National Construction Code

Housing Provisions Standard

Australian Building Codes Board

2022

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General table of contents

How to use the Housing Provisions

This Section is for information only.

1.1 Introduction

This ABCB Housing Provisions contains *Deemed-to-Satisfy Provisions* that are considered to be acceptable forms of construction that meet the legislative requirements for complying with Parts H1 to H7 of NCC Volume Two (i.e. they comply with the *Performance Requirements* listed in Parts H1 to H7 of NCC Volume Two).

There is no obligation to adopt any particular option contained in this Housing Provisions if it is preferred to meet the *Performance Requirement* some other way.

However, if one of the options described in this Housing Provisions or elsewhere in the *Deemed-to-Satisfy Provisions* of NCC Volume Two is not complied with, then the appropriate authority must be satisfied that the *Performance Requirements* have been met.

1.2 Application

This Housing Provisions must be applied in accordance with each of the following:

- Section A (Governing Requirements) of NCC Volume Two.
- Any conditions on the use of the Housing Provisions set out within the *Deemed-to-Satisfy Provisions* of NCC Volume Two where it is referenced.
- The Scope clause at the beginning of each Section of this Housing Provisions.

1.3 The scope of the Housing Provisions

In Section H of NCC Volume Two, some *Deemed-to-Satisfy Provisions* contain more than one compliance pathway. Usually, the first of these pathways will be by referenced to a relevant Australian Standard (or similar) and the second will be by reference to a particular Section or Part of the ABCB Housing Provisions. In these cases, use of the Housing Provisions is one option for complying with the relevant *Deemed-to-Satisfy Provision*.

Other *Deemed-to-Satisfy Provisions* contain only one compliance pathway: either a reference to an Australian Standard (or similar), or a reference to a particular Section or Part of the ABCB Housing Provisions. In these cases, the ABCB Housing Provisions may only be used if it is referenced, and must be used if it is the only compliance option for the particular *Deemed-to-Satisfy Provision*.

If a *Deemed-to-Satisfy Provision* does not reference the ABCB Housing Provisions, then the Housing Provisions cannot be used as a compliance pathway for that particular *Deemed-to-Satisfy Provision*.

The ABCB Housing Provisions only contains content relevant to the *Deemed-to-Satisfy Provisions* in NCC Volume Two which call it up. Therefore, the ABCB Housing Provisions should not be interpreted as a comprehensive or complete manual for house building.

Section 2 of the ABCB Housing Provisions contains a number of structural design manuals which can be used to design building elements using engineering principles.

There is no obligation for the provisions of Section 2 to be used apart from situations where a particular building, building element or component is required to comply with NCC Volume Two and is not contained on the scope of any other *Deemed-to-Satisfy Provisions*.

Section 11 contains additional construction requirements that are ancillary to the construction of a building or structure, such as the construction of swimming pools, heating appliances, fireplaces, methods of attaching decks and balconies to external walls or the like. Section 11 also contains special provisions for construction in alpine areas (earthquake areas are addressed in Section 2, flood hazard areas are addressed in the ABCB Standard for Construction of Buildings in Flood Hazard Areas, which is referenced directly by H1D10).

Situations where it is necessary for a mixed application of the ABCB Housing Provisions and other standards referenced in the *Deemed-to-Satisfy Provisions* of NCC Volume Two may be identified by reference to the differing components of the *Performance Requirements* (see A2G3).

1.4 Suitability of Performance Solutions

The options described in the *Deemed-to-Satisfy Provisions* are typical examples of national construction methods. They are certainly not the only means available of complying with NCC Volume Two. The performance format of the NCC provides flexibility and allows the use of alternative construction methods to those described in the *Deemed-to-Satisfy Provisions*.

1.5 The use of maps

Maps have been used throughout NCC Volume Two, including in the ABCB Housing Provisions, to indicate areas where particular requirements apply. These maps are indicative and some variation in conditions will apply, especially on the border of marked areas.

It is recommended that the *appropriate authority* be consulted and in most cases they be able to identify what conditions apply in such areas at the early stage of building design.

1.6 Consultation with appropriate authorities

When building in certain locations there may be local conditions or other site constraints that may limit the type of construction that can be used. This is particularly important with buildings that are constructed in areas subject to increased structural loading conditions that may occur due to geographical, topographical or climatic conditions and soil types.

Appropriate authorities have a wide range of experience and information on the geographical and topographical conditions found in their area of responsibility, and should be consulted during the initial design stage.

1.7 Layout of the ABCB Housing Provisions

Although it does not cover every aspect of housing construction, the ABCB Housing Provisions has nonetheless been organised in a manner that follows the logical construction sequence of a building. Table 1.7 outlines some of the more frequently used details and where they are located in the ABCB Housing Provisions.

Table 1.7: Information guide

Stage	Relevant part	Reference(s)
Initial design considerations	Earthworks	3.2
	Fire Safety	9
	Facilities	10.4
	Room heights	10.3
	Light and ventilation	10.5, 10.6
	Stairway and ramp construction	11.2
	Energy efficiency	13
	Site preparation and drainage	3.1,3.3
	Footings and slabs	4
	Masonry	5
	Framing	6
	Roof cladding, gutters and downpipes and wall cladding	7
	Gutters and downpipes	7.4
	Glazing	8
	Barriers and handrails	11.3
Construction issues	Wet areas and external waterproofing	10.2
	Sound insulation	10.7
	Condensation management	10.8
	Swimming pools	H7D2

Stage	Relevant part	Reference(s)
	Termite risk management	3.4
	Earth retaining structures	H1D3
	Subfloor ventilation	6.2
	Smoke alarms and evacuation lighting	9.5
	Boilers, pressure vessels, heating appliances, fireplaces, chimneys and flues	12.4
Special requirements	Earthquake areas	2
	Flood hazard areas	H1D10
	Construction in bushfire areas	H7D4
	Construction in alpine areas	12.2
	Attachment of decks and balconies to external walls of buildings	12.3
	High wind areas	2
	Class 10 buildings and structures	Various

1.8 Interpretation

Throughout the ABCB Housing Provisions, diagrams, explanatory information and cross-volume considerations are included. A1G1 (interpretation) contains information on these elements in the NCC which is also applicable when they appear in the ABCB Housing Provisions.

1.9 How to use the requirements of each Section/Part

Each Section of the ABCB Housing Provisions is comprised of a scope statement and one or more Parts which contain the technical provisions which must be followed as appropriate to achieve compliance with the relevant *Deemed-to-Satisfy Provision*. Generally, a *Deemed-to-Satisfy Provision* will refer to a specific Part of the ABCB Housing Provisions in order to link the user directly to the relevant technical provisions.

Each Section contains a scope and application Part which sets out the conditions and limitation applicable to the subsequent Parts contained within that Section. Each Part must only be applied in a way that is consistent with its scope.

Sections are numbered with a single numeral (e.g. Section 2 - Structure).

Parts are numbered with two numbers separated by a decimal (e.g. Part 2.2 – Structural provisions).

Clauses within each Part are numbered with three numbers separated by a decimal point (e.g. Clause 2.2.4 – Determination of structural resistance of materials and forms of construction).

Subclauses and below are numbered using the system used throughout the NCC.

2 Structure

Part 2.1 Scope and application of Section 2

2.1.1 Scope

[New for 2022]

(1) This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for structure (see Part 2.2).

(2) For other structural provisions not included in this Section of the ABCB Housing Provisions, refer to the following *Deemed-to-Satisfy Provisions* in NCC Volume Two:

- (a) Site preparation (see H1D3).
- (b) Footings and slabs (see H1D4).
- (c) Masonry (see H1D5).
- (d) Framing (see H1D6).
- (e) Roof and wall cladding (see H1D7).
- (f) Glazing (see H1D8).
- (g) Earthquake areas (see H1D9).
- (h) Flood hazard areas (see H1D10).
- (i) Attachment of decks and balconies to external walls of buildings (see H1D11).

2.1.2 Application

[New for 2022]

The application of Section 2 of the ABCB Housing Provisions is subject to the following:

- (a) The Governing Requirements of NCC 2022 Volume Two.
- (b) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 2 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in Part 3.0 of NCC Volume Two.

Part 2.2 Structural provisions

2.2.1 Application of Part 2.2

[New for 2022]

Part 2.2 need not be complied with if, for the purposes of H1D2(1)(b) only, the *Deemed-to-Satisfy Provisions* of H1D3 to H1D11 relating to structural elements are complied with.

2.2.2 Resistance to actions

[2019: 3.0.2]

The resistance of a building or structure must be greater than the most critical action effect resulting from different combinations of actions, where—

(a) the most critical action effect on a building or structure must be determined in accordance with 2.2.3 and the general design procedures contained in AS/NZS 1170.0; and

(b) the resistance of a building or structure is determined in accordance with 2.2.4.

Explanatory Information:

A building or structure must be designed to resist the most critical effect resulting from different combinations of actions, taking into consideration—

(a) the probability of simultaneous occurrence of two or more actions; and

(b) the levels of reliability of the structure when subject to combined actions; and

(c) the characteristics of the action.

Determining the levels of reliability of the structure when subject to combined actions should be consistent with the levels of reliability implicit in the design events for natural phenomenon. When designing for the maximum combined actions, a principle frequently adopted is that the maximum is likely to occur when at least one of the actions is at its maximum value.

NT 2.2.3

2.2.3 Determination of individual actions

[2019: 3.0.3]

The magnitude of individual actions must be determined in accordance with the following:

(a) Permanent actions:

(i) the design or known dimensions of the building or structure; and

(ii) the unit weight of the construction; and

(iii) AS/NZS 1170.1.

(b) Imposed actions:

(i) the known loads that will be imposed during the occupation or use of the building or structure; and

(ii) *construction activity actions*; and

(iii) AS/NZS 1170.1.

(c) Wind, snow and earthquake actions:

(i) the applicable annual probability of design event for safety, determined by—

(A) assigning the building or structure an Importance Level in accordance with Table 2.2.3a; and

(B) determining the corresponding annual probability of exceedance for safety in accordance with Table 2.2.3b; and

(ii) for wind actions, AS/NZS 1170.2 or AS 4055; and

(iii) for snow and ice actions, AS/NZS 1170.3; and

(iv) for earthquake actions, AS 1170.4.

(d) Actions not covered in (a), (b) and (c) above:

(i) the nature of the action; and

(ii) the nature of the building or structure; and

(iii) the Importance Level of the building or structure determined in accordance with Table 2.2.3a; and

(iv) AS/NZS 1170.1.

(e) For the purposes of (d) the actions include but are not limited to—

(i) liquid pressure action; and

(ii) (ground water action; and

(iii) rainwater action (including ponding action); and

(iv) earth pressure action; and

(v) differential movement; and

(vi) time dependent effects (including creep and shrinkage); and

(vii) thermal effects; and

(viii) ground movement caused by—

(A) swelling, shrinkage or freezing of the subsoil; and

(B) landslip or subsidence; and

(C) siteworks associated with the building or structure; and

(ix) *construction activity actions*.

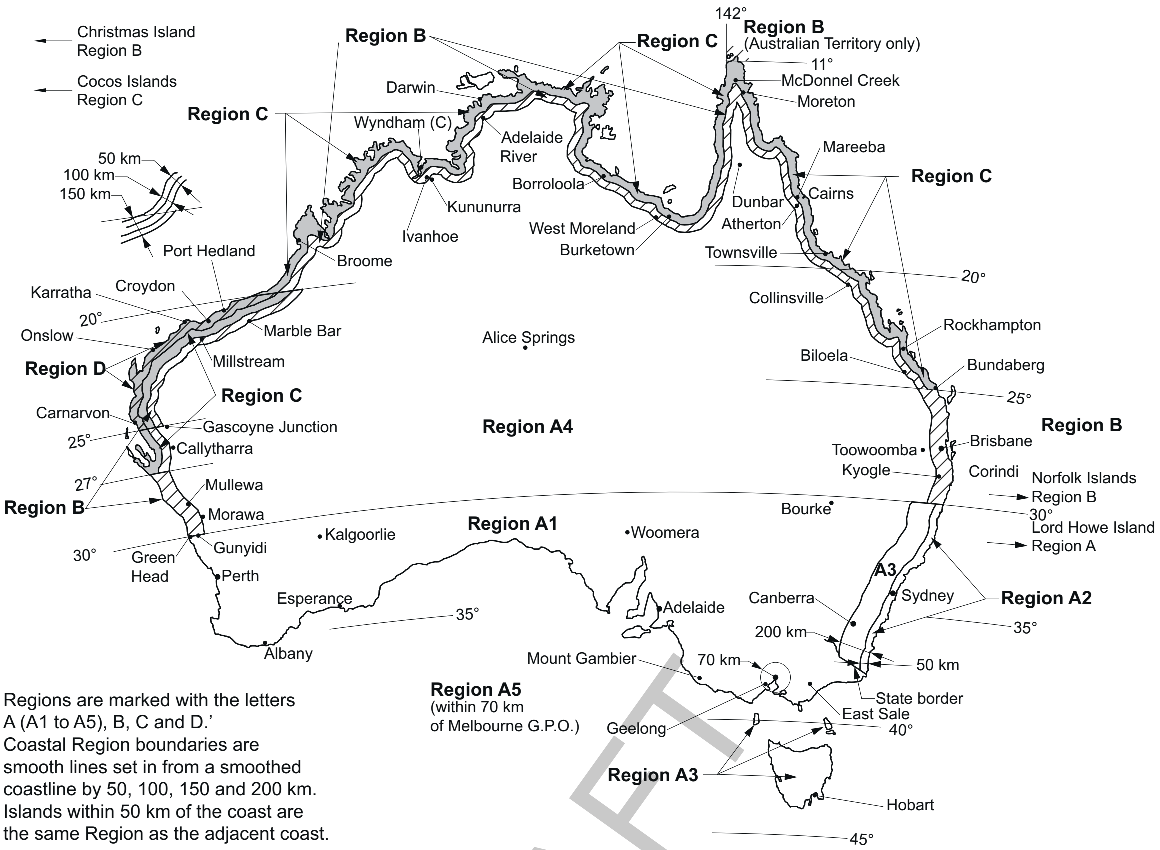
Table 2.2.3a: Importance Levels of buildings and structures

Importance Level	Building types
1	Buildings or structures presenting a low degree of hazard to life and *other property* in the case of failure.
2	Buildings or structures not included in Importance Level 1.

Table 2.2.3b: Design events for safety—annual probability of exceedance

Importance Level	Non-cyclonic wind	Cyclonic wind	Snow	Earthquake
1	1:100	1:200	1:100	1:250
2	1:500	1:500	1:150	1:500

Figure 2.2.3: **Wind regions**



Explanatory Information: Permanent and imposed actions

Permanent actions include the dead loads of the building or structure. These include the load imposed by the building's components inclusive of the forces imposed by the floors, walls, roofs, suspended ceilings, etc.

Imposed actions include live loads on the building or structure. These include the load arising from construction activity and the intended use or function of the building or structure.

Explanatory Information: Application of AS 1170.4

There are certain limitations on the application to domestic structures such as Class 1a and Class 1b buildings in Appendix A of AS 1170.4. These limitations include building height, roof slope, etc. For additional information refer to Appendix A of AS 1170.4.

Explanatory Information: Importance Levels (Table 2.2.3a)

Table 2.2.3a provides a generic description of building types to which Importance Levels have been assigned. The "Importance Level" concept is applicable to building structural safety only. More specific examples are provided in the following list. The examples are indicative and not exhaustive.

- Importance Level 1: Isolated minor Class 10a buildings and Class 10b structures.
- Importance Level 2: Class 1 buildings; Class 10a buildings and Class 10b structures associated with Class 1 buildings.

Importance Levels must be assigned on a case by case basis and relate to the hazards to human life and *other property* in the event of the structure's failure. For example—

(a) Importance Level 1 is for minor isolated structures that rarely contain people, are not required as part of normal infrastructure and present a low risk to life and *other property*.

(b) Importance Level 2 includes domestic housing and structures intended to contain reasonable numbers of people under normal operations.

Explanatory Information: Construction in cyclonic areas

The intent of building construction in cyclonic areas (see Figure 2.2.3) is to ensure the structure has sufficient strength to transfer wind forces to the ground with an adequate safety margin to prevent collapse of the building and the building being lifted, or slid off its foundations.

To resist these forces it is necessary to have—

(a) an anchorage system, where the roof is connected by the walls to the footings by a chain of connections; and

(b) a bracing system to prevent horizontal collapse due to wind forces; and

(c) continuity of the system where each structural element is interlocked to its adjoining structural element throughout the building.

Explanatory Information: Anchorage

Anchorage of the system is achieved by using a variety of connectors. Each connector must be capable of carrying the uplift force, because the ability of the building to resist the wind forces is directly related to its weakest link.

2.2.4 Determination of structural resistance of materials and forms of construction

[2019: 3.0.4]

The following requirements, or any combination of them, must be used to determine the structural resistance of materials and forms of construction as appropriate:

(a) Earthworks: H1D3(1).

(b) Earth retaining structures: H1D3(2).

(c) Termite risk management: H1D3(3).

(d) Concrete construction (including slabs and footings, piled footings and reinforced and prestressed concrete structures): H1D4 or AS 3600 as applicable.

(e) Post-installed and cast-in fastenings in concrete: AS 5216.

(f) Masonry (including masonry veneer, *unreinforced masonry* and *reinforced masonry*): H1D5.

(g) Steel construction (including steel framing and structural steel members): H1D6(2), (4) and (5).

(h) Timber construction (including design of timber structures, timber framing and design of nail-plated timber roof trusses): H1D6(3).

(i) Composite steel and concrete: AS/NZS 2327.

(j) Aluminium construction:

  (i) AS/NZS 1664.1.

  (ii) AS/NZS 1664.2.

(k) Roof construction (including plastic sheeting, roofing tiles, metal roofing and terracotta, fibre-cement and timber slates and shingles): H1D7.

(l) Wall cladding: H1D7.

(m) Glazed assemblies: H1D8.

(n) Barriers and handrails (including stairway and ramp construction):

  (i) H5D3; and

  (ii) AS/NZS 1170.1 for the determination of loading forces on a barrier.

(o) Attachment of decks and balconies to *external walls* of buildings: H1D11.

(p) Garage doors and other large access doors in openings not more than 3 m in height in *external walls* of buildings determined as being located in wind region C or D in accordance with Figure 2.2.3: AS/NZS 4505.

(q) For *high wind areas*: requirements listed in (a) to (p) as appropriate or the Northern Territory Deemed to Comply Standards Manual.

Explanatory Information:

The weight of roof or ceiling insulation, particularly if additional ceiling insulation is used for compliance with the energy efficiency provisions, needs to be considered in the selection of plasterboard, plasterboard fixings and building framing.

2.2.5 Structural software

[2019: 3.0.5]

(1) Structural software used in computer aided design of a building or structure that uses design criteria based on the *Deemed-to-Satisfy Provisions* of the *Housing Provisions*, including its referenced documents, for the design of steel or timber trussed roof and floor systems and framed building systems, must comply with the ABCB Protocol for Structural Software.

(2) The requirements of (1) only apply to structural software used to design steel or timber trussed roof and floor systems and framed building systems for buildings within the following geometrical limits:

- (a) The distance from ground level to the underside of eaves must not exceed 6 m.
- (b) The distance from ground level to the highest point of the roof, neglecting chimneys, must not exceed 8.5 m.
- (c) The building width including roofed verandahs, excluding eaves, must not exceed 16 m.
- (d) The building length must not exceed five times the building width.
- (e) The roof pitch must not exceed 35 degrees.

(3) The requirements of (1) do not apply to design software for individual frame members such as electronic tables similar to those provided in—

- (a) AS 1684 Parts 2, 3 and 4; or
- (b) NASH Standard Residential and Low-Rise Steel Framing, Part 2.

Explanatory Information:

2.2.5 does not apply where a software package simply eliminates manual calculations and the process of the package requires identical methodology as that undertaken manually, e.g. AS 1684 span tables and bracing calculations.

3 Site preparation

Part 3.1 Scope and application of Section 3

3.1.1 Scope

[New for 2022]

(1) This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for—

(a) Earthworks (see Part 3.2); and

(b) Drainage (see Part 3.3); and

(c) Termite risk management (see Part 3.4).

(2) For other site preparation provisions not included in this Section of the ABCB Housing Provisions, refer to the following *Deemed-to-Satisfy Provisions* in NCC Volume Two: Earth retaining structures (see H1D3(2)).

Explanatory Information:

These provisions relate to general *site* preparation for footings, services, drainage and installation of termite management systems. It should be noted that other construction methods may be used to achieve the same results as specified in this Part provided they comply with the appropriate *Performance Requirement*.

The provisions in Part 3.2 will enable earthworks associated with the construction of a building to be carried out safely and to avoid potential damage to the subject building, adjoining structures and property through the soil collapsing or subsiding. Exceptional *site* conditions (including the effects of torrential rain) may need special consideration and additional advice from appropriately qualified people should be considered.

State and Territory legislation may also have requirements that apply to earthworks, especially in relation to adjoining property and notification of owners of that property. Advice should be obtained from the *appropriate authority* before commencement of works.

The requirements of this Part are to be read in conjunction with H1D3(2) where an earth retaining structure is installed.

NSW 3.1.2

3.1.2 Application

[New for 2022]

The application of Section 3 of the ABCB Housing Provisions is subject to the following:

(a) The Governing Requirements of NCC 2022 Volume Two.

(b) Any conditions set out within the following *Deemed-to-Satisfy Provisions* of NCC Volume Two:

(i) H1D3(1), for earthworks.

(ii) H2D4(1)(b), for drainage.

(c) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 3 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practices for Parts 3.1.1, 3.1.3 and 3.1.4 of NCC 2019 Volume Two.

NCC 2019 Volume Two did not include an acceptable construction practice for Part 3.1.2.

Part 3.2 Earthworks

3.2.1 Un-retained bulk earthworks – site cut and fill

[2019: 3.1.1.1]

(1) A *site* cut using an un-retained embankment must be—

(a) within the allotment; and

(b) not within the zone of influence of any existing structure on the property, or the allotment boundary as defined in Table 3.2.1 and Figure 3.2.1a; and

(c) not deeper than 2 m from the natural ground level at any point.

(2) Fill, using an un-retained embankment must—

(a) be placed within the allotment; and

(b) be placed at a gradient which complies with Table 3.2.1 and Figure 3.2.1b; and

(c) be placed and mechanically compacted in layers not more than 150 mm; and

(d) be not more than 2 m in height from the natural ground level at any point; and

(e) where used to support footings or slabs, be placed and compacted in accordance with Part 4.2; and

(f) have *surface water* diverted away from any existing structure on the property or adjoining allotment in accordance with 3.3.3.

Table 3.2.1: Un-retained embankment slope ratios

Soil class (see 4.4.1 for material description)	Site cut (excavation) (maximum embankment slope ratio, angle of site cut H:L Note 1)	Compacted fill (maximum embankment slope ratio, angle of batter H:L Note 1)
Stable rock (Class A)	8:1	3:3
Sand (Class A)	1:2	1:2
Firm clay (Class M-E)	1:1	1:2
Soft clay (Class M-E)	2:3	Not suitable

Table Notes:

1. See Figures 3.2.1a and 3.2.1b for some examples of un-retained embankment slopes.
2. Retaining walls must be installed in accordance with H1D3(2) where—
   a. the embankment slope is steeper than described in this Table; or
   b. the soil type is not described in this Table.

Figure 3.2.1a: **Site cut and fill using un-retained embankments — Site cut commencing at the allotment boundary or affecting an adjoining property**

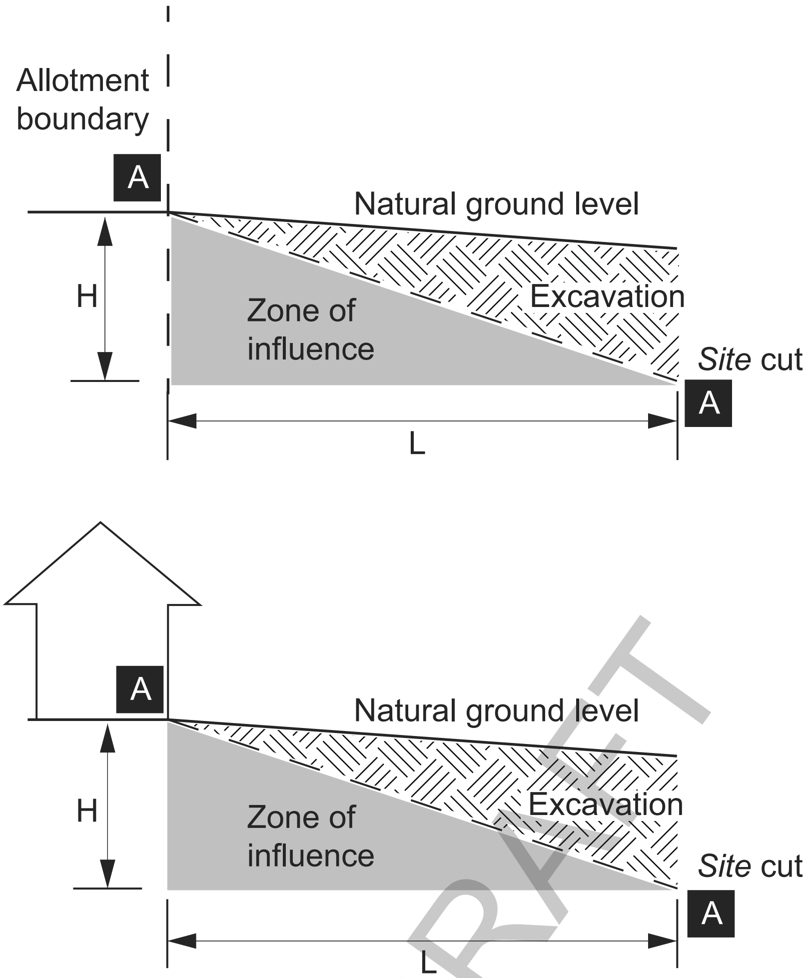


Figure Notes:

1. The angle for line A-A is defined as the maximum embankment slope ratio H:L in Table 3.2.1 and is taken from the bottom of the existing footing and is defined as the area suitable for excavation.
2. Consideration must be given for drainage of *surface water*, particularly where fill affects an adjoining property.

Figure 3.2.1b: **Site cut and fill using un-retained embankments — Fill commencing at the allotment boundary or affecting an adjoining property**

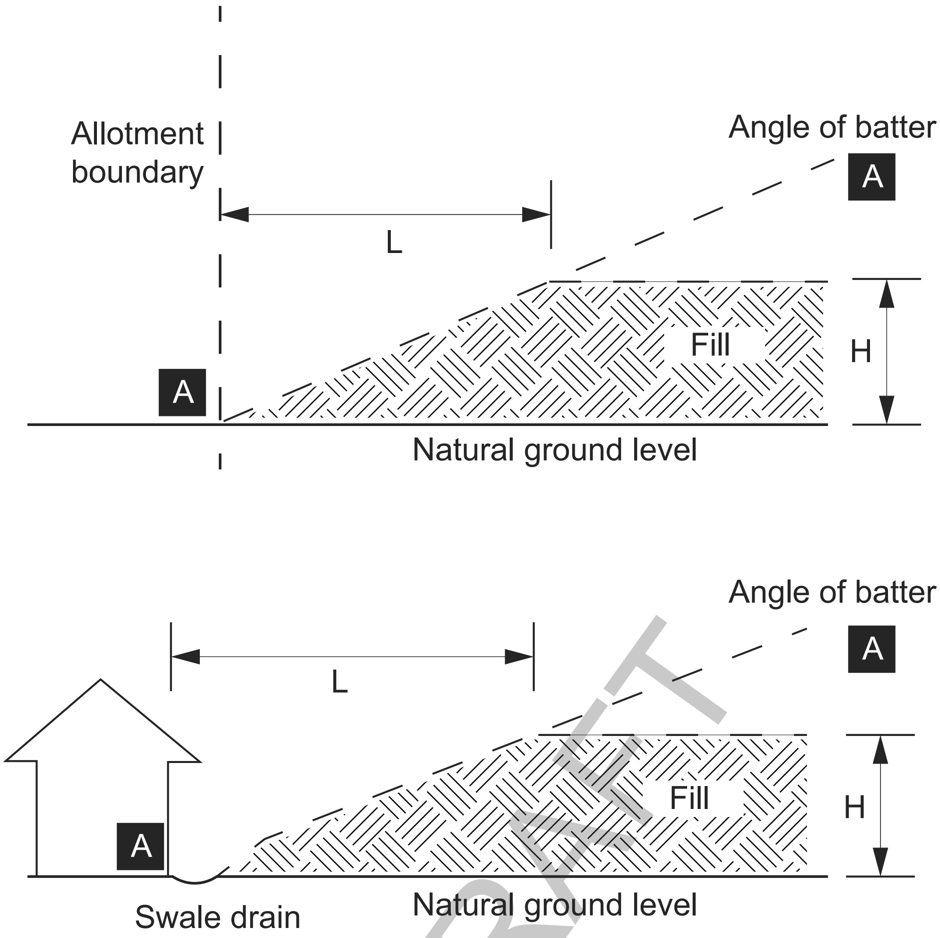


Figure Notes:

1. The angle for line A-A is defined as the maximum embankment slope ratio H:L in Table 3.2.1 and is taken from the bottom of the existing footing and is defined as the area suitable for excavation.
2. Consideration must be given for drainage of *surface water*, particularly where fill affects an adjoining property.

Part 3.3 Drainage

3.3.1 Application of Part 3.3

[New for 2022]

(1) Part 3.3 is subject to the limitations set out in H2D2(1)(b).

(2) Part 3.3 need not be complied with if H2D2(1)(a) is complied with.

