- (b) The clearance between the handle and the back plate or door face at the centre grip section of the handle shall be not less than 35 mm and not more than 45 mm.

- (c) 'D' type handles shall be provided on sliding doors.
- (d) Where snibs are installed, they shall have a lever handle of a minimum length of 45 mm from the centre of the spindle.
- (e) For doors other than fire doors and smoke doors where a door closer is fitted, the force required at the door handle to operate the door shall not exceed the following:
 - (i) To initially open the door..... 20 N
 - (ii) To swing or slide the door20 N.
 - (iii) To hold the door open between 60° and 90°20 N.
- (f) Where an outward opening door is not self-closing, a horizontal handrail or pull bar shall be fixed on the closing face of a side-hung door, as shown in Figure 36.

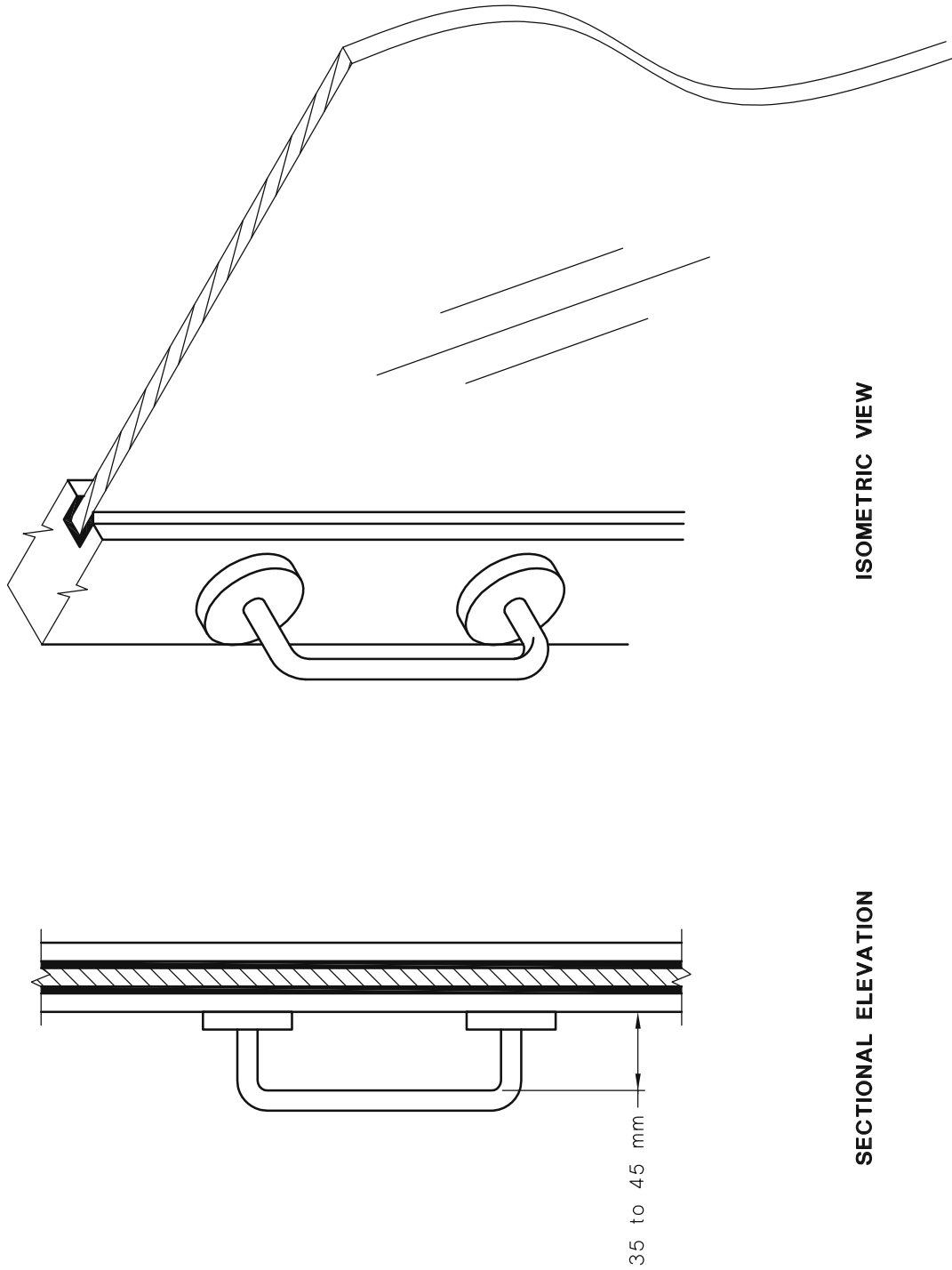


(a) Isometric view



(b) Plan view

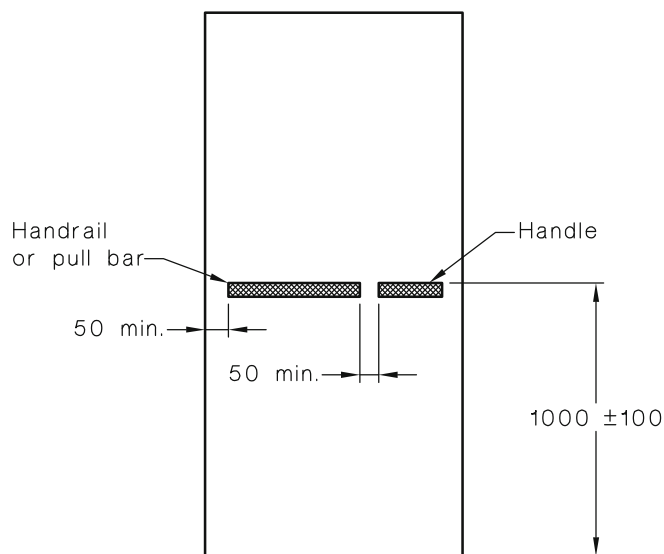
FIGURE 35(A) EXAMPLE OF ACCEPTABLE DOOR HARDWARE FOR HINGED DOORS



ISOMETRIC VIEW

SECTIONAL ELEVATION

FIGURE 35(B) EXAMPLE OF ACCEPTABLE DOOR HARDWARE FOR SLIDING DOORS



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FIGURE 36 LOCATIONS FOR DOOR CONTROLS SHOWING CLOSING FACE

13.5.3 Location

Except in early childhood centres, swimming pool barriers or similar situations where the location of the opening and locking controls is prescribed by the relevant statutory authority, the location of the controls for doors and gates shall be above a level surface and as follows:

- Controls that need to be grasped or turned shall be not less than 900 mm and not more than 1100 mm above the plane of the finished floor, as shown in Figure 36.
- Controls that only need to be pushed, such as panic bars on egress routes, shall be not less than 900 mm, and not greater than 1200 mm above the plane of the finished floor.
- Controls that only need to be touched shall be not less than 900 mm, and not greater than 1250 mm above the plane of the finished floor, and not less than 500 mm from an internal corner except as specified in AS 1735.12.
- Handles on sliding doors shall be not less than 60 mm from the door jamb or doorstop when in the open or closed position, as shown in Figure 30.
- Manual controls to power-operated doors shall be located on the continuous accessible path of travel no closer than 500 mm from an internal corner and between 1000 mm to 2000 mm from the hinged door leaf in any position or clear of a surface-mounted sliding door in the open position.

13.5.4 Power-operated door controls

Push-button controls shall have a minimum dimension of 25 mm diameter and be proud of the surface and shall activate the door before the button becomes level with the surrounding surface.

14 SWITCHES AND GENERAL PURPOSE OUTLETS (POWER POINTS)

14.1 General

All switches and controls on an accessible path of travel, other than general purpose outlets, shall be located not less than 900 mm nor more than 1100 mm above the plane of the finished floor and not less than 500 mm from internal corners except where on the architrave on the latch side as shown in Figure 37.

14.2 Accessible sole-occupancy units and accessible sanitary facilities

Rocker action and toggle switches shall be provided and have a minimum dimension of 30 mm × 30 mm. Push-pad switches shall have a minimum dimension of 25 mm in diameter.

General purpose outlets shall be located not less than 600 mm nor more than 1100 mm above the plane of the finished floor and not less than 500 mm from internal corners.

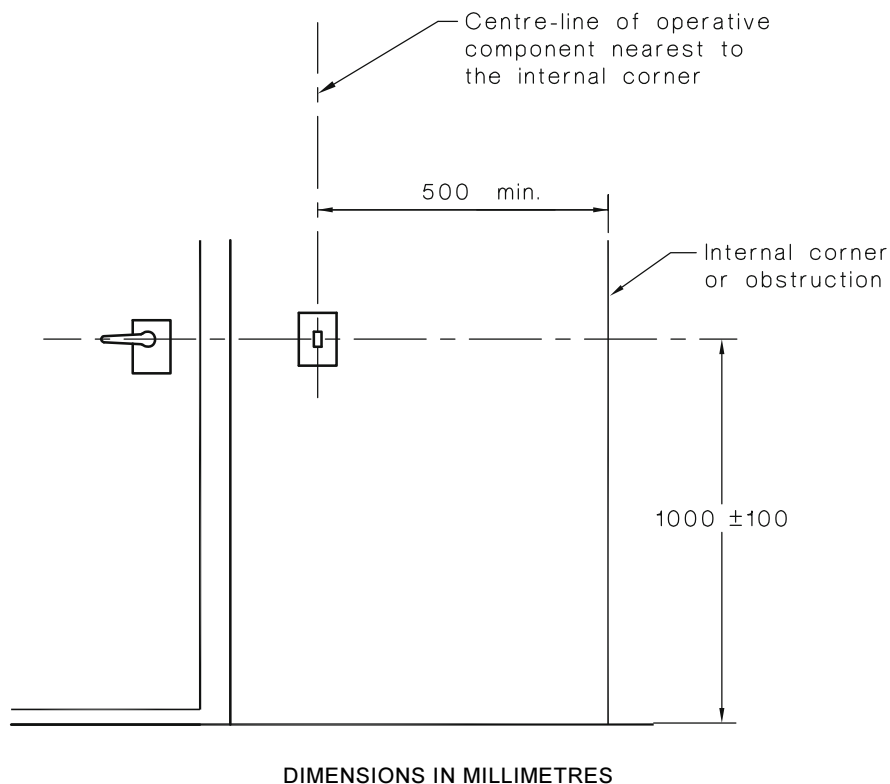


FIGURE 37 HEIGHTS FOR SWITCHES AND DOOR HANDLES

15 SANITARY FACILITIES

15.1 General

The facilities described in this Clause may be used as individual modules, in mirror image configurations or in a combined form, as specified in Clause 15.6.

15.2 Accessible unisex sanitary facilities

15.2.1 Water taps

Water taps shall comply with the following:

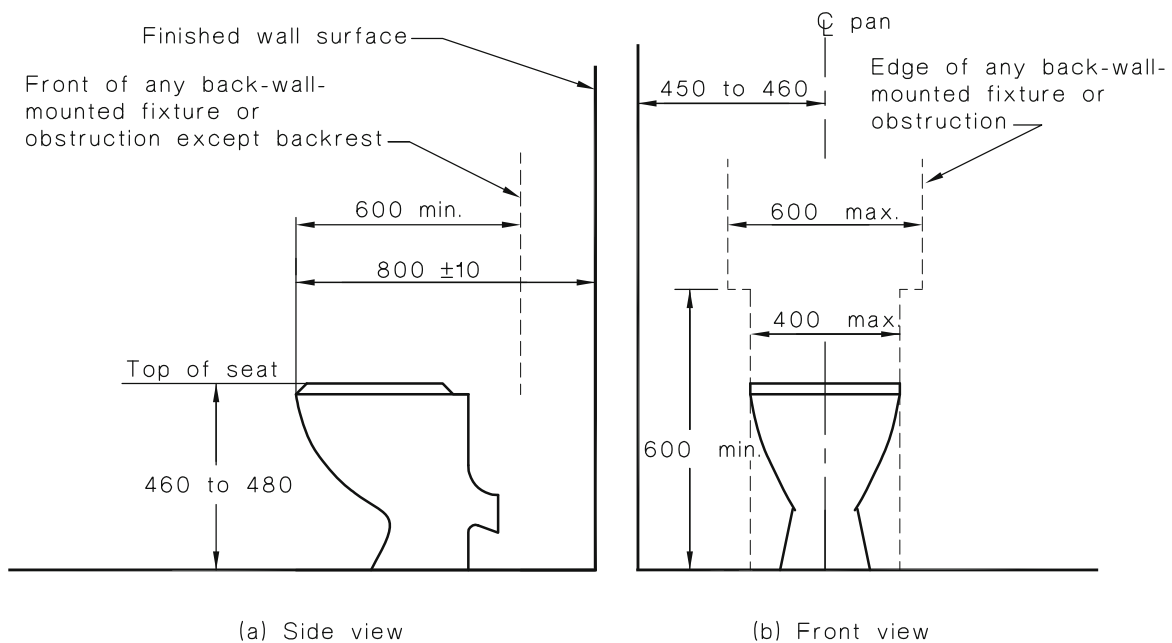
- (a) Taps shall have lever handles, sensor plates, or other similar controls.

- (b) Lever handles shall have not less than 50 mm clearance from an adjacent surface.
- (c) Where separate taps are provided for hot and cold water, the hot water tap shall be placed to the left of the cold water tap for horizontal configurations, or above the cold water tap for vertical configurations.
- (d) Where hot water is provided, the water shall be delivered through a mixing spout.

15.2.2 WC pan clearances

WC pan clearances, including set-out, seat height and seat width shall be as shown in Figure 38.

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NOTES:

- 1 For the purpose of dimensioning, the front of the WC pan has been taken as the datum plane.
- 2 The dimension of 800 ± 10 mm from the front of the WC pan to the wall is a critical dimension.

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FIGURE 38 WATER CLOSET PAN CLEARANCES, SEAT HEIGHT AND SEAT WIDTH

15.2.3 Seat

A toilet seat shall be provided on accessible toilets. The toilet seat shall—

- (a) be of the full-round type, (i.e., not open fronted) and with minimal contours to the top surface;
- (b) be securely fixed in position when in use;
- (c) have seat fixings that create lateral stability for the seat when in use;
- (d) be load-rated to 150 kg; and
- (e) have a minimum luminance contrast of 30% with the background (e.g., pan, wall or floor against which it is viewed).

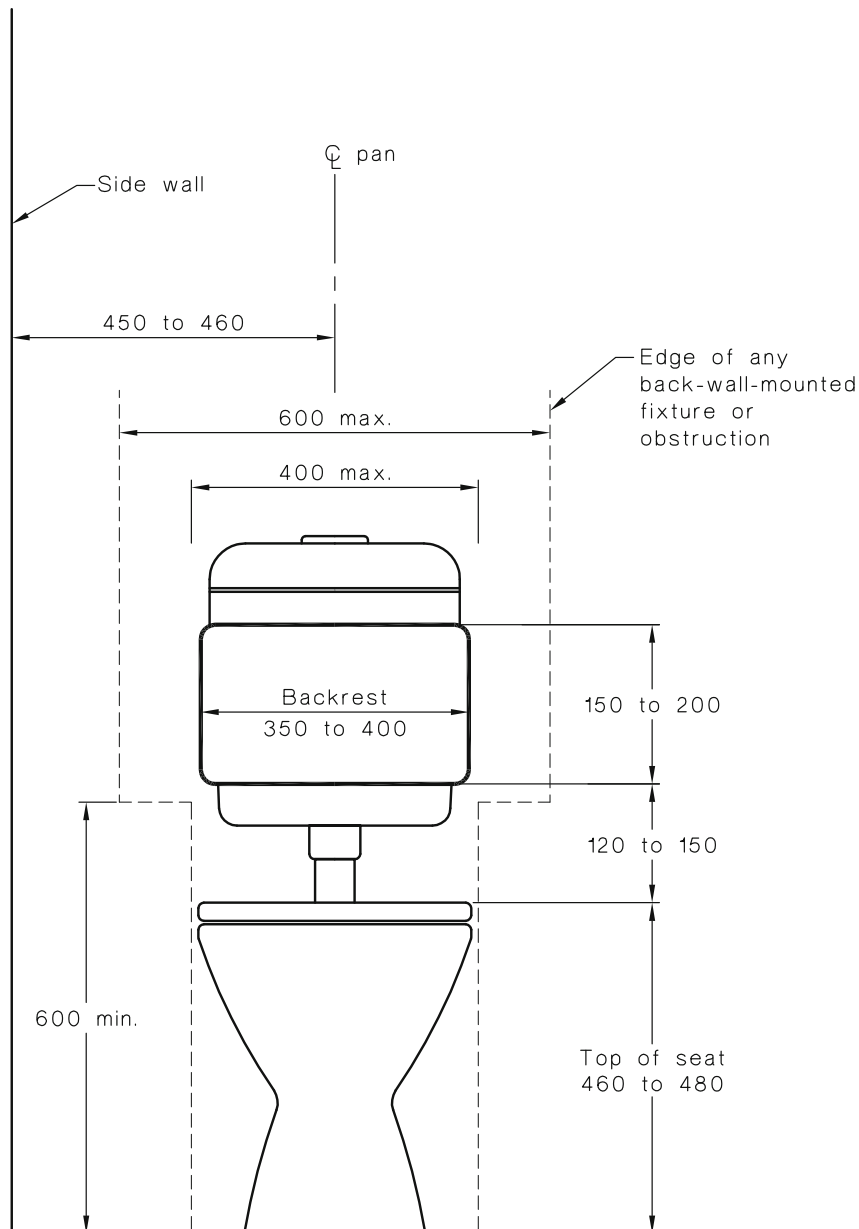
15.2.4 Backrest

A backrest shall be provided on accessible toilets. The backrest shall—

- (a) be capable of withstanding a force in any direction of 1100 N;
- (b) have a height, at the lower edge of backrest to the top of the WC seat, of 120 mm to 150 mm, as shown in Figure 39(a);
- (c) have a vertical height of 150–200 mm and a width of 350–400 mm, as shown in Figure 39(a); and
- (d) the front edge of the centre of the backrest be positioned to achieve an angle of between 95° to 100° back from the seat hinge (Figure 39(b)).

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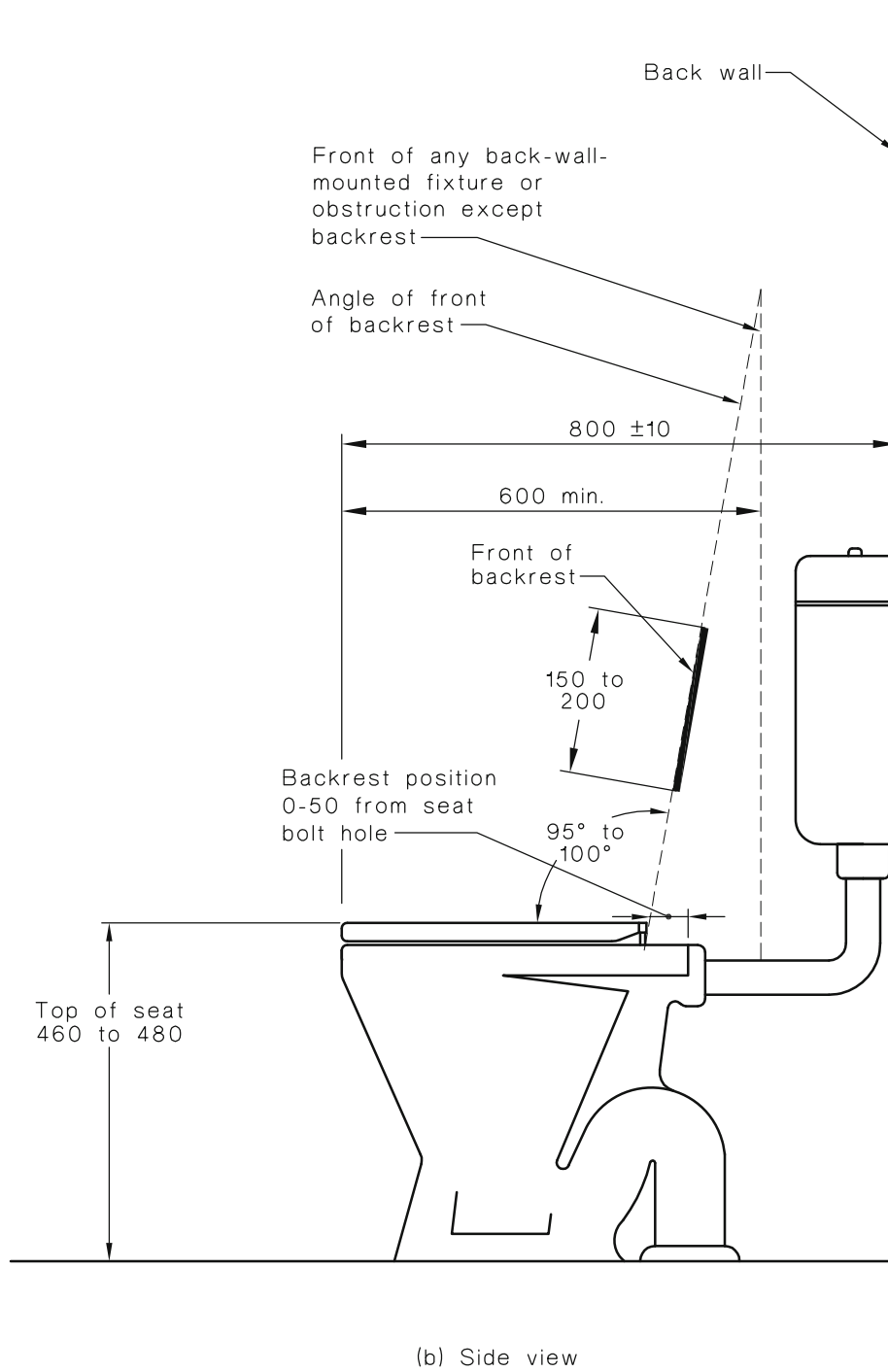


(a) Front view

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FIGURE 39 (in part) WATER CLOSET INSTALLATION

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FIGURE 39 (in part) WATER CLOSET INSTALLATION

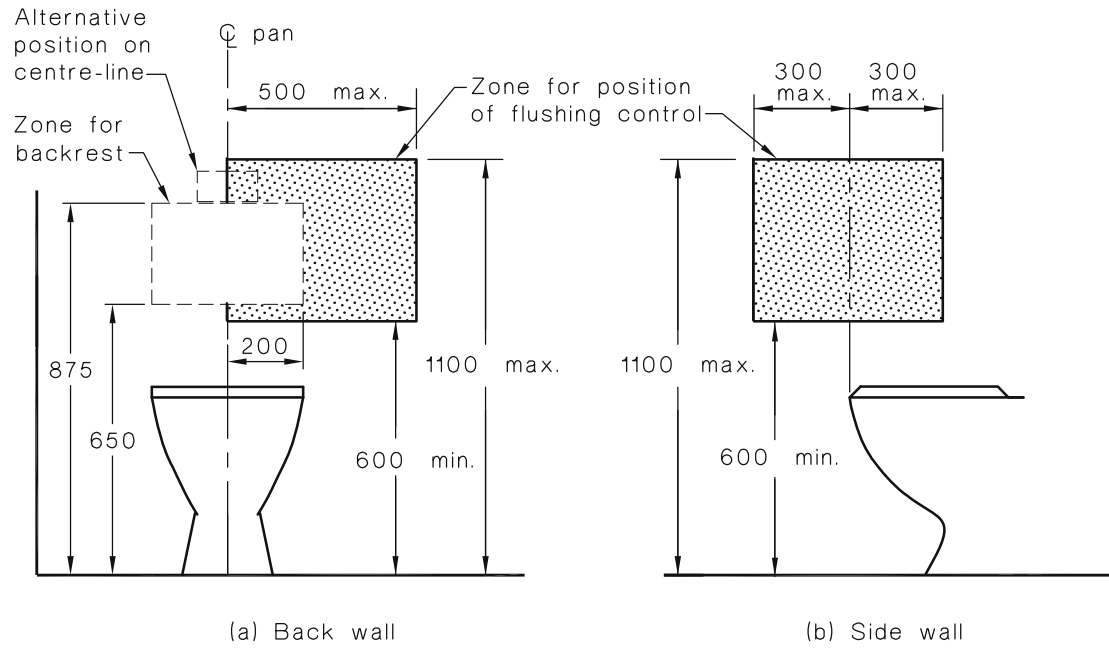
15.2.5 Flushing control

Flushing controls shall be user activated, either hand operated or automatic. Where hand-operated flushing controls are used, they shall be located within the zone shown in Figure 40, or centred on the centre-line of the toilet, wholly within the vertical limits of that zone. The position of the flushing control within this zone shall not be within the area required for any grabrails or backrest. The flushing control shall be proud of the surface and shall activate the flush before the button becomes level with the surrounding surface.

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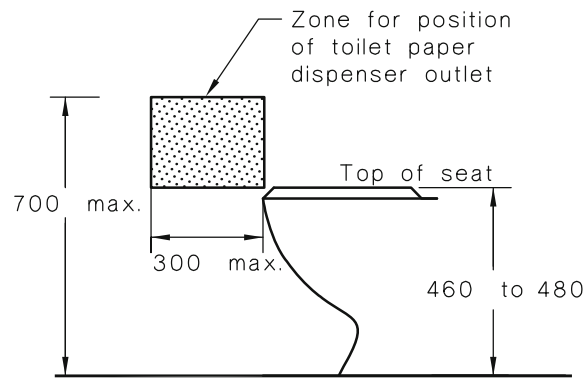
DIMENSIONS IN MILLIMETRES

FIGURE 40 ZONE FOR POSITION OF FLUSHING CONTROL

15.2.6 Toilet paper dispenser

The outlet for the toilet paper dispenser shall be located within the zone specified in Figure 41.

The toilet paper dispenser shall not encroach upon the clearance space required around the grabrail specified in Clause 15.2.7.

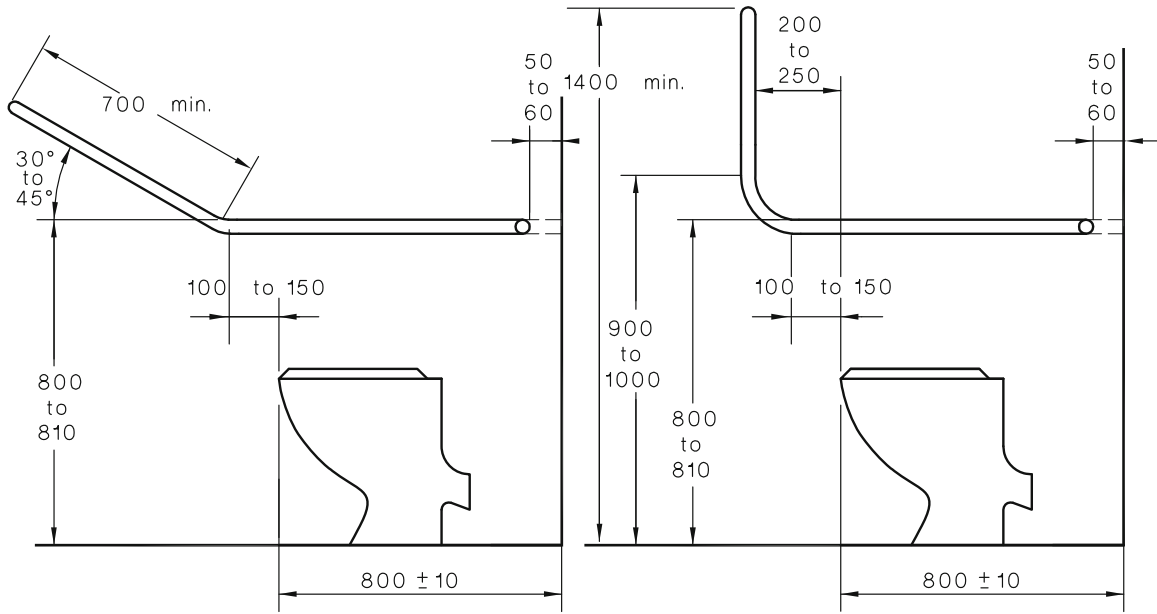


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FIGURE 41 ZONE FOR POSITION OF TOILET PAPER DISPENSER

15.2.7 Grabrails

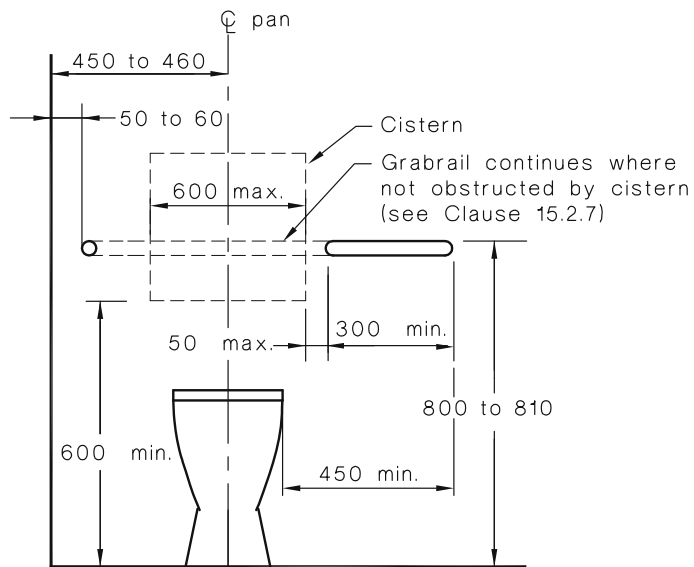
Where a concealed or high-level cistern or flush valve is used, a continuous grabrail, as specified in Clause 17, shall be provided across the rear wall and side wall nearest the WC pan, as shown in Figure 42. Where a low-level non-concealed cistern or flush valve is used, the grabrail shall be terminated at each side of the cistern, as shown in Figure 42.



(i) Option A

(ii) Option B

(a) Side view showing optional systems for grabrail at sides of pan



(b) Grabrail at back of pan and sectional view of grabrail at side of pan

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FIGURE 42 POSITIONS OF GRABRAILS IN WATER CLOSETS

15.2.8 *Circulation space*

15.2.8.1 *General*

For each WC, the unobstructed circulation space from the finished floor to a height of not less than 2000 mm shall be as shown in Figure 43, except for the following, which are allowed to intrude into the circulation space:

- (a) The toilet paper dispenser (see Clause 15.2.6).
- (b) Grabrails (see Clause 15.2.7).
- (c) Washbasin limited to 100 mm intrusion as shown in Figure 43.
- (d) Hand dryers and towel dispensers.
- (e) Soap dispensers (see Clause 15.4.3).
- (f) Shelves (see Clause 15.4.2).
- (g) Wall cabinets, where provided, which shall not protrude more than 150 mm into the circulation space. The mounting of wall cabinets shall be at least 900 mm above floor level and the top shelf shall be a maximum of 1250 mm above floor level.
- (h) Clothes hanging devices (see Clause 15.4.4).
- (i) Portable sanitary disposal unit as shown in Figure 43.
- (j) Other wall mounted fixtures, such as dispensing units and sharps disposal units, which shall have 900 mm minimum height clearance from the finished floor level and a maximum projection of 150 mm from finished wall surface.

The overlapping of circulation spaces shall be in accordance with Clause 15.6.