3.3.2 Drainage requirements

[2019: 3.1.3.2]

Drainage systems must be installed as follows—

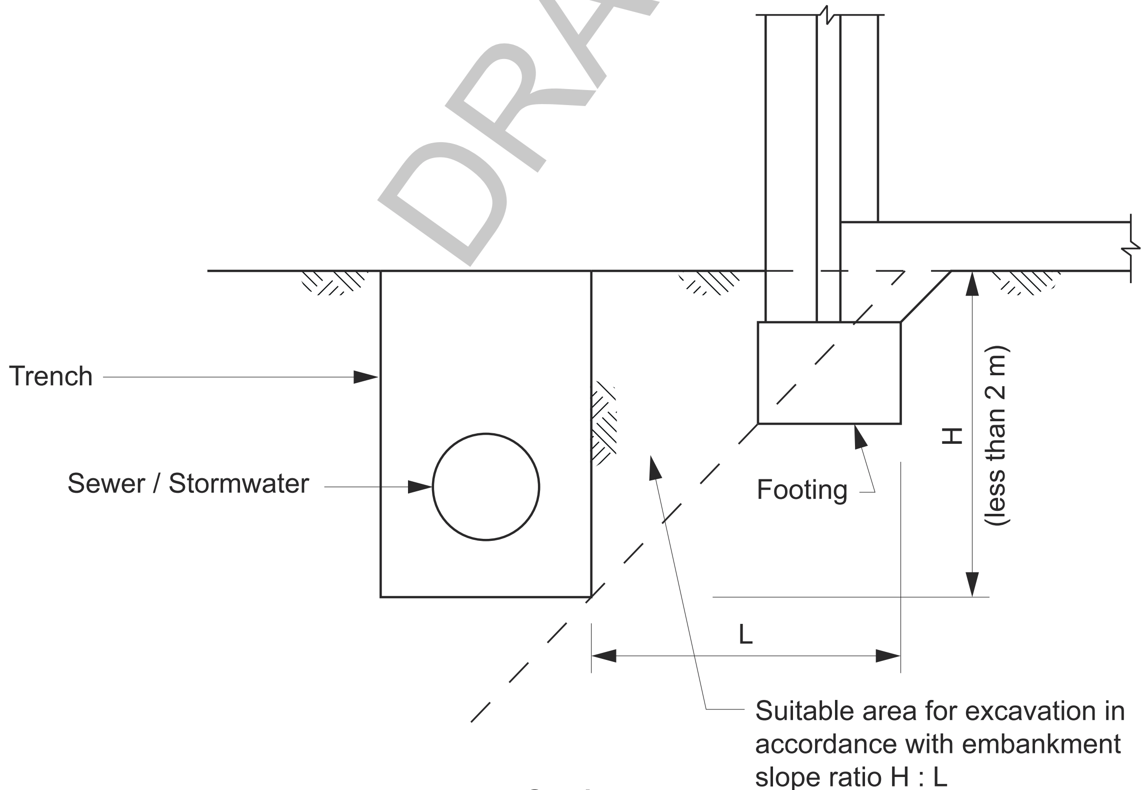
(a) areas adjoining and under buildings — *surface water* drainage in accordance with 3.3.3; and

(b) where *site* conditions exist that create a need for subsoil water to be diverted away from footings, basements, retaining walls etc — sub-soil drainage in accordance with 3.3.4; and

(c) where underground drainage from roof areas is *required* or permitted — underground stormwater drainage in accordance with 3.3.5; and

(d) excavation for drains adjacent to existing footings must be within the area described in Figure 3.3.2 as being safe for excavation.

Figure 3.3.2: Excavation for drains adjacent to footings



Section

Figure Notes:

1. Any excavation below the area defined as being safe for excavation will need additional protection measures to be determined by appropriately qualified persons.
2. Slope ratio H:L is determined using Table 3.2.1.

3.3.3 Surface water drainage

[2019: 3.1.3.3]

Surface water must be diverted away from Class 1 buildings as follows:

(a) Slab-on-ground — finished ground level adjacent to buildings: the external finished surface surrounding the slab must be drained to move *surface water* away from the building and graded to give a slope of not less than (see Figure 3.2.1) —

  (i) 25 mm over the first 1 m from the building in *low rainfall intensity areas* for surfaces that are reasonably impermeable (such as concrete or clay paving); or

  (ii) 50 mm over the first 1 m from the building in any other case.

(b) Slab-on-ground — finished slab heights: the height of the slab-on-ground above external finished surfaces must be not less than (see Figure 3.3.3a) —

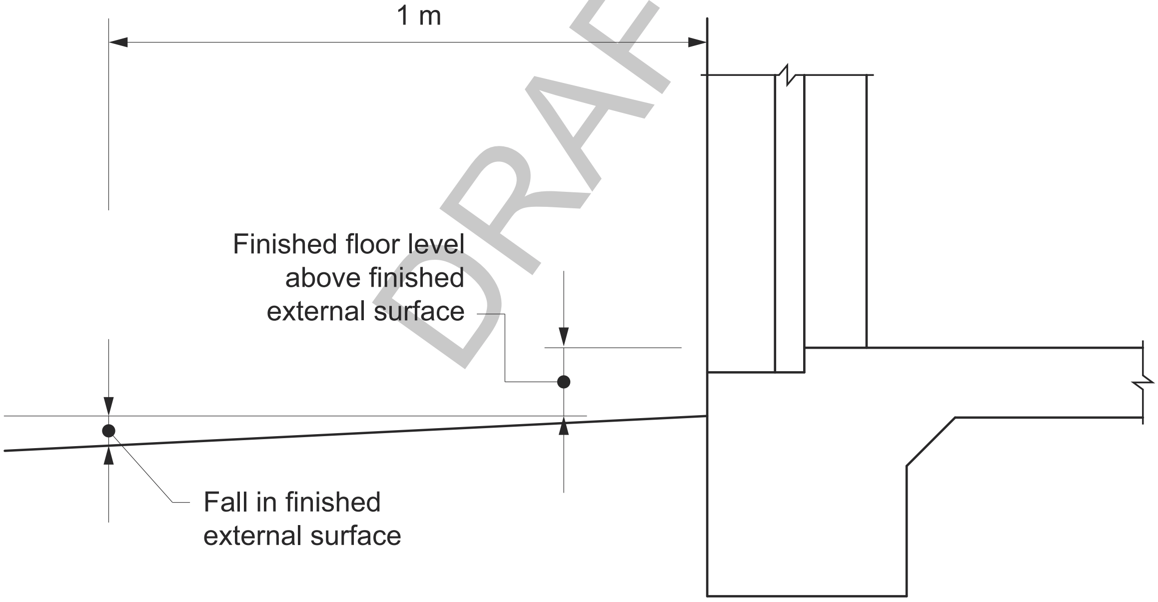
  (i) 100 mm above the finished ground level in *low rainfall intensity areas* or sandy, well-drained areas; or

  (ii) 50 mm above impermeable (paved or concrete) areas that slope away from the building in accordance with (a); or

  (iii) 150 mm in any other case.

(c) The ground beneath suspended floors must be graded so that the area beneath the building is above the adjacent external finished ground level and *surface water* is prevented from ponding under the building (see Figure 3.3.3b).

Figure 3.3.3a: Site surface drainage

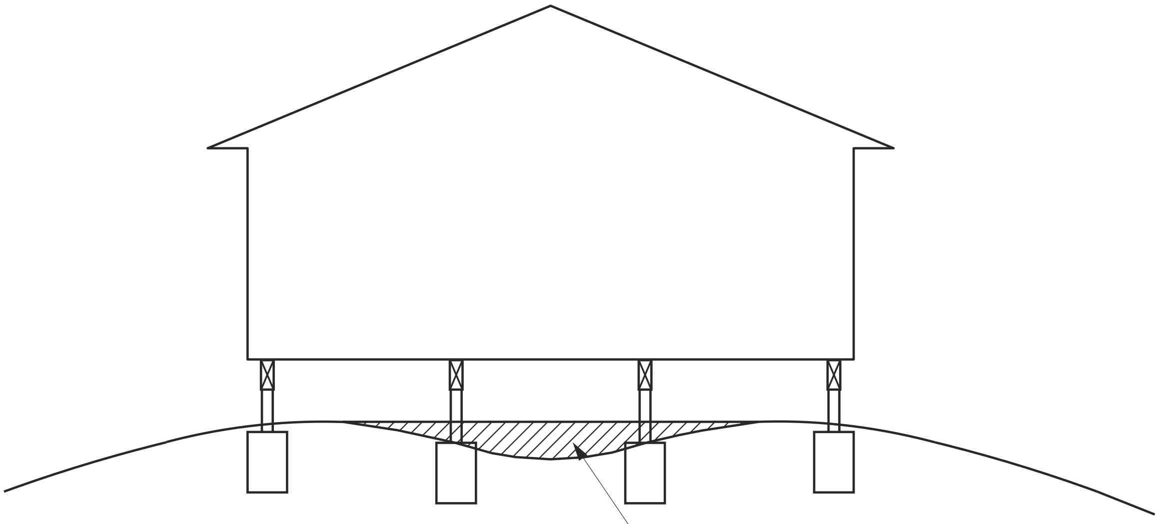


Elevation

Figure Notes:

1. For fall in finished external surface, see 3.3.3(a).
2. For finished floor level above finished external surface, see 3.3.3(b).

Figure 3.3.3b: Grading of ground under suspended floors



Explanatory Information:

The appropriate slab height above finished ground level and the slope of the external finished surface surrounding the slab may vary depending on:

(a) The local plumbing requirements; in particular the height of the overflow relief gully relative to drainage fittings and ground level (to work effectively they must be a minimum of 150 mm below the lowest sanitary fixture).

(b) The run-off from storms, particularly in areas of high rainfall intensity, and the local topography.

(c) The effect of excavation on a cut and fill *site*.

(d) The possibility of flooding.

(e) Termite risk management provisions.

Clearances between wall cladding and the finished ground level are provided in 7.5.7.

3.3.4 Subsoil drainage

[2019: 3.1.3.4]

Where a subsoil drainage system is installed to divert subsurface water away from the area beneath a building, the subsoil drain must—

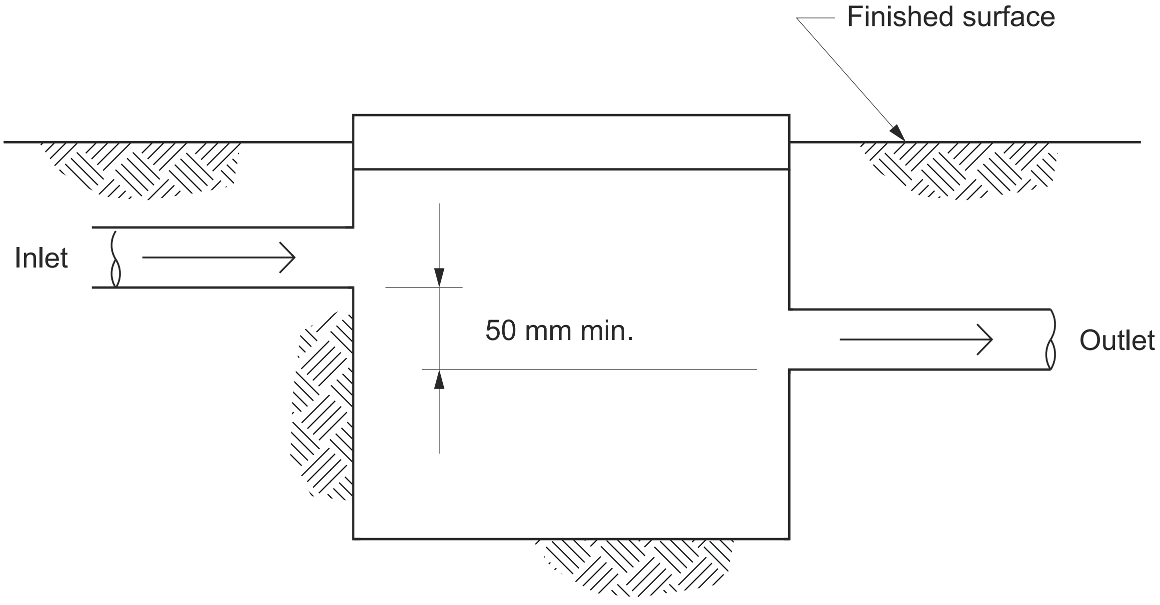
(a) be graded with a uniform fall of not less than 1:300; and

(b) discharge into an external silt pit or sump with—

(i) the level of discharge from the silt pit or sump into an impervious drainage line not less than 50 mm below the invert level of the inlet (see Figure 3.3.4); and

(ii) provision for cleaning and maintenance.

Figure 3.3.4: **Construction of silt pits**



Explanatory Information:

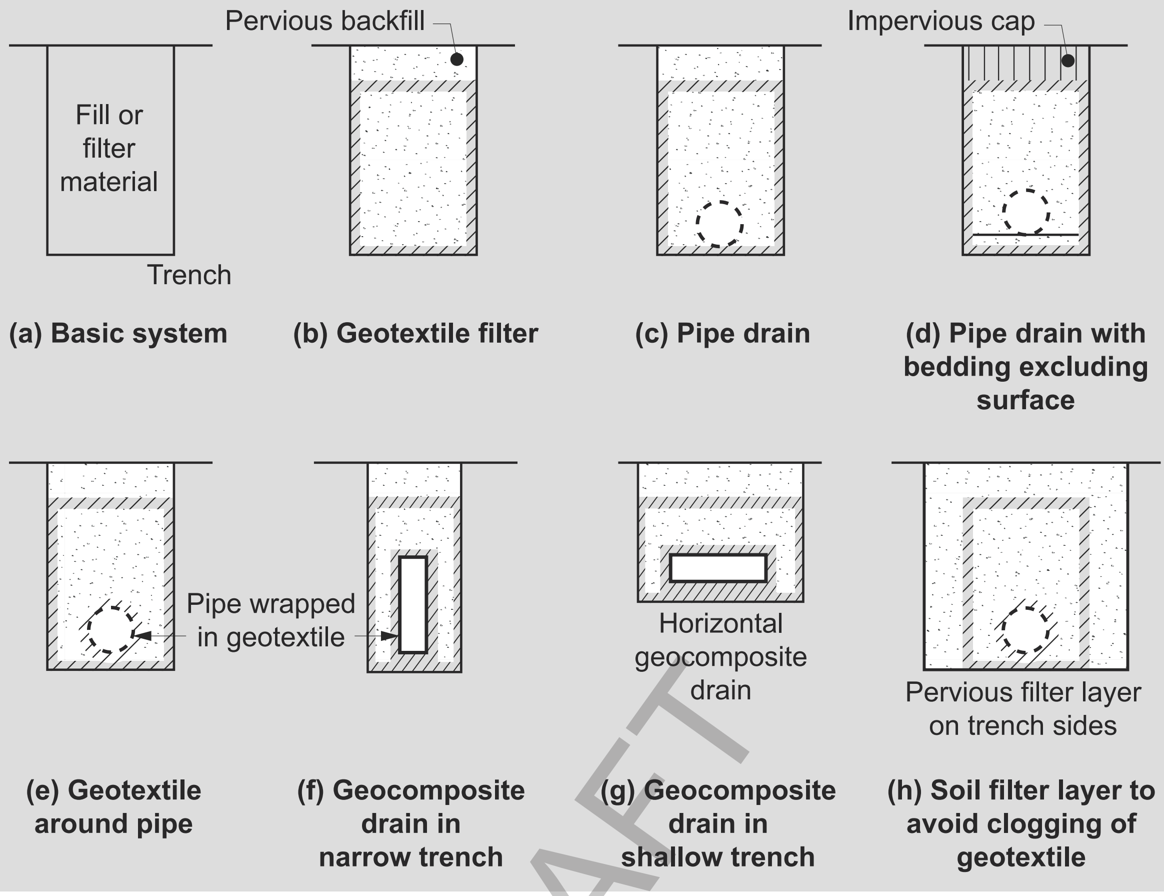
Subsoil drainage systems may need to be installed where subsurface water movement could damage buildings or cause loss of amenity through the build up of excessive moisture or lateral water pressure. Typical locations of subsoil drainage systems are on the uphill side of cut and fill sites, adjacent to deep footings, behind retaining walls and adjacent to basement walls.

The design and installation of subsoil drainage systems should take into account the nature of the soil and the anticipated water level, quantity and movement. In some cases, detailed investigations involving excavations, field observations and soil tests may be necessary to determine the appropriate solution. Typical subsoil drain configurations are shown in the following diagrams.

In clay soil, subsoil drains can alter the long-term moisture content in the soil, adversely affecting the building foundation by removing or, in some cases, introducing water. In such conditions, subsoil drains should only be used where there are no other options for dealing with subsoil water.

Additional guidance on subsoil drainage systems can be found in AS/NZS 3500.3 and AS 2870.

Figure 3.3.4 (explanatory): Typical subsoil drain configurations



3.3.5 Stormwater drainage

[2019: 3.1.3.5]

Where a stormwater drainage system is installed, it must comply with the following:

(a) The position and manner of discharge of the stormwater drainage system must be to the satisfaction of the *appropriate authority*.

(b) The stormwater drainage system must be designed so that any overflow during heavy rain periods is prevented from flowing back into the building.

(c) Cover to stormwater drains: the cover to 90 mm Class 6 UPVC stormwater drains installed underground must be not less than—

  (i) under soil — 100 mm; or

  (ii) under paved or concrete areas — 50 mm; or

  (iii) under areas subject to light vehicle traffic—

    (A) reinforced concrete — 75 mm; or

    (B) paved — 100 mm.

Explanatory Information: Discharge points

The manner of discharge of stormwater drainage systems includes consideration of discharge points. Some examples of discharge points which may be acceptable to the *appropriate authority* are:

(a) A legal discharge point at the allotment boundary.

(b) On-site catchment systems, such as stormwater tanks.

(c) On-site soil drainage systems, such as soaker wells.

Explanatory Information: Depth of cover

Different depths of soil cover (or no cover at all) can be achieved using other types of pipes. The cover specified is measured from the top of the pipe to either the finished ground level or, in the case of paved or concreted areas, to the underside of the paving or concrete.

Part 3.4 Termite risk management

3.4.1 Requirements for termite management systems

[2019: 3.1.4.2]

(1) The requirements of this Part apply where:

(a) a Class 1 or 10 building is constructed in an area where subterranean termites are known to present a potential risk of attack; and

(b) a of a Class 1 or 10 building is considered susceptible to termite attack.

NT 3.4.1(2)

(2) For the purposes of (1), a consisting entirely of, or a combination of, any of the following materials is considered not subject to termite attack:

(a) Steel, aluminium or other metals.

(b) Concrete.

(c) Masonry.

(d) Fibre-reinforced cement.

(e) Timber — naturally termite resistant in accordance with Appendix C of AS 3660.1.

(f) Timber — preservative treated in accordance with Appendix D of AS 3660.1.

QLD 3.4.1(3)

QLD 3.4.1(4)

QLD 3.4.1(5)

QLD 3.4.1(6)

Explanatory Information:

1. 3.4.1(1): Termites are not considered to be a risk in Tasmania and a lesser risk in parts of Victoria. The *appropriate authority* may have records of termite activity for each area and may be able to advise on whether termite risk management is needed.
2. 3.4.1(2): Where individual are susceptible to termite attack and the remainder of the are constructed of termite resistant materials, only the susceptible elements need to be provided with a termite management system.
3. 3.4.1(2)(c): states that masonry is not subject to termite attack, however termites may gain entry through mortar and other joints.
4. Explanatory Figure 3.4.1 provides a flowchart for identifying if a termite management system is required.

Figure 3.4.1 (explanatory): Flow chart for identifying if a termite management system is required

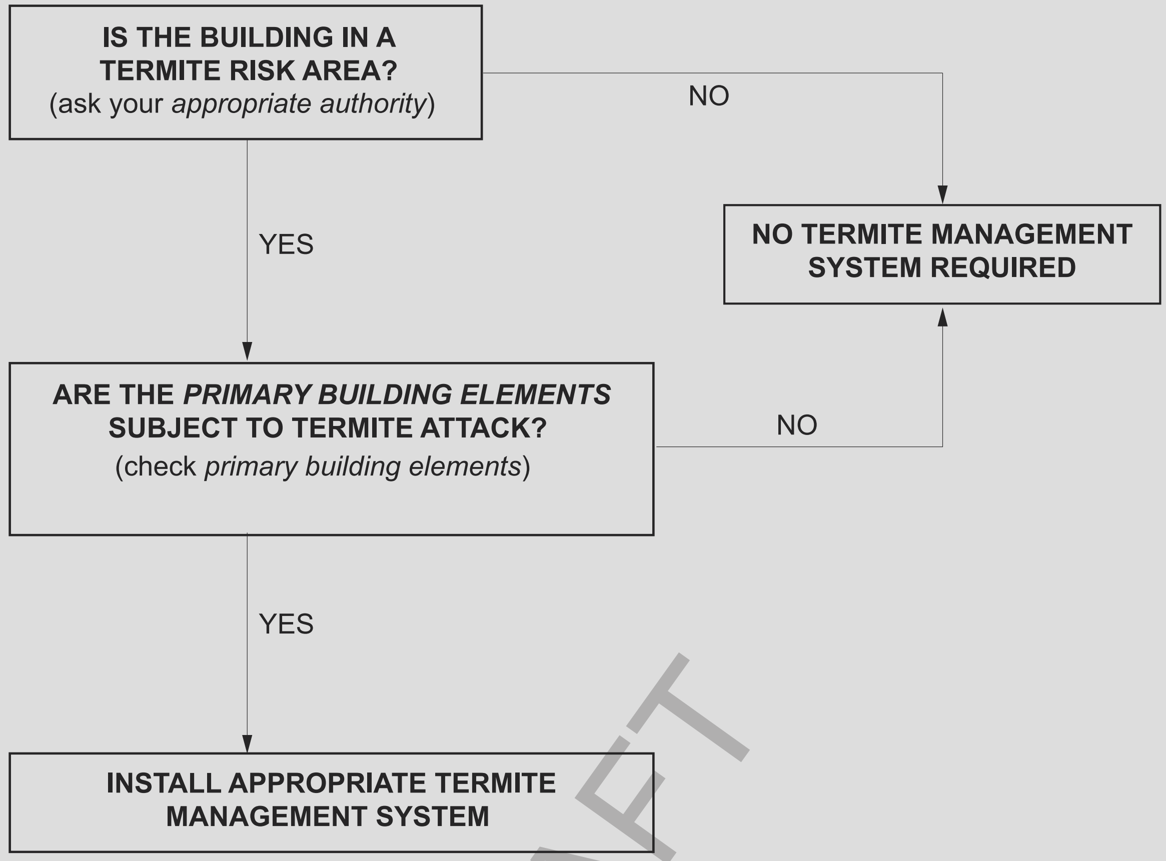


Figure Notes:

To check *primary building elements*, see 3.4.1(2).

NT 3.4.2

QLD 3.4.2

3.4.2 Termite management systems

[2019: 3.1.4.3]

Where a termite management system is required it must—

(a) be selected appropriate to Table 3.4.2; and

(b) comply with—

(i) AS 3660.1; or

(ii) have been tested and passed the tests *required* by Section 5 of AS 3660.3; and

(c) have a durable notice installed in accordance with 3.4.3; and

(d) where a chemical termite management system is used, the chemical must be included on the *appropriate authority's* pesticides register.

Table 3.4.2: Acceptable termite management systems and components

Building element	Termite management system or component options
Concrete slab-on-ground: slab perimeter or *external wall* perimeter	Slab edge exposure
	Sheet material
	Granular material

Building element	Termite management system or component options
	Chemical
Concrete slab-on-ground: penetrations/control joints/area beneath the slab (see Note)	Sheet material
	Granular material
	Chemical
Suspended floors	Sheet material
	Granular material
	Chemical
Attachments to buildings	Termite management system to the attachment
	Inspection zone between attachment and building

Table Notes:

The entire area beneath the slab must be treated when the slab-on-ground is not designed and constructed in accordance with AS 2870 or AS 3600.

Explanatory Information: Validity of test results

3.4.2(b)(ii) provides the option of having a chemical termite management system tested to AS 3660.3. In order for the test results to remain valid, the system would then have to be installed as tested.

Explanatory Information: Component

A component of a system as referred to in Table 3.4.2 is one that when used in combination with other components, will form a "full system".

For example, if a concrete slab is used as a component of a system, it in itself will not provide a complete termite management system. Depending on the construction methods and the *site* conditions, additional requirements will be necessary for service penetrations through the concrete slab. Each of these are "components", when integrated, will form a "full system".

Explanatory Information: Integrity of the termite management system

There are more than 350 species of termites in Australia, about 30 of which achieve economic importance by causing costly damage to building structures. Due to the nature of termites, it is extremely difficult to prevent them gaining access to a building.

In addition to correct installation of a termite management system, its effectiveness will rely on regular maintenance and competent inspection.

Explanatory Information: Attachments to buildings

Attachments referred to in Table 3.4.2 include downpipes, service pipes, steps, verandahs, porches, access ramps, carports, trellises, decks, heated water systems, air-conditioners and the like.

3.4.3 Durable notice

[2019: 3.1.4.4]

A durable notice must be permanently fixed to the building in a prominent location, such as in a meter box or the like, indicating—

(a) the termite management system used; and

(b) the date of installation of the system; and

(c) where a chemical is used, its life expectancy as listed on the *appropriate authority's* register label; and

(d) the installer's or manufacturer's recommendations for the scope and frequency of future inspections of termite activity.

Explanatory Information: Appropriate authority

For the purpose of the pesticides register, the *appropriate authority* is the government body responsible for the registration of pesticides. Currently, the Australian Pesticides and Veterinary Medicines Authority (APMVA) coordinates the registration scheme.

Explanatory Information: Durable notice

Where a durable notice is *required* by 3.4.3 a durable notice must be fixed to the building in a prominent location advising the building occupants that the system should be inspected and maintained.

The notice should be clearly written, on a material that will not deteriorate or fade over time and be located in or near the electrical meter box or similar location so that it can be easily seen and read by future owners of the building. Additional information may be included if desired by the person placing the notice.

4 Footings and slabs

Part 4.1 Scope and application of Section 4

4.1.1 Scope

[New for 2022]

This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for footings and slabs.

Explanatory Information:

This Section specifies the requirements for the excavation and filling for the footing or slab together with the construction of various alternative concrete slab and footing configurations. The slab and footing configurations detailed in ~~Part 4.5~~ this Part are only suitable for the specified soil classifications. The requirements contained in the remainder of this Section are more general and may be applied to all slab and footing construction.

The requirements of this Section are to be read in conjunction with Part 6.2. The Part 6.2 subfloor ventilation requirements apply to the subfloor space of all suspended floors of a building or deck, including but not limited to, timber and steel-framed subfloors and suspended concrete slabs.

4.1.2 Application

[New for 2022]

The application of Section 4 of the ABCB Housing Provisions is subject to the following:

(a) The Governing Requirements of NCC 2022 Volume Two.

(b) Any conditions set out within the following *Deemed-to-Satisfy Provisions* of NCC Volume Two: H1D4(2), for footings and slabs.

(c) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 4 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practices for Part 3.2 of NCC 2019 Volume Two.

4.1.3 Explanation of terms

[New for 2022]

Figures 4.1.3a, 4.1.3b and 4.1.3c depict footing and slab members and associated terminology used to describe them in Part 4.2 of the ABCB Housing Provisions.

Figure 4.1.3a: Footing and slab members and associated terminology: diagram 1

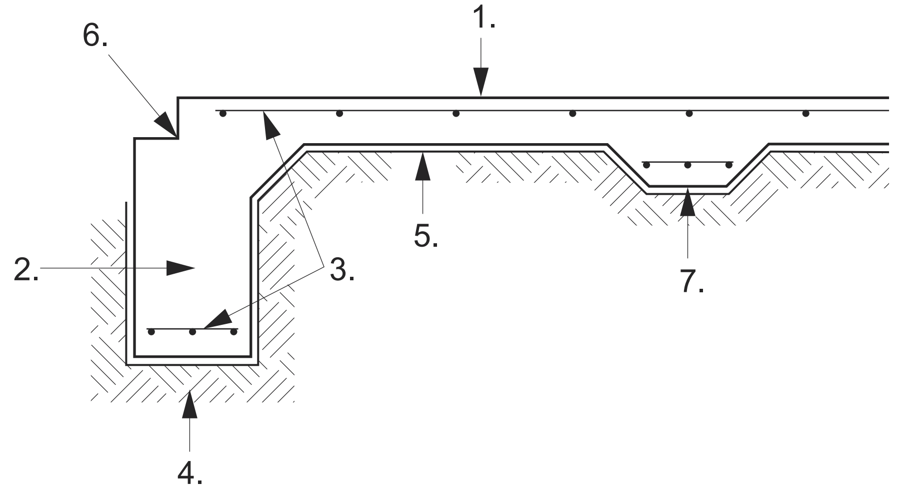


Figure Notes:

1. Slab (monolithic).
2. Deepened edge beam.
3. Reinforcement.
4. Foundation.
5. Vapour barrier/damp proofing membrane.
6. Edge rebate.
7. Internal beam (thickening).

Figure 4.1.3b: Footing and slab members and associated terminology: diagram 2

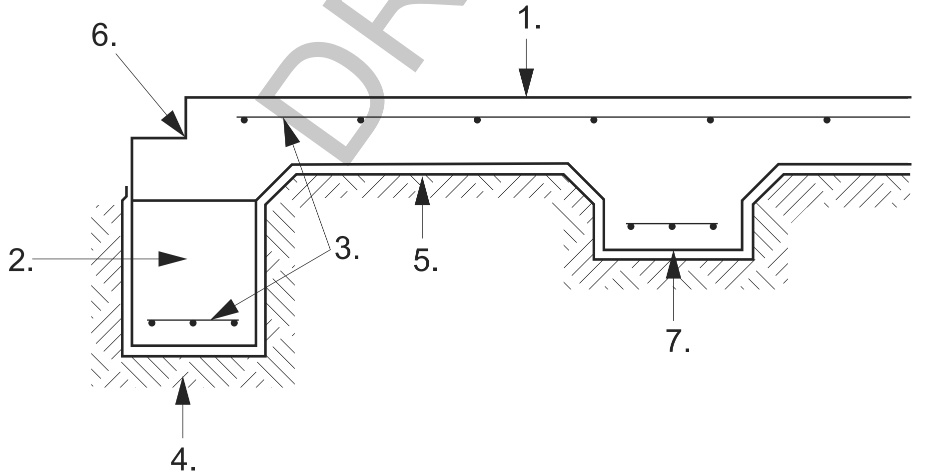


Figure Notes:

1. Controlled fill.
2. Deepened edge beam and slab.
3. Reinforcement.
4. Foundation
5. Vapour barrier/damp proofing membrane.
6. Edge rebate.
7. Internal beam (thickening).

Figure 4.1.3c: Footing and slab members and associated terminology: diagram 3

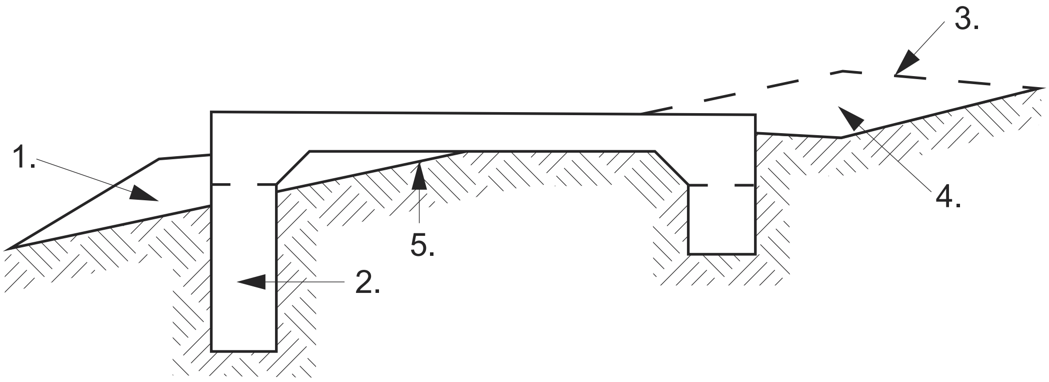


Figure Notes:

1. Controlled fill.
2. Deepened edge beam and slab.
3. Natural ground line above cut.
4. Cut.
5. Foundation (natural ground below fill).

Part 4.2 ~~Preparation~~Footings, slabs and associated elements

4.2.1 Application of Part 4.2

[New for 2022]

Part 4.2 is subject to the limitations set out in H1D4(2).

4.2.2 Site classification

[2019: 3.2.4.1]

The foundations where footings and slabs are to be located must be classified in accordance with AS 2870.