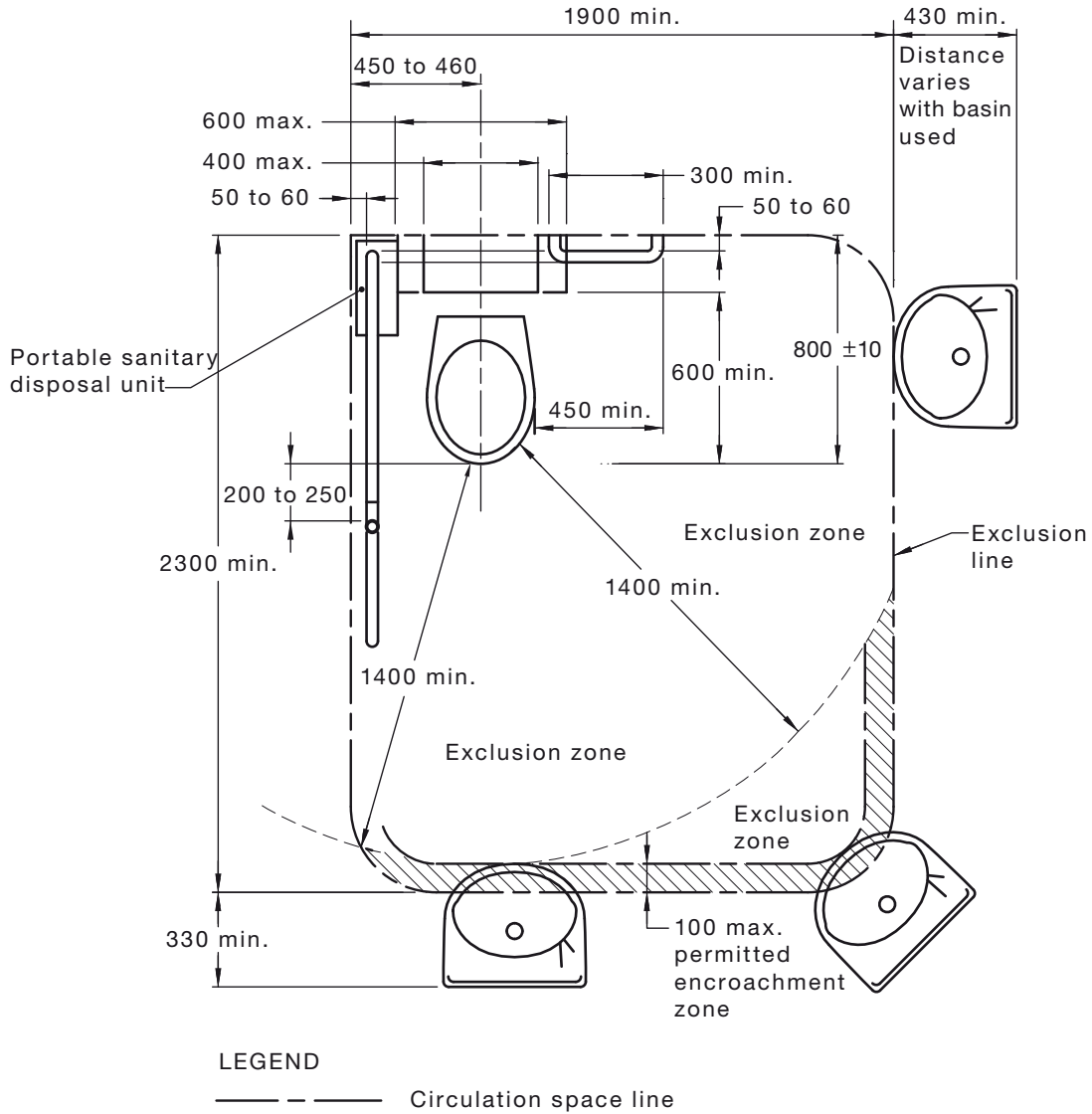
15.2.8.2 *Baby change tables*

Where installed, baby change tables shall—

- (a) not encroach into the circulation space of any other toilet facility when in the folded up position; and
- (b) have a maximum height of 820 mm and a minimum clearance underneath of 720 mm when in the open position.

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NOTE: This circulation space may overlap any other circulation spaces specified in this Standard.

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FIGURE 43 CIRCULATION SPACE FOR WC PAN—RIGHT-HAND TRANSFER (LEFT-HAND TRANSFER IS MIRROR REVERSED)

15.2.9 WC doors

WC doors may be either hinged or sliding. WC doors shall comply with the following:

- (a) Outward-opening doors shall have a mechanism that holds the door in a closed position without the use of a latch.
- (b) Doors shall be provided with an in-use indicator and a bolt or catch. Where a snib catch is used, the snib handle shall have a minimum length of 45 mm from the centre of the spindle. In an emergency, the latch mechanism shall be openable from the outside.
- (c) The force required to operate the door shall be in accordance with Clause 13.5.2(e).
- (d) Door handles and hardware shall be in accordance with Clause 13.5.

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15.2.10 *Washbasins for unisex accessible sanitary facilities*

A hand-washing facility shall be provided inside the toilet cubicle and shall form part of the accessible unisex facility (see Clause 15.3).

15.3 Washbasins

15.3.1 *General*

The installation of washbasins shall comply with the following:

- (a) The washbasin shall be outside the pan circulation space as shown in Figure 43.
- (b) Water taps shall comply with Clause 15.2.1.
- (c) Exposed hot water supply pipes shall be insulated or located so as not to present a hazard.
- (d) The projection of the washbasin from the wall and the position of taps, bowl and drain outlet shall be determined in accordance with Figures 44(A) and 44(B); except in sole-occupancy units, where Figure 45 shall apply.
- (e) Water supply pipes and waste outlet pipes shall not encroach on the required clear space under the washbasin.

For each washbasin fixture, the unobstructed circulation space shall be as shown in Figure 46; except in sole occupancy units, where Figure 45 shall apply. The washbasin fixture and its fittings are the only fixtures permitted in this space.

15.3.2 Accessible sole occupancy units

Accessible sole occupancy units shall have the following characteristics:

- (a) The projection of the washbasin from the wall and the position of taps, bowl and drain outlet shall be determined in accordance with Figure 45.
- (b) Water supply pipes and waste outlet pipes shall not encroach on the required clear space under the washbasin, as shown in Figure 45.
- (c) For each washbasin fixture, the unobstructed circulation space shall be in accordance with Figure 46. The washbasin fixture and its fittings are the only fixtures permitted in this space.
- (d) Shelf space shall be provided adjacent to the washbasin in one of the following ways:
 - (i) As a vanity top—
 - (A) at a height of 800 mm to 830 mm above the floor;
 - (B) with a minimum width of 120 mm beside the basin;
 - (C) with a minimum depth of 300 mm from the front to the rear wall; and
 - (D) with no encroachment into any knee and toe clearance space for a minimum width of 850 mm centred on the basin.
 - (ii) As a separate fixture—
 - (A) within any circulation space at a height of 900 mm to 1000 mm with a minimum underside clearance of 850 mm for a width of 120 mm to 150 mm and length of 300 mm to 400 mm; and
 - (B) external to all circulation spaces at a height of 800 mm to 1000 mm with a minimum width of 120 mm and minimum length of 400 mm.

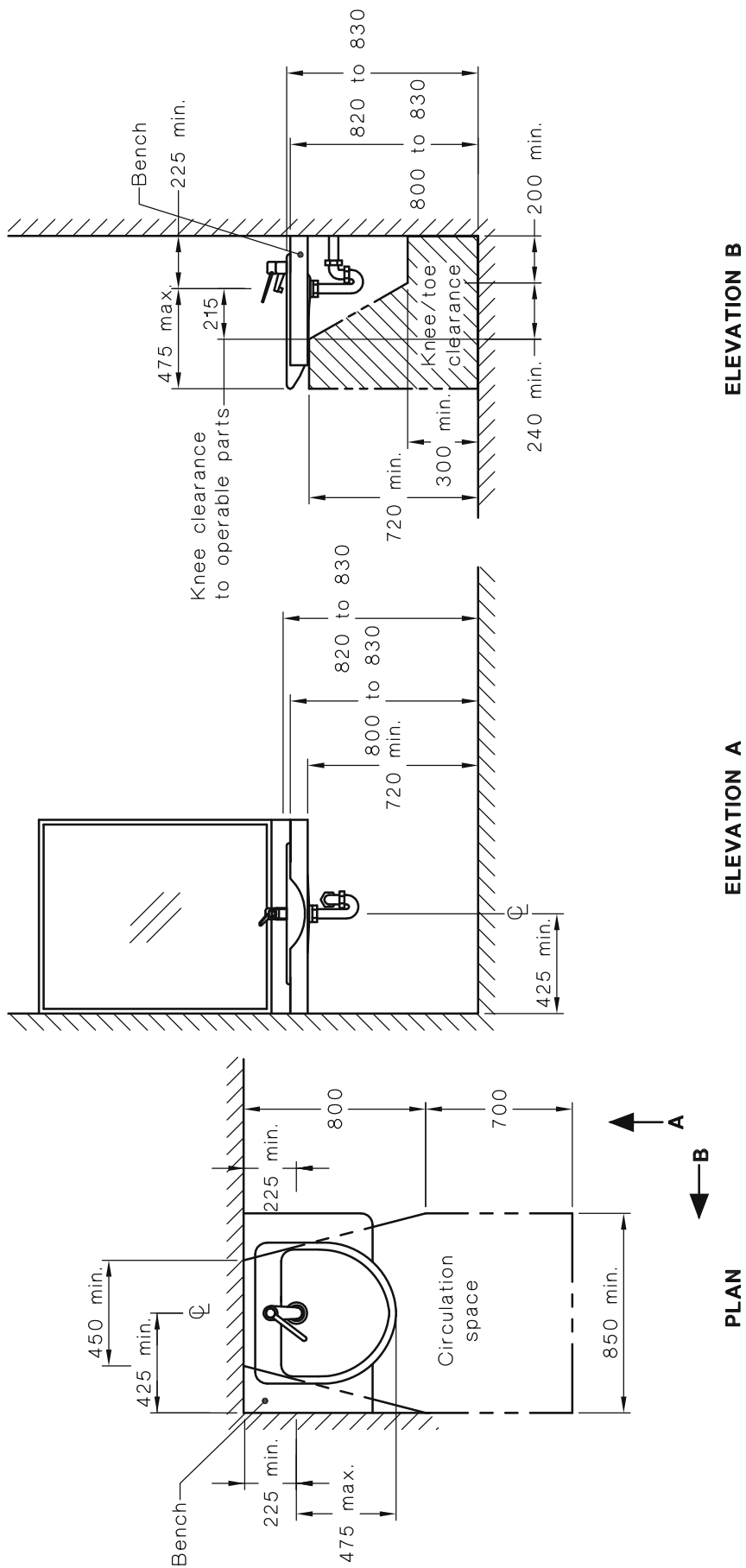
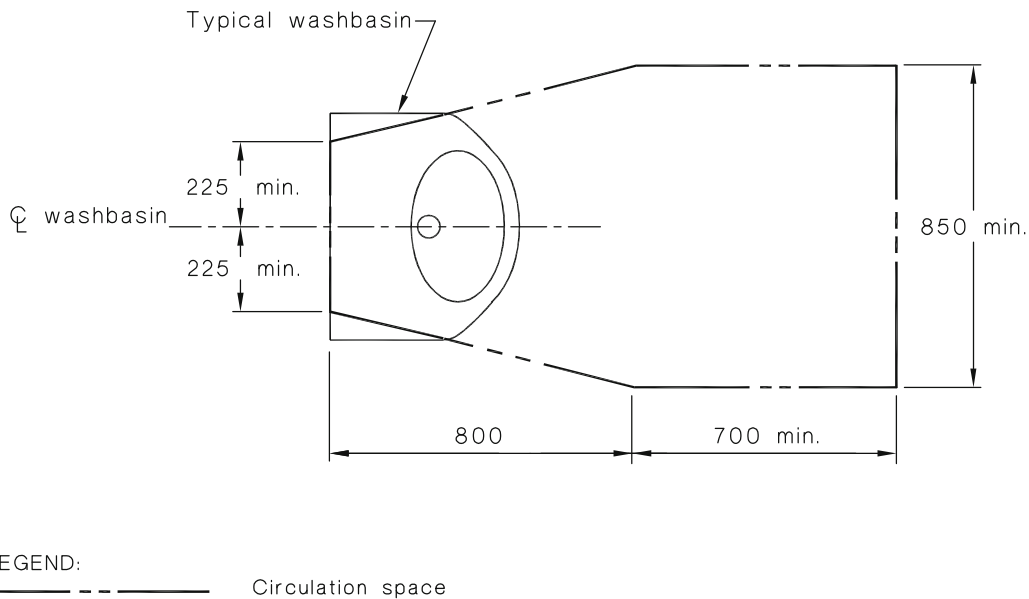


FIGURE 45 WASHBASIN FOR ACCESSIBLE SOLE-OCCUPANCY UNIT

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DIMENSIONS IN MILLIMETRES

FIGURE 46 CIRCULATION SPACE FOR WASHBASINS

15.4 Fixtures and fittings within a sanitary facility

15.4.1 Mirrors

In all sanitary facilities, the mirror shall be located either above or adjacent to the washbasin.

Where provided, a vertical mirror with a reflective surface not less than 350 mm wide shall extend from a height of not more than 900 mm to a height of not less than 1850 mm above the plane of the finished floor. Where provided, a second vertical mirror shall extend from a height of not less than 600 mm to a height of not less than 1850 mm above the plane of the finished floor.

NOTE: Angled or tilted mirrors should not be used since they do not work for all users or accessible facilities.

In an accessible sole occupancy unit, the mirror shall be centred over the washbasin.

15.4.2 Shelves

Shelf space shall be provided adjacent to the washbasin in one of the following ways:

- (a) As a vanity top at a height of 800 mm to 830 mm and a minimum width of 120 mm and depth of 300 mm to 400 mm without encroaching into any circulation space.
- (b) As a separate fixture—
 - (i) within any circulation space at a height of 900 mm to 1000 mm with a width of 120 mm to 150 mm and length of 300 mm to 400 mm; and
 - (ii) external to all circulation spaces at a height of 790 mm to 1000 mm with a minimum width of 120 mm and minimum length of 400 mm.

15.4.3 Soap dispensers, towel dispensers and similar fittings

Where provided, soap dispensers, towel dispensers, hand dryers and similar fittings shall be operable by one hand, and shall be installed with the height of their operative component or outlet not less than 900 mm and not more than 1100 mm above the plane of the finished floor, and no closer than 500 mm from an internal corner.

15.4.4 Clothes-hanging devices

A clothes-hanging device shall be installed 1200 mm to 1350 mm above the plane of the finished floor and not less than 500 mm out from any internal corner.

15.4.5 Sanitary disposal unit

Where provided, the sanitary disposal unit shall be located as follows:

- (a) Portable unit as shown in Figure 43.
- (b) Recessed unit within 500 mm from the pan.

15.4.6 Switches and general purpose outlets

Where provided near the washbasin, switches and general purpose outlets shall be located in accordance with Clause 14 and as close to the shelf or worktop as practicable.

15.5 Showers

15.5.1 General

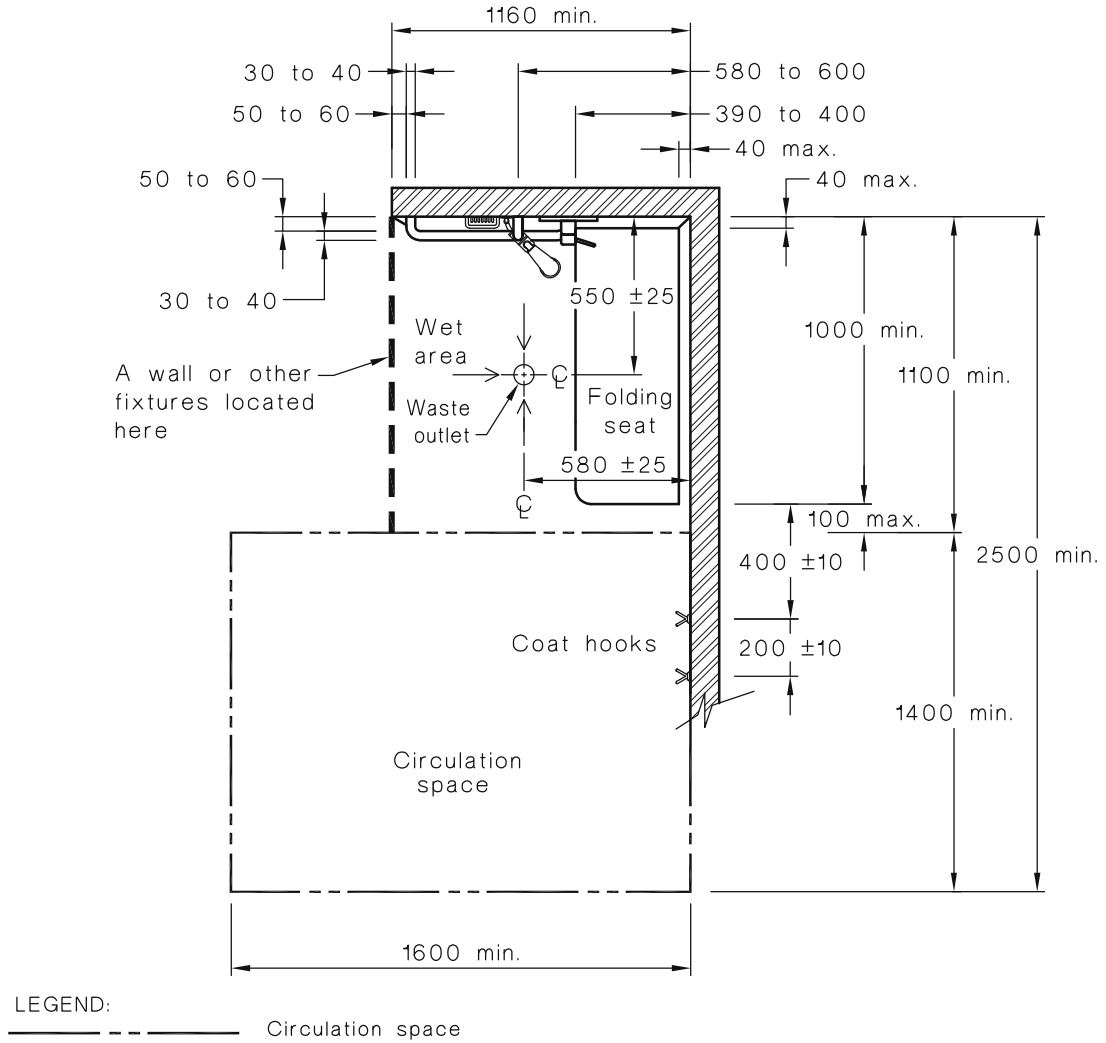
The general requirements for showers are as follows:

- (a) Shower recesses and the circulation space for each shower recess from the finished floor to a height of not less than 900 mm shall be as shown in Figure 47. Grabrails, shower hose fittings; taps, soap holder, shelf (if provided) and the folding seat are the only fixtures permitted in these spaces.
- (b) Shower recess fittings shall be provided as shown in Figures 47 and 48. Not less than two clothes-hanging devices, as specified in Clause 15.4.4, shall be fitted outside the shower recess. One such device shall be located within 400 ± 10 mm and the other within 600 ± 10 mm of the folding seat.
- (c) If two or more shower recesses are provided, at least one shall be of the opposite hand.

15.5.2 Floor and waste outlet

The requirements for the floor and waste outlet are as follows:

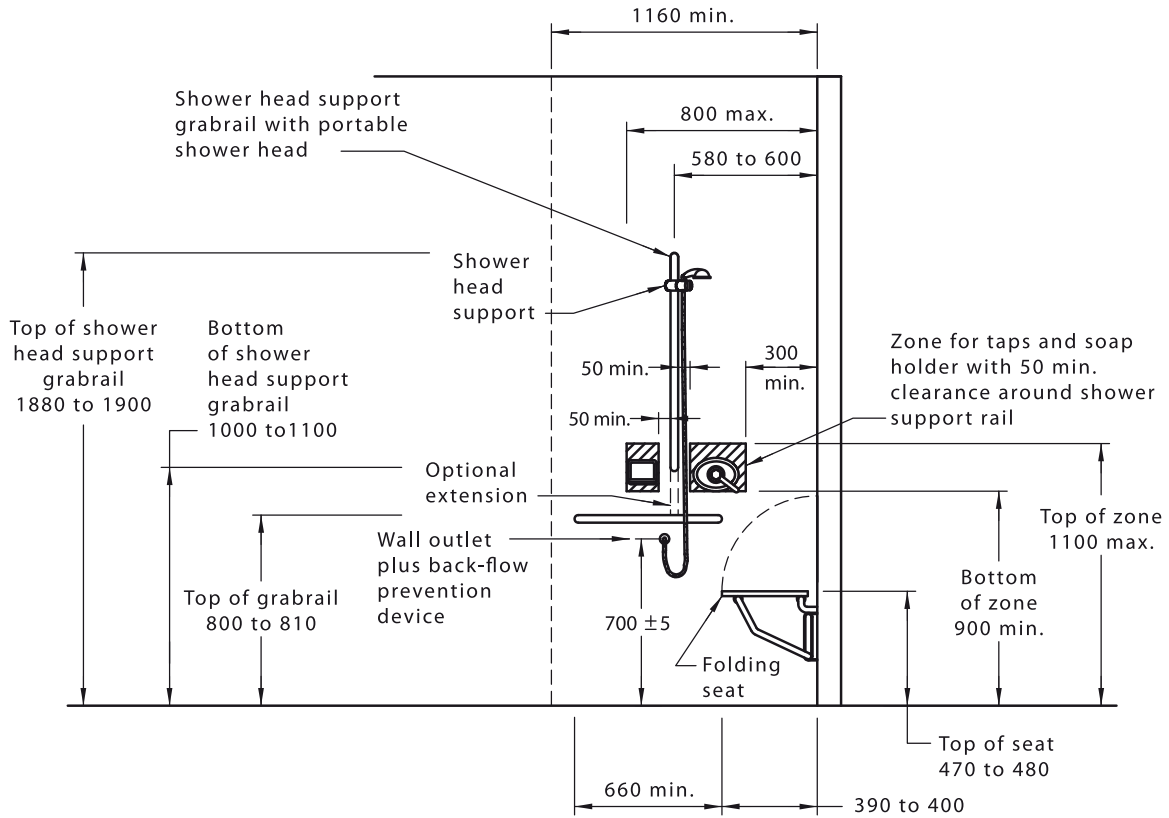
- (a) The floor of the shower recess and associated circulation space shall be self-draining and without a step-down, raised step kerb or hob at the entry to the recess.
- (b) The waste outlet for the shower shall be provided in accordance with Figure 47.
- (c) The slope of the floor of the shower recess shall have a gradient between 1 in 60 and 1 in 80, as shown in Figure 49.
- (d) The slope of floor of the remainder of the sanitary facility shall have a gradient between 1 in 80 and 1 in 100, as shown in Figure 49.



(b) Shower recess with a third side provided by a wall or other fixtures

FIGURE 47 (in part) SHOWER RECESS AND CIRCULATION SPACE—PLAN

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FIGURE 48 SHOWER RECESS FITTINGS—ELEVATION

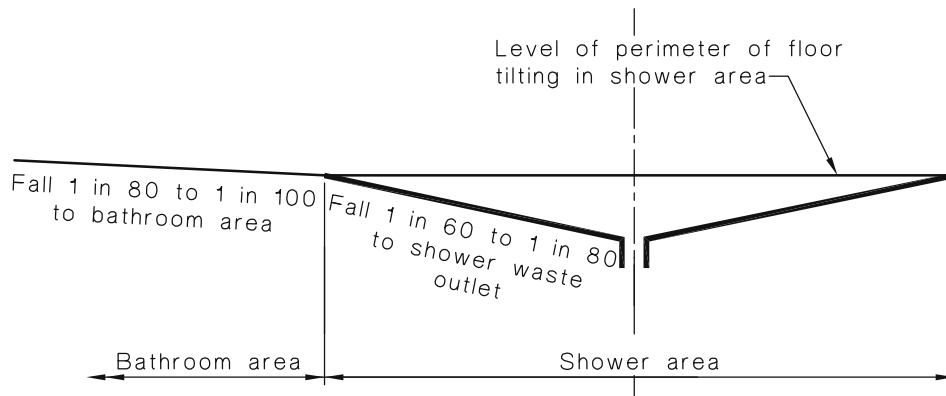


FIGURE 49 GRADES FOR BATHROOM AND SHOWER FLOORS

15.5.3 Opening shower screens

The means of screening a shower recess shall be either by a curtain or a door system that maintains the required circulation space of 1600 mm × 2350 mm.

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15.5.4 Grabrails

Grabrails, as specified in Clause 17, shall be fixed on the walls in the positions shown in Figures 47 and 48. Taps, soap holder and shower head support grabrail, as shown in Figures 47 and 48 may encroach into the 600 mm clearance above the grabrail required by Clause 17(e).

15.5.5 Shower head support grabrail

A shower head support grabrail, as specified in Clause 17, shall be fixed on the wall in the position shown in Figure 48.

15.5.6 Shower head

A hand-held shower head shall be provided, which shall have a flexible hose of a minimum length of 1500 mm.

An adjustable shower head holder shall be provided to support the shower head and shall—

- (a) be installed on the shower head holder support grabrail as shown in Figure 48;
- (b) allow the graspable portion of the shower head to be positioned at various angles and heights;
- (c) allow the graspable portion of the shower head to be located at heights between 1000 mm and 1800 mm above the plane of the finished floor; and
- (d) allow access and adjustment from a seated position.

15.5.7 Soap holder

The soap holder shall be located within the zone shown in Figure 48.

15.5.8 Taps

Taps, as specified in Clause 15.2.1, shall be located within the zone shown in Figure 48.

15.5.9 Folding seat

A foldable seat shall be provided inside the shower recess, as shown in Figures 47 and 48, and shall—

- (a) be self-draining;
- (b) be slip-resistant;
- (c) have front corners that are rounded to a radius of 10 to 15 mm;
- (d) have top edges that are rounded with a minimum radius of 2 to 3 mm; and
- (e) shall fold in an upwards direction and when folded the grabrail shall be accessible.

Where drainage is provided by holes or slots in single unit seats or by gaps between slats in compound seats, the diameter of the holes, the width of the slots and the gaps between slats shall be between 4 to 6 mm.

The fastenings, materials and construction of the seat shall be able to withstand a force of 1100 N applied at any position and in any direction without failing or loosening of fastenings.

15.5.10 Clothes hanging devices

Two clothes hooks shall be installed within reach of the shower seat, as shown in Figure 47.

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15.6 Circulation spaces in accessible sanitary facilities

The circulation spaces in accessible sanitary facilities shall be in accordance with Clause 15.2.8 and Figures 43 to 47 and 50. The following also apply:

- (a) Circulation spaces, including door circulation spaces, may be overlapped.
- (b) With the following exceptions, fixtures shall not encroach into circulation spaces:

A1 | (i) The washbasin may encroach into the WC circulation space in accordance with Figure 43 and 50.

A1 | (ii) *'deleted'*

(iii) The washbasin may encroach into the circulation space of the door in accordance with Figures 51(A) and 51(B).

NOTE: An example of an overlapping circulation space in a sanitary compartment is shown in Figure 52.

Clearances beneath the washbasin shall be in accordance with Clause 15.3 and door circulation spaces shall be in accordance with Clause 13.3 modified in accordance with Item (b)(ii) or (b)(iii) of this Clause, if appropriate.

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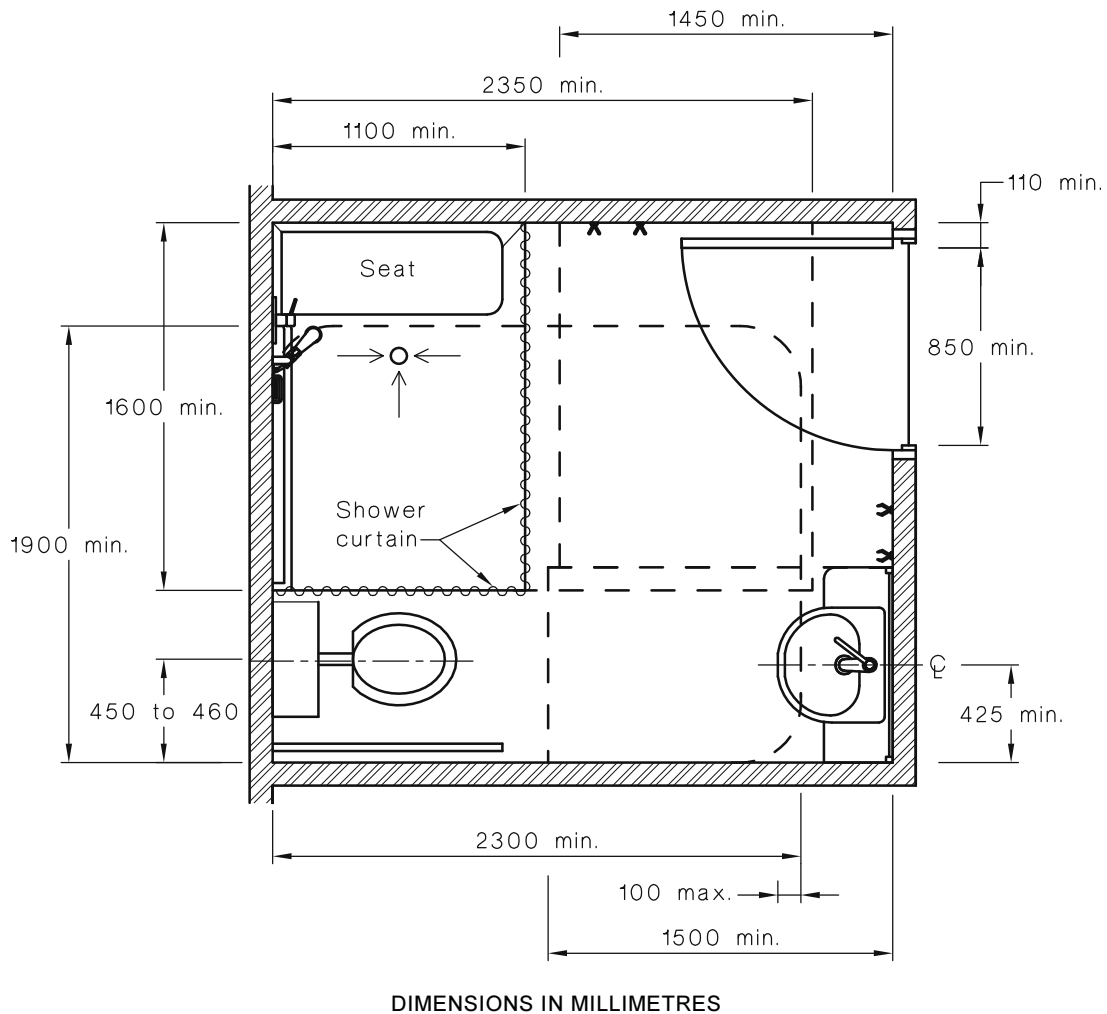
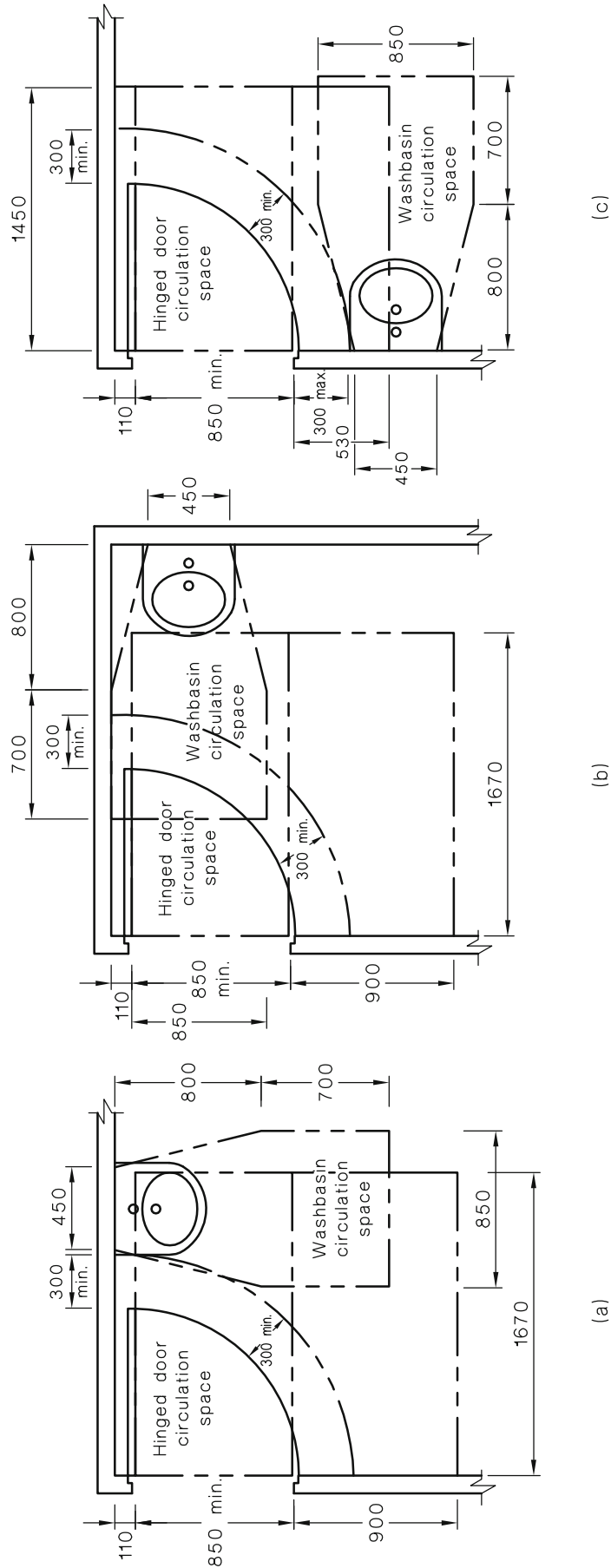