Explanatory Information:

Explanatory Table 4.2.2 provides a general description of *foundation* soil types that will assist in the classification of a *site*. More detailed information, including differentiation between classifications, can be found in AS 2870 or alternatively contact the *appropriate authority*.

Due to the limitations of this Part, if a *site* is classified H, E or P then reference must be made to AS 2870 for design and construction information.

Table 4.2.2 (explanatory): General definition of site classes

Class	Foundation
A	Most sand and rock *sites* with little or no ground movement from moisture changes
S	Slightly reactive clay *sites* with only slight ground movement from moisture changes
M	Moderately reactive clay or silt *sites* which can experience moderate ground movement from moisture changes
H	Highly reactive clay *sites* which can experience high ground movement from moisture changes
E	Extremely reactive clay *sites* which can experience extreme ground movement from moisture changes
A to P	Filled *sites* — see AS 2870
P	*Sites* which include soft soils, such as soft clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soils subject to erosion; reactive *sites* subject to abnormal moisture conditions or *sites* which cannot be classified otherwise.

Table Notes:

1. For Class M, further division based on the depth of expected movement is *required*.
2. For deep-seated movement, characteristic of dry climates and corresponding to a design depth of suction change H_S, equal to or greater than 3 m, the classification must be M-D.
3. If classification M-D is established due to further division, design of footings and slabs is beyond the scope of the ABCB Housing Provisions and reference must be made to AS 2870 for design and construction information.

4.2.~~2~~3 Excavation for footings

[2019: 3.2.2.1]

(1) Excavation for footings, including thickenings for slabs and pads must be clean cut with vertical sides, wherever possible.

(2) The base of the excavation must be—

  (a) for flat *sites*, generally level but may slope not more than 1:40 to allow excavations to drain; and

  (b) sloping *sites* at an angle of not more than 1:10; and

  (c) stepped footings in accordance with 4.2.7~~6~~.

(3) Footing excavations must be free of loose earth, tree roots, mud or debris ~~immediately before pouring concrete~~.

(4) Topsoil containing grass roots must be removed from the ~~area on which the footing will rest~~ site of the foundation.

(5) Excavation depths and soil cuts must comply with Part 3.2.

(6) On loose sand *sites* or *sites* subject to wind or water erosion, the depth below *finished ground level* ~~for~~to the bottom of footings must be not less than 300 mm.

(7) Height of finished slab-on-ground must be in accordance with 3.3.3(b).

4.2.~~3~~4 Filling under concrete slabs

[2019: 3.2.2.2]

Filling placed under a slab (except where the slab is suspended) must comply with the following:

  (a) Filling must be either *controlled fill* or *rolled fill* as follows:

    (i) Sand used in *controlled fill* or *rolled fill* must not contain any gravel size material and achieve a blow count of 7 or more per 300 mm using the test method described in AS 1289.6.3.3.

    (ii) Clay used in *controlled fill* or *rolled fill* must be moist during compaction.

    (iii) *Controlled fill*:

      (A) Sand fill up to 800 mm deep — well compacted in layers not more than 300 mm deep by vibrating plate or vibrating roller.

      (B) Clay fill up to 400 mm deep — well compacted in layers of not more than 150 mm by a mechanical roller.

    (iv) *Rolled fill*:

      (A) Sand fill up to 600 mm deep — compacted in layers of not more than 300 mm by repeated rolling by an excavator or other suitable mechanical equipment.

      (B) Clay fill up to 300 mm deep — compacted in layers of not more than 150 mm by repeated rolling by an excavator or similar machine.

  (b) A level layer of clean quarry sand must be placed on top of the fill, with a depth of not less than 20 mm.

  (c) A graded stone termite management system complying with Part 3.4 may be substituted for the sand *required* in (b).

  (d) Where perimeter walls retain the controlled fill or rolled fill, the walls must be able to resist the lateral pressures from compacted soil and the compaction equipment activity.

4.2.~~4~~5 Foundations for footings and slabs

[2019: 3.2.2.3]

Footings and slabs, including internal and edge beams, must be founded on soil with an allowable bearing pressure as follows:

  (a) Slab panels, load support panels and internal beams — natural soil with an allowable bearing pressure of not less than 50 kPa or *controlled fill* or *rolled fill* compacted in accordance with ~~4.2.3~~4.2.4.

(b) Edge beams connected to the slab — natural soil with an allowable bearing pressure of not less than 50 kPa or *controlled fill* compacted in accordance with ~~4.2.3(a)(iii)~~ 4.2.4(a)(iii)and extending past the perimeter of the building 1 m with a slope ratio not steeper than 2 horizontal to 1 vertical (see ~~Figure 4.2.4~~Figure 4.2.5).

(c) Pad footings, strip footings and edge beams not connected to the slab, must be—

(i) founded in natural soil with an allowable bearing pressure of not less than 100 kPa; or

(ii) for Class A and S sites they may be founded on controlled sand fill in accordance with ~~4.2.3(a)~~4.2.4(a).

Figure 4.2.~~4~~5: Foundations for footings and slabs

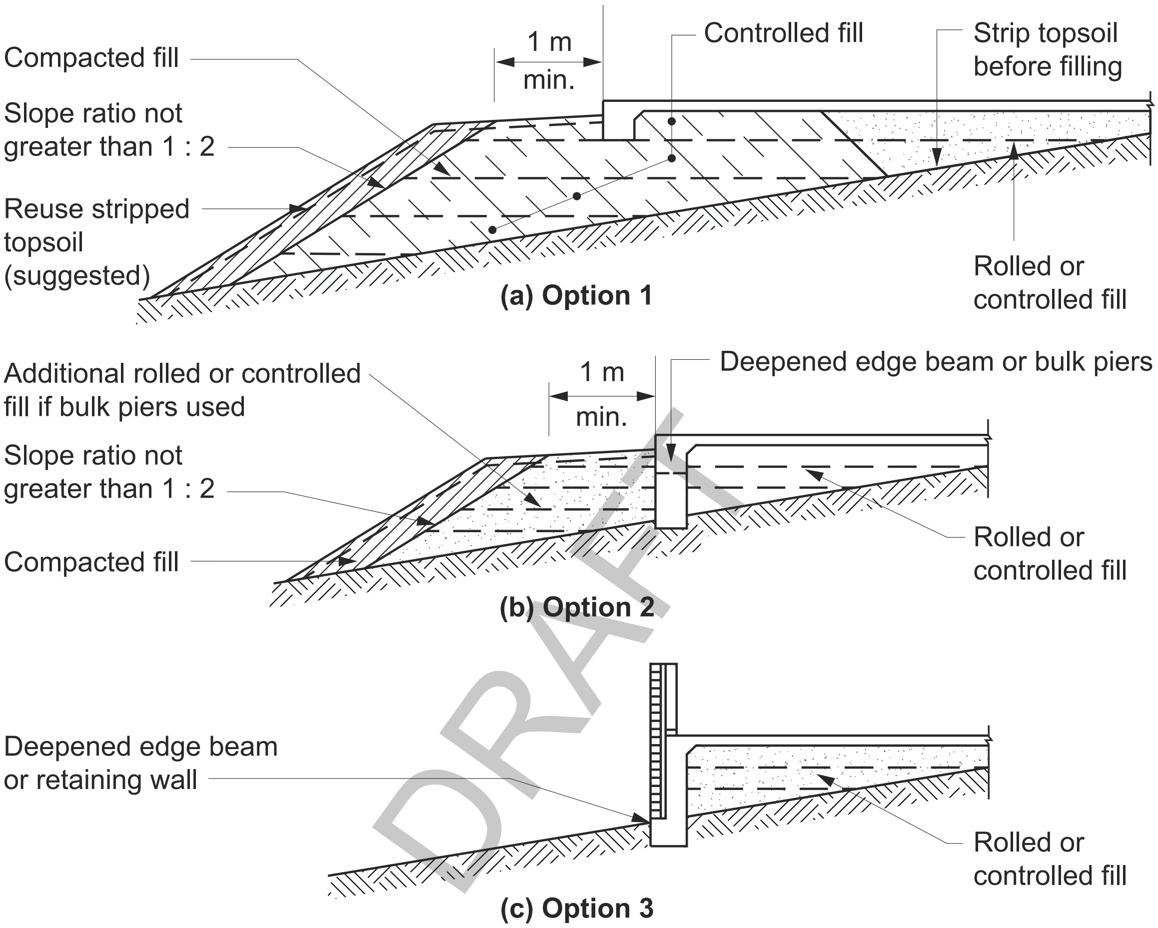


Figure Notes:

Compacted fill must be in accordance with 4.2.4.

Explanatory Information:

The *foundations* of a building are critical to its successful performance. As such, the soil must have the strength or bearing capacity to carry the building load with minimum movement.

The bearing capacity of a soil varies considerably and needs to be determined on a *site* by *site* basis. For this to occur, the appropriate people need to be consulted. These people may include a qualified engineer or experienced engineering geologist, or it may be determined by a person with appropriate local knowledge. The minimum bearing capacity (soil strength rating) may depend on the *site* conditions. The soil may be naturally undisturbed or be disturbed by building work or the like. Where soil is disturbed by building work and the like, the bearing capacity can be dramatically altered. This is typically the case for sloping *sites* where cut and fill procedures are used. In these situations the soil needs to be consolidated, generally via compaction, to achieve the *required* bearing capacity.

There are a number of alternatives for working on cut and filled sites. These are described in ~~Figure 4.2.4~~Figure 4.2.5.

Option 1 of~~Figure 4.2.4~~Figure 4.2.5 refers to the *controlled fill* process which involves the compaction of fill in layers to achieve the bearing capacity described in ~~4.2.4~~4.2.5. The depth of fill for each layer is specified to ensure effective compaction. Fill beyond these depths will need to be installed in accordance with H1D4(1).

Option 2 and 3 of ~~Figure 4.2.4~~Figure 4.2.5 refer to edge beams that extend through the fill into undisturbed soil which provides the ~~4.2.4~~4.2.5 *required* bearing capacity. In this situation the fill is essentially only taking the internal slab loads.

4.2.~~5~~6 Slab edge support on sloping sites

[2019: 3.2.2.4]

Footings and slabs installed on the low side of sloping *sites* must be as follows:

(a) Slab panels — in accordance with ~~4.2.4(a)~~4.2.5(a).

(b) Edge beams—

  (i) supported by *controlled fill* in accordance with ~~4.2.4(b)~~4.2.5(b) (see Figure 4.2.5~~Figure 4.2.4~~, Option 1); or

  (ii) supported by deepened edge beams or bulk piers designed in accordance with AS 3600 (see Figure 4.2.5~~Figure 4.2.4~~, Option 2); or

  (iii) deepened (as per AS 2870) to extend into the natural soil level with a bearing capacity in accordance with ~~4.2.4(b)~~4.2.5(b) (see ~~Figure 4.2.4~~Figure 4.2.5, Option 3); or

  (iv) stepped in accordance with AS 2870.

(c) Edge beams not connected to the slab, pad footings and strip footings — founded in accordance with ~~4.2.4(c)~~4.2.5(c).

(d) Where an excavation (cut) of the natural ground is used it must be in accordance with Part 3.2.

4.2.~~6~~7 Stepped footings

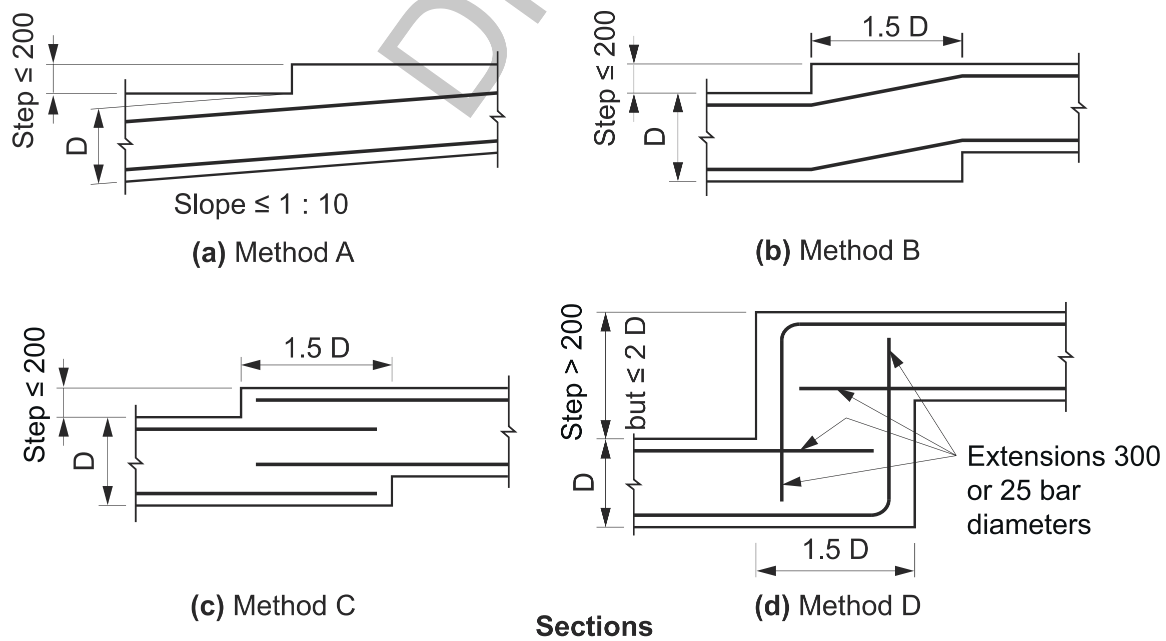
[2019: 3.2.2.5]

Stepped strip footings must be constructed as follows—

(a) the base of the footing must be horizontal or have a slope of not more than 1:10; or

(b) be stepped in accordance with one of the methods shown in ~~Figure 4.2.6~~Figure 4.2.7.

Figure 4.2.~~6~~7: Stepped strip footings



Sections

Figure Notes:

All dimensions in millimetres.

NSW 4.2.7

SA 4.2.7

4.2.~~7~~8 Vapour barriers

[2019: 3.2.2.6]

(1) A vapour barrier must be installed under slab-on-ground construction for all Class 1 buildings and for Class 10 buildings where the slab is continuous with the slab of a Class 1 building in accordance with (2), (3), (4) and (5).

(2) Materials: A vapour barrier must be—

(a) 0.2 mm nominal thickness polyethylene film; and

(b) medium impact resistant,

determined in accordance with criteria specified in clause 5.3.3.3 of AS 2870.

(3) A vapour barrier must be branded continuously “AS 2870 Concrete underlay, 0.2 mm Medium impact resistance”.

(3) Installation: A vapour barrier must be installed as follows—

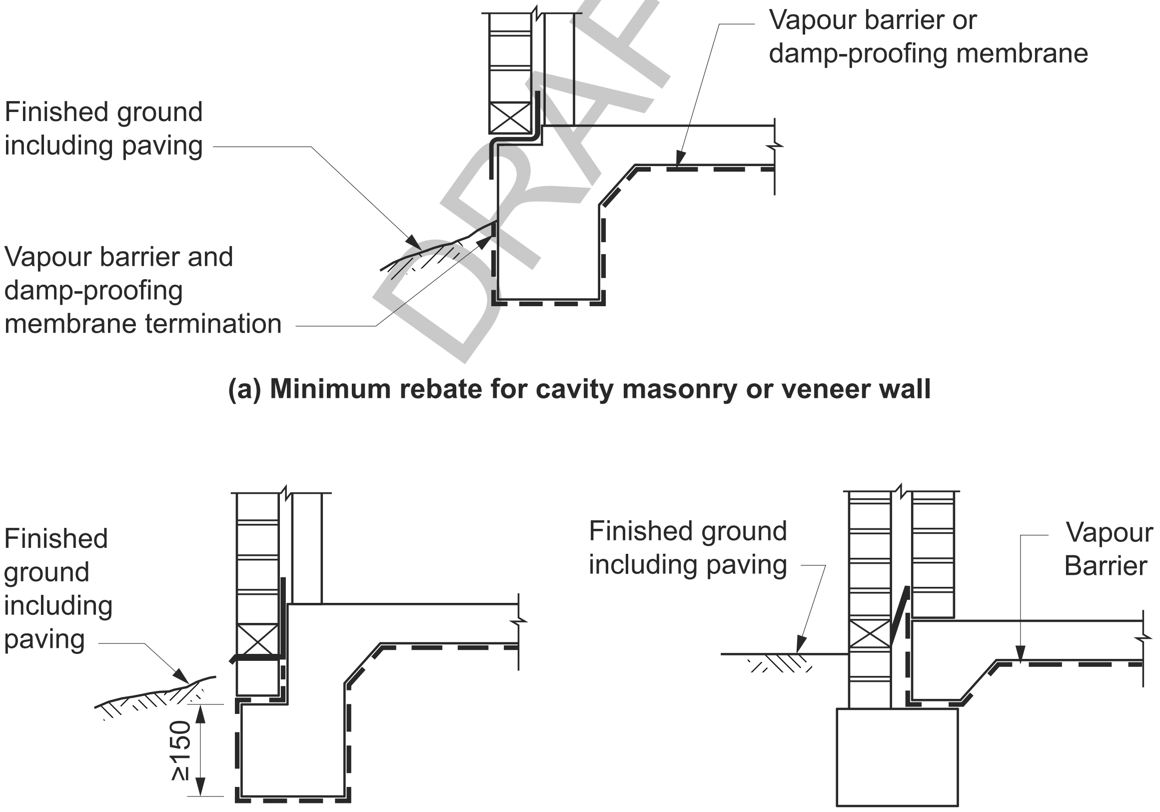
(a) lap not less than 200 mm at all joints; and

(b) tape or seal with a close fitting sleeve around all service penetrations; and

(c) fully seal where punctured (unless for service penetrations) with additional polyethylene film and tape.

(4) The vapour barrier must be placed beneath the slab so that the bottom surface of the slab is entirely underlaid and extends under internal and edge beams to finish at ground level in accordance with ~~Figure 4.2.7~~Figure 4.2.8.

Figure 4.2.~~7~~8: Acceptable vapour barrier and damp-proofing membrane location



(a) Minimum rebate for cavity masonry or veneer wall

(b) Deep edge rebate alternative

(c) Masonry alternative

Figure Notes:

All dimensions in millimetres.

4.2.~~8~~9 Edge rebates

[2019: 3.2.2.7]

Edge rebates for slab-on-ground~~,~~ and stiffened raft ~~or waffle raft~~ with masonry *cavity* or veneer construction must comply with the following:

(a) The rebate must not be less than 20 mm~~, except as provided for in (d)~~.

(b) ~~Exterior masonry must not overhang more than 15 mm past the edge of the slab.~~

(c) The edge rebate must be flashed and drained in accordance with H2D4 and where it cannot be flashed it must be filled with mortar.

(d) ~~Edge rebates are not *required* for *single leaf masonry*.~~

Explanatory Information:

See ~~4.5.5~~4.2.20 for minimum edge beam details. For single skin or frames walls with external cladding, rebates are not required.

SA 4.3.2

4.~~3.2~~2.10 Concrete

[2019: 3.2.3.1]

Concrete must comply with the following:

(a) Concrete must ~~be manufactured to~~ comply with AS 3600; and—

  (i) have a strength at 28 days of not less than 20 MPa (denoted as N20 grade); and

  (ii) have a 20 mm maximum nominal aggregate size; and

  (iii) have a nominal 100 mm slump.

(b) Water must not be added to the mix to increase the slump to a value in excess of that specified.

(c) Concrete must be placed, compacted and cured in accordance with good building practice.

Explanatory Information:

1. Complete discharge of the concrete from the truck should be made within one and a half hours of initial mixing with water unless a suitable retarder has been specified.
2. Compacting concrete by vibration removes air pockets and works the concrete thoroughly around reinforcement, service penetrations etc. and into corners of formwork to increase durability and resistance to termite infestation and salt damp attack. Care should be taken not to over-vibrate. The finishing and curing of slab edges provides an improved edge finish which is resistant to edge dampness.
3. Care should be taken when using chemical curing methods, because some products may not be compatible with adhesives used to fix surface finishes to the slab.

4.~~3.3~~2.11 Steel reinforcement

[2019: 3.2.3.2]

(1) Materials used for reinforcing steel must comply with AS 2870 and be—

  (a) welded wire reinforcing fabric; or

  (b) trench mesh; or

  (c) steel reinforcing bars.

(2) Steel reinforcing bars may be substituted for trench mesh in accordance with ~~Table 4.3.3a~~Table 4.2.11a.

(3) Minimum laps for reinforcement as shown in ~~Table 4.3.3b~~Table 4.2.11b and ~~Figure 4.3.3~~Figure 4.2.11 must be provided where reinforcing is used.

(4) Any slab in H1D4 with a re-entrant corner must have the following reinforcement not less than 2 m in length and placed at an angle of 45° across the corner—

(a) two strips of 3-L8TM; or

(b) one strip of 3-L11TM; or

(c) 3-N12 bars.

(~~4~~5) Footings and slabs-on-ground must have concrete cover between the outermost edge of the reinforcement (including ligatures, tie wire etc.) and the surface of the concrete of not less than ~~the following~~:

(a) 40 mm to unprotected ground.

(b) 30 mm to a membrane in contact with the ground.

(c) 20 mm to an internal surface.

(d) 40 mm to external exposure.

(~~5~~6) Reinforcement must be ~~cleaned~~free of loose rust, mud, paints and oils immediately prior to the concrete pour.

(~~6~~7) Reinforcement must be placed as follows:

(a) All reinforcement must be firmly fixed in place to prevent it moving during concreting operations.

(b) Reinforcement must be supported off the ground or the forms by bar chairs made from wire, concrete or plastic.

(c) When using wire chairs the minimum concrete cover (see ~~4.3.3(4)~~(5)) to the uncoated portion of the chair must be obtained.

(d) Wire chairs on soft ground or plastic membrane must be placed on flat bases.

(e) Bar chairs must be spaced at not more than 800 mm centres for steel fabric.

Table 4.~~3.3a~~2.11a: Alternative mesh/reinforcing bar sizes

Trench mesh (TM)	Area — mm^2	Reinforcing bar alternative	Trench mesh alternative
2-L8TM	91	2-N10 or 1-N12	Not applicable
3-L8TM	136	2-N10 or 2-N12	Not applicable
4-L8TM	182	2-N12	2-L11TM
5-L8TM	227	2-N12	3-L11TM
2-L11TM	180	1-N16 or 2-N12	2x2-L8TM
3-L11TM	270	3-N12	2x3-L8TM
4-L11TM	360	2-N16	2x4-L8TM
2-L12TM	222	2-N12	3-L11TM
3-L12TM	333	3-N12	4-L11TM
4-L12TM	444	4-N12	5-L11TM

Table Notes:

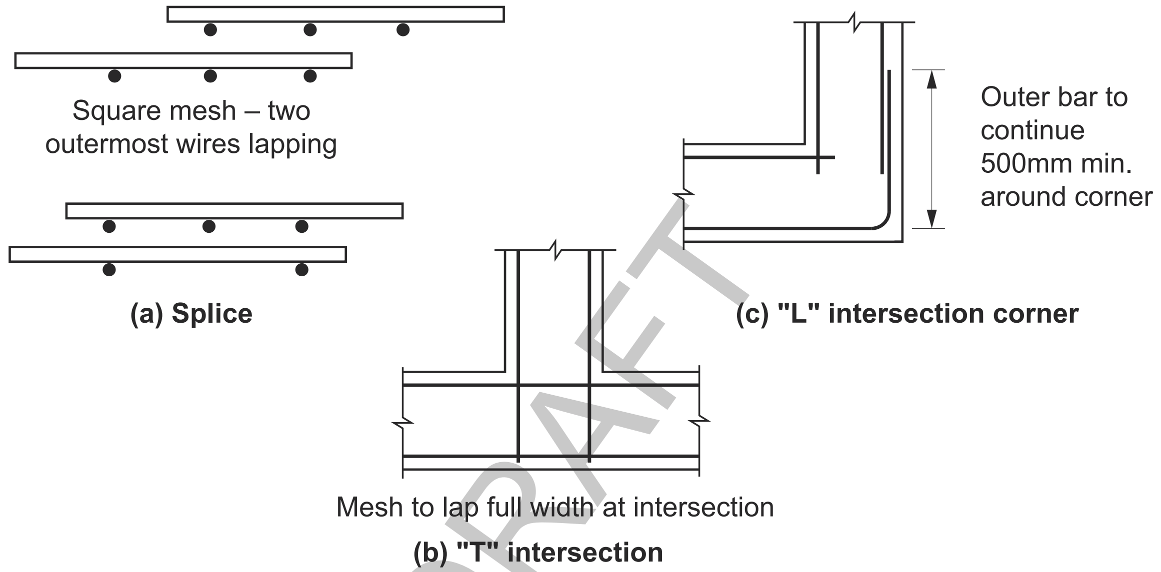
1. Where necessary 2 layers of mesh may be used.
2. L11TM and L12TM may be replaced by RL1118 and RL1218 mesh respectively.
3. L11TM may be replaced by two layers of L8TM.

Table 4.~~3.3b~~2.11b: Minimum lap for reinforcement

Reinforcement	Minimum splice	Minimum Lap at "T" intersections	Minimum Lap at "L" intersections
Steel reinforcing bars ≤ 12 mm diameter	500 mm	Full width across the junction	One outer bar must be bent and continue 500 mm (min) around corner

Reinforcement	Minimum splice	Minimum Lap at "T" intersections	Minimum Lap at "L" intersections
Steel reinforcing bars >12 mm to ≤16 mm diameter	700 mm	Full width across the junction	One outer bar must be bent and continue 500 mm (min) around corner
Trench mesh	500 mm	Full width across the junction	Full width across the junction
Square and rectangular mesh	The two outermost transverse wires of one sheet must overlap the two outermost transverse wires of the other	Not applicable	Not applicable

Figure 4.~~3.3~~2.11: Splice, L and T intersections



Explanatory Information: Reinforcement types

Reinforcement types referenced in this clause are described as follows:

(a) Square mesh is designated in terms of the diameter of each bar and the spacing of consecutive bars. For example, SL62 consists of 6 mm bar at 200 mm spacings.

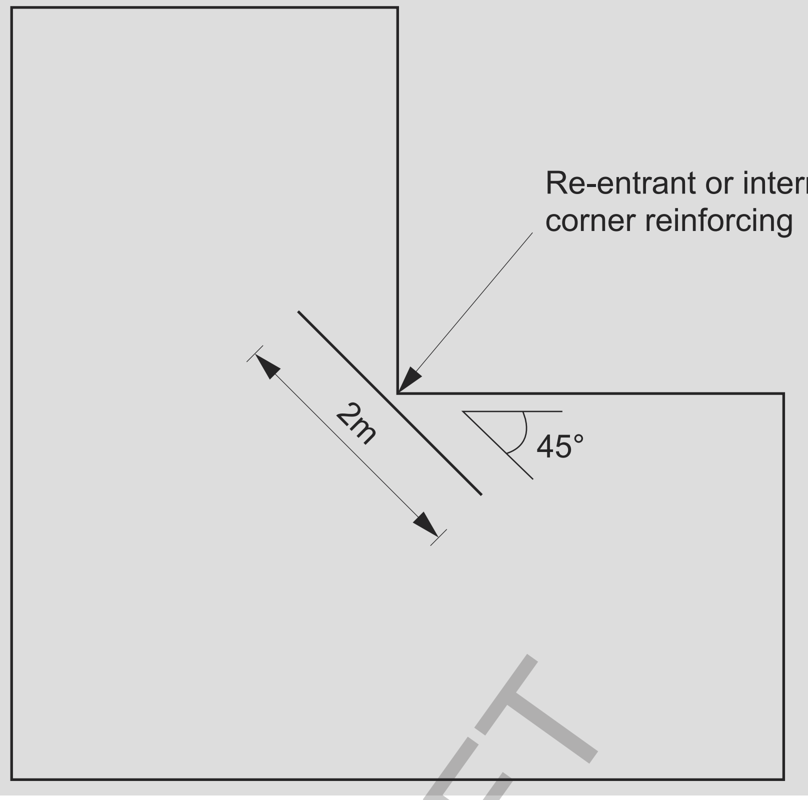
(b) Trench mesh is designated in terms of the number of longitudinal bars and the diameter of each bar. For example, 3-L11TM consists of 3 longitudinal bars each of which are 11 mm in diameter.

(c) Reinforcing bars are designated in terms of the number of bars and the diameter of each bar. For example, 6-N12 consists of 6 bars each of which are 12 mm in diameter.

Explanatory Information: Reinforcement length and angle

Reinforcement described in 4.2.11(4)(a), (b) or (c) is required to be at least 2 m long and placed at an angle of 45° to the re-entrant corner. Placement of the reinforcing should ensure the minimum concrete cover is provided in accordance with 4.2.11(5) and it is positioned so that the centre of the 2 m length is at the point of the internal angle of the slab. See Explanatory Figure 4.2.11.

Figure 4.2.11 (explanatory): Reinforcing for re-entrant corners



Explanatory Information: Cleaning and placement of reinforcing

In order to obtain a good bond between concrete and reinforcement, the reinforcement should be free of contamination by mud, paint, oils, etc. It is not necessary for the reinforcement to be completely free of rust. Some rusting is beneficial in promoting a good bond as it roughens the surface of the steel. Loose rust, however, must be removed from the reinforcement.

Reinforcement is designed to be in a particular place so as to add strength or to control cracking of the concrete. A displacement from its intended location could make a significant difference to the life or serviceability of the structure.

Supports for fabric reinforcement are provided to prevent the fabric distorting when workers walk on top of it to place the concrete and maintain the correct concrete cover to the fabric.

4.2.12 Footing and slab construction

[New for 2022]

Footing and slab construction, including size and placement of reinforcement, must be in accordance with the relevant provisions of—

(a) 4.2.13 for footings for stumps; and
(b) 4.2.14 for stiffened rafts on Class A, S and M *sites*; and
(c) 4.2.15 for strip footing systems on Class A, S and M *sites*; and
(d) 4.2.16 for footing slabs on Class A *sites*; and
(e) 4.2.17 for footings for *single leaf masonry*, *mixed construction* and earth retaining walls; and
(f) 4.2.18 for footings for fireplaces on Class A and S *sites*; and
(g) 4.2.19 for shrinkage control; and
(h) 4.2.20 for minimum edge beam dimensions; and
(i) 4.2.21 for recessed areas of slabs.

4.~~5.7~~2.13 Stump footing details

[2019: 3.2.5.6]

(1) Footings for stumps must comply with—

(a) the provisions of ~~Table 4.5.2a and Table 4.5.2b~~Tables 4.2.13a, 4.2.13b or 4.2.13c for Class A and Class S *sites*; or

(b) the appropriate referenced document listed in—

(i) H1D6(3); or

(ii) H1D4.

(2) Concrete stumps must—

(a) be designed in accordance with—

(i) AS 3600; or

(ii) ~~Table 4.5.2a and Table 4.5.2b~~Tables 4.2.13d, 4.2.13e or 4.2.13f; and

(b) use a minimum 20 MPa concrete as defined in AS 3600.