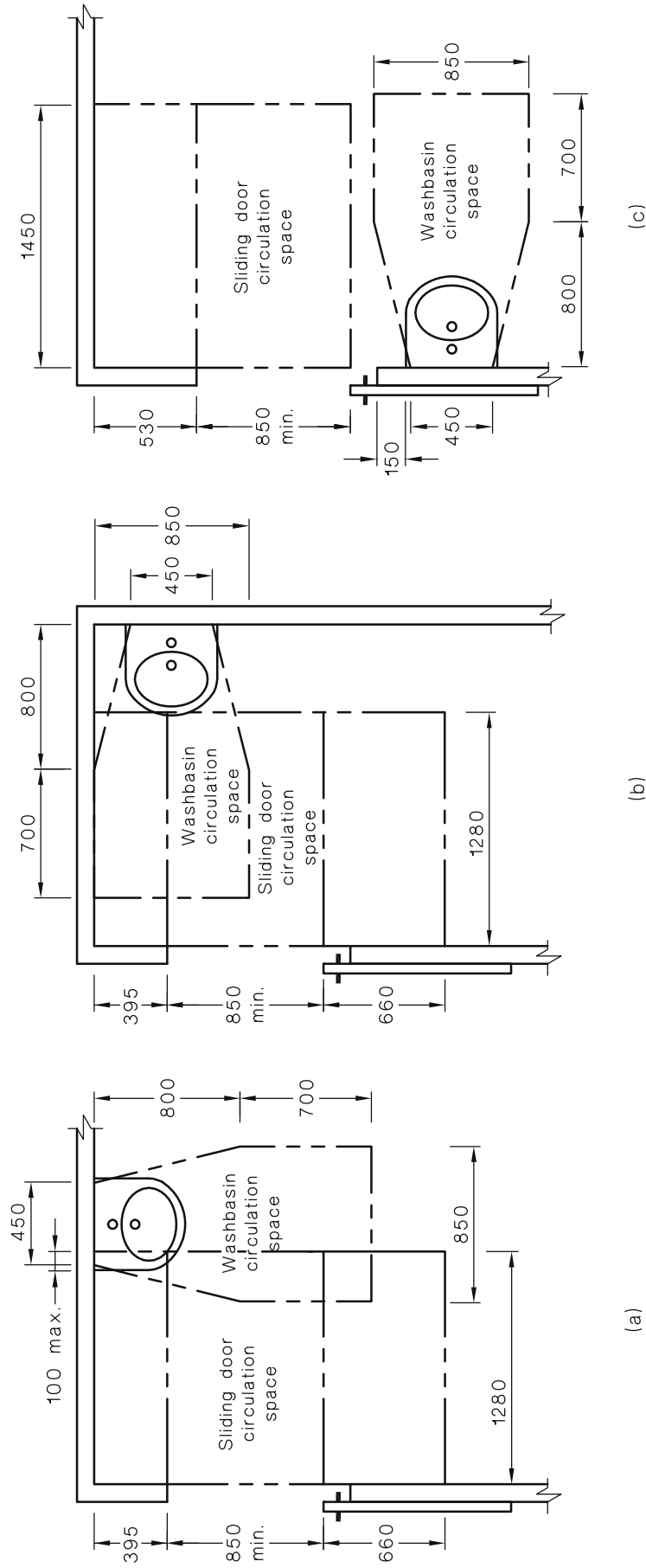
FIGURE 50 SANITARY COMPARTMENT SHOWING OVERLAP OF WASHBASIN FIXTURE INTO SHOWER CIRCULATION SPACE

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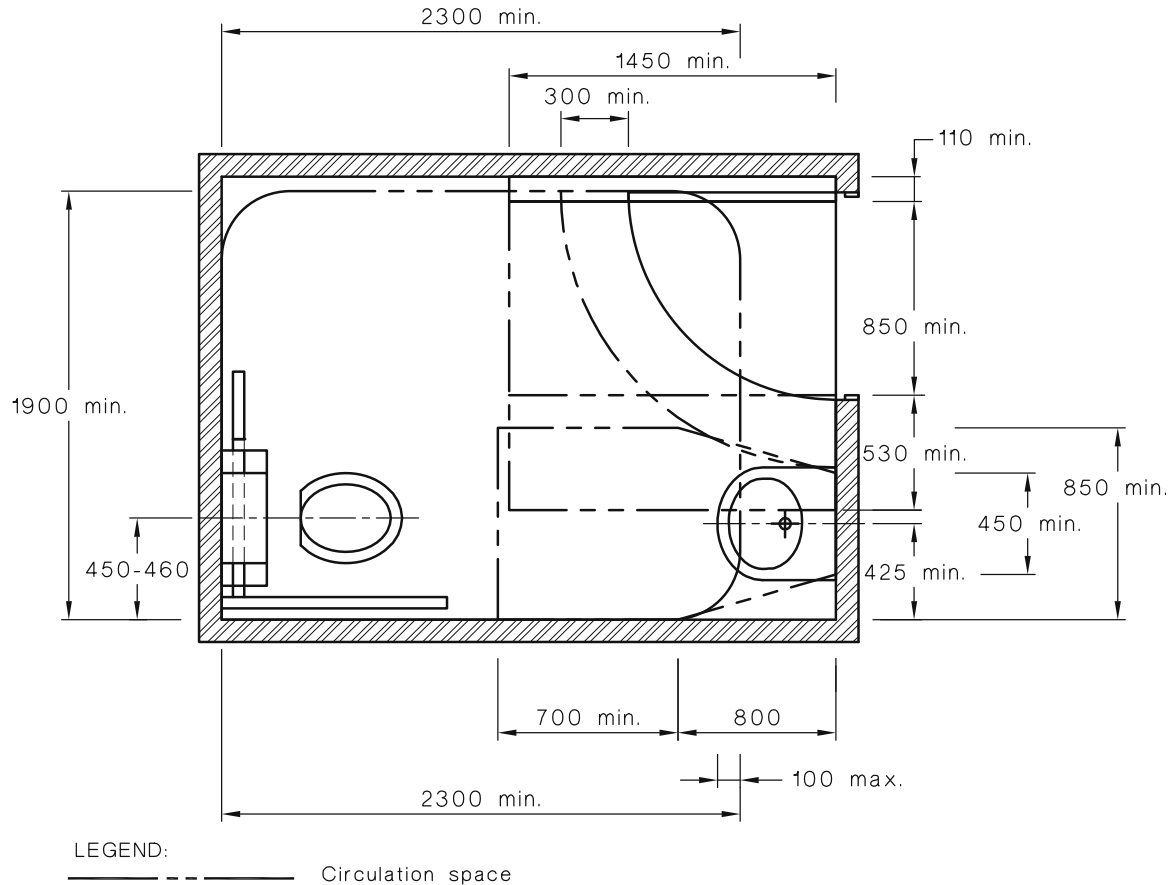
FIGURE 51(A) ALLOWABLE ENCROACHMENT OF A WASHBASIN INTO HINGED DOOR CIRCULATION SPACE



DIMENSIONS IN MILLIMETRES

FIGURE 51(B) OVERLAP OF WASHBASIN FIXTURE INTO DOOR CIRCULATION SPACE WHERE WASHBASIN IS LOCATED OPPOSITE A SLIDING DOOR

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FIGURE 52 EXAMPLE OF OVERLAPPING CIRCULATION SPACES IN A SANITARY COMPARTMENT

16 SANITARY COMPARTMENT FOR PEOPLE WITH AMBULANT DISABILITIES

16.1 General

Sanitary compartment for people with ambulant disabilities shall be in accordance with Figures 53(A) and 53(B).

16.2 Grabrails

Grabrails shall be installed in accordance with Clause 17 and Figure 53(A).

16.3 Doors

Doors to sanitary compartments for people with ambulant disabilities shall have openings with a minimum clear width of 700 mm, and shall comply with Figure 53(B).

Doors shall be provided with an in-use indicator and a bolt or catch. Where a snib catch is used, the snib handle shall have a minimum length of 45 mm from the centre of the spindle. In an emergency, the latch mechanism shall be openable from the outside.

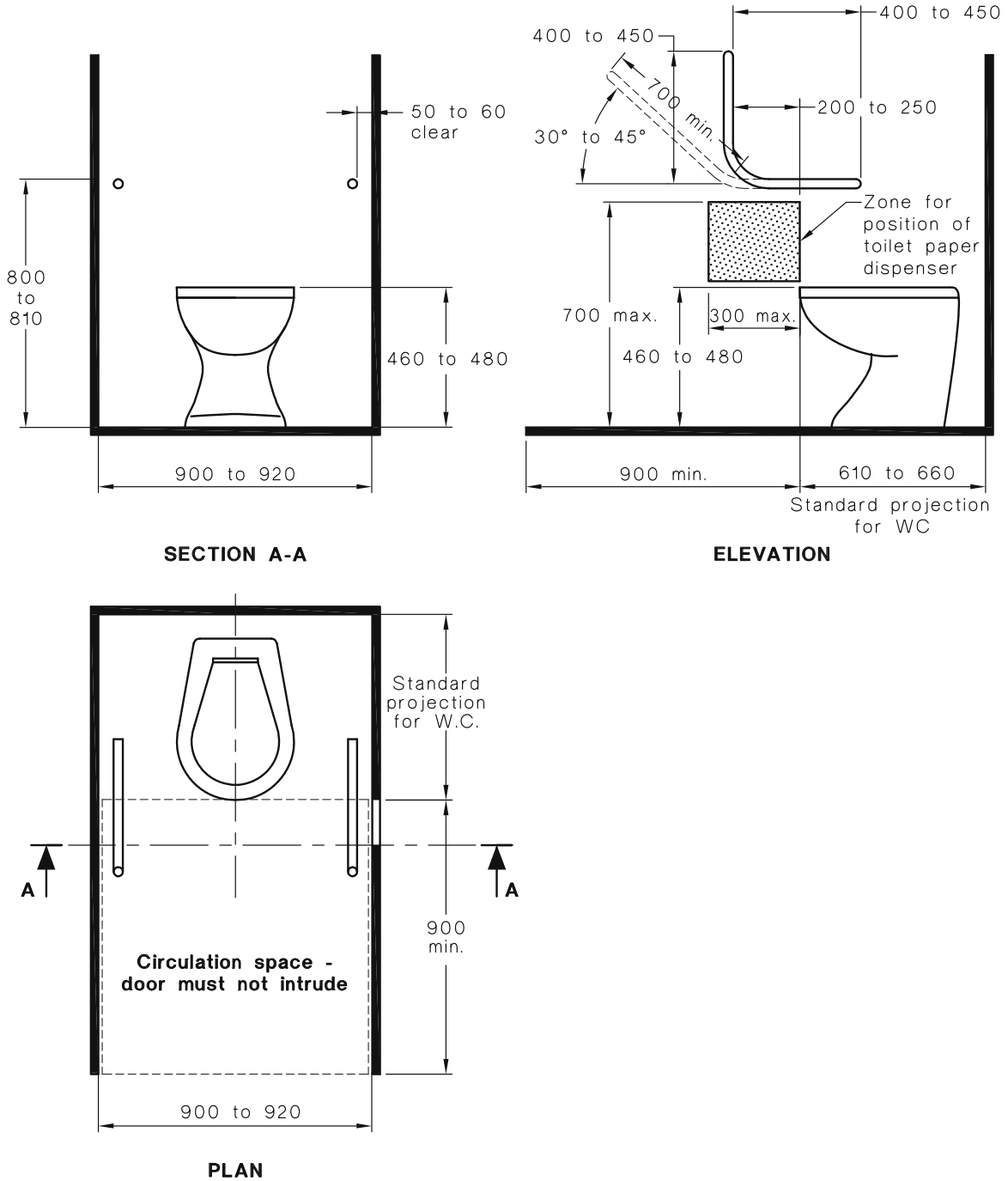
16.4 Signage

Sanitary compartment for people with ambulant disabilities shall be identified by symbol or words, as specified in Clause 8.

16.5 Coat hook

A coat hook shall be provided within the sanitary compartment and at a height between 1350 mm to 1500 mm from the floor.

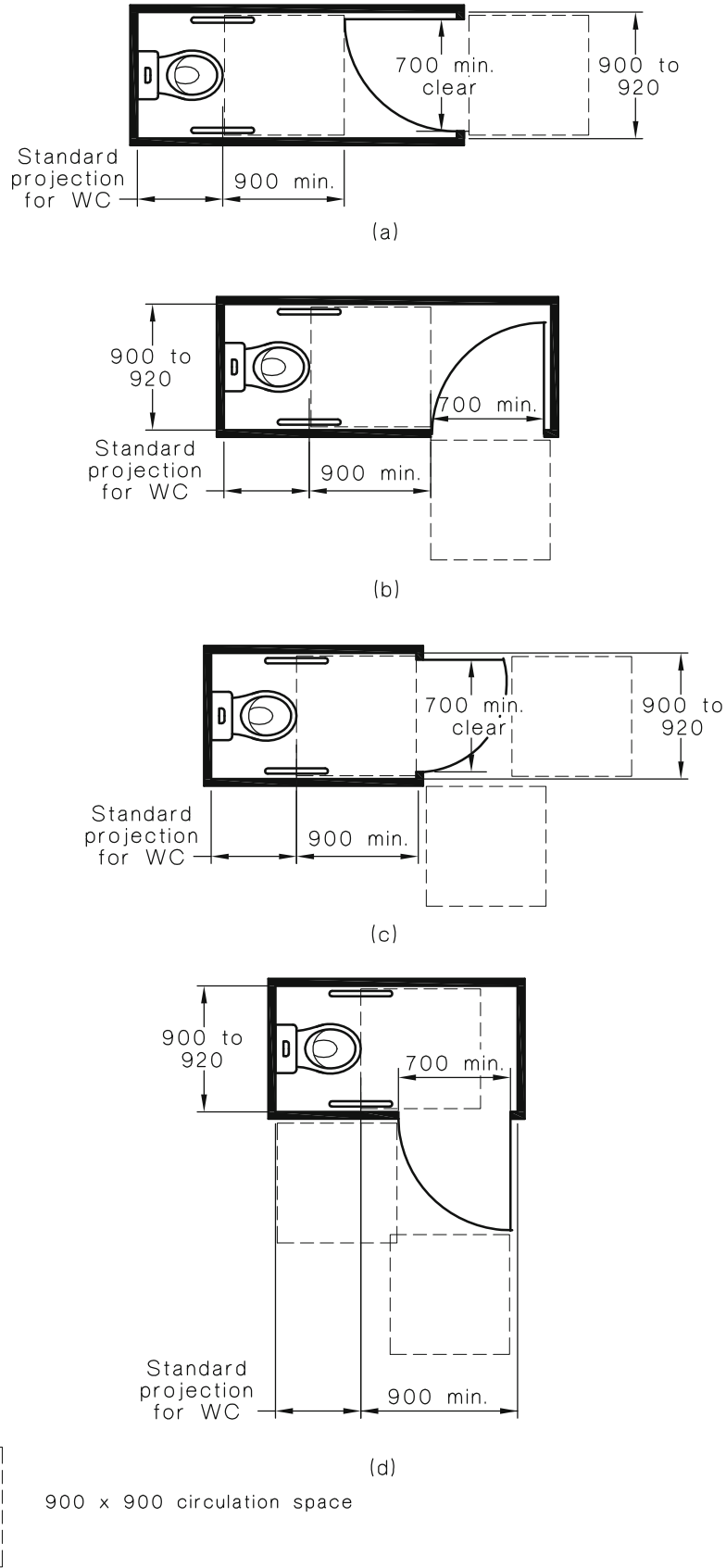
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FIGURE 53(A) SANITARY COMPARTMENT FOR PEOPLE WITH AMBULANT DISABILITIES—PLAN AND ELEVATION

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FIGURE 53(B) SANITARY COMPARTMENT FOR PEOPLE WITH AMBULANT DISABILITIES—DOORWAY OPTIONS

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17 GRABRAILS

Grabrails shall comply with the following:

- (a) Grabrails shall be not less than 30 mm and not more than 40 mm outside diameter; or they shall have a sectional shape within the limits of 30 mm to 40 mm diameter.
- (b) Exposed edges and corners of grabrails shall have a radius of not less than 5 mm.
- (c) The fastenings and the materials and construction of grabrails shall be able to withstand a force of 1100 N applied at any position and in any direction without deformation or loosening or rotation of the fastenings or fittings.
- (d) The clearance between a grabrail and the adjacent wall surface or other obstruction shall be not less than 50 mm and not more than 60 mm. The clearance above a horizontal grabrail shall extend above the top of the grabrail by not less than 600 mm. The clearance below a horizontal or angled rail shall be a minimum of 50 mm except at fixing points.
- (e) Grabrails shall be fixed so that there is no obstruction to the passage of the hand along the top 270° arc of horizontal and angled grabrails. There shall be no obstruction to the passage of the hand for the full length of vertical grabrails.

18 ASSEMBLY BUILDINGS

18.1 Wheelchair seating spaces

Where fixed seating is provided, wheelchair seating space shall be as follows:

- (a) Adjacent to, and on the same level as, other seating in the row and shall be accessed by a continuous accessible path of travel.
- (b) Located to allow lines of sight comparable to those for general viewing areas and shall not be obstructed by opaque handrails or balustrades.

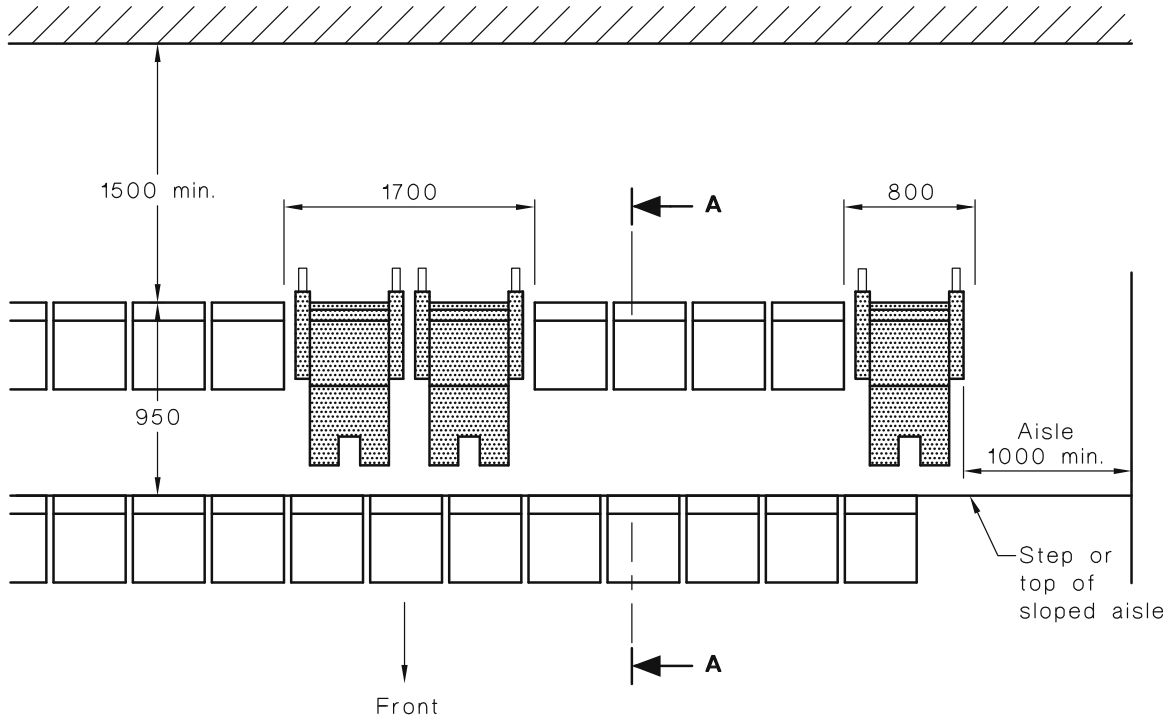
NOTE: Wheelchair seating spaces may be achieved by providing removable seating.

18.2 Surfaces

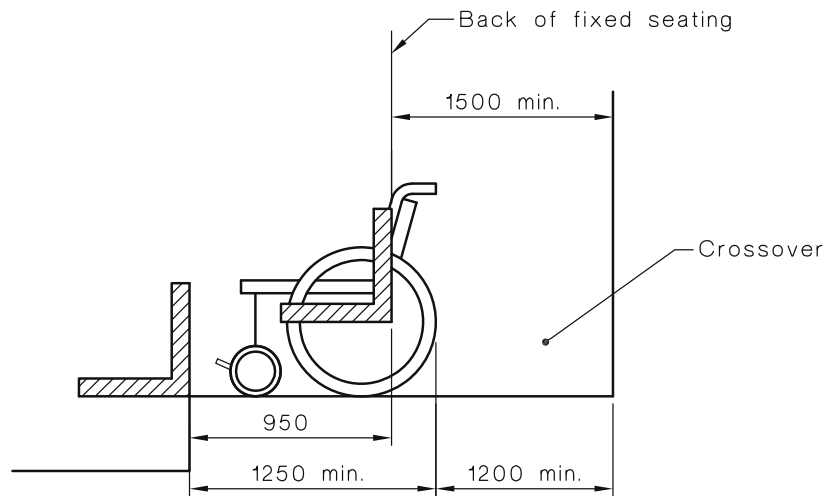
The ground or floor at wheelchair seating spaces shall be level when indoors or have a gradient not steeper than 1 in 40 in outdoor areas.

18.3 Spatial requirements

The minimum space for each wheelchair shall be as shown in Figure 54(A). The whole of the space allocated for any wheelchair shall not impinge on the dimensions required for aisles by more than 250 mm, or for crossovers by more than 300 mm. See Figures 54(B) and 54(C).



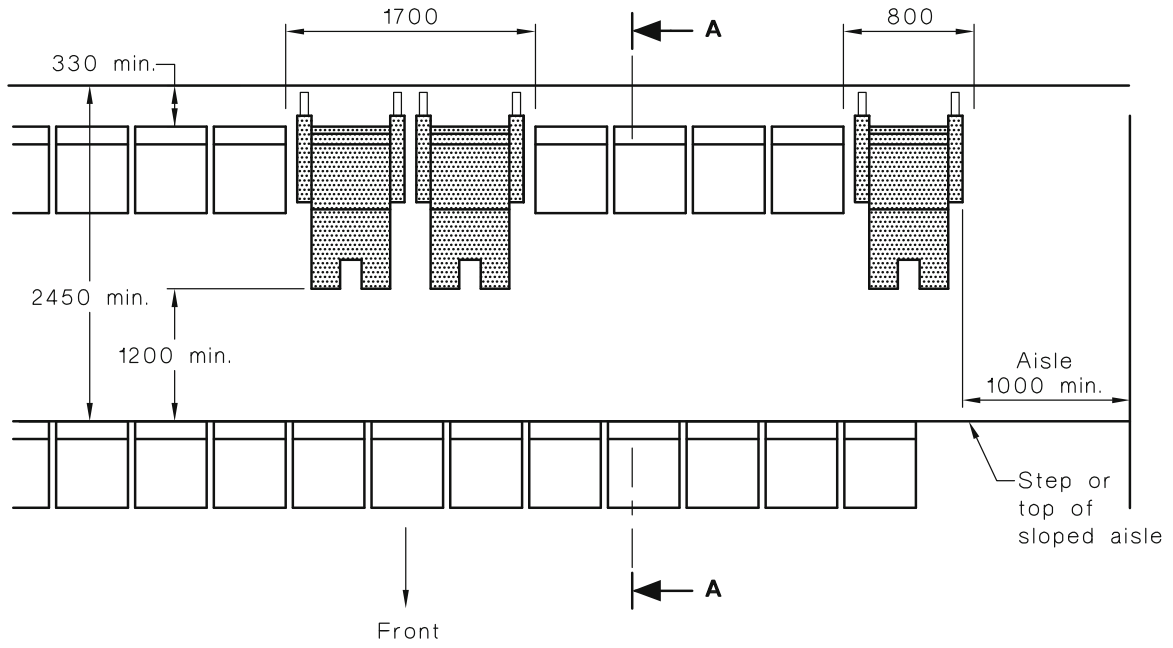
PLAN—APPROACH FROM THE REAR



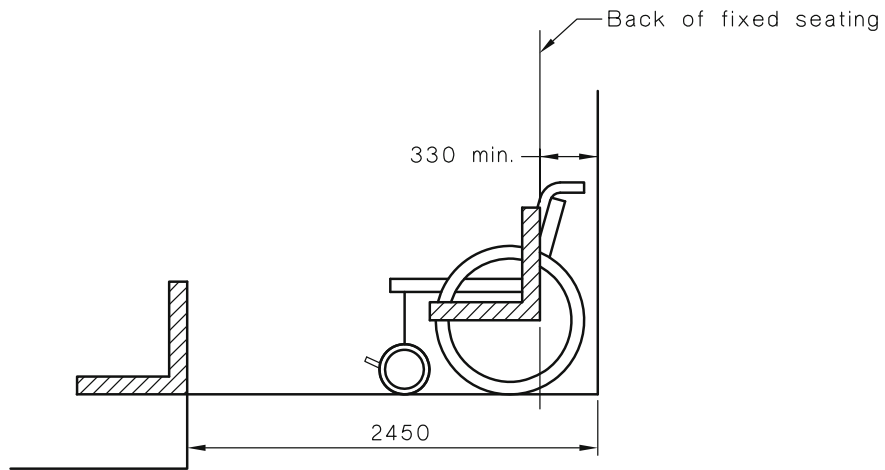
SECTION A-A

DIMENSIONS IN MILLIMETRES

FIGURE 54(A) WHEELCHAIR SEATING SPACES IN AUDITORIA WITH AISLES AND CROSSOVERS—APPROACH FROM THE REAR



PLAN—APPROACH FROM THE FRONT

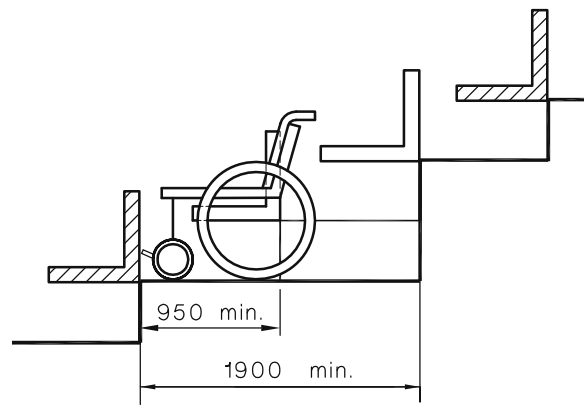
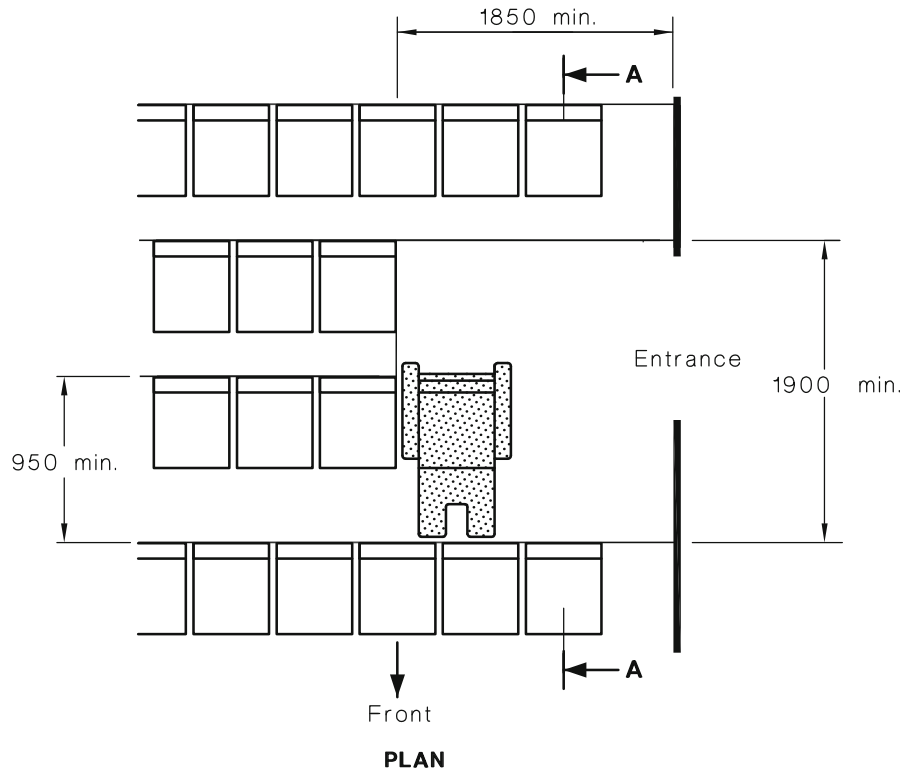