(3) Steel stumps must be—

(a) designed in accordance with—

(i) AS 4100; or

(ii) ~~Table 4.5.2a and Table 4.5.2b~~Tables 4.2.13d, 4.2.13e or 4.2.13f; and

(b) fully enclosed and sealed with a welded top plate; and

(c) encased in concrete sloping away from the stump and finishing not less than 100 mm above *finished ground level*; and

(d) corrosion protected in accordance with Part 6.3.

(4) Timber stumps must be designed in accordance with—

(a) AS 1684.2, AS 1684.3 ~~or~~, AS 1684.4 or AS 1720.1; or

(b) ~~Table 4.5.2a and Table 4.5.2b~~Tables 4.2.13d, 4.2.13e or 4.2.13f.

(5) Stumps must be braced—

(a) by a full perimeter masonry base; or

(b) for concrete stumps — in accordance with AS 3600; or

(c) for steel stumps — in accordance with AS 4100; or

(d) for timber stumps — in accordance with AS 1684.2, AS 1684.3 ~~or~~, AS 1684.4 or AS 1720.1.

(6) Stumps must be embedded into the foundation material not less than 30% of their height above ground level or 450 mm, whichever is the greater.

(7) Pad footings for clad frame, Class A and Class S *sites*, must be in accordance with Table 4.2.13g and Figure 4.2.13.

Table 4.2.13a: Stumps supporting single storey timber floor and metal roof

Floor load area (m^2)	Dimension (mm)	Roof load area (m^2)		
		0	6	12
3	Square pad footing size	250 x 250	300 x 300	350 x 350
8	Square pad footing size	400 x 400	400 x 400	450 x 450
12	Square pad footing size	450 x 450	500 x 500	500 x 500
3	Circular pad footing	300	400	400

Floor load area (m^2)	Dimension (mm)	Roof load area (m^2)		
		0	6	12
8	Circular pad footing diameter	450	450	600
12	Circular pad footing diameter	600	600	600
3	Pad footing depth	250	250	250
8	Pad footing depth	250	250	250
12	Pad footing depth	250	250	250

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 0.92 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations for ULS included are 1.35G and 1.2G + 1.5Q for stumps and G + 0.5Q for pad footings.
3. Minimum bearing pressure is 100 kPa for pad footings.
4. For pad footings founded on rock, the width or diameter may be reduced by half but not less than 250 mm x 250 mm or 300 mm diameter.
5. Stumps are assumed to be braced and simply-supported at both ends with an effective length factor of 1.
6. A maximum load eccentricity of length/100 has been accounted for in the stumps.
7. A roof load area of “0” must be used for stumps not supporting roof loads.
8. The length of wall load allowed for is equal to the square root of the floor area.

Table 4.2.13b: Stumps supporting single storey tiled floor and tiled roof

Floor load area (m^2)	Dimension (mm)	Roof load area (m^2)		
		0	6	12
3	Square pad footing size	300 x 300	400 x 400	450 x 450
8	Square pad footing size	450 x 450	500 x 500	550 x 500
12	Square pad footing size	500 x 500	550 x 550	600 x 600
3	Circular pad footing diameter	400	450	600
8	Circular pad footing diameter	600	600	650
12	Circular pad footing diameter	650	650	700
3	Pad footing depth	250	250	250
8	Pad footing depth	250	250	250
12	Pad footing depth	250	300	300

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 0.92 kN/m permanent wall, 0.85 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations for ULS included are 1.35G and 1.2G + 1.5Q for stumps and G + 0.5Q for pad footings.
3. Minimum bearing pressure is 100 kPa for pad footings.
4. For pad footings founded on rock, the width or diameter may be reduced by half but not less than 250 mm x 250 mm or 300 mm diameter.

5. Stumps are assumed to be braced and simply-supported at both ends with an effective length factor of 1.
6. A maximum load eccentricity of length/100 has been accounted for in the stumps.
7. A roof load area of “0” must be used for stumps not supporting roof loads.
8. The length of wall load allowed for is equal to the square root of the floor area.

Table 4.2.13c: **Stumps supporting double storey timber floor and metal roof**

Floor load area (m^2)	Dimension (mm)	Roof load area (m^2)		
		0	6	12
3	Square pad footing size	350 x 350	400 x 400	450 x 450
8	Square pad footing size	550 x 550	550 x 550	600 x 600
12	Square pad footing size	650 x 650	650 x 650	700 x 700
3	Circular pad footing diameter	400	450	600
8	Circular pad footing diameter	650	650	700
12	Circular pad footing diameter	750	750	800
3	Pad footing depth	250	250	250
8	Pad footing depth	300	300	350
12	Pad footing depth	350	350	350

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 0.92 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations for ULS included are 1.35G and 1.2G + 1.5Q for stumps and G + 0.5Q for pad footings.
3. Minimum bearing pressure is 100 kPa for pad footings.
4. For pad footings founded on rock, the width or diameter may be reduced by half but not less than 250 mm x 250 mm or 300 mm diameter.
5. Stumps are assumed to be braced and simply-supported at both ends with an effective length factor of 1.
6. A maximum load eccentricity of length/100 has been accounted for in the stumps.
7. A roof load area of “0” must be used for stumps not supporting roof loads.
8. The length of wall load allowed for is equal to the square root of the floor area.

Table 4.2.13d: **Maximum stump height (mm): stump supporting single storey timber floor and metal roof**

Stump material	Section size (mm)	Floor load area (m^2)	Roof load area (m^2)		
			0	6	12
Concrete f'_c = 20 MPa	100 x 100	3	2500	2000	1750
Concrete f'_c = 20 MPa	100 x 100	8	1500	1500	1500
Concrete f'_c = 20 MPa	100 x 100	12	1250	1250	1250
Steel f_y = 350 MPa	100 x 100 x 2.0	3	3000	3000	3000
Steel f_y = 350	100 x 100 x 2.0	8	3000	3000	3000

Stump material	Section size (mm)	Floor load area (m^2)	Roof load area (m^2)		
			0	6	12
Steel f_y = 350 MPa	100 x 100 x 2.0	12	3000	3000	3000
Timber F17	100 x 100	3	3000	3000	3000
Timber F17	100 x 100	8	2500	2500	2250
Timber F17	100 x 100	12	2250	2000	2000
Timber F14	100 x 100	3	3000	3000	2500
Timber F14	100 x 100	8	2250	2000	1750
Timber F14	100 x 100	12	1750	1500	1500
Timber F11	100 x 100	3	3000	2500	2250
Timber F11	100 x 100	8	2000	1750	1750
Timber F11	100 x 100	12	1500	1500	1250
Timber F8	100 x 100	3	3000	2500	2000
Timber F8	100 x 100	8	1750	1500	1250
Timber F8	100 x 100	12	1250	1000	750
Timber F7	100 x 100	3	2500	2250	1750
Timber F7	100 x 100	8	1500	1250	750
Timber F7	100 x 100	12	750	–	–
Timber F5	100 x 100	3	2500	2000	1500
Timber F5	100 x 100	8	1250	750	–
Timber F5	100 x 100	12	–	–	–

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 0.92 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations for ULS included are 1.35G and 1.2G + 1.5Q for stumps and G + 0.5Q for pad footings.
3. Minimum bearing pressure is 100 kPa for pad footings.
4. For pad footings founded on rock, the width or diameter may be reduced by half but not less than 250 mm x 250 mm or 300 mm diameter.
5. Stumps are assumed to be braced and simply-supported at both ends with an effective length factor of 1.
6. A maximum load eccentricity of length/100 has been accounted for in the stumps.
7. A roof load area of “0” must be used for stumps not supporting roof loads.
8. The length of wall load allowed for is equal to the square root of the floor area.

Table 4.2.13e: Maximum stump height: stump supporting single storey tiled floor and tiled roof

Stump material	Section size (mm)	Floor load area (m^2)	Roof load area (m^2)		
			0	6	12
Concrete f'_c = 20 MPa	100 x 100	3	2250	1750	1500
Concrete f'_c = 20 MPa	100 x 100	8	1500	1250	1250
Concrete f'_c = 20 MPa	100 x 100	12	1250	1250	750
Steel f_y = 350 MPa	100 x 100 x 2.0	3	3000	3000	3000

Stump material	Section size (mm)	Floor load area (m^2)	Roof load area (m^2)		
			0	6	12
Steel f_y = 350 MPa	100 x 100 x 2.0	8	3000	3000	3000
Steel f_y = 350 MPa	100 x 100 x 2.0	12	3000	3000	3000
Timber F17	100 x 100	3	3000	3000	2500
Timber F17	100 x 100	8	2500	2250	2000
Timber F17	100 x 100	12	2000	2000	1750
Timber F14	100 x 100	3	3000	2500	2000
Timber F14	100 x 100	8	2000	1750	1500
Timber F14	100 x 100	12	1500	1250	1000
Timber F11	100 x 100	3	3000	2250	2000
Timber F11	100 x 100	8	1750	1500	1250
Timber F11	100 x 100	12	1250	1000	750
Timber F8	100 x 100	3	2500	2000	1750
Timber F8	100 x 100	8	1500	1250	1000
Timber F8	100 x 100	12	1000	500	–
Timber F7	100 x 100	3	2500	1750	1250
Timber F7	100 x 100	8	1250	750	–
Timber F7	100 x 100	12	–	–	–
Timber F5	100 x 100	3	2250	1500	1000
Timber F5	100 x 100	8	750	–	–
Timber F5	100 x 100	12	–	–	–

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 0.92 kN/m permanent wall, 0.85 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations for ULS included are 1.35G and 1.2G + 1.5Q for stumps and G + 0.5Q for pad footings.
3. Minimum bearing pressure is 100 kPa for pad footings.
4. For pad footings founded on rock, the width or diameter may be reduced by half but not less than 250 mm x 250 mm or 300 mm diameter.
5. Stumps are assumed to be braced and simply-supported at both ends with an effective length factor of 1.
6. A maximum load eccentricity of length/100 has been accounted for in the stumps.
7. A roof load area of “0” must be used for stumps not supporting roof loads.
8. The length of wall load allowed for is equal to the square root of the floor area.

Table 4.2.13f: Maximum stump height: stump supporting double storey timber floor and metal roof

Stump material	Section size (mm)	Floor load area (m^2)	Roof load area (m^2)		
			0	6	12
Concrete f'_c = 20 MPa	100 x 100	3	1750	1500	1500
Concrete f'_c = 20 MPa	100 x 100	8	1250	1000	750
Concrete f'_c = 20 MPa	100 x 100	12	–	–	–

Stump material	Section size (mm)	Floor load area (m^2)	Roof load area (m^2)		
			0	6	12
Steel f_y = 350 MPa	100 x 100 x 2.0	3	3000	3000	3000
Steel f_y = 350 MPa	100 x 100 x 2.0	8	3000	3000	3000
Steel f_y = 350 MPa	100 x 100 x 2.0	12	3000	2750	2500
Timber F17	100 x 100	3	3000	2500	2500
Timber F17	100 x 100	8	1750	1750	1500
Timber F17	100 x 100	12	1250	1250	1250
Timber F14	100 x 100	3	2500	2250	2000
Timber F14	100 x 100	8	1250	1250	1000
Timber F14	100 x 100	12	750	500	500
Timber F11	100 x 100	3	2250	2000	1750
Timber F11	100 x 100	8	1000	1000	750
Timber F11	100 x 100	12	–	–	–
Timber F8	100 x 100	3	2000	1750	1500
Timber F8	100 x 100	8	500	500	–
Timber F8	100 x 100	12	–	–	–
Timber F7	100 x 100	3	1750	1500	1250
Timber F7	100 x 100	8	–	–	–
Timber F7	100 x 100	12	–	–	–
Timber F5	100 x 100	3	1500	1000	750
Timber F5	100 x 100	8	–	–	–
Timber F5	100 x 100	12	–	–	–

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 0.92 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations for ULS included are 1.35G and 1.2G + 1.5Q for stumps and G + 0.5Q for pad footings.
3. Minimum bearing pressure is 100 kPa for pad footings.
4. For pad footings founded on rock, the width or diameter may be reduced by half but not less than 250 mm x 250 mm or 300 mm diameter.
5. Stumps are assumed to be braced and simply-supported at both ends with an effective length factor of 1.
6. A maximum load eccentricity of length/100 has been accounted for in the stumps.
7. A roof load area of "0" must be used for stumps not supporting roof loads.
8. The length of wall load allowed for is equal to the square root of the floor area.

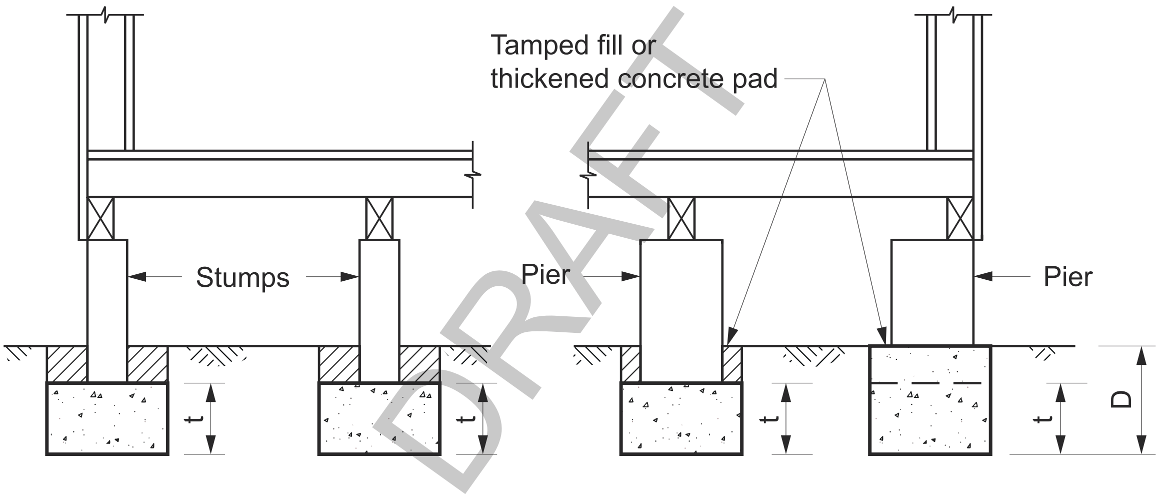
Table 4.~~5.7~~2.13g: Minimum dimensions of circular and square pad footings for clad frame, Class A and S sites

Effective supported areas (m^2)	Width of square pad (mm)	Width of circular pad (mm)	Thickness (t) (mm)	Depth (mm)
10	400	500	200	400
20	500	600	200	400
30	600	750	250	400

Table Notes:

1. The effective area supported by a pad footing is the sum of—
    a. the supported floor area; and
    b. the supported roof area (if applicable); and
    c. half the supported wall area in elevation (if applicable).
2. The width or diameter can be reduced to one half the above footings on rock.
3. The pad footings must be constructed in concrete except that footings for masonry can be used under masonry piers.
4. Pad footing sizes must also apply to footings supporting roof and floor loads only.
5. The *foundation* must provide an allowable bearing pressure of not less than 100 kPa.
6. The excavation must be backfilled with manually rodded tamped soil, or the footing thickness shall be increased by 50 mm.
7. Where stump pad footings provide resistance to horizontal or uplift forces, the minimum size of the footing must comply with AS 2870.
8. Braced stumps must comply with ~~4.5.7(5)~~4.2.13(5).

Figure 4.~~5.7~~2.13: Pad footings for clad frame, Class A and S sites



(a) Stumps **(b) Piers**

Figure Notes:

1. For minimum pad footing dimensions t and D, see Table 4.2.13g.
2. For tamped fill or thickened concrete pads, see Note 6 to Table 4.2.13g.

4.2.14 Stiffened rafts Class A, S and M sites

[New for 2022]

Footing and stiffened raft slabs must comply with—

(a) For Class A and S *sites* — Tables 4.2.14a, 4.2.14b and Figure 4.2.14a; and

(b) For Class M *sites* — Table 4.2.14c and Figure 4.2.14b.

Table 4.~~5.2c~~2.14a: Reinforcement for stiffened raft footings for Class A sites

Type of construction	Depth (D) (mm)	Bottom reinf.	Max. spacing c/l to c/l	Slab fabric ~~where slab length <18m~~	~~Slab fabric where slab length <25m~~	~~Slab fabric where slab length <30m~~
Clad frame	300	3-L8TM	N/A	SL72	~~SL82~~	~~SL92~~
Articulated masonry veneer	300	3-L8TM	N/A	SL72	~~SL82~~	~~SL92~~
Masonry veneer	300	3-L8TM	N/A	SL72	~~SL82~~	~~SL92~~
Articulated full masonry	400	3-L8TM	N/A	SL72	~~SL82~~	~~SL92~~
Full masonry	400	3-L8TM	N/A	SL72	~~SL82~~	~~SL92~~

Table Notes:

1. Internal and external edge beams must be arranged to form an integral structural grid (see clauses 5.3.8 and 5.3.9 of AS 2870).
2. A 10% increase in spacings is permitted where the spacing in the other direction is 20% less than that specified.
3. Where external beams are wider than 300 mm, an extra bottom bar or equivalent of the same bar size is *required* for each 100 mm additional width.
4. Where a reinforced *single leaf masonry* wall is constructed directly above and structurally connected to a concrete edge beam, the beam may be reduced to 300 mm wide by 300 mm deep and reinforced with 3–L8TM reinforcement.
5. Alternative reinforcement sizes must comply with AS 2870.
6. Internal beam details and spacings must comply with ~~Figure 4.5.2a~~Figure 4.2.14a or ~~Figure 4.5.2b~~Figure 4.2.14b. ~~At a re-entrant corner where an external beam continues as an internal beam, the internal beam details must be continued for a length of 1 m into the external beam.~~

Table 4.~~5.2d~~2.14b: Reinforcement for stiffened raft footings for Class S sites

Type of construction	Depth (D) (mm)	Bottom reinf.	Max. spacing c/l to c/l	Slab fabric ~~where slab length <18m~~	~~Slab fabric where slab length <25m~~	~~Slab fabric where slab length <30m~~
Clad frame	300	3-L8TM	N/A	SL72	~~SL82~~	~~SL92~~
Articulated masonry veneer	300	3-L8TM	N/A	SL72	~~SL82~~	~~SL92~~
Masonry veneer	300	3-L11TM	N/A	SL72	~~SL82~~	~~SL92~~
Articulated full masonry	45~~0~~0	3-L11TM	N/A	SL72	~~SL82~~	~~SL92~~
Full masonry	450	~~3-L11TM~~3-N16	5.0 (m) Note 2	SL82	~~SL82~~	~~SL92~~

Table Notes:

1. Internal and external edge beams must be arranged to form an integral structural grid (see clauses 5.3.8 and 5.3.9 of AS 2870).
2. A 10% increase in spacings is permitted where the spacing in the other direction is 20% less than that specified.
3. Where external beams are wider than 300 mm, an extra bottom bar or equivalent of the same bar size is *required* for each 100 mm additional width.
4. Where a reinforced *single leaf masonry* wall is constructed directly above and structurally connected to a concrete edge beam, the beam may be reduced to 300 mm wide by 300 mm deep and reinforced with 3–L8TM reinforcement.
5. Alternative reinforcement sizes must comply with AS 2870.

6. Internal beam details and spacings must comply with ~~Figure 4.5.2a~~Figure 4.2.14a or ~~Figure 4.5.2b~~Figure 4.2.14b. ~~At a re-entrant corner where an external beam continues as an internal beam, the internal beam details must be continued for a length of 1 m into the external beam.~~

Table 4.~~5.2e~~2.14c: Reinforcement for stiffened raft footings for Class M sites

Type of construction	Depth (D) (mm)	Bottom reinf.	Max. spacing c/l to c/l	Slab mesh~~fabric where slab length <18m~~	~~Slab fabric where slab length <25m~~	~~Slab fabric where slab length <30m~~
Clad frame	300	3-L11TM	6.0 Note 2	SL72	~~SL82~~	~~SL92~~
Articulated masonry veneer	400	3-L11TM	6.0 Note 2	SL72	~~SL82~~	~~SL92~~
Masonry veneer	400	3-L11TM	5.0 Note 2	SL72	~~SL82~~	~~SL92~~
Articulated full masonry	500	3-L12TM	4.0	SL82	~~SL82~~	~~SL92~~
Full masonry	85~~0~~0	3-N16	4.0	SL92	~~SL92~~	~~SL92~~

Table Notes:

1. Internal and external edge beams must be arranged to form an integral structural grid (see clauses 5.3.8 and 5.3.9 of AS 2870).
2. A 10% increase in spacings is permitted where the spacing in the other direction is 20% less than that specified.
3. Where external beams are wider than 300 mm, an extra bottom bar or equivalent of the same bar size is *required* for each 100 mm additional width.
4. Where a reinforced *single leaf masonry* wall is constructed directly above and structurally connected to a concrete edge beam, the beam may be reduced to 300 mm wide by 300 mm deep and reinforced with 3–L8TM reinforcement.
5. Alternative reinforcement sizes must comply with AS 2870.
6. Internal beam details and spacings must comply with ~~Figure 4.5.2b~~Figure 4.2.14b. ~~At a re-entrant corner where an external beam continues as an internal beam, the internal beam details must be continued for a length of 1 m into the external beam.~~

Figure 4.~~5.2a~~2.14a: Footing slab and stiffened raft slab details for Class A and S sites

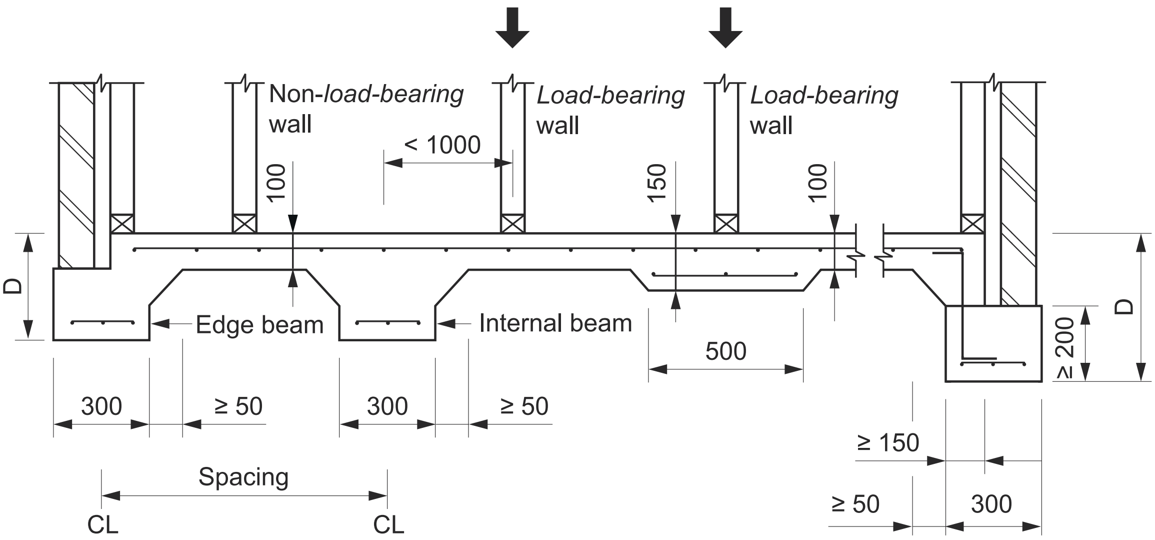
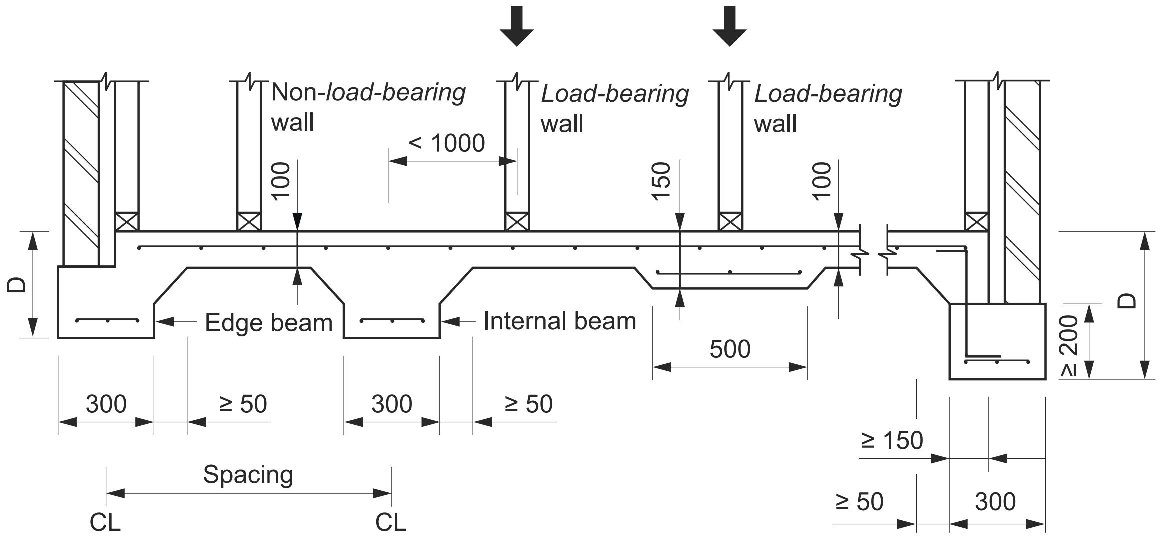


Figure 4.~~5.2b~~2.14b: Footing slab and stiffened raft slab details for Class M~~, M-D, H and H-D~~ sites



4.2.15 Strip footings Class A, S and M sites

[New for 2022]

Strip footings for Class A, S and M *sites* must comply with—

(a) for Class A and S *sites* — Tables 4.2.15a, 4.2.15b and Figure 4.2.15a; and

(b) for Class M *sites* — Table 4.2.15c and Figure 4.2.15b.

Table 4.~~5.2i~~2.15a: Dimensions and reinforcement for strip footing systems for Class A sites

Type of construction	D (mm)	B (mm)	Reinforcement (top and bottom)
Clad frame	300	300	3–L8TM
Articulated masonry veneer	300	300	3–L8TM
Masonry veneer	300	300	3–L8TM
Articulated full masonry	300	400	4–L8TM
Full masonry	300	400	4–L8TM

Table Notes:

1. All masonry walls must be supported on strip footings.
2. Internal strip footings must be of the same proportions as the external footings and run from external footing to external footing. “Side slip joints” consisting of a double layer of polyethylene must be provided at the sides of the footing only.
3. Infill floors may be concrete slabs, brick paving, stone flags or compacted and stabilised earth. For concrete slab infill panels, mesh may be required to control shrinkage in slab panels and around openings or restrained regions. Concrete infill slabs must use a minimum of SL62 mesh to control shrinkage (see also ~~4.5.4~~4.2.19).
4. Where footings are wider than the specified width, an extra bottom bar or equivalent of the same bar size is *required* for each 100 mm additional width. If strip footings deeper than those required are used, the reinforcement must be increased to match that specified for the deepened proportions.
5. The measurement of D_f is greater or equal to D plus 75 mm.
6. Alternative reinforcing sizes must comply with AS 2870.

Table 4.~~5.2j~~2.15b: Dimensions and reinforcement for strip footing systems for Class S sites

Type of construction	D (mm)	B (mm)	Reinforcement (top and bottom)
Clad frame	400	300	3–L8TM
Articulated masonry veneer	400	300	3–L8TM
Masonry veneer	400	300	3–L8TM
Articulated full masonry	400	400	4–L11TM
Full masonry	500	400	4–L11TM

Table Notes:

1. All masonry walls must be supported on strip footings.
2. Internal strip footings must be of the same proportions as the external footings and run from external footing to external footing. “Side slip joints” consisting of a double layer of polyethylene must be provided at the sides of the footing only.
3. Infill floors may be concrete slabs, brick paving, stone flags or compacted and stabilised earth. For concrete slab infill panels, mesh may be *required* to control shrinkage in slab panels and around openings or restrained regions. Concrete infill slabs must use a minimum of SL62 mesh to control shrinkage (see also~~4.5.4~~4.2.19).
4. Where footings are wider than the specified width, an extra bottom bar or equivalent of the same bar size is *required* for each 100 mm additional width. If strip footings deeper than those *required* are used, the reinforcement must be increased to match that specified for the deepened proportions.
5. The measurement of D_f is greater or equal to D plus 75 mm.
6. Alternative reinforcing sizes must comply with AS 2870.

Table 4.~~5.2k~~2.15c: Dimensions and reinforcement for strip footing systems for Class M sites

~~Site Class~~	Type of construction	D (mm)	B (mm)	Reinforcement (top and bottom)
~~Class M~~	*Clad frame*	400	300	3-L11TM
~~Class M~~	*Articulated masonry* veneer	450	300	3-L11TM
~~Class M~~	Masonry veneer	500	300	3-L12TM
~~Class M~~	Articulated full masonry	600	400	4-L12TM
~~Class M~~	Full masonry	900 Note 2	400	4-L12TM

Table Notes:

1. All masonry walls must be supported on strip footings.
2. For beams 700 mm or deeper, as specified in the table above, internal footings must be provided at no more than 6 m centres and at re-entrant corners to continue footings to the opposite external footing. Internal strip footings must be of the same proportions as the external footings and run from external footing to external footing. “Side slip joints” consisting of a double layer of polyethylene must be provided at the sides of the footing only.
3. Infill floors must only be used for Class A and S sites.
4. Where footings are wider than the specified width, an extra bottom bar or equivalent of the same bar size is *required* for each 100 mm additional width. If strip footings deeper than those *required* are used, the reinforcement must be increased to match that specified for the deepened proportions.
5. The measurement of D_f is greater or equal to D plus 75 mm.
6. Alternative reinforcing sizes must comply with AS 2870.
7. For Class M articulated full masonry and full masonry, internal strip footings must be of the same proportions as the external footing and run from external footing to external footing.