SECTION A-A

DIMENSIONS IN MILLIMETRES

FIGURE 54(B) WHEELCHAIR SEATING SPACES IN AUDITORIA WITH AISLES AND CROSSOVERS—APPROACH FROM THE FRONT

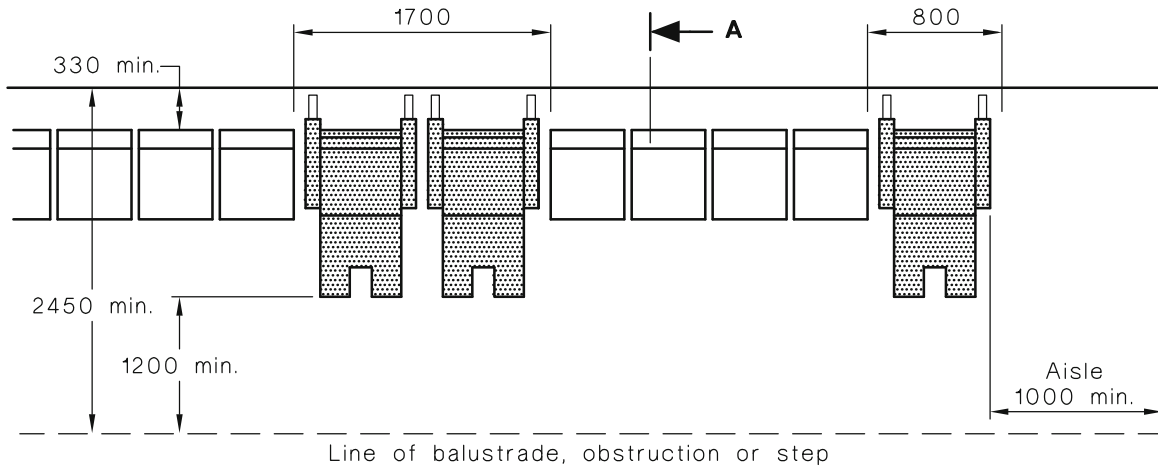
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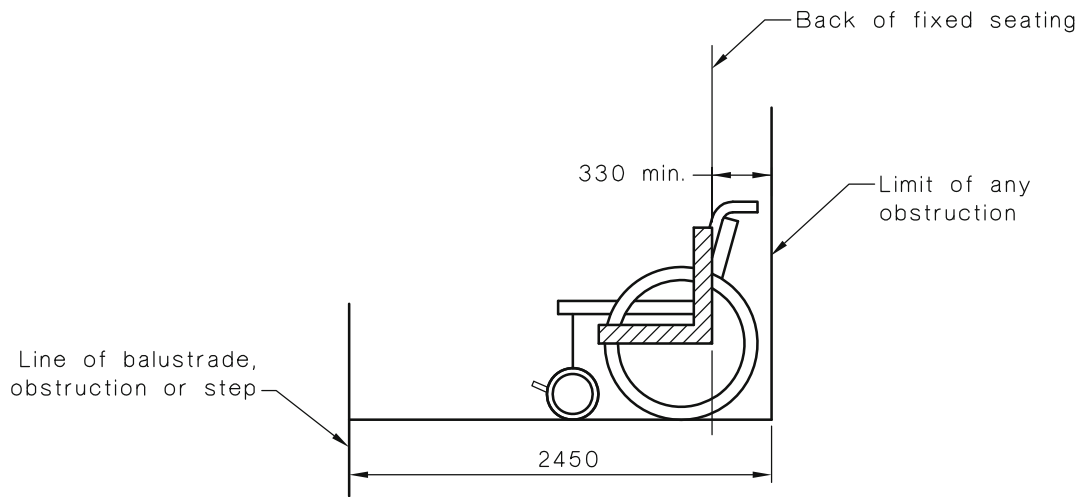
DIMENSIONS IN MILLIMETRES

FIGURE 54(C) WHEELCHAIR SEATING SPACES IN AUDITORIA WITH CONTINENTAL SEATING (i.e., NO AISLES OR CROSSOVERS)

A1



PLAN—APPROACH FROM THE FRONT

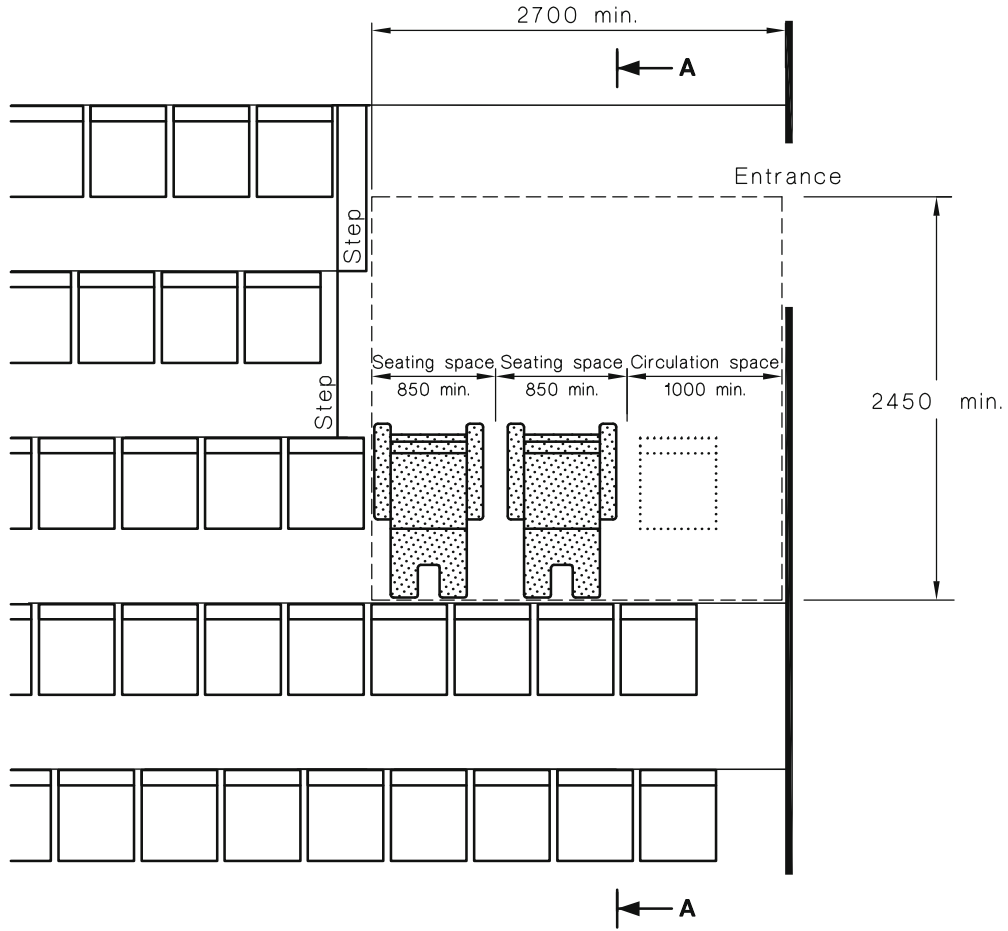


SECTION A-A

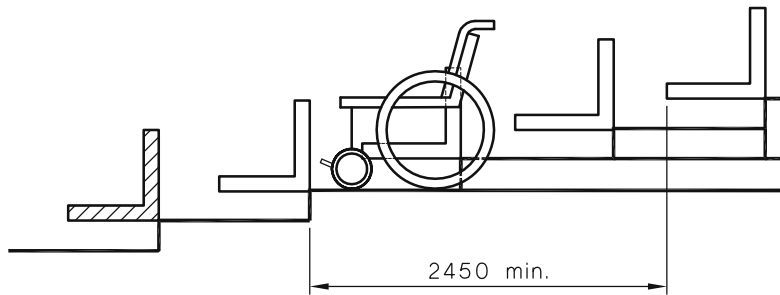
**FIGURE 54(D) WHEELCHAIR SEATING SPACES IN AUDITORIA FRONT ROW—
APPROACHING FROM THE FRONT**

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A1



PLAN



SECTION A-A

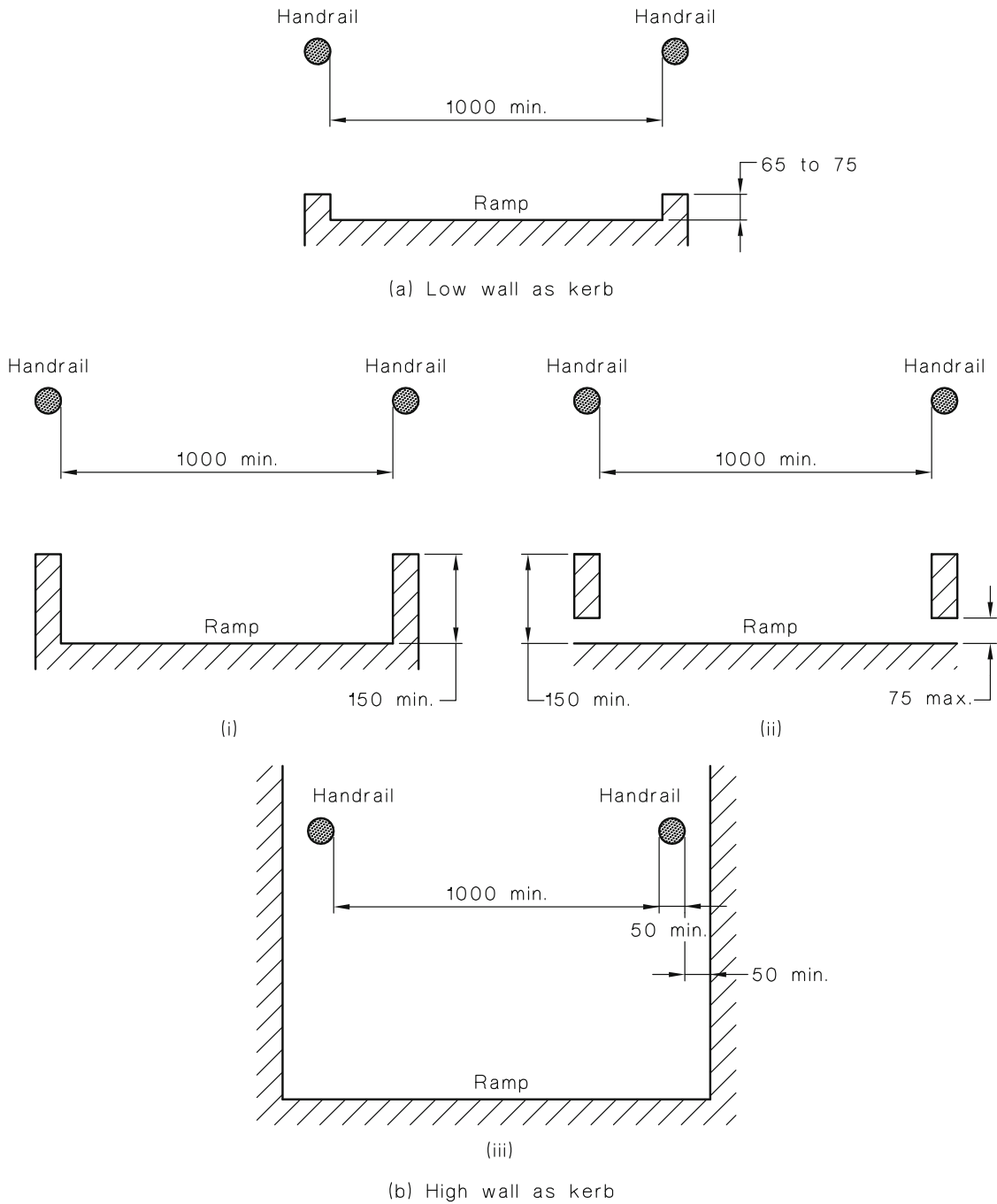
FIGURE 54(E) PAIRED WHEELCHAIR SEATING SPACES IN AUDITORIA WITH CONTINENTAL SEATING OR WHERE THERE ARE NO CROSSOVERS

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APPENDIX A
EXAMPLES OF KERBS
(Informative)

This Appendix provides kerb and handrail configurations, as shown in Figure A1, to enable compliance with the requirements of Clause 10.3(j).

A1

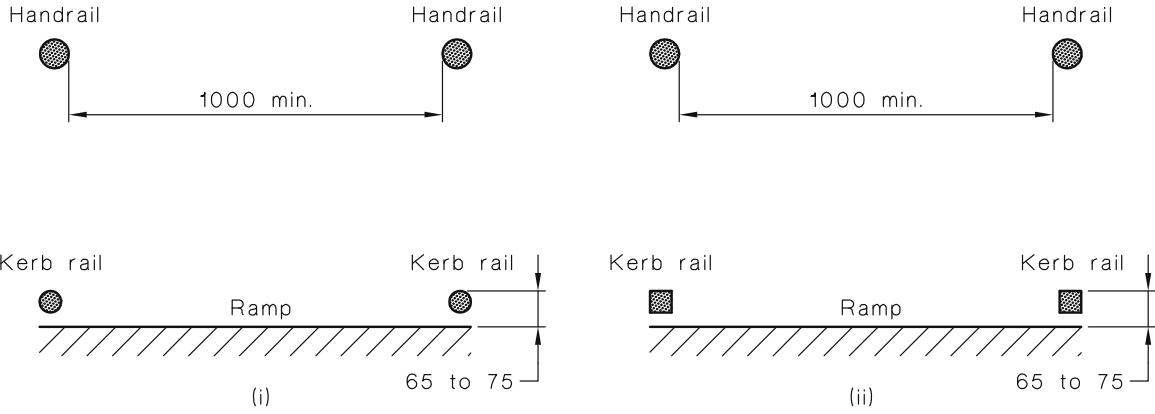


DIMENSIONS IN MILLIMETRES

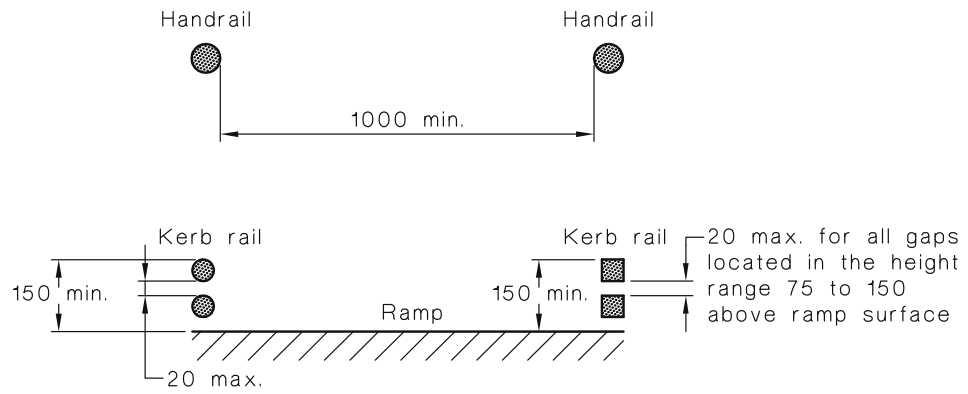
FIGURE A1 (in part) TYPES OF KERBS

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A1



(c) Single rail as kerb



(d) Multiple rail as kerb

DIMENSIONS IN MILLIMETRES

FIGURE A1 (in part) TYPES OF KERBS

APPENDIX B

THE MEASUREMENT OF LUMINANCE CONTRAST BETWEEN BUILDING ELEMENTS

(Informative)

B1 GENERAL

This Appendix sets out two methods for measuring the luminance contrast between building elements—in a laboratory or on-site.

Where it is necessary to achieve sufficient luminance contrast between building elements, this can usually be achieved by using very dark or very light materials. The luminance contrast is achieved by measuring the luminous reflectance of the first building element and comparing it with the luminous reflectance of the second building element, as set out in Paragraphs B3 and B4 or B5.

B2 LUMINANCE CONTRAST REQUIREMENTS

Luminance contrast between building elements is the difference in the amount of light reflected (luminance reflectance) from the 1st building element compared to the amount of light reflected from the 2nd building element.

The first building element has to have a minimum luminance contrast of 30% compared to the amount of light reflected from the second building element.

It may be necessary to test both elements when wet and dry.

The test to be conducted may be carried out in the laboratory and on-site, and for published results to then be compared.

B3 MEASUREMENT OF LUMINANCE CONTRAST—LABORATORY

B3.1 General

This Paragraph sets out a method for measuring the luminous reflectance of building elements. The method is carried out with reference to a standard light source, which is an inherent feature of suitable colorimeters and spectrophotometers.

NOTE: Some buildings materials manufacturers do publish luminous reflectance values for each of their products.

This test method is not suitable for measuring the luminous reflectance of translucent materials or illuminated objects. It is less applicable where the measured surface is not uniformly coloured.

NOTE: The method specifies colorimeters and spectrophotometers that are widely available.

B3.2 Instrumentation

A tristimulus colorimeter, or spectrophotometer with a diffuse illumination/normal viewing (d/o) geometry, is used with CIE Standard Illuminant D65. The instrument has to be capable of measuring absolute CIE for Y_{xy} to be calculated. The measured luminous reflectance is defined by the tristimulus value Y . The chromaticity coordinates x and y provide an indication of the colour.

B3.3 Procedure

The procedure is as follows:

- (a) Calibrate the equipment in accordance with the manufacturer's instructions.
- (b) Locate the equipment on the surface to be measured.
- (c) Take measurements in at least five locations (on each building element) or on five units of the product (such as samples, where five units are available). Where the surface does appear (visually) to be uniformly coloured, a minimum of 10 measurements have to be taken. Record the luminous reflectance (Y value) for each individual dry measurement that is taken. The luminous reflectance (Y value) of the CIE 1964 colour system is recognized in AS/NZS 1580.601.2.
- (d) Unless wet measurements are deemed to be inappropriate, wet the surface of the product and ensure that the surface remains wet (such that water ponds on the surface) for a minimum of 5 min. Take measurements as in Step (c), as soon as possible after removing any unabsorbed water from the surface with a cloth or sponge that does not leave any solid residue. Record the luminous reflectance (Y value) for each individual wet measurement that is taken.

Determine the mean dry luminous reflectance (Y_d) and the mean wet luminous reflectance (Y_w).

NOTES:

- 1 The use of standardized illumination conditions when making photometer measurements could enable manufacturers to publish luminous reflectance values that are consistent with those obtained using this Appendix.
- 2 For standard colours, see AS 2700.

The luminance contrast (C) of two surfaces has to be calculated using the following equation:

$$C = 125 (Y_2 - Y_1) / (Y_1 + Y_2 + 25) \text{ Bowman-Sapolinski equation}^*$$

where

C = luminance contrast

Y_1 and Y_2 = luminous reflectance values of the two surfaces

B3.4 Report

The following has to be reported:

- (a) Full description of the surfaces tested with product details where known.
- (b) The instrument geometry, the light source as being D65, the aperture and the observer angle.
- (c) The locations of the measurements on the sample.
- (d) The mean luminous reflectance of the building elements under the conditions set out in Paragraph B3.3.

The corresponding data for other light sources and illuminant may also be reported.

* An Improved Metric for Visual Differentiation using Colour-modified Clinical Eye Charts, Redeemer Baptist School North Parramatta Australia, Sapolinski, J., August 2009.

B4 DETERMINATION OF LUMINANCE CONTRAST

This Paragraph sets out a method for using the luminous reflectance values to calculate the required minimum luminance contrast between two adjacent or contiguous surfaces when the luminous reflectance of the products are known, and is based on the following equation:

$$C = 125 (Y_2 - Y_1)/(Y_1 + Y_2 + 25) = 30$$

where

C = luminance contrast

Y_1 = darker surface

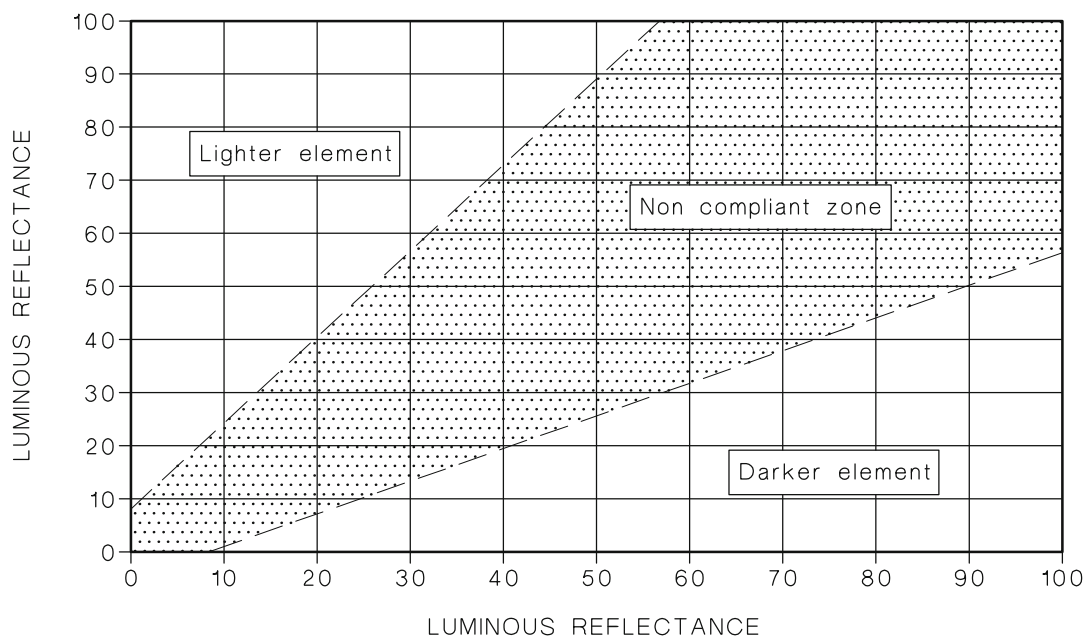
Y_2 = lighter surface

The full set of limits is shown in Table B1.

The luminous reflectance of the building elements has to lie above or below the lines illustrating the minimum and maximum luminous reflectance necessary, as shown in Figure B1.

TABLE B1
VALUES OF LUMINOUS REFLECTANCE REQUIRED
TO PROVIDE ADEQUATE LUMINANCE CONTRAST
AS A FUNCTION BETWEEN BUILDING ELEMENTS

Luminous reflectance of the building element	Minimum luminous reflectance of a possible lighter building element	Maximum luminous reflectance of a possible darker building element
95	—	53
90	—	50
85	—	47
80	—	44
75	—	41
70	—	38
65	—	35
60	—	31
55	96	28
50	90	25
45	82	22
40	74	19
35	65	16
30	57	13
25	49	10
20	41	7
15	33	4
10	25	1



NOTE: Luminous reflectance of building elements must lie outside the shaded area. Of the 2 elements the lighter element is to be above the shaded area and the darker element is to be below the shaded area.

FIGURE B1 LIMITING VALUES OF LUMINOUS REFLECTANCE OF BUILDING ELEMENTS

B5 MEASUREMENT OF LUMINANCE CONTRAST—ON-SITE

B5.1 General

This Paragraph sets out the method for on-site measurement of contrast of building elements. This method is carried out under the prevailing lighting condition(s) and is also applicable where a building element is not uniformly coloured.

NOTE: The method specifies a luminance meter (photometer) with a 1° measurement field. Such meters are widely available. While a wider field of view such as 3° may be preferable because it permits a shorter measurement distance, luminance meters with wider fields are less common and substantially more expensive.

B5.2 Instrumentation

A single lens reflex luminance meter commonly known as a photometer with a 1° measurement field and a spectral responsivity approximating the CIE 1931 Standard Observer V (λ) function as specified in ISO 11664-1 are to be used.

B5.3 Procedure

The procedure is as follows:

- Mount the luminance meter on a tripod so that the centre of the objective lens is at a height of 1.6 ± 0.1 m (representative of the eye height of a standing person).
- Locate the tripod so that measurements can be made of both building elements without moving the tripod. Direct the luminance meter to the point where the width of the smaller building element just fills the measurement field. Choose an area that is visually uniformly lit. Record the luminance L_1 .
- Direct the luminance meter to measure the second building element immediately adjacent to the previous location of the first building. Record the luminance L_2 .

- (d) If either building element is highly coloured, correct any significant deviation from the CIE $V(\lambda)$ function by measuring the luminance of a white plate (L_a) directly and then through a filter (L_b) with nominally the same chromaticity as the building element and known luminous transmittance (τ) = the correction factor (F) is defined as follows:

$$F = \frac{L_a}{L_b} \times \tau$$

- (e) When calculating the contrast between the building element use either one of the appropriate following equations:

$$\text{If } L_2 > L_1 \text{ then } C = \frac{L_2 - L_1}{L_2}$$

$$\text{If } L_1 > L_2 \text{ then } C = \frac{L_1 - L_2}{L_1}$$

Compliance is established using C as appropriate.

- (f) To carry out wet measurements take measurements in at least 5 locations (on each building element) or on five units of the product (such as samples where 5 units are available). Where the surface does not appear (visually) to be uniformly coloured, a minimum of 10 measurements have to be taken. Record the luminance reflectance (L value) for each individual dry measurement that is made. The luminance reflectance (L value) of the CIE 1964 colour system is recognized in AS/NZS 1580.601.2.
- (g) Unless wet measurements are deemed to be inappropriate, wet the surface of the product and ensure that the surface remains wet (such that water ponds on the surface) for a minimum of 5 min. Take measurements as in Step (c) as soon as possible after removing any unabsorbed water from the surface with a cloth or sponge that does not leave any solid residue. Record the luminous reflectance (Y value) for each individual wet measurement that is taken. Determine the mean dry luminous reflectance (L_d) and the mean wet luminous reflectance (L_{aw}).

NOTES:

- 1 The use of standardized illumination conditions when making photometer measurements could enable manufacturers to publish luminous reflectance values that are consistent with those obtained using this Appendix.
- 2 For standard colours, see AS 2700.

B5.4 Report

The following has to be reported:

- (a) Full description of the building elements with product details where known.
- (b) The instrument being a luminance meter with a 1° measurement area corrected to approximate the CIE 1931 Standard Observer.
- (c) The location of the sample, if on-site.
- (d) The location of the sample of the measurements on the first building element.
- (e) A description of the light source(s) illuminating the sample, including type, e.g., fluorescent tube, incandescent, high pressure sodium discharge, metal halide, and colour (in general terms).
- (f) The mean luminance reflectance of the second building element to the first building element under the conditions set out in Paragraph B5.3.

- (g) The mean luminance reflectance of the first building element to the second building element under the conditions set out in Paragraph B5.3.
- (h) The luminance contrast with the second building element.
- (i) Where the lighting source varies, e.g., by night and day, the corresponding data for other light sources may also be reported.

APPENDIX C
SUMMARY OF REQUIREMENTS FOR WALKWAYS, RAMPS AND
LANDINGS

(Informative)

Table C1 provides a summary of the requirements for walkways, ramps and landings, together with a reference to the relevant clause or figure.

TABLE C1
SUMMARY OF SPECIFICATIONS FOR WALKWAYS, RAMPS AND LANDINGS

Component	Gradient	Width	Height	Length	Landing spacing		Maximum camber/crossfall	Clause/ Figure
					Walkway gradient	Landing spacing		
Walkway (straight)	Not steeper than 1 in 20	1000 mm minimum unobstructed	N/A	N/A	Walkway gradient	Landing spacing	For walkway gradients shallower than 1 in 33; a camber or crossfall of not steeper than 1 in 40; or 1 in 33 where the surface is bitumen. Camber or crossfall not required where the walkway gradient is 1 in 33 or steeper	10.1 and 10.2
					Less than 1 in 33 1 in 33 1 in 20 Between 1 in 33 and 1 in 20	N/A 25 m maximum 15 m maximum By interpolation		
Walkway (curved)	Not steeper than 1 in 20	1500 mm minimum unobstructed	N/A	N/A	Walkway gradient	Landing spacing	For walkway gradients shallower than 1 in 33; a camber or crossfall of not steeper than 1 in 40; or 1 in 33 where the surface is bitumen. Camber or crossfall not required where the walkway gradient is 1 in 33 or steeper	10.1 and 10.4
					Less than 1 in 33 1 in 33 1 in 20 Between 1 in 33 and 1 in 20	N/A 25 m maximum 15 m maximum By interpolation		

(continued)

TABLE C1 (continued)

Component	Gradient	Width	Height	Length	Landing spacing		Maximum camber/crossfall	Clause/ Figure
					Ramp gradient	Landing spacing		
Ramp (straight)	Steeper than 1 in 20 and not steeper than 1 in 14	1000 mm minimum unobstructed	See Premises Standards/BCA for maximum height of a series of connected ramps	N/A	Ramp gradient	Landing spacing	To be level	10.1 and 10.3
					1 in 14	9 m maximum		
					1 in 20	15 m maximum		
					Between 1 in 14 and 1 in 20	By interpolation		
Ramp (curved)	Steeper than 1 in 20 and not steeper than 1 in 14	1500 mm minimum unobstructed	See Premises Standards/BCA for maximum height of a series of connected ramps	N/A	Ramp gradient	Landing spacing	N/A	10.1 and 10.4
					1 in 14	9 m maximum		
					1 in 20	15 m maximum		
					Between 1 in 14 and 1 in 20	By interpolation		
Step ramp	Not steeper than 1 in 10	1000 mm minimum unobstructed	190 mm maximum	1900 mm maximum	N/A		To be level	10.1 and 10.6
Kerb ramp	Not steeper than 1 in 8	1000 mm minimum unobstructed	190 mm maximum	1520 mm maximum	N/A		To be level	10.1 and 10.7
Threshold ramp	Not steeper than 1 in 8	Minimum width of opening between door jambs unobstructed	35 mm maximum	280 mm maximum	N/A		N/A	10.5
Landing with no change of direction	Not steeper than 1 in 40 or 1 in 33 where the surface is bitumen	1000 mm minimum unobstructed	N/A	1200 mm minimum	Refer to walkways and ramps		A camber or crossfall not steeper than 1 in 40 or 1 in 33 where the surface is bitumen. At doorways no crossfall or camber	10.1 and 10.8

(continued)

TABLE C1 (continued)

Component	Gradient	Width	Height	Length	Landing spacing	Maximum camber/crossfall	Clause/ Figure
Landing with up to 90° change of direction	Not steeper than 1 in 40 or 1 in 33 where the surface is bitumen	1500 mm minimum unobstructed	N/A	1500 mm minimum	Refer to walkways and ramps for spacing of landings and Figure 13 for angle of approach requirements	A camber or crossfall of not steeper than 1 in 40 or 1 in 33 where the surface is bitumen. At doorways no crossfall or camber	10.1 and 10.8
Landing with between 90° to 180° change of direction	Not steeper than 1 in 40 or 1 in 33 where the surface is bitumen	1540 mm minimum unobstructed	N/A	2070 mm minimum	Refer to walkways and ramps for spacing of landings and Figure 13 for angle of approach requirements	A camber or crossfall of not steeper than 1 in 40 or 1 in 33 where the surface is bitumen. At doorways no crossfall or camber	10.1 and 10.8

BIBLIOGRAPHY

The following documents were referred to during the preparation of this Standard:

AS 1742.15—2007 Manual of uniform traffic control devices—Direction signs, information signs and route numbering.

AS/NZS 1580.601.2: Paints and related materials—Methods of test—Colour—Principles of colour measurement.

ISO 1164-1 Colorimetry—CIE Standard Colorimetric Observers.

Sapolinski, J., August 2009, An Improved Metric for Visual Differentiation using Colour-modified Clinical Eye Charts, Redeemer Baptist School, North Parramatta, Australia.

A1

Bails, J. H., 1983. 'Project Report of the Field Testing of Australian Standard 1428—1977.' (Comprises a series of separate investigations). South Australian Department of Housing and Construction. (Now SA Housing)

AMENDMENT CONTROL SHEET

AS 1428.1—2009

Amendment No. 1 (2010)

REVISED TEXT

SUMMARY: This Amendment applies to the Preface, Clauses 6.5.2, 6.6, 7.4.1(a), 8.1, 10.1(a), 10.3(i), 13.4, 15.2.3, 15.2.4(b), 15.2.5, 15.2.8.2(a), 15.5.10 (new), 15.6(b), Figures 4, 8, 9, 18 (caption), 14, 19, 22(A) and (B), 23(a) and (b), 24(C), 38(a) and (b), 39(a) and (b), 40, 43, 44(A) and (B), 45, 50, 52, 53(A), 54(D) (new) and (E) (new), Appendix A1(a) and (b) and the Bibliography.

Published on 26 November 2010.

NOTES

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