Figure 4.~~5.2c~~2.15a: Strip footing systems for Class A and S sites

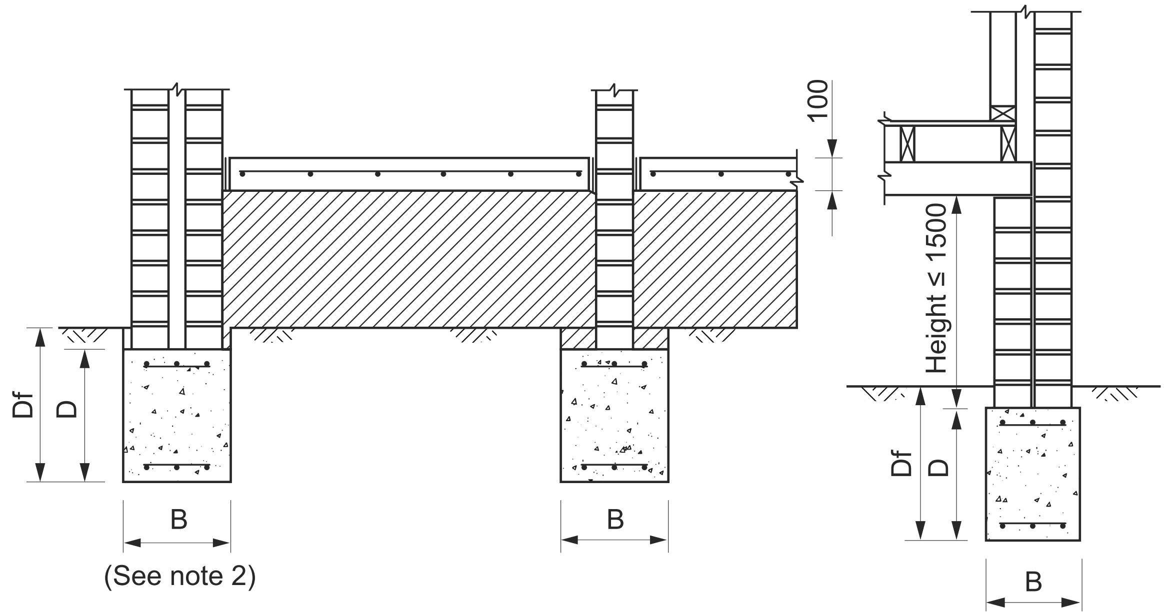
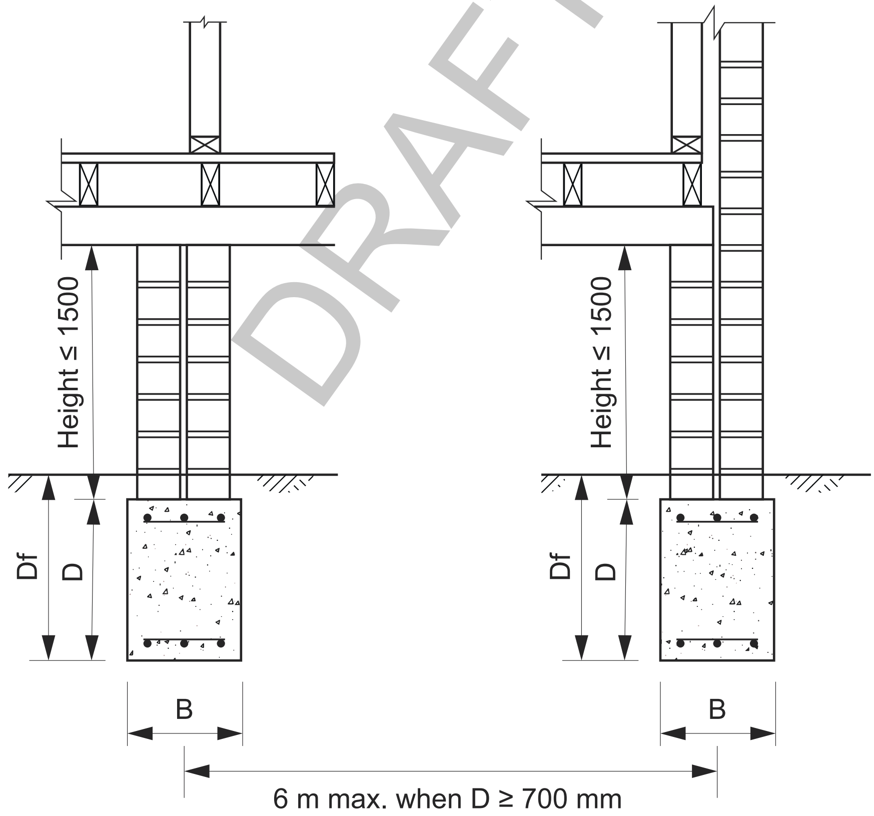


Figure 4.~~5.2d~~2.15b: Strip footing system for Class M~~, M-D and H~~ sites



4.2.16 Footing slabs for Class A sites

[New for 2022]

Footing slabs for Class A *sites* supporting the following external wall types must comply with Figure 4.2.16:

(a) *Clad frame.*

(b) *Articulated masonry.*

(c) Masonry veneer.

(d) Articulated full masonry.

(e) Full masonry.

Figure 4.2.16~~5.2e~~: Footing slabs for Class A sites suitable for clad frame, articulated masonry veneer, masonry veneer, articulated full masonry and full masonry

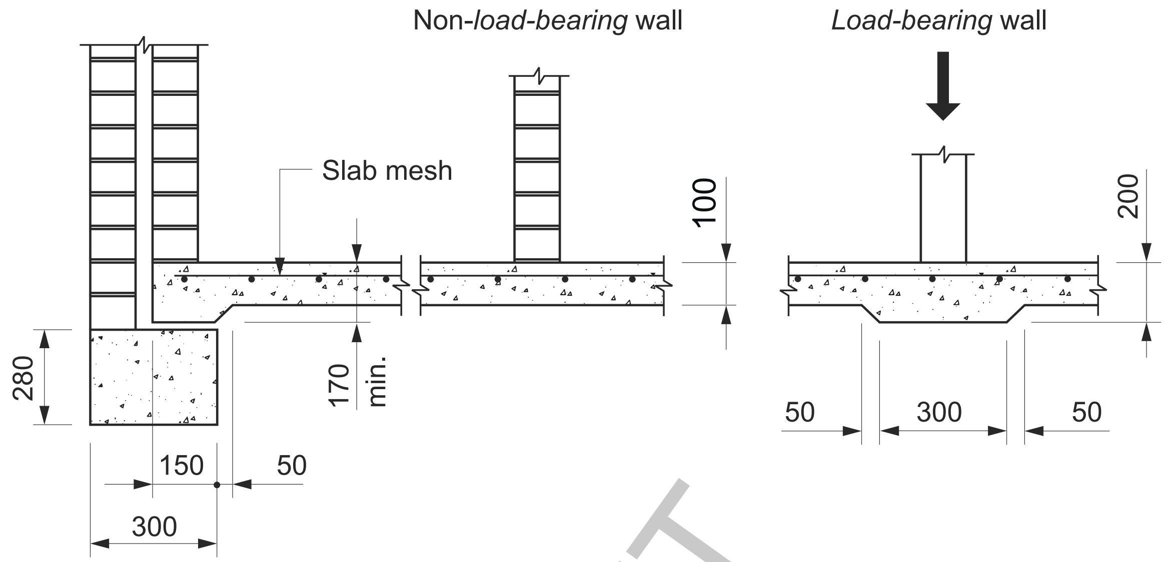


Figure Notes:

1. Use SL63 when slab length is less than 12 m.
2. Use SL62 when slab length is less than 18 m.
3. In parts of Western Australia (around Perth) and other locations where the *site* consists of extremely stable sands, and where specified by a *professional engineer*, the slab thickness may be reduced to 85 mm and reinforced as follows:
    a. Use SL53 when slab length is less than or equal to 12 m.
1. Dune sands may require compaction.

4.2.17 Footings for single leaf masonry, mixed construction and earth wall construction

[New for 2022]

Footings supporting the following external wall types must comply with the equivalent footing construction set out in Tables 4.2.17a, 4.2.17b and 4.2.17c:

(a) *Single leaf masonry*.

(b) *Mixed construction*.

(c) Earth wall structures.

Table 4.2.17a: Equivalent wall construction: single leaf masonry

Actual construction: external walls	Actual construction: internal walls	Equivalent wall construction
Reinforced *single leaf masonry*	*Articulated masonry* on Class A and Class S *sites*, or framed	*Articulated masonry* veneer
Reinforced *single leaf masonry*	*Articulated masonry* or reinforced *single leaf masonry*	Masonry veneer
Articulated *single leaf masonry*	*Articulated masonry*	Articulated full masonry

Table 4.2.17b: **Equivalent wall construction: mixed construction**

Actual construction: external walls	Actual construction: internal walls	Equivalent wall construction
Full masonry	Framed	Articulated full masonry
Articulated full masonry	Framed	Masonry veneer

Table 4.2.17c: **Equivalent wall construction: earth wall construction**

Actual construction: external walls	Actual construction: internal walls	Equivalent wall construction
Infill panels of earth wall construction	Framed earth wall construction	*Articulated masonry* veneer
Loadbearing earth wall construction	*Loadbearing* earth wall construction	Articulated full masonry

4.~~5.6~~2.18 Footings for fireplaces on Class A and S sites

[2019: 3.2.5.5]

(1) Fireplaces must be supported on a pad footing—

(a) 150 mm thick for single storey (one trafficable floor and a wall height not more than 4.2 m) construction; and

(b) 200 mm thick for 2 storey (two trafficable floors and a wall height not more than 8 m) construction; and

(c) reinforced top and bottom with SL72 mesh; and

(d) extending 300 mm past the edges of the masonry except for any edge flush with the outer wall.

(2) The pad footing ~~may~~must form an integral part of the slab.

4.~~5.4~~2.19 Shrinkage control

[2019: 3.2.5.3]

(1) Where brittle floor coverings, such as ceramic tiles, are to be used over an area greater than 16 m^2, one of the following additional measures must be taken to control the effect of shrinkage cracking—

(a) the amount of shrinkage reinforcement (steel reinforcement mesh in the slab panel) must be—

(i) increased to SL92 or equivalent throughout the affected slab area; or

(ii) ~~doubled~~ reinforced top and bottom with~~an additional~~ sheets of slab mesh throughout the affected slab area; or

(b) the bedding system for brittle coverings must be selected on the basis of the expected slab movement and the characteristics of the floor covering (including the use of expansion joints etc.); or

(c) the placement of floor covering must be delayed for not less than 3 months after the concrete has been poured.

(~~2~~) ~~At re-entrant or internal corners, two strips, minimum 2 m in length, of 3–L8TM or one strip of 3–L11TM (or 3-N12 bars) must be placed diagonally across the corner in accordance with Figure 4.5.4.~~

(2) Where a footing or slab supports a concentrated load from a structural steel column, localised thickening must—

(a) be provided in accordance with—

(i) for tiled floor and tiled roof, Tables 4.2.19a, 4.2.19b or 4.2.19c; or

(ii) for timber floor and metal roof, Tables 4.2.19d, 4.2.19e or 4.2.19f; and

(b) be centred under the structural steel column; and

(c) have SL72 reinforcement with a minimum 50 mm of concrete cover (see Figure 4.2.19).

Table 4.2.19a: **Localised thickening under concentrated load — tiled floor and tiled roof — roof load area = 0 m^2**

Localised thickening	Floor load area (m^2)		
	4	10	16
Square thickening size (mm)	450 x 450	650 x 650	850 x 850
Thickening depth (mm)	250	350	400

Table Notes:

1. Load accounted for includes 0.98 kPa permanent tiled floor, 0.85 kPa permanent tiled roof, 1.16 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are G + 0.5Q for ULS.
3. Minimum bearing pressure is 1000 kPa for pad footings.
4. A roof load area of "0" must be used for footings not supporting roof loads.
5. The length of wall allowed for is equal to the square root of the floor area.

Table 4.2.19b: **Localised thickening under concentrated load — tiled floor and tiled roof — roof load area = 9 m^2**

Localised thickening	Floor load area (m^2)		
	4	10	16
Square thickening size (mm)	650 x 650	800 x 800	950 x 950
Thickening depth (mm)	350	400	450

Table Notes:

1. Load accounted for includes 0.98 kPa permanent tiled floor, 0.85 kPa permanent tiled roof, 1.16 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are G + 0.5Q for ULS.
3. Minimum bearing pressure is 1000 kPa for pad footings.
4. The length of wall allowed for is equal to the square root of the floor area.

Table 4.2.19c: **Localised thickening under concentrated load — tiled floor and tiled roof — roof load area = 18 m^2**

Localised thickening	Floor load area (m^2)		
	4	10	16
Square thickening size (mm)	750 x 750	900 x 900	1000 x 1000
Thickening depth (mm)	400	450	500

Table Notes:

1. Load accounted for includes 0.98 kPa permanent tiled floor, 0.85 kPa permanent tiled roof, 1.16 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are G + 0.5Q for ULS.
3. Minimum bearing pressure is 1000 kPa for pad footings.
4. The length of wall allowed for is equal to the square root of the floor area.

Table 4.2.19d: **Localised thickening under concentrated load — timber floor and metal roof — roof load area = 0 m²**

Localised thickening	Floor load area (m²)		
	4	10	16
Square thickening size (mm)	400 x 400	600 x 600	750 x 750
Thickening depth (mm)	250	300	350

Table Notes:

1. Load accounted for includes 0.53 kPa permanent timber floor, 0.4 kPa permanent metal roof, 1.16 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are G + 0.5Q for ULS.
3. Minimum bearing pressure is 1000 kPa for pad footings.
4. A roof load area of "0" must be used for footings not supporting roof loads.
5. The length of wall allowed for is equal to the square root of the floor area.

Table 4.2.19e: **Localised thickening under concentrated load — timber floor and metal roof — roof load area = 9 m²**

Localised thickening	Floor load area (m²)		
	4	10	16
Square thickening size (mm)	500 x 500	700 x 700	800 x 800
Thickening depth (mm)	300	350	400

Table Notes:

1. Load accounted for includes 0.53 kPa permanent timber floor, 0.4 kPa permanent metal roof, 1.16 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are G + 0.5Q for ULS.
3. Minimum bearing pressure is 1000 kPa for pad footings.
4. The length of wall allowed for is equal to the square root of the floor area.

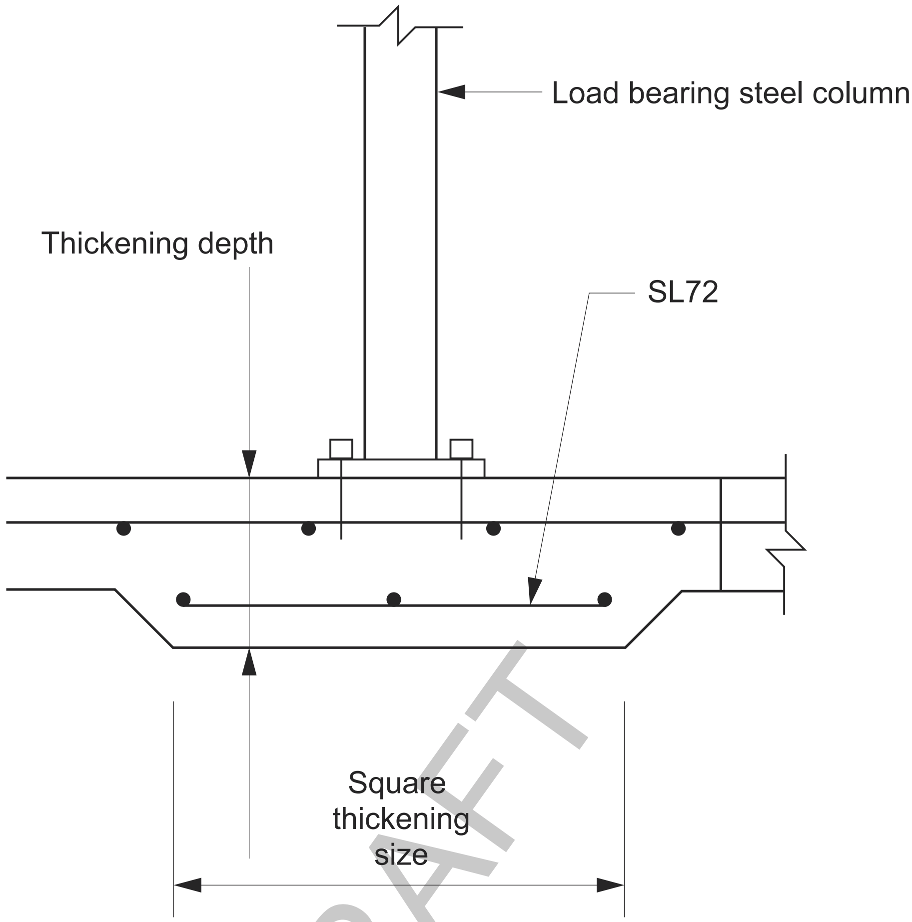
Table 4.2.19f: **Localised thickening under concentrated load — timber floor and metal roof — roof load area = 18 m²**

Localised thickening	Floor load area (m²)		
	4	10	16
Square thickening size (mm)	600 x 600	750 x 750	850 x 850
Thickening depth (mm)	300	400	450

Table Notes:

1. Load accounted for includes 0.53 kPa permanent timber floor, 0.4 kPa permanent metal roof, 1.16 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are G + 0.5Q for ULS.
3. Minimum bearing pressure is 1000 kPa for pad footings.
4. The length of wall allowed for is equal to the square root of the floor area.

Figure 4.2.19: Localised thickening for concentrated loads



4.~~5.5~~2.20 Minimum edge beam dimensions

[2019: 3.2.5.4]

~~Except for waffle raft slabs, where the edge rebate is more than 150 mm in depth,~~ For footing slabs located on a Class ~~a~~A or Class S *sites*, the width of the edge beam at the base of the rebate must not be less than 200 mm, except that if R10 or N10 ties at 900 mm spacing (or equivalent) are provided to resist vertical forces, the width of the edge beam at the base of the rebate can be reduced to 150 mm.

4.2.21 Recessed areas of slabs

[New for 2022]

(1) Where a recess in a slab is provided, it must comply with one of the following:

(a) For recess depths less than or equal to half the nominal slab thickness, the reinforcing mesh must have a minimum lap length of 400 mm measured from the inside face of the recess (see Figure 4.2.21a).

(b) For recess depths greater than half the nominal slab thickness (see Figure 4.2.21b)—

(i) top reinforcing mesh must overlap the bottom reinforcing mesh by not less than 400 mm; and

(ii) bottom reinforcing mesh must be two layers of SL72.

(2) Concrete cover to reinforcing in (1)(a) and (b) must comply with 4.2.11(5).

Figure 4.2.21a: Recess depths less than or equal to nominal slab thickness

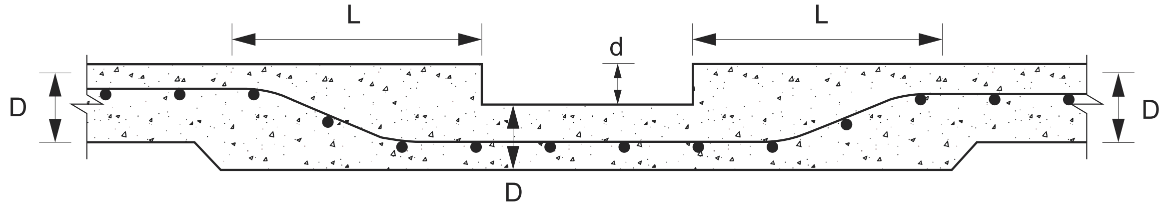
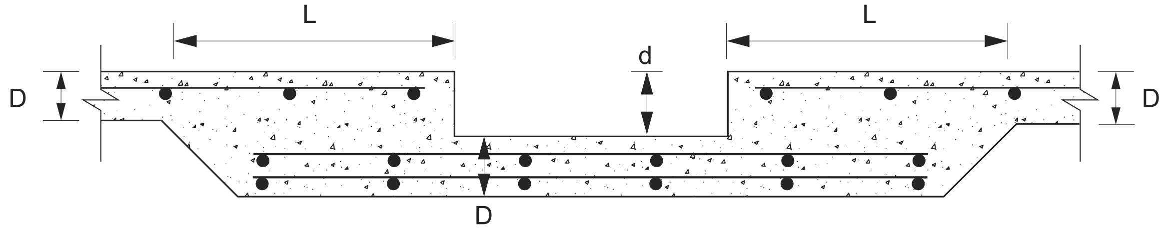


Figure 4.2.21b: Recess depths greater than nominal slab thickness



5 Masonry

Part 5.1 Scope and application of Section 5

5.1.1 Scope

[New for 2022]

(1) This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for—

(a) masonry veneer (see Part 5.2); and

(b) *cavity* masonry (see Part 5.3); and

(c) single leaf *unreinforced masonry* (see Part 5.4); and

(d) isolated masonry piers (see ~~Part 5.3~~Part 5.5)~~.~~; and

(e) masonry components and accessories (see Part 5.6); and

(f) weatherproofing of masonry (see Part 5.7).

(2) For other masonry provisions not included in this Section of the ABCB Housing Provisions, refer to the following *Deemed-to-Satisfy Provisions* in NCC Volume Two:*reinforced masonry* (see H1D5(4)).

(a) ~~*Unreinforced masonry* (see H1D5(1)).~~

(b) ~~*Reinforced masonry* (see H1D5(1) and (2)).~~

(c) ~~Masonry accessories (see H1D5(1)).~~

(d) ~~Weatherproofing of masonry (see H2D4).~~

5.1.2 Application

[New for 2022]

The application of Section 5 of the ABCB Housing Provisions is subject to the following:

(a) The Governing Requirements of NCC 2022 Volume Two.

(b) Any conditions set out within the following *Deemed-to-Satisfy Provisions* of NCC Volume Two:

(i) ~~H1D5(3)(a)~~H1D5(1), for masonry veneer.

(ii) H1D5(2), for *cavity* masonry.

(iii) H1D5(3), for *unreinforced masonry*.

(iv) ~~H1D5(3)(b)~~H1D5(5), for isolated masonry piers.

(v) H1D5(6), for masonry accessories.

(vi) H2D4(2)(c), for weatherproofing of masonry.

(c) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 5 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practices for Parts 3.3.5 and 3.3.6 of NCC 2019 Volume Two.

NCC 2019 Volume Two did not include an acceptable construction practice for Parts 3.3.1, 3.3.2, 3.3.3 or 3.3.4.

Part 5.2 Masonry veneer

5.2.1 Application of Part 5.2

[New for 2022]

(1) Part 5.2 is subject to the limitations set out at ~~H1D5(3)(a)~~H1D5(1)(c).

(2) Part 5.2 need not be complied with if H1D5(1)(a) or (b) is complied with.

5.2.2 Height of wall limitation

[2019: 3.3.5.2]

Masonry veneer walls must not be greater than 8.5 m in height when measured above the adjacent finished ground level.

5.~~2.11~~2.3 Openings in masonry veneer

[2019: 3.3.5.11]

(1) Except where excluded by (2), openings in masonry veneer must be spanned by steel lintels.

(2) Openings in masonry veneer not more than 500 mm wide need not be provided with a steel lintel provided the opening is adequately supported.

5.2.4 Damp-proof courses and flashing materials

[New for 2022]

Damp-proof courses and flashing materials must be in accordance with 5.7.3 and 5.7.4.

5.2.5 Vertical articulation joints

[New for 2022]

Vertical articulation joints are to be installed in accordance with 5.6.8.

5.~~2.14~~2.6 Engaged piers

[2019: 3.3.5.14]

Where engaged piers are installed to support subfloor framing, they must comply with the provisions of this Part and be constructed as follows:

(a) Footings for piers must comply with Section 4.

(b) Engaged piers must not support more than a single storey with a roof framing span of not more than 12 m.

(c) Piers must be spaced at not more than 3 m centres with floor framing complying with—

- (i) ~~H1D6(2)~~H1D6(3) for steel framing; and
- (ii) ~~H1D6(3)~~H1D6(4) for timber framing; and
- (iii) ~~H1D6(4)~~H1D6(5) for structural steel framing.

(d) Piers must be—

- (i) not more than 1.2 m high; and
- (ii) a minimum thickness of 100 mm inclusive of mortar; and
- (iii) a width greater than the depth of the timber or steel section which it is supporting (~~S~~see ~~Figure 5.2.14~~Figure

5.2.6).

(e) Notwithstanding (c), engaged piers must be located beneath—

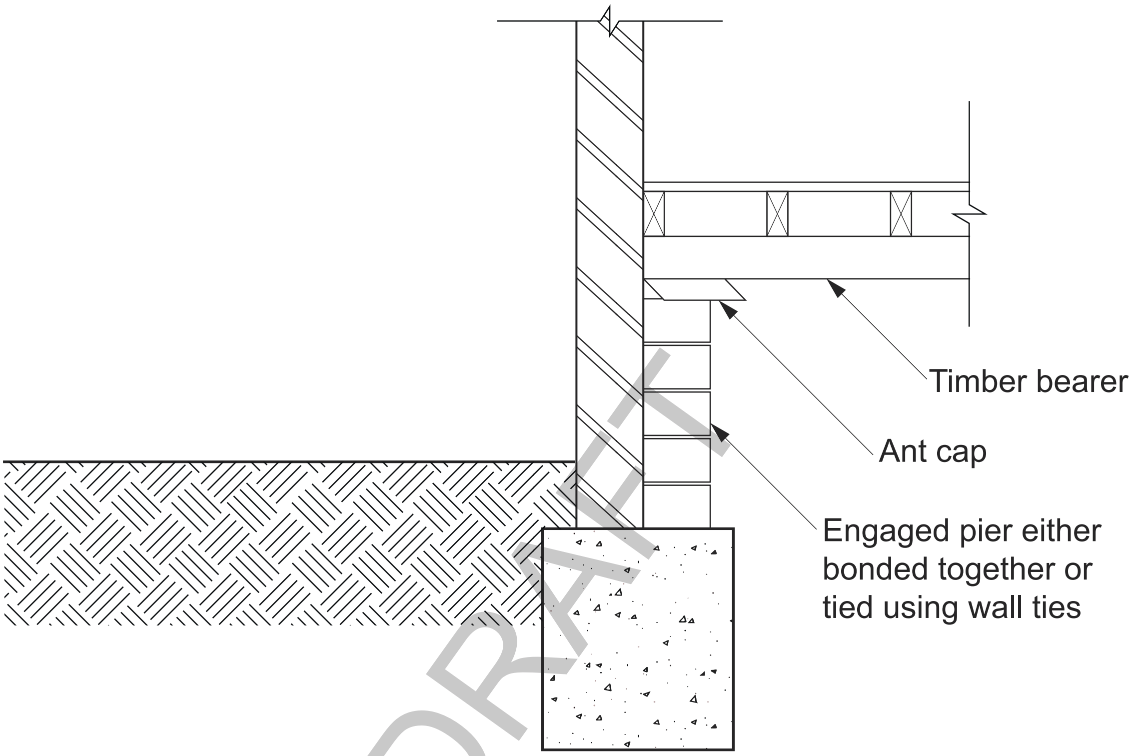
   (i) each side of *window* and door openings; and

   (ii) concentrated roof loads, inclusive of any roof beams and girder trusses.

(f) Piers must be tied or bonded to the external masonry wall, and where ties are used they must comply with ~~5.2.10~~5.6.5.

(g) Piers formed from hollow-core masonry units must be filled with grout.

Figure 5.~~2.14~~2.6: **Engaged pier**



Part 5.3 Cavity masonry

5.3.1 Application of Part 5.3

[New for 2022]

(1) Part 5.3 applies subject to the limitations set out at H1D5(2)(c).

(2) Part 5.3 need not be complied with if H1D5(2)(a) or (b) is complied with.

5.3.2 Height of wall limitation

[New for 2022]

Cavity masonry walls must not be greater than 8.5 m in height when measured above the adjacent finished ground level.

5.3.3 External walls

[New for 2022]

(1) *Cavity* masonry walls must comply with the relevant provisions of this Part and Parts 5.6 and 5.7 and be constructed as follows:
- (a) The height of the wall between *lateral support* (floor or ceiling or roof diaphragm) must be not more than 3 m.
- (b) *Cavity* masonry walls subject to wind loads must be supported by masonry cross walls.
- (c) Masonry cross walls must be—
  - (i) not less than 2 m in length; and
  - (ii) at not more than 5.1 m centres where the length of the *cavity* wall being supported does not contain any opening or control joint; and
  - (iii) not more than 2.5 m from the edge of a control joint in the length of the *cavity* wall being supported; and
  - (iv) not more than a distance from the edge of an opening in the length of cavity wall being supported as stated in Table 5.3.3; and
  - (v) located at both edges of openings of width greater than 2700 mm; and
  - (vi) directly connected to the internal leaf of the *cavity* wall being supported using—
    - (A) properly bonded units with at least 90 mm engagement on each side of the interface with the selected bond pattern but not less than every fourth course of masonry; or
    - (B) medium duty Type A *cavity* wall ties in aligning mortar bed joints at a vertical spacing of not more than 300 mm; and
  - (vii) connected by a floor or ceiling diaphragm to the wall being supported where floor or ceiling connections are designed in accordance with the relevant material design standard AS/NZS 4600, AS 1720.1 or AS 3600, as appropriate.

(2) *Cavity* masonry walls must be constructed of two leaves, with each leaf not less than 90 mm wide.

(3) In *cavity* masonry construction, a *cavity* must be provided between the inner and outer masonry leaves as follows:
- (a) The *cavity* must be not less than 35 mm and not more than 75 mm in width.
- (b) Except for steel mullions, the minimum *cavity* width specified in (a) is to be maintained between the outer masonry leaf and any insulation or services located in the *cavity*.
- (c) Where steel mullions are located in a *cavity* as permitted by (b), a vertical *damp-proof course* must be placed between the outer masonry leaf and the mullion to prevent moisture penetration.

Table 5.3.3: **Spacing of return walls for cavity walls with openings — distance from the edge of an opening (mm)**

Wind class	Opening width (mm)			
	900	1500	2100	2700
N3	2100	1800	800	400
N2	3200	2900	2600	2300
N1	2500(Note)	2200(Note)	1900(Note)	800(Note)

Table Notes:

The spacing for N1 is smaller than for N2 because 5.6.5 states that for *cavity* walls with N1, light duty *cavity* ties are to be used. This results in only relying on one leaf to resist the load instead of sharing it equally as per clause 7.7.3 of AS 3700.

Explanatory Information:

Steel mullions complying with AS 4773.1 and 4773.2 used to support wind loads may be placed within a cavity. Flat ceiling capable of performing diaphragm action may act as lateral support to walls provided the structure has been specifically designed.

5.3.4 Internal walls

[New for 2022]

(1) Where internal masonry walls intersect with other internal or external walls they must comply with the relevant provisions of this Part and be—
  (a) not less than 75 mm thick; and
  (b) either—
    (i) bonded at the junctions of the intersecting walls; or
    (ii) provided with an articulation joint in accordance with 5.6.8.

(2) Where a vertical articulation joint is provided in an internal masonry wall it must be formed in accordance with 5.6.8.

5.3.5 Openings in cavity masonry

[New for 2022]

(1) Except where excluded by (2), openings in *cavity* masonry must be spanned by steel lintels in accordance with 5.6.7.

(2) Openings in *cavity* masonry not more than 600 mm wide need not be provided with a steel lintel provided the opening is adequately supported.

5.3.6 Damp-proof courses and flashing materials

[New for 2022]

Damp-proof courses and flashing must be provided in accordance with 5.7.3 and 5.7.4.

5.3.7 Vertical articulation joints

[New for 2022]

Vertical articulation joints are to be installed in accordance with 5.6.8.

Part 5.4 Unreinforced single leaf masonry

5.4.1 Application of Part 5.4

[New for 2022]

(1) Part 5.4 applies subject to the limitations set out at H1D5(3)(c).

(2) Part 5.4 need not be complied with if H1D5(3)(a) or (b) is complied with.

5.4.2 External walls

[New for 2022]

(1) Single leaf *unreinforced masonry* walls with *engaged piers* and return walls must comply with the relevant provisions of this Part and be constructed in accordance with the following:

- (a) The roof frame must be connected continuously to the top of the wall (see Figure 5.4.2a).
- (b) Stack bonded piers must have wall ties at every fourth course.
- (c) Pier and return supports size limitations for—
  - (i) single leaf *unreinforced masonry* walls with *engaged piers* must comply with Table 5.4.2a and Figure 5.4.2b; and
  - (ii) single leaf *unreinforced masonry* walls with return supports must comply with Table 5.4.2b and Figure 5.4.2c.
- (d) An *engaged pier* or return wall must be provided at both sides of an opening.
- (e) Openings must be not more than the spacing between the *engaged piers*.
- (f) For openings more than the spacing width, the *engaged piers* either side of the opening must be designed in accordance with AS 3700.
- (g) Articulation joints must be located within 300 mm of vertical supports in accordance with 5.6.8.

(2) A Class 10a building containing not more than 1 storey may be enclosed with single leaf masonry *external walls* not less than 110 mm in thickness, provided that—

- (a) the building measured in the direction of the span of the roof is not more than 9 m and the height is not more than 2.4 m; and
- (b) piers are formed that are not less than 230 mm wide, project not less than 1200 mm and are spaced at not more than 550mm centres; and
- (c) the roof does not place any spreading thrust onto the *external walls*; and
- (d) the Class 10a building is located in an area with a *design wind speed* of not more than N2.

Table 5.4.2a: Piers in external single leaf masonry walls to AS 3700

Element	Symbol used in Figure 5.4.2b	Thickness of wall (T)			
		90	110	140	190
Pier size (minimum) (not more than N2)	A x B	290 x 190 (800 spacing)	350 x 230 (1150 spacing)	–	–
Pier size (minimum) (not more than N3)	A x B	290 x 290 (700 spacing)	350 x 350 (1050 spacing)	–	–
Spacing of returns (maximum)	S	700	1050	–	–
Height (maximum)	H	2400	2700	1700 (N2)	2300 (N2)

Table Notes:

1. Dimensions are in mm.
2. Return supports are not required for 140 mm and 190 mm thickness walls.

Table 5.4.2b: Return support limitations for external; single leaf masonry walls to AS 3700

Element	Symbol used in Figure 5.4.2c	Thickness of wall (T)			
		90	110	140	190
Return length (minimum)	R	450	450	–	–
Spacing of returns (maximum) (N2)	S	1050	1300	–	–
Spacing of returns (maximum) (N3)	S	600	750	–	–
Height (maximum)	H	2400	2400	1700 (N2)	2300 (N2)

Table Notes:

1. Dimensions are in mm.
2. Return supports are not required for 140 mm and 190 mm thickness walls.

Figure 5.4.2a: Top lateral restraint detail for unreinforced single leaf masonry walls

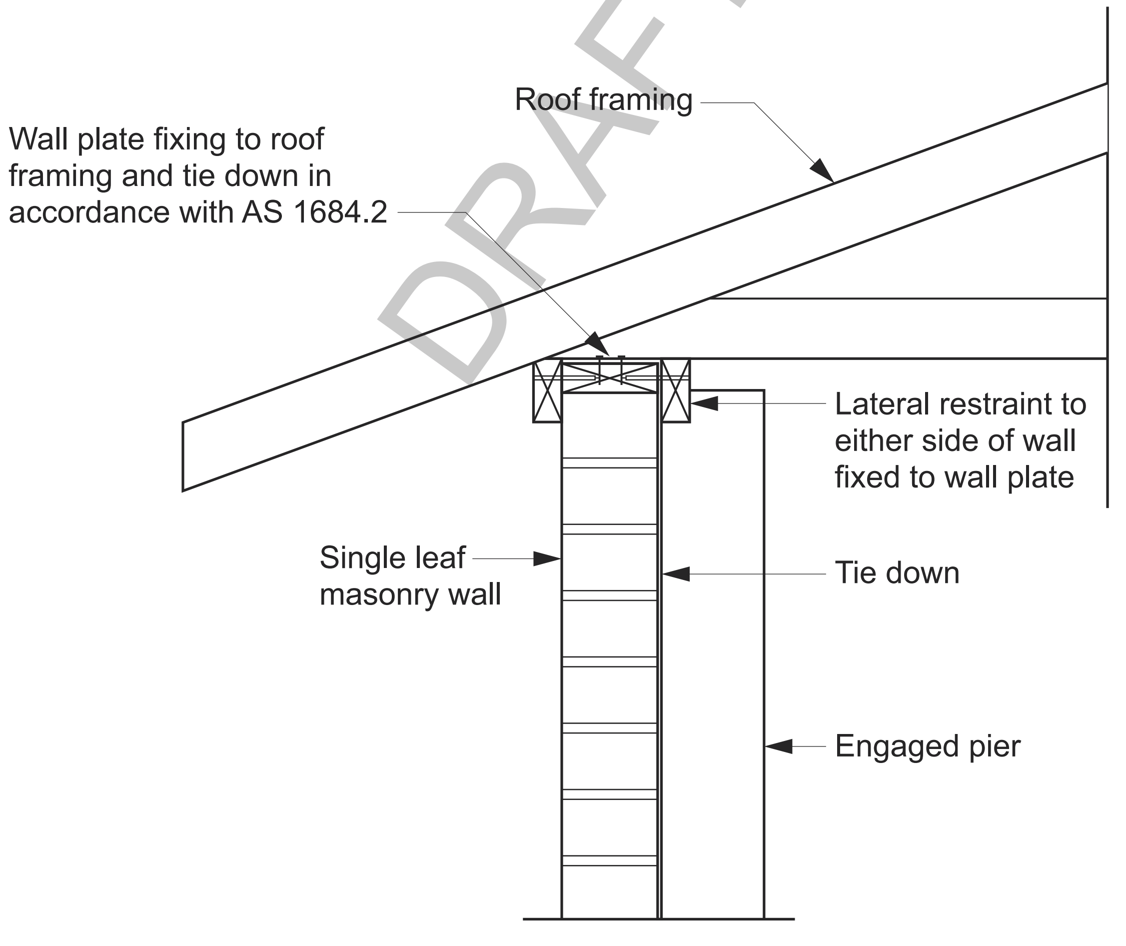


Figure Notes:

Tie down of wall must comply with 5.6.6.

Figure 5.4.2b: Piers in external single leaf masonry walls to AS 3700

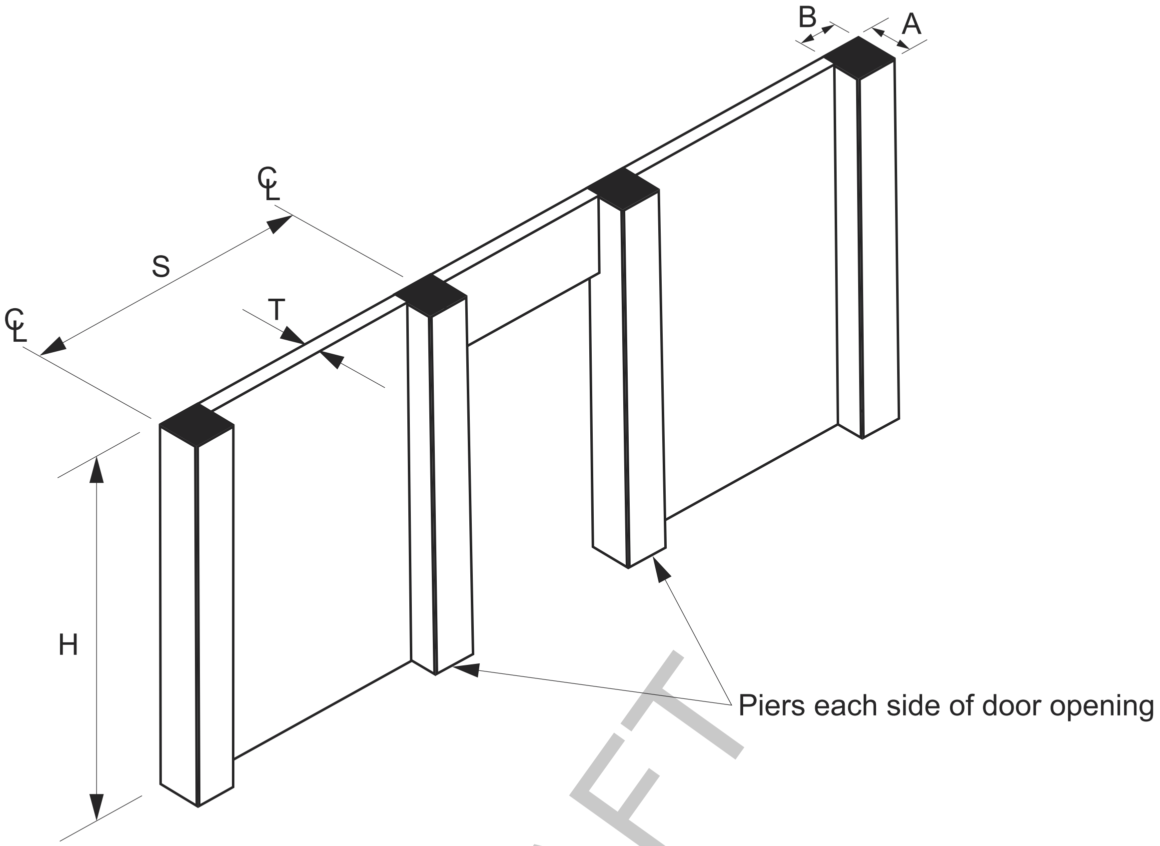
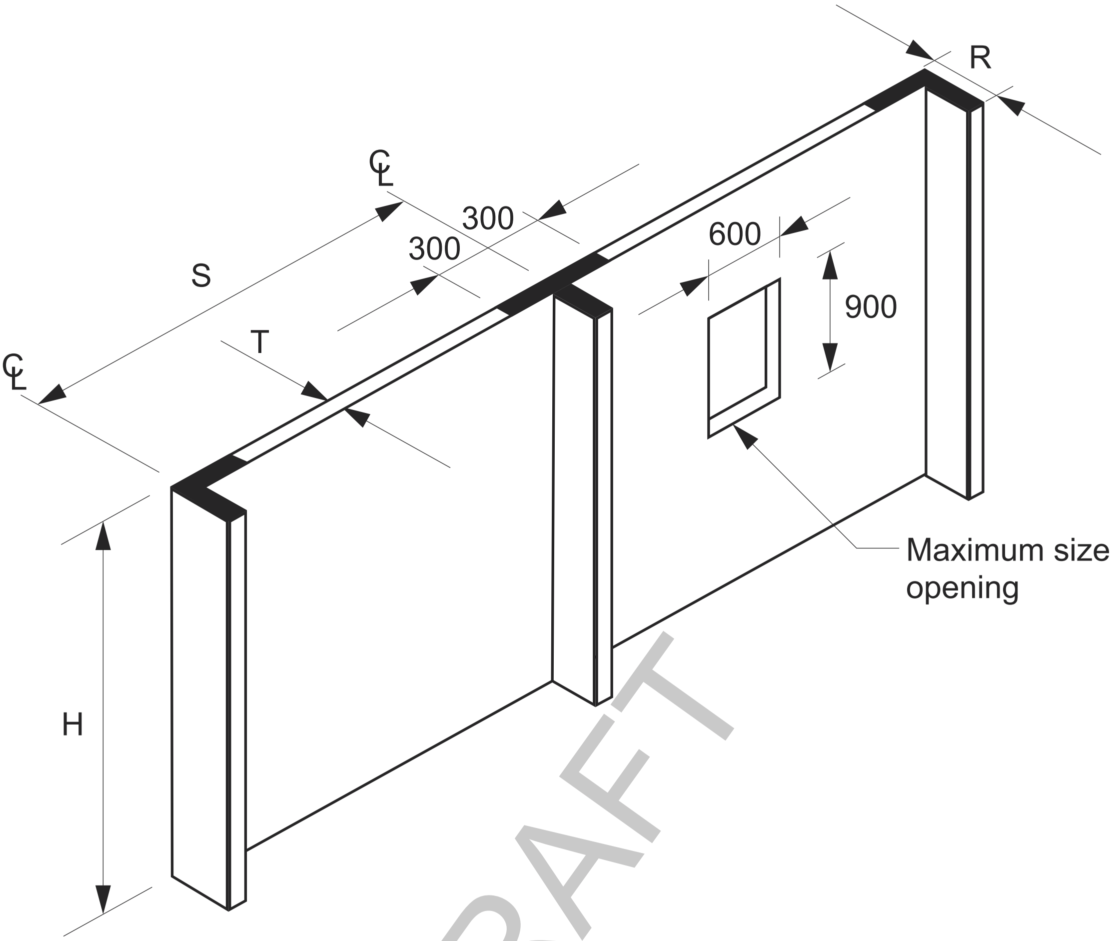


Figure 5.4.2c: Return support limitations for external single leaf masonry walls to AS 3700



5.4.3 Internal walls

[New for 2022]

Internal masonry walls must be engaged with other walls, must comply with the relevant provisions of this Part and must be—

(a) not less than 75 mm thick; and

(b) supported by either—

(i) the ceiling structure in accordance with Figure 5.4.3a; or

(ii) return walls in accordance with Figure 5.4.3b.

Figure 5.4.3a: Support for internal walls—supported by ceiling structure

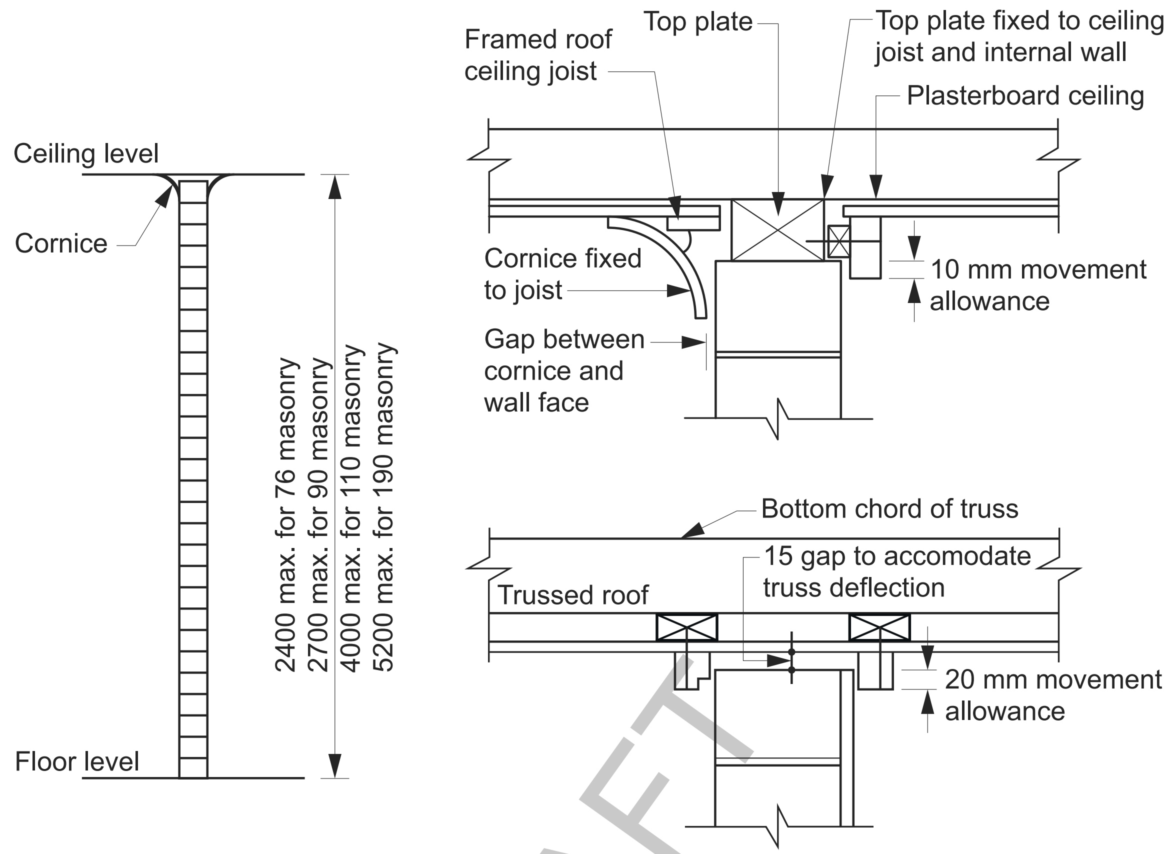


Figure Notes:

1. Timber joist to be fixed to top plate in accordance with H1D6(4).
2. Fixing of top plate to masonry wall to be in accordance with 5.6.6.

Figure 5.4.3b: Support for internal walls—supported by return walls

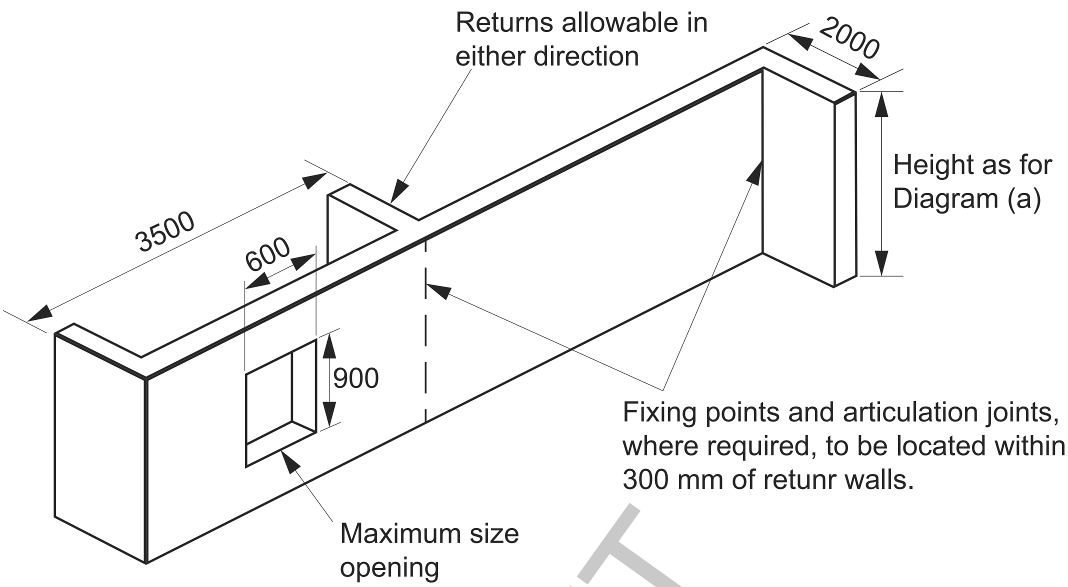


Figure Notes:

1. An opening of not more than 600 mm x 900 mm is allowed to internal walls without additional support.
2. Openings larger than as described in Note 1 and door openings must be supported.
3. The maximum allowable height for the wall is described in Figure 5.4.3a.
4. Articulation joints must be in accordance with 5.6.8.

Explanatory Information:

A full height door frame or stud fastened at the roof framing and tied to the wall at 300 mm centres can be considered equivalent to a return wall.

5.4.4 Vertical articulation joints

[New for 2022]

Vertical articulation joints must be provided in accordance with 5.6.8.

5.4.5 Damp-proof courses and flashing materials

[New for 2022]

Where required, *damp-proof courses* and flashing must be provided in accordance with 5.7.3 and 5.7.4.

Part 5.~~3~~5 Isolated ~~masonry~~ piers

5.~~3.1~~5.1 Application of Part ~~5.3~~5.5

[New for 2022]

(1) ~~Part 5.3~~Part 5.5 is subject to the limitations set out in H1D5(5)(c).

(2) ~~Part 5.3~~Part 5.5 need not be complied with if H1D5(5)(a) or (b) is complied with.

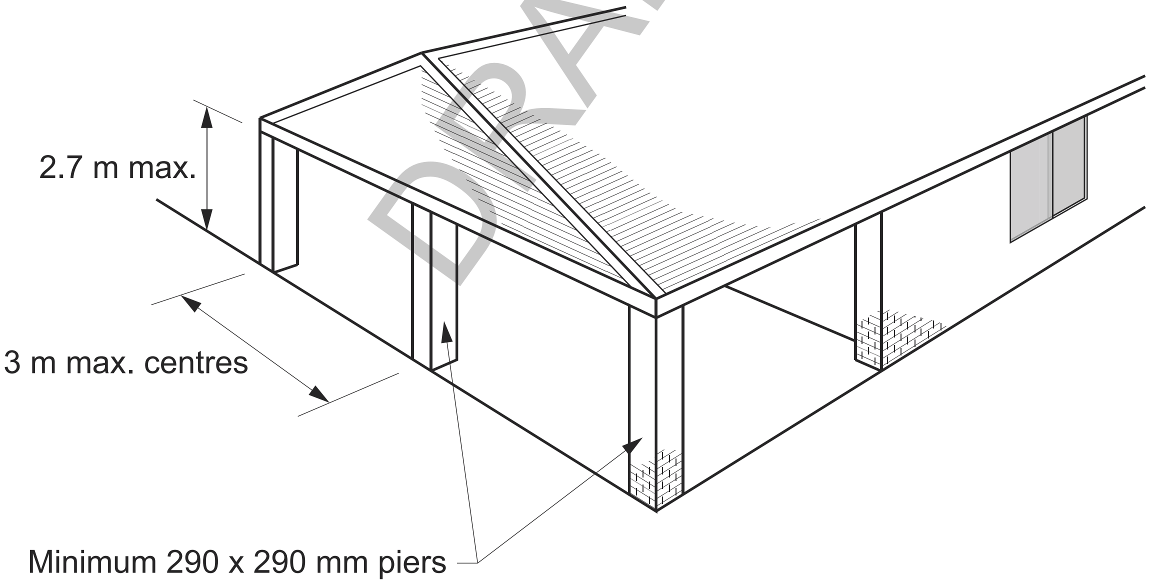
5.~~3.2~~5.2 Piers supporting carports, verandahs, porches and similar roof structures

[2019: 3.3.6.2]

Isolated piers supporting carports, verandahs, porches and similar roof structures, or vehicle access door openings, which form part of the main roof, or are attached to a wall of a Class 1 building must—

- (a) be not less than 290 x 290 mm in section; and
- (b) be not more than 2.7 m high (see ~~Figure 5.3.2~~Figure 5.5.2); and
- (c) be spaced at not more than 3 m centres (see ~~Figure 5.3.2~~Figure 5.5.2); and
- (d) provide a bearing length of not less than 150 mm for any supported members; and
- (e) comply with the relevant provisions of this Part.

Figure 5.~~3.2~~5.2: Piers under main roof



5.~~3.3~~5.3 Piers supporting tiled roofs

[2019: 3.3.6.3]

Isolated piers supporting tiled roofs must have—

- (a) a built-in 32 x 0.8 mm galvanised steel strap fixed to the roof structure that extends the full height of the pier; and
- (b) a 4.6 grade M12 galvanised steel rod which is cast into the footing when poured and looped and fixed around the galvanised steel strap *required* by (a).

5.~~3.4~~5.4 Piers supporting sheet roofs

[2019: 3.3.6.4]

Isolated piers supporting sheet roofs must have—

(a) a built-in 32 x 0.8 mm galvanised steel strap fixed to the roof structure extending the full height of the pier which is looped and fixed around a 4.6 grade 16 mm diameter galvanised steel rod cast into the footing when poured; or

(b) a 4.6 grade M16 galvanised steel rod cast into the footing, threaded at the top and extending the full height of the pier to connect to the roof structure.

5.~~3.5~~5.5 Piers for freestanding carports

[2019: 3.3.6.5]

Piers for freestanding carports must—

(a) be not less than 290 x 290 mm with the central core filled with 20 MPa concrete, or an exposure class mortar (see ~~Table 5.2.4~~Table 5.6.4) complying with ~~5.2.4~~5.6.4; and

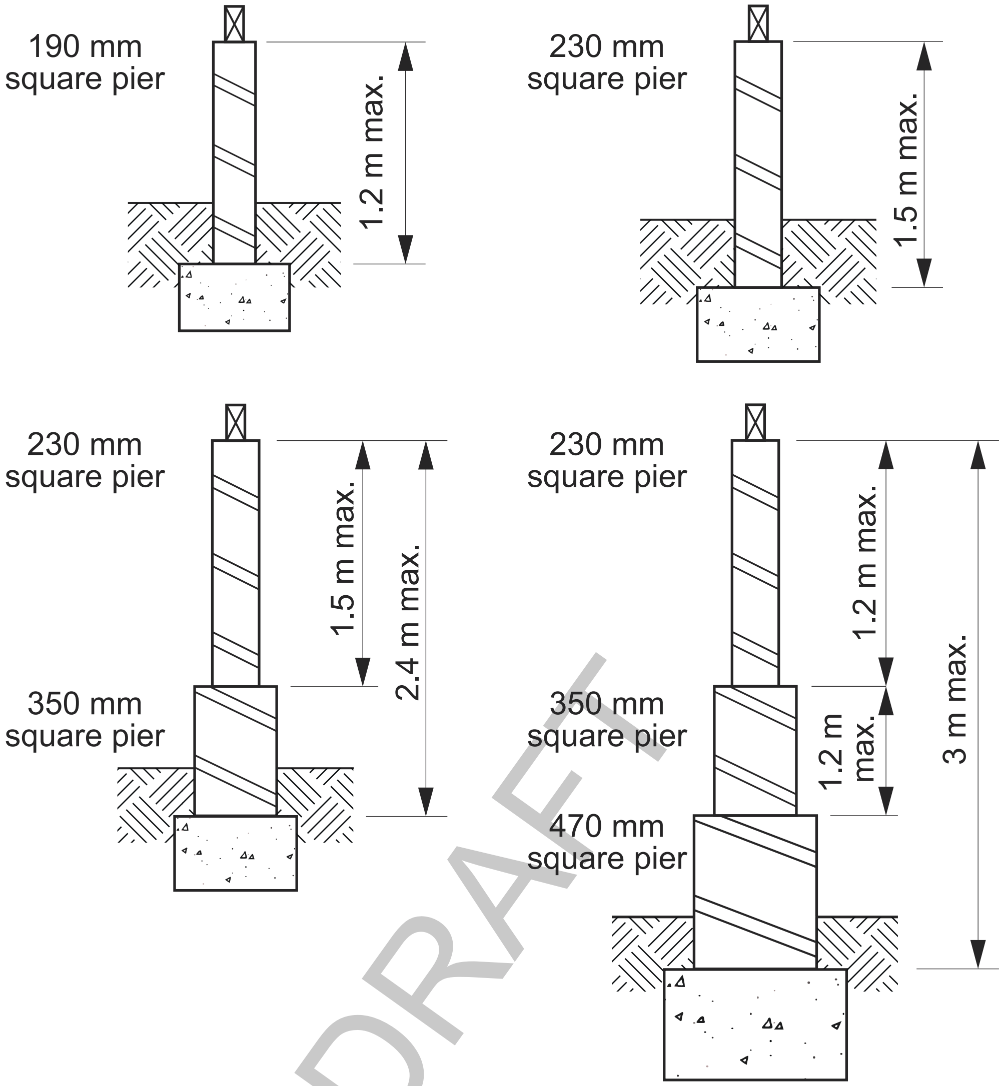
(b) have the core reinforced with one Y16 steel reinforcing rod cast into the footing and extending the full height of the pier to connect to the roof structure.

5.~~3.6~~5.6 Subfloor piers

[2019: 3.3.6.6]

Subfloor isolated piers must be a minimum of 190 x 190 mm in section and comply with ~~Figure 5.3.6~~Figure 5.5.6 for height requirements.

Figure 5.~~3.6~~5.6: Sub-floor isolated piers — maximum height and sectional details



Part 5.6 Masonry components and accessories

5.6.1 Application of Part 5.6

[New for 2022]

(1) Part 5.6 is subject to the limitations set in H1D5(6)(c)(i), (ii) and (iii).

(2) Part 5.6 need not be complied with if H1D5(6)(a) or (b) is complied with.

5.~~2.3~~6.2 Masonry units

[2019: 3.3.5.3]

(1) Masonry veneer masonry units must have a minimum characteristic unconfined compressive strength of—

(a) 3 MPa for solid or cored units; or

(b) 10 MPa for hollow units.

(2) *Cavity* masonry and single skin masonry units must have a minimum compressive strength of—

(a) 5 MPa for solid or cored units; or

(b) 10 MPa for hollow units.

(~~2~~3) Masonry ~~veneer~~*cavity* walls must have a minimum ~~veneer~~leaf thickness of 90 mm.

(~~3~~4) Subject to (~~4~~5), masonry units must be—

(a) either clay or calcium silicate brick or concrete brick or block; and

(b) classified and used in the exposure conditions appropriate to their classification as described in (~~5~~6).

(~~4~~5) Mixing of panels consisting of clay masonry units with panels consisting of concrete or calcium silicate masonry units is not permitted unless—

(a) at vertical junctions, a control joint is installed; and

(b) at horizontal junctions between panels of different materials, a slip joint using a membrane similar to that used for *damp-proof courses* is installed.

(~~5~~6) Masonry unit exposure classifications and corresponding masonry unit applications are as follows:

(a) Protected (P) masonry units are suitable for use in locations such as—

(i) internal walls; and

(ii) *external walls* that are coated or rendered; and

(iii) walls above *damp-proof courses* provided the wall is protected at the top by a roof, eaves, coping, topping or the like.

(b) General Purpose (GP) masonry units are suitable for use in all locations except those where 'Exposure class' (Exp) is *required*.

(c) Exposure class (Exp) masonry units are suitable for use in all locations including severe local conditions such as—

(i) below the *damp-proof course* in areas where walls are expected to be attacked by salts in the ground water or brickwork itself (salt attack or salt damp); and

(ii) on sea fronts where walls are exposed to attack from salt spray; and

(iii) in heavily polluted areas subject to deposition of atmospheric pollution; and

(iv) under regular cyclic freeze and thaw conditions.

Explanatory Information:

The exposure classification or durability of a masonry unit is a measure of its resistance to attack by soluble salts, either in the ground or in the atmosphere. All masonry products manufactured are classified by their durability. The majority of uses will require either an Exposure class (Exp) product or a General Purpose (GP) product.

5.~~2.4~~6.3 Mortar mixes

[2019: 3.3.5.4]

Mortar used for masonry construction must comply with AS 3700 or AS 4773 except that the mortar may be mixed by volume in the proportions stated in ~~Table 5.2.4~~Table 5.6.3.

Table 5.~~2.4~~6.3: Acceptable mortar mixes

Brick exposure classification	Mortar mix by volume Note 1 Cement: lime: sand	
	General use	Suitable for concrete masonry Note 2
Protected	1:2:9	1:0:5
General purpose	1:1:6	1:0:5
Exposure class	1:0.5:4.5	1:0:4.2

Table Notes:

1. Additives may be used provided they comply with the appropriate specified rate.
2. Mortar mixes for masonry require the use of methyl cellulose water thickener.

5.~~2.5~~6.4 Mortar joints

[2019: 3.3.5.5]

(1) Unless otherwise specified, masonry bed and perpend joints must have a nominal thickness of 10 mm.

(2) Where raked joints are used they must not be—

(a) ~~raked deeper than 10 mm; or~~

(b) used in saline environments or areas subject to heavy industrial airborne pollution~~.~~; or

(c) more than 5 mm for masonry units at least 90 mm wide; or

(d) more than 10 mm for masonry units at least 110 mm wide.

5.~~2.10~~6.5 Wall ties

[2019: 3.3.5.10]

(~~1~~) ~~Veneer wall ties must—~~

(a) ~~comply with AS/NZS 2699.1 and be—~~

(i) ~~light duty veneer ties in areas where the *design wind speed* is not more than N2; and~~

(ii) ~~medium duty ties—~~

(A) ~~in areas where the *design wind speed* is more than N2; and~~

(B) ~~where engaged piers are provided; and~~

(b) ~~be spaced and fixed in accordance with Table 5.2.10a and Table 5.2.10b; and~~

(c) ~~be protected against corrosion in accordance with Table 5.2.10c.~~

(1) Masonry wall ties must—

(a) comply with AS/~~NZS~~ 2699.1 and—

(i) for masonry veneer walls be—

(A) minimum light duty veneer ties in areas where the *design wind speed* is not more than N2; and

(B) minimum medium duty veneer ties in areas where the *design wind speed* is more than N2; and

(ii) for *cavity* masonry walls be—

(A) minimum light duty *cavity* ties in areas where the *design wind speed* is N1; and

(B) minimum medium duty *cavity* ties in areas where the *design wind speed* is more than N1; and

(iii) where non-*engaged piers* are provided, piers must be tied to walls using medium duty ties; and

(iv) for monolithic or solid masonry construction be minimum medium duty ties; and

(b) be spaced and fixed in accordance with Tables 5.6.5a, 5.6.5b and 5.6.5c (see also Figures 5.6.5a and 5.6.5b); and

(c) be protected against corrosion in accordance with Table 5.6.5d.

Table 5.~~2.10a~~6.5a: Wall tie spacings in masonry veneer

Maximum spacings	450 mm wall stud spacing	600 mm wall stud spacing
Horizontal	Maximum 450 mm centres	Maximum 600 mm centres
Vertical	Maximum ~~400~~600 mm	Maximum 400 mm

Table Notes:

Wall ties that are suitable for higher duties are also suitable for use in lower duty conditions.

Table 5.6.5b: Wall tie spacing in cavity and solid masonry

Maximum spacing	Cavity masonry	Solid or monolithic masonry
Horizontal	600 mm	400 mm
Vertical	600 mm	400 mm

Table Notes:

Wall ties that are suitable for higher duties are also suitable for use in lower duty conditions.

Table 5.~~2.10b~~6.5c: Placement of wall ties

Location	Placement of wall ties
Unsupported panel sides and edges of openings	Within 300 mm of panel side or edge
Top of veneer panels and top of panels under openings	Within 300 mm or two courses (whichever is the lesser) of the top of veneer
Bottom of veneer panel in masonry rebate sealed with liquid applied *damp-proof course*	Within 300 mm or two courses (whichever is the lesser) from the bottom of the veneer
Bottom of veneer panel supported on steel lintel	
Bottom of veneer panel in masonry rebate with membrane *damp-proof course*	In each of the first two courses
Intersection of internal and external walls	300 mm vertically
Where articulation joints occur	At both sides of the articulation joint within 300 mm from the joint
~~Engaged piers~~	~~Within 200 mm of the top of the pier~~

Table Notes:

1. Ties ~~are~~ to be embedded a minimum of 50 mm into each masonary leaf ~~fixed to the supporting frame at all regular stud positions using screws or nails~~.
2. Masonry wall ties must be installed in such a manner as to prevent moisture travelling along the tie to the inner leaf of masonry or the frame.

Table 5.~~2.10c~~6.5d: Corrosion protection for wall ties

Exposure condition	Tie specification (minimum corrosion protection)
Areas less than 1km from *breaking surf*; or less than 100 m from salt water not subject to *breaking surf*; or within heavy industrial areas.	Grade 316L stainless steel; or engineered polymer complying with the requirements of AS~~/NZS~~ 2699.1.
Areas 1km or more but less than 10km from *breaking surf*; or 100m or more but less than 1km from salt water not subject to *breaking surf*.	Sheet steel and bar ties galvanised after manufacture - 470 g/m^2 on each side; or galvanised wire ties - 470 g/m^2 coating mass; or Grade 304L stainless steel.
All other areas	Galvanised sheet steel - 300 g/m^2 coating on each side; or sheet steel ties galvanised after manufacture - 300 g/m^2 on each side.

Figure 5.6.5a: Wall tie details (lowset)

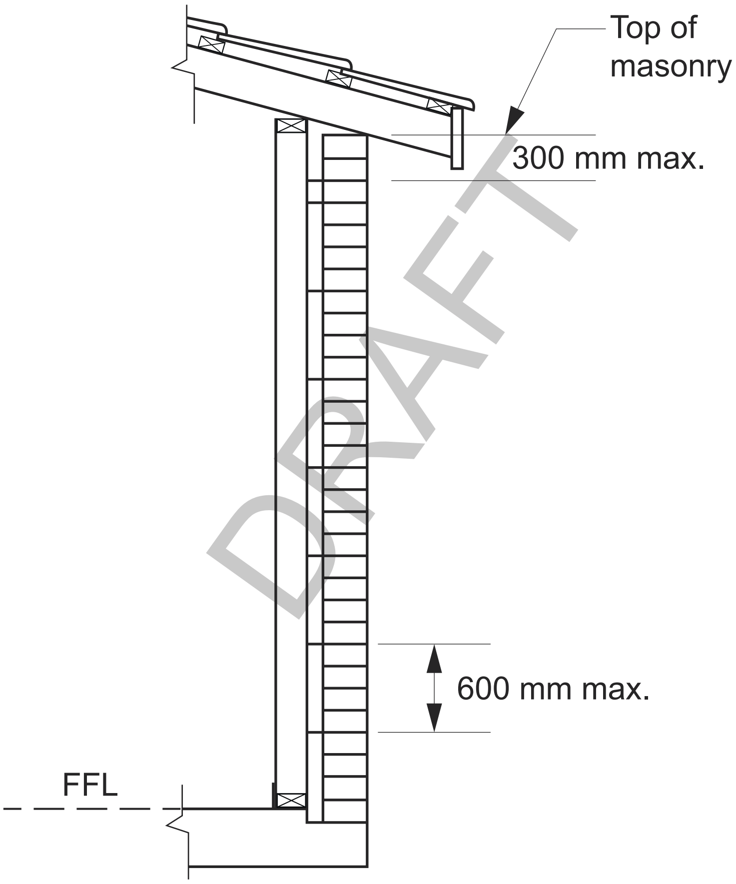
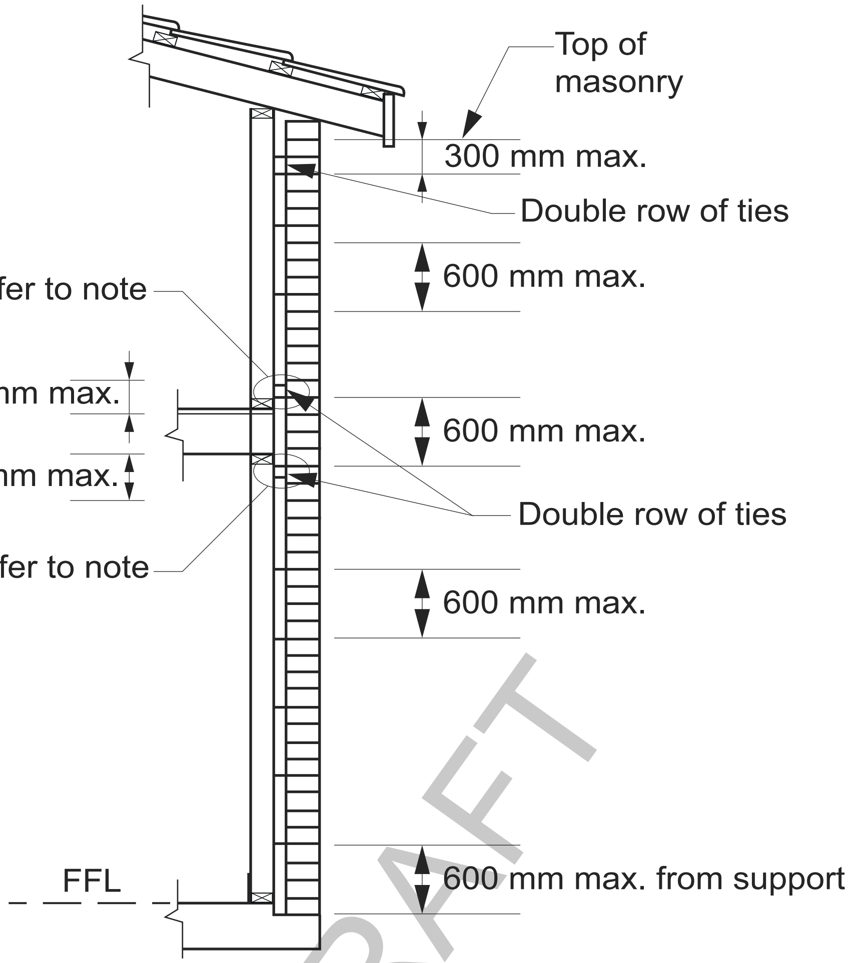


Figure 5.6.5b: Wall tie details (highset)



Explanatory Information:

Wall ties that are suitable for use in a more severe exposure condition are also suitable for use in less severe exposure conditions, i.e. stainless steel and engineered polymer ties are suitable for use in all conditions and 470g/m^2 galvanised ties can be used in all exposure conditions except the most severe.

5.6.6 Fixing straps and tie-down systems

[New for 2022]

(1) Timber door and *window* frames abutting *cavity* masonry must be—

(a) fixed with 300 mm long 32 mm x 0.8 mm kinked galvanised steel straps; and

(b) fixed to the back of frames; and

(c) set into courses not less than 150 mm at not more than 400 mm intervals.

(2) For areas with a *design wind speed* of N1 or N2 and a building width from outside wall to outside wall of not more than 10 m in the direction of the roof span (see Figure 5.6.6a), sheet metal and tiled roofs must be tied down using one of the following methods:

(a) 32 mm x 0.8 mm galvanised steel straps at not more than 1.2 m centres and corresponding with truss or rafter positions, looped around 10 mm diameter galvanised mild steel rods—

(i) built-in across the *cavity* at a course not more than 900 mm below the top of the wall; and

(ii) embedded not less than 50 mm into each leaf.

(b) 25 mm x 1 mm galvanised steel straps at not more than 1.2 m centres and corresponding with truss or rafter positions, built-in to masonry inner leaf not less than 50 mm and 900 mm below the top of the wall (see Figure

5.6.6b).

(3) Roof framing supporting tiled roofs on single leaf *unreinforced masonry* walls with piers or return walls must have—

(a) a built-in 32 mm x 0.8 mm galvanised steel strap fixed to the roof structure that extends the full height of the pier or return wall; and

(b) a 4.6 grade M12 galvanised steel rod which is cast into the footing when poured and looped and fixed around the galvanised steel strap *required* by (a) (see Figure 5.6.6c).

(4) Roof framing supporting sheet roofs on single leaf *unreinforced masonry* with piers or return walls must have—

(a) a built-in 32 mm x 0.8 mm galvanised steel strap fixed to the roof structure extending the full height of the pier or return wall which is looped and fixed around a 4.6 grade 16 mm diameter galvanised steel rod cast into the footing when poured; or

(b) a 4.6 grade M16 galvanised steel rod cast into the footing, threaded at the top and extending the full height of the pier or return wall to connect to the roof structure.

Figure 5.6.6a: **Building width**

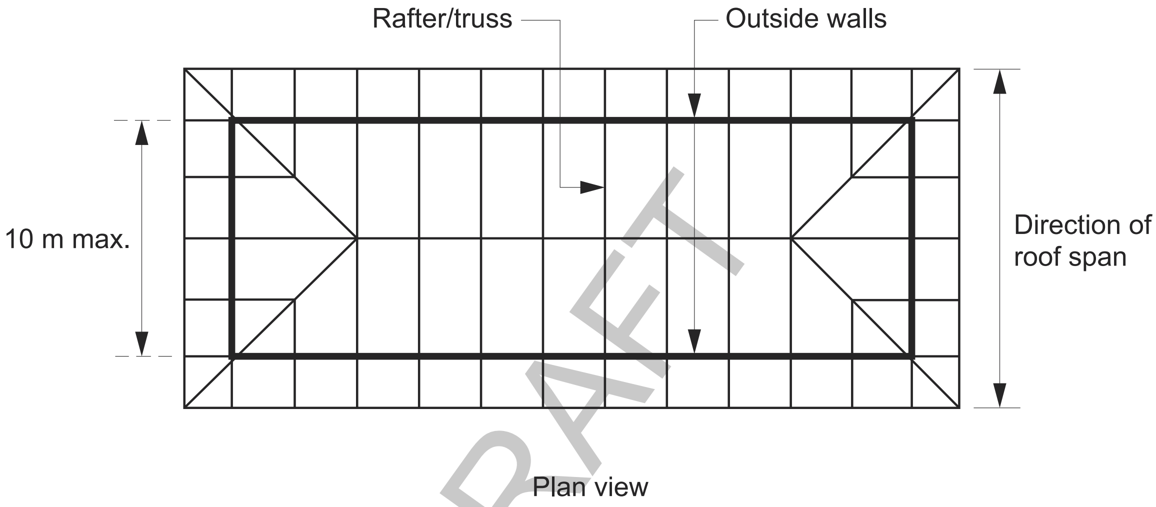


Figure 5.6.6b: Suitable tie-down strap details

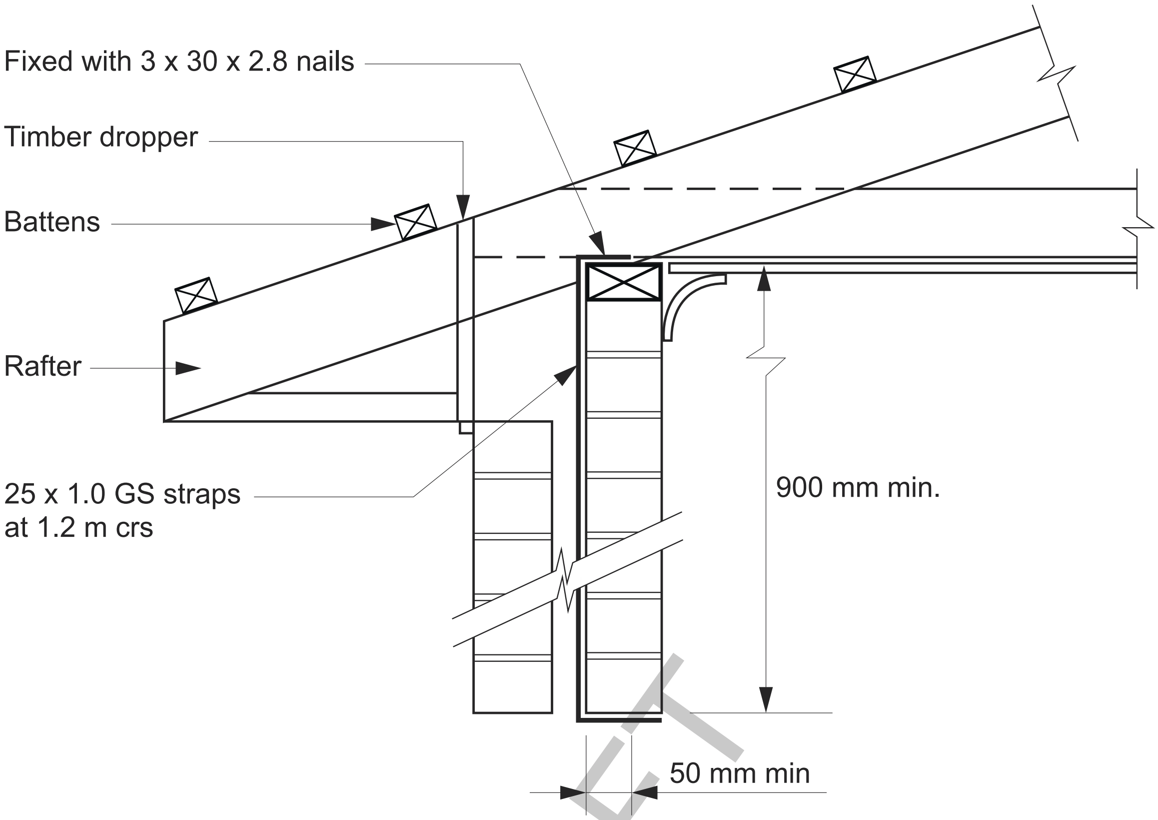
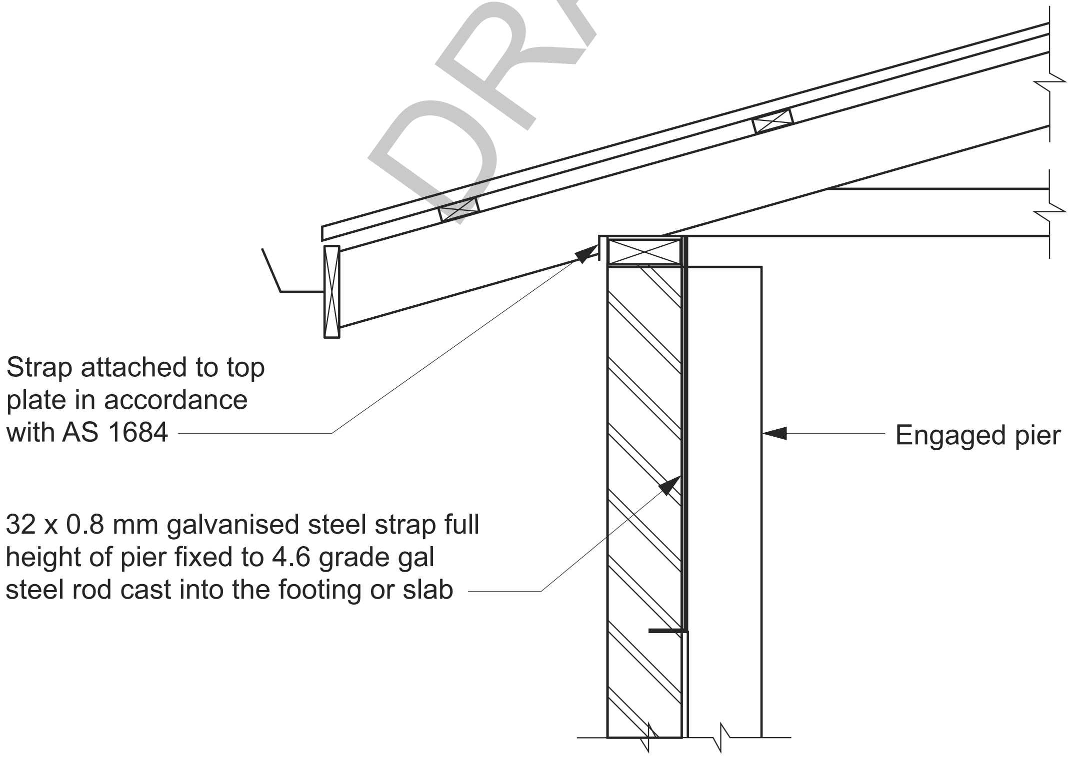


Figure 5.6.6c: Typical tie-down to single leaf unreinforced masonry



Explanatory Information:

Roof tie-down over openings greater than 1200 mm wide in masonry construction must be specifically designed in accordance with relevant material and structural design standards.

5.~~2.12~~6.7 Lintels

[2019: 3.3.5.12]

Where a lintel is *required* it must comply with the following:

(a) Steel lintels must comply with this Part or H1D6(~~4~~3).

(b) Steel lintels must—

(i) be sized in accordance with ~~Table 5.2.12a~~Table 5.6.7a; and

(ii) be installed with the long leg of lintel angle vertical; and

(iii) not carry more than a 110 mm thick veneer or otherwise be wide enough so that no more than 25 mm of masonry overhang is provided; and

(iv) not carry masonry more than 3 m in height when measured above the opening; and

(v) have a minimum bearing length at each end of the lintel of—

(A) for clear spans not more than 1 m - 100 mm; or

(B) for clear spans more than 1 m - 150 mm (See ~~Figure 5.2.12~~Figure 5.6.7); and

(i) have a minimum of three courses of masonry over openings; and

(ii) comply with the corrosion protection requirements of ~~Table 5.2.12b~~Table 5.6.7b.

Table 5.~~2.12a~~6.7a: Masonry ~~veneer~~ lintel sizes

Lintel	Maximum clear span of lintel (mm): ≤ 600 mm of masonry over opening	Maximum clear span of lintel (mm): > 600 mm of masonry over opening
Flat 75 x 8	700	700
Flat 100 x 10	900	900
Angle 90 x 90 x 6EA	3000	2650
Angle 90 x 90 x 8EA	3200	2800
Angle 100 x 100 x 6EA	3350	2900
Angle 100 x 100 x 8EA	3600	3040
Angle 150 x 90 x 8UA	4200	3850

Table Notes:

The lintels described in this Table must be not less than grade 300 MPa in accordance with AS 4100.

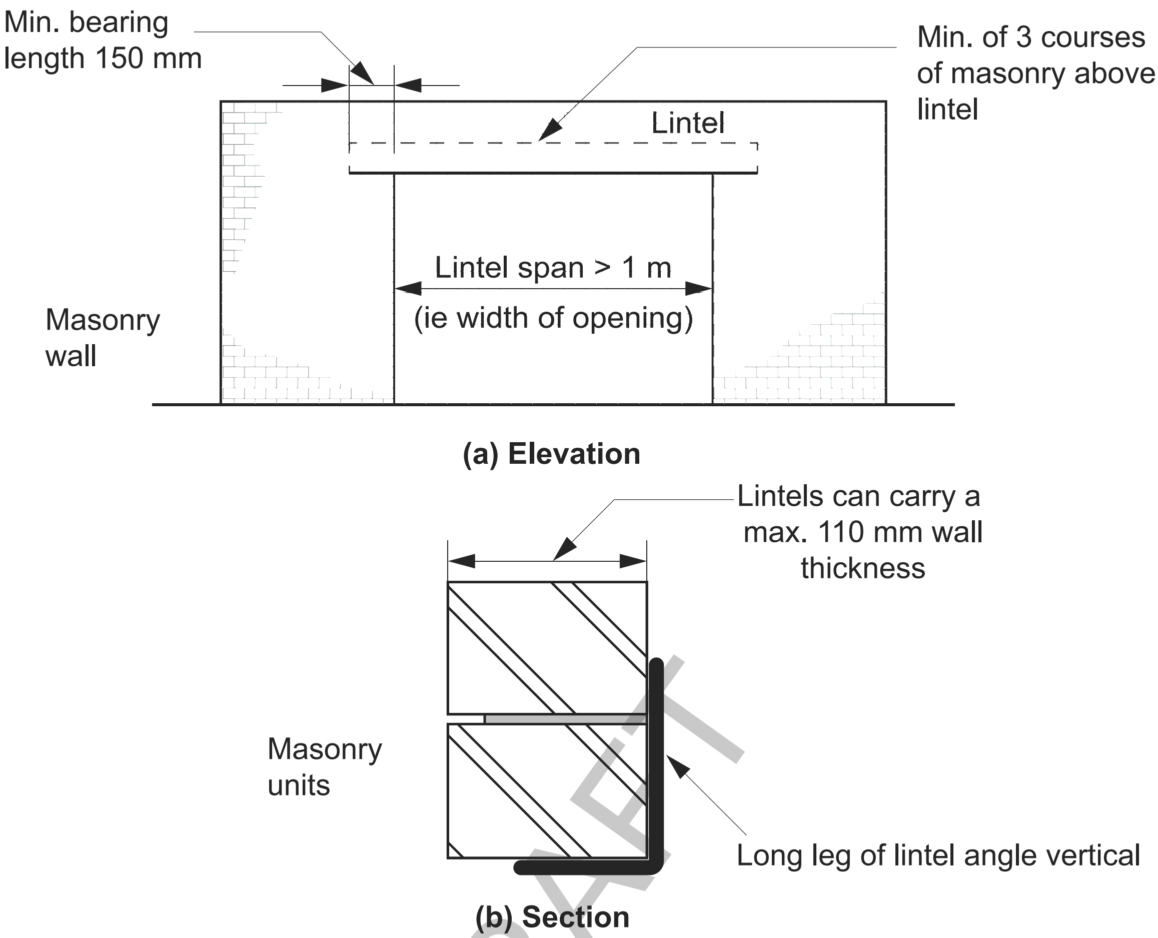
Table 5.~~2.12b~~6.7b: Corrosion protection – Lintels

Durability class of lintel in accordance with AS~~/NZS~~ 2699.3 Note 1	Material or protective requirements in accordance with AS~~/NZS~~ 2699.3 Note 1
R1, R2	Hot dip galvanised with a minimum average coating thickness of 300 g/m^2; or stainless steel 316L
R3	Hot dip galvanised with a minimum average coating thickness of 600 g/m^2; or stainless steel 316L
R4	Stainless steel 316L

Table Notes:

1. AS~~/NZS~~ 2699.3 contains information on the corrosivity category locations in Australia and provides a method for determining coating thickness for lintels.
2. Additional decorative coatings can be applied, but must not be considered for the purpose of satisfying the requirements of this Table.
3. Any lintel with a coating that is modified, i.e. by cutting, welding, or where damaged, must have the coating restored to provide an equivalent level of protection provided by the original coating.

Figure 5.~~2.12~~6.7: Lintel installation



5.~~2.13~~6.8 Vertical articulation joints

[2019: 3.3.5.13]

(1) Vertical articulation joints must be provided in masonry veneer walls in accordance with (2), except in walls constructed on *sites* where the soil classification is A or S (see ~~Part 4.4.1~~4.2.2).

(2) Articulation joints between masonry elements must have a width of not less than 10 mm and be provided (see ~~Figures 5.2.13a~~Figures 5.6.8a and~~,~~ ~~5.2.13b~~5.6.8b~~ and 5.2.13c~~)—

- (a) in straight, continuous walls ~~having no openings~~ with openings less than 900 mm x 900 mm or walls without openings - at not more than 6 m centres and within 4.5 m, but not closer than 470 mm of all corners; and
- (b) in straight, continuous walls with openings more than 900 mm x 900 mm - at not more than 5 m centres and located so that they are not more than 1.2 m away from openings; and
- (c) where the height of the wall changes by more than 20% - at the position of change in height; and
- (d) where a wall changes in thickness; and
- (e) at control or construction joints in footings or slabs; and
- (f) at junctions of walls constructed of different masonry materials.

(3) Articulation joints must not be constructed adjacent to arched openings.

(4) Articulation joints must either be filled with flexible sealant that is supported during installation by—

- (a) a compressible foam or polystyrene filler~~ and a flexible sealant (see Figure 5.2.13c)~~(see Figures 5.6.8d and 5.6.8e); or
- (b) a purpose made backer rod ~~and a flexible sealant~~ (see ~~Figure 5.2.13d~~Figures 5.6.8c, 5.6.8d, 5.6.8e and 5.6.8f).

Figure 5.~~2.13a~~6.8a: Example of vertical articulation joint locations in plan view

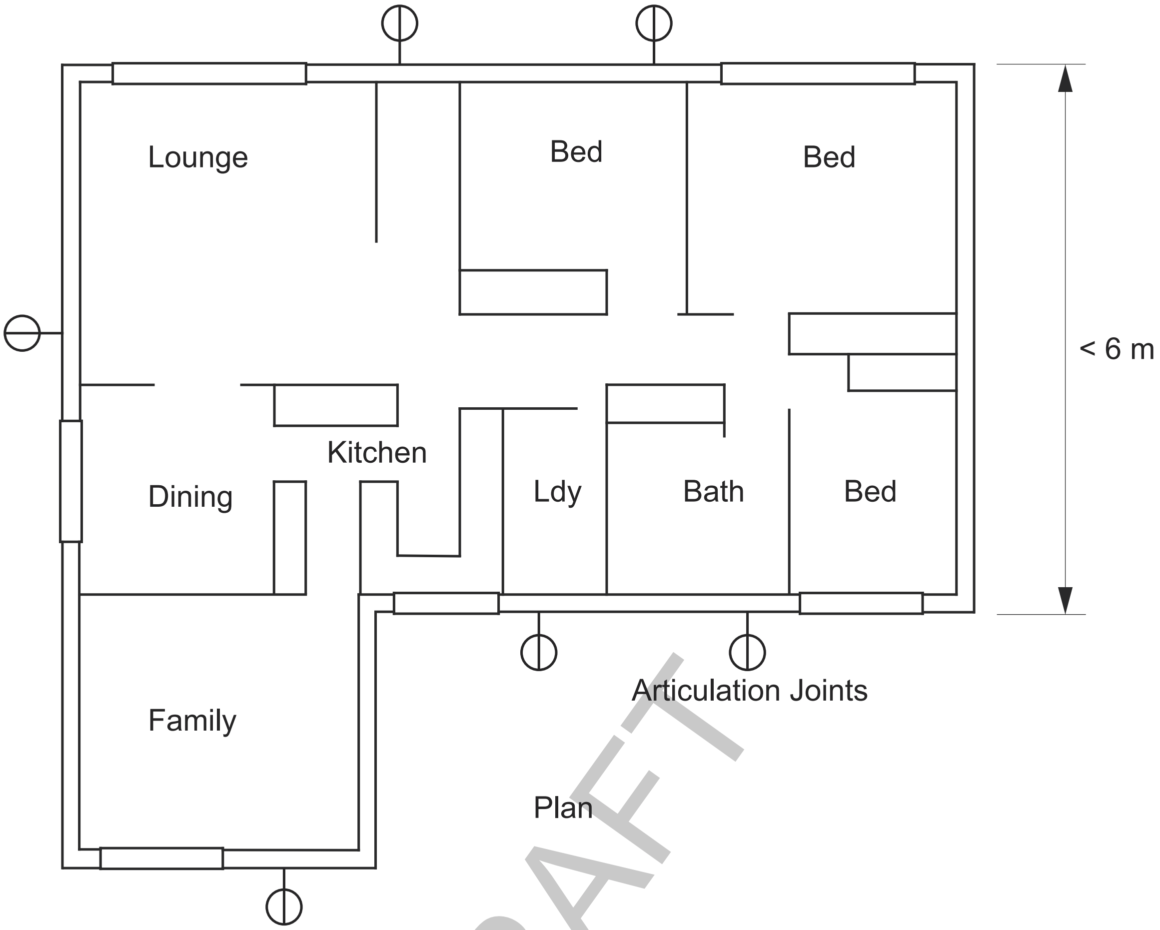


Figure 5.~~2.13b~~6.8b: Vertical articulation joints

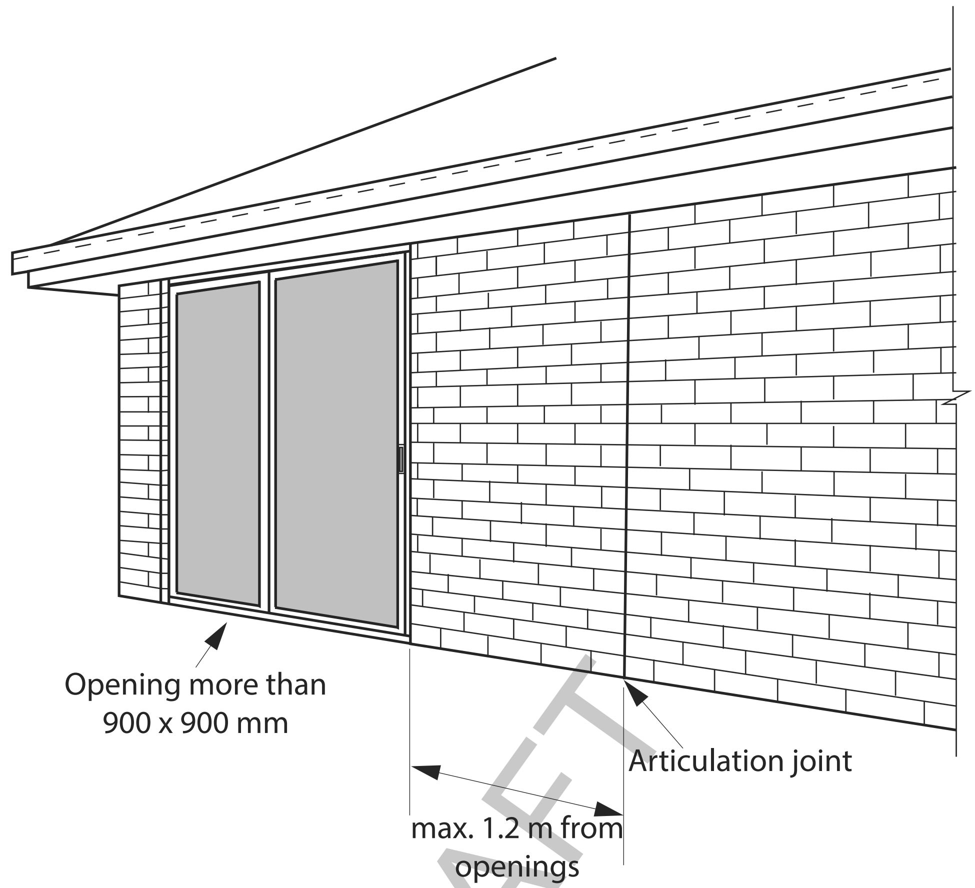


Figure 5.~~2.13c~~6.8c: Articulation joint with backer rod and sealant—single skin masonry and masonry veneer walls

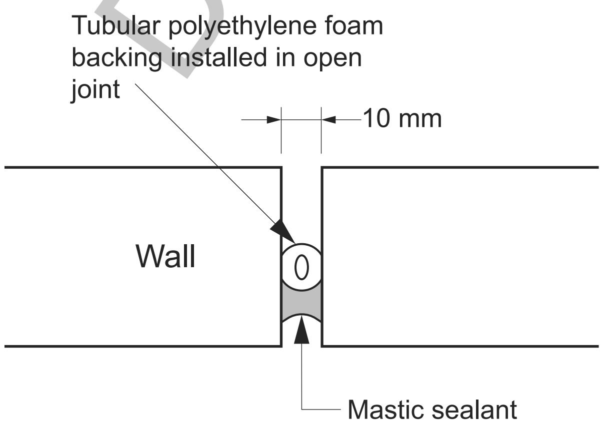


Figure 5.~~2.13d~~6.8d: Articulation joint in unreinforced single leaf masonry wall with compressed foam

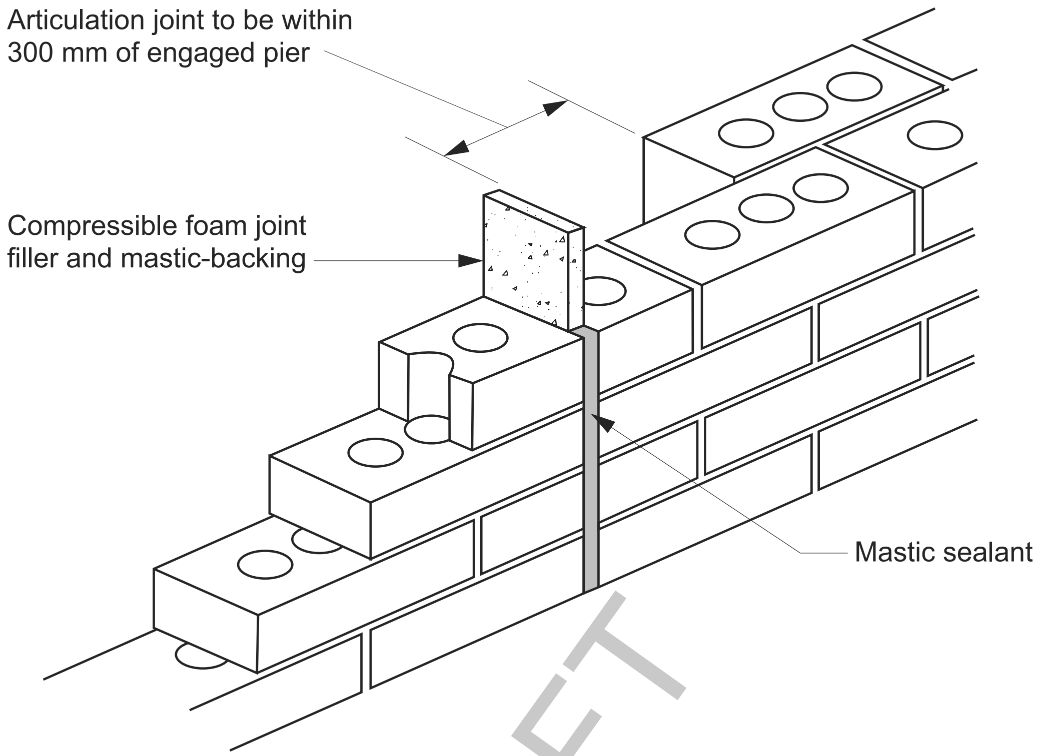


Figure 5.6.8e: Articulation joint in unreinforced masonry veneer wall with compressed foam

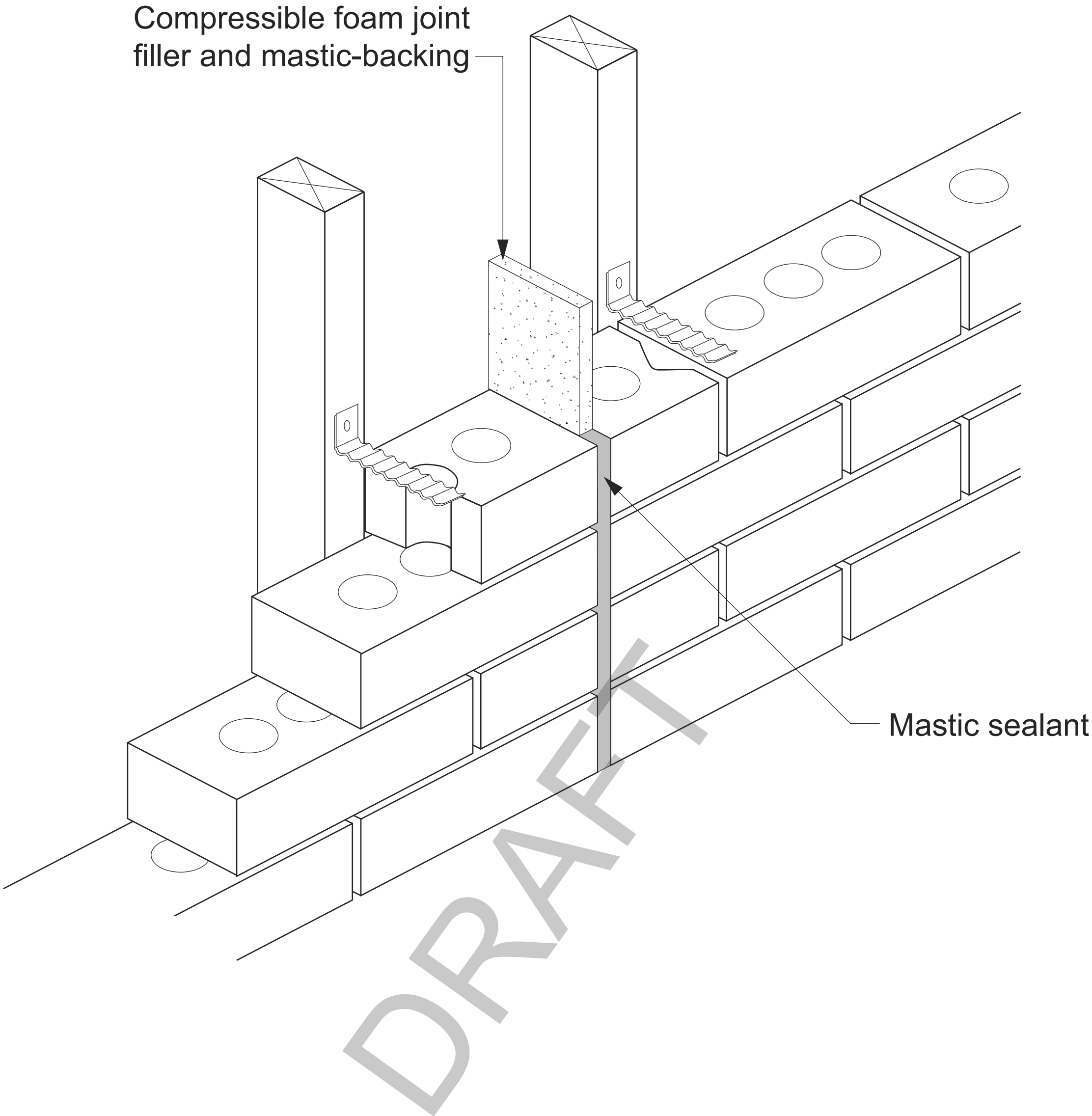
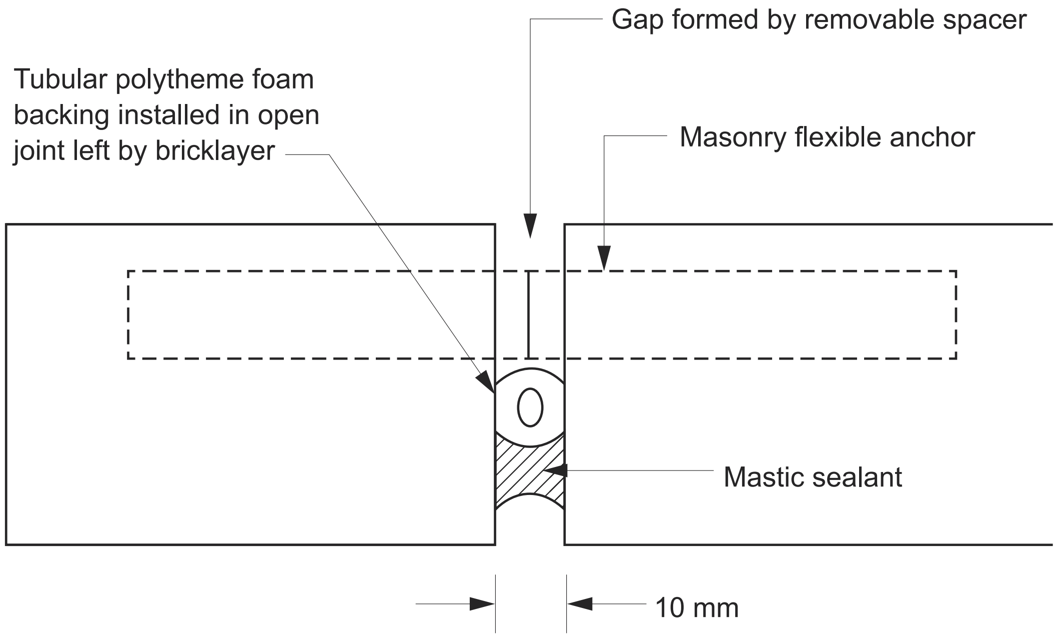
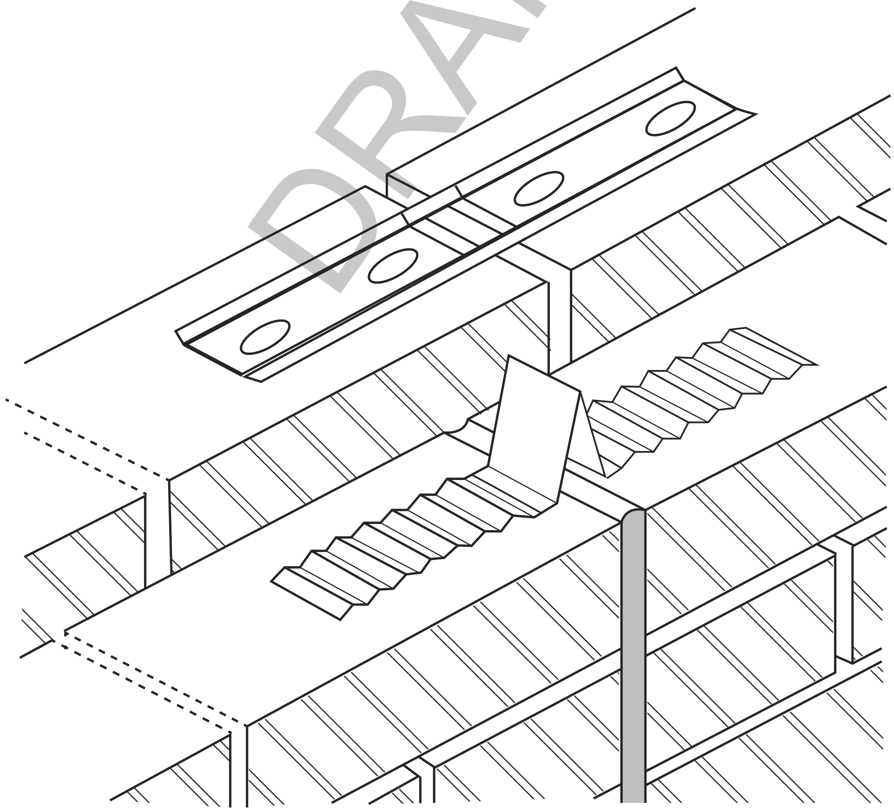


Figure 5.6.8f: Articulation joint in cavity masonry wall



(a) Backer rod joint detail



(b) Cavity wall extendible anchors

Explanatory Information:

For the purposes of ~~5.2.13~~5.6.8, the vertical articulation joint also performs the function of a contraction or expansion joint.

Part 5.7 Weatherproofing of masonry

5.7.1 Application of Part 5.7

[New for 2022]

(1) Part 5.7 applies subject to the limitation set out at H2D4(4)(c).

(2) Part 5.7 need not be complied with H2D4(4)(a) or (b) is complied with.

5.~~2.6~~7.2 Cavities

[2019: 3.3.5.6]

(~~1~~) ~~The clear width of a cavity between the masonry veneer and the exterior face of the supporting frame must be not less than 25 mm wide and where the masonry veneer is constructed on a slab-on-ground, the cavity must be drained to the outside in accordance with 5.2.9.~~

(1) For masonry veneer, the clear width of a *cavity* between the masonry veneer and the exterior face of the supporting frame must not be—

- (a) less than 25 mm wide; and
- (b) more than 75 mm wide.

(2) For *cavity* masonry, the clear width of a *cavity* between the inner and outer masonry leaves must not be—

- (a) less than 35 mm; and
- (b) more than 75 mm.

(3) Where masonry veneer and *cavity* masonry in (1) and (2) are constructed on a slab-on-ground, the *cavity* must be drained outside in accordance with 5.7.5.

(4) The exterior masonry leaf must not overhang more than 15 mm past the edge of the slab.

Explanatory Information:

The 25 mm clear width of the *cavity* needs to be maintained regardless of any wall membranes, sheet bracing or services installed to the supporting frame.

Where mullions are located within a *cavity*, a vertical *damp-proof course* must be placed between the outer masonry leaf and the mullion to prevent moisture penetration.

5.~~2.7~~7.3 Damp-proof courses and flashings – material

[2019: 3.3.5.7]

Damp-proof courses and *flashings* must consist of—

- (a) a material that complies with AS/NZS 2904; or
- (b) embossed black polyethylene film of high impact resistance and low slip, with a nominal thickness of 0.5 mm prior to embossing, and comply with clause 7.6 of AS/NZS 2904; or
- (c) polyethylene coated metal, that has an aluminium core of not less than 0.1 mm thick, is coated both sides with bitumen adhesive enclosed in polyethylene film of not less than 0.1 mm thick on each face, and has a nominal total thickness of not less than 0.5 mm prior to embossing; or
- (d) bitumen impregnated materials of not less than 2.5 mm thick, that comply with clause 7.5 of AS/NZS 2904; or
- (e) termite sheet materials complying with Part 3.4 (with no penetrations) serving the purpose of a *damp-proof course* and/or *flashing* that is continuous through the wall or pier.

5.~~2.8~~7.4 Damp-proof courses and flashings – installation

[2019: 3.3.5.8]

(1) *Damp-proof courses* and *flashings* must be—

(a) located so as to form a continuous damp-proofing barrier—

(i) around the bottom perimeter of walls where constructed on a concrete slab; and

(ii) in walls and piers below suspended floors; and

(iii) where a masonry wall passes through a roof; and

(iv) where a roof abuts an external masonry wall; and

(v) to the bottom and tops of *windows* and doors and the like in accordance with (3), except a *damp-proof course* or a *flashing* need not be provided to the top of a *window* or door where the opening is protected by an eave of a width more than 3 times the height of the masonry veneer above the opening; and

(b) continuous through the wall or pier and be visible from the outside face of the wall.

(2) The location of a *damp-proof course* or *flashing* serving as a *damp-proof course*, must be not less than—

(a) 150 mm above the adjacent ground level; or

(b) 75 mm above the finished surface level of adjacent paved, concreted or landscaped areas that slope away from the wall; or

(c) 50 mm above finished paved, concreted or landscaped areas complying with 3.3.3(b)(ii) and protected from the direct effects of the weather by a carport, verandah or the like; or

(d) in *low rainfall intensity areas*—

(i) 15 mm above finished paved, concreted or landscaped areas; or

(ii) 50 mm above finished paved, concreted or landscaped areas if the *damp-proof course* is protected from the direct effects of the weather by a carport, verandah or the like.

(3) Sill and head *flashings* serving openings must be—

(a) installed so that the *flashing* extends not less than 150 mm beyond the reveals on each side of the opening; and

(b) located not more than—

(i) one course below the sill brick course; and

(ii) 300 mm above the opening; and

(c) turned up in the *cavity* not less than 150 mm above the opening; and

(d) embedded not less than 30 mm into ~~the masonry veneer; and~~—

(i) for masonry veneer, the masonry leaf; and

(ii) for *cavity* masonry, the outer masonry leaf; and

(e) attached to the *window* or wall framing.

5.~~2.9~~7.5 Weepholes

[2019: 3.3.5.9]

(1) Except where excluded by (2), open perpend joints (weepholes) must be created in the course immediately above any *flashing* (including above any *damp-proof course* acting as a *flashing*) and be—

(a) a minimum of 50 mm in height, by the width of the vertical mortar joint; and

(b) at not more than 1.2 m centres; and

(2) Weepholes are not *required* in the following locations:

(a) Where head openings are less than 1.2 m wide.

(b) Beneath *window* and door sills.

5.7.6 Weatherproofing for single leaf masonry walls

[New for 2022]

(1) A *waterproof* coating material must be applied to all external single skin masonry walls in accordance with the following:

(a) The coating must extend from the upper most exposed part of the wall—

(i) to a level adjacent to the internal finished floor level, if the external masonry wall leaf overhangs the edge of the slab by not less than 10 mm; or

(ii) 50 mm below the internal floor level if no edge overhang is provided to the blockwork.

(b) Acceptable external *waterproof* finishes are—

(i) three coats of 100% acrylic based exterior quality gloss paint; or

(ii) one complete coat of cement based paint and two coats of 100% acrylic based exterior quality gloss paint; or

(iii) clear water repellent, provided the wall is protected by a roof overhang.

(2) *Windows* must be installed in accordance with Figure 5.7.6a.

(3) A *damp-proof course*, vapour barrier or damp-proofing membrane must be installed in accordance with Figure 5.7.6b.

Figure 5.7.6a: Typical window installation for single skin masonry

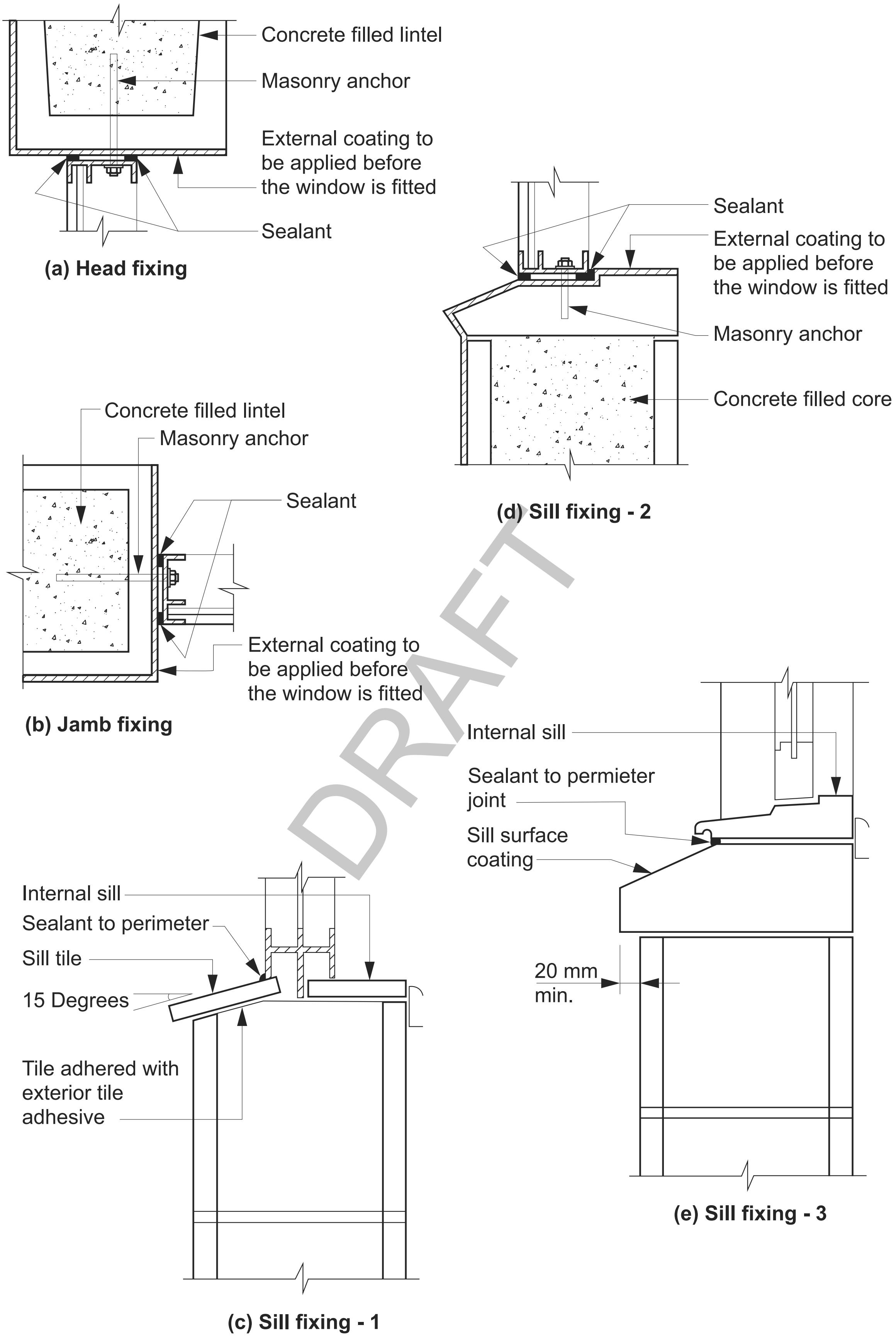
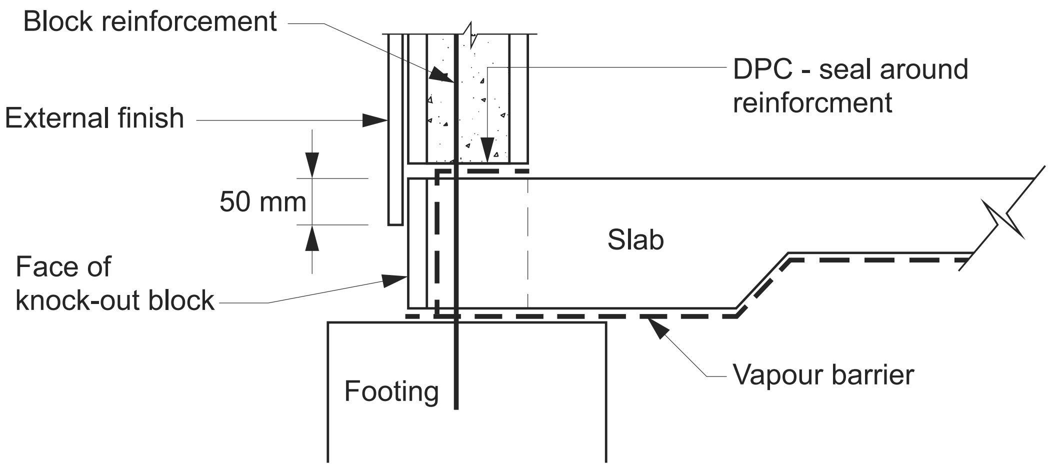
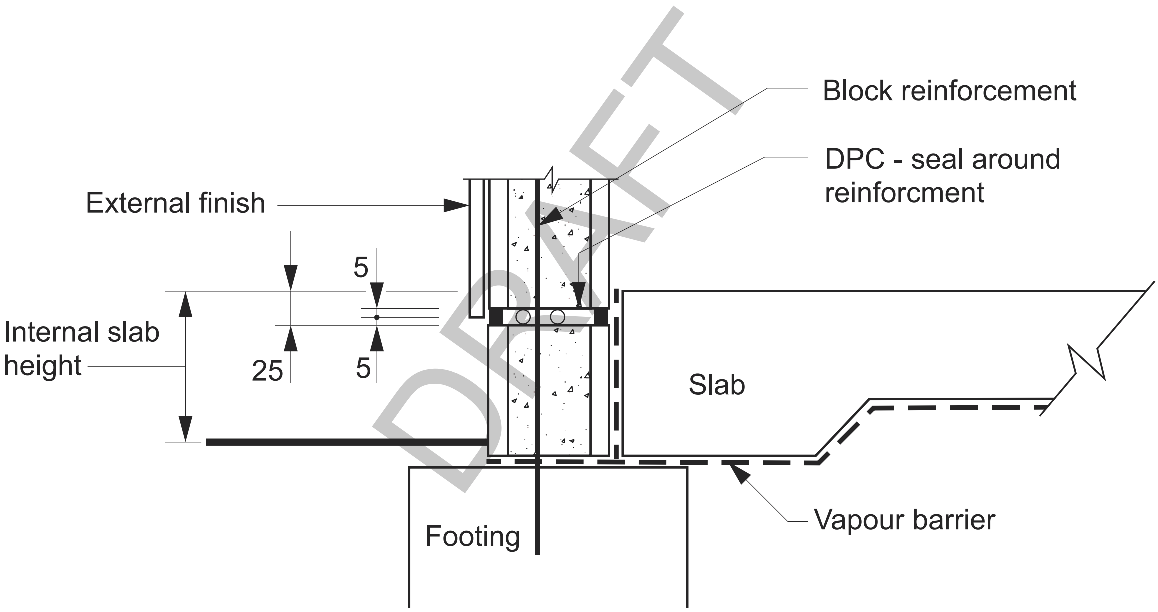


Figure 5.7.6b: Typical damp-proof course and weatherproofing detail for single skin masonry



(a) Arrangement A



(b) Arrangement B

6 Framing

Part 6.1 Scope and application of Section 6

6.1.1 Scope

[New for 2022]

(1) This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for—

  (a) subfloor ventilation (see Part 6.2); and

  (b) structural steel members (see Part 6.3).

(2) For other framing provisions not included in this Section of the ABCB Housing Standard, refer to the following *Deemed-to-Satisfy Provisions* in NCC Volume Two:

  (a) Steel framing (see H1D6(2)).

  (b) Timber framing (see H1D6(3)).

  (c) Use of structural software (see H1D6(6)).

Explanatory Information:

Part 6.2 applies to the subfloor space of all suspended floors of a building or deck, including but not limited to, timber and steel-framed subfloors and suspended concrete slabs.

6.1.2 Application

[New for 2022]

The application of Section 6 of the ABCB Housing Provisions is subject to the following:

  (a) The Governing Requirements of NCC 2022 Volume Two.

  (b) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 6 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practices for Parts 3.4.1 and 3.4.4 of NCC 2019 Volume Two.

NCC 2019 Volume Two did not include an acceptable construction practice for Parts 3.4.2 or 3.4.3.

Part 6.2 Subfloor ventilation

6.2.1 Subfloor ventilation

[2019: 3.4.1.2]

(1) Subfloor spaces must—

(a) be provided with openings in *external walls* and internal subfloor walls in accordance with Table 6.2.1a for the climatic zones given in Figure 6.2.1a; and

(b) have clearance between the ground surface and the underside of the lowest horizontal member in the subfloor in accordance with Table 6.2.1b (see Figure 6.2.1b and Figure 6.2.1c).

(2) In addition to (1), a subfloor space must—

(a) be cleared of all building debris and vegetation; and

(b) have the ground beneath the suspended floor graded in accordance with 3.3.3; and

(c) contain no dead air spaces; and

(d) have openings evenly spaced as far as practicable (see Figure 6.2.1d); and

(e) have openings placed not more than 600 mm in from corners.

(3) In double leaf masonry walls, openings specified in (1) must be provided in both leaves of the masonry, with openings being aligned to allow an unobstructed flow of air (see Figure 6.2.1d).

(4) Openings in internal subfloor walls specified in (1) must have an unobstructed area equivalent to that *required* for the adjacent external openings (see Figure 6.2.1d).

(5) Where the ground or subfloor space is excessively damp or subject to frequent flooding, in addition to the requirements of (1) to (4)—

(a) the subfloor ventilation *required* in (1) must be increased by 50%; or

(b) the ground within the subfloor space must be sealed with an impervious membrane; or

(c) subfloor framing must be—

(i) where above ground — above ground durability Class 1 or 2 timbers or H3 preservative treated timbers in accordance with AS 1684.2, AS 1684.3 or AS 1684.4; or

(ii) where in-ground — in-ground durability Class 1 or 2 timbers or H5 preservative treated timbers in accordance with AS 1684.2, AS 1684.3 or AS 1684.4; or

(iii) steel in accordance with NASH Standard ‘Residential and Low-Rise Steel Framing’ Part 2.

Table 6.2.1a: Subfloor openings

Climatic zone (see Figure 6.2.1a)	Minimum aggregate subfloor ventilation openings with no membrane (mm^2/m of wall)	Minimum aggregate subfloor ventilation openings with ground sealed with impervious membrane (mm^2/m of wall)
A	2000	1000
B	4000	2000
C	6000	3000

Table Notes:

In situations where openings in *external walls* and internal subfloor walls, including *separating walls*, are not able to be provided, additional measures must be provided to ensure that the overall level of ventilation of the subfloor space is maintained. This may include measures similar to those in 6.2.1(5) i.e. providing durability class timbers, or having the ground sealed in the subfloor space with an impervious membrane.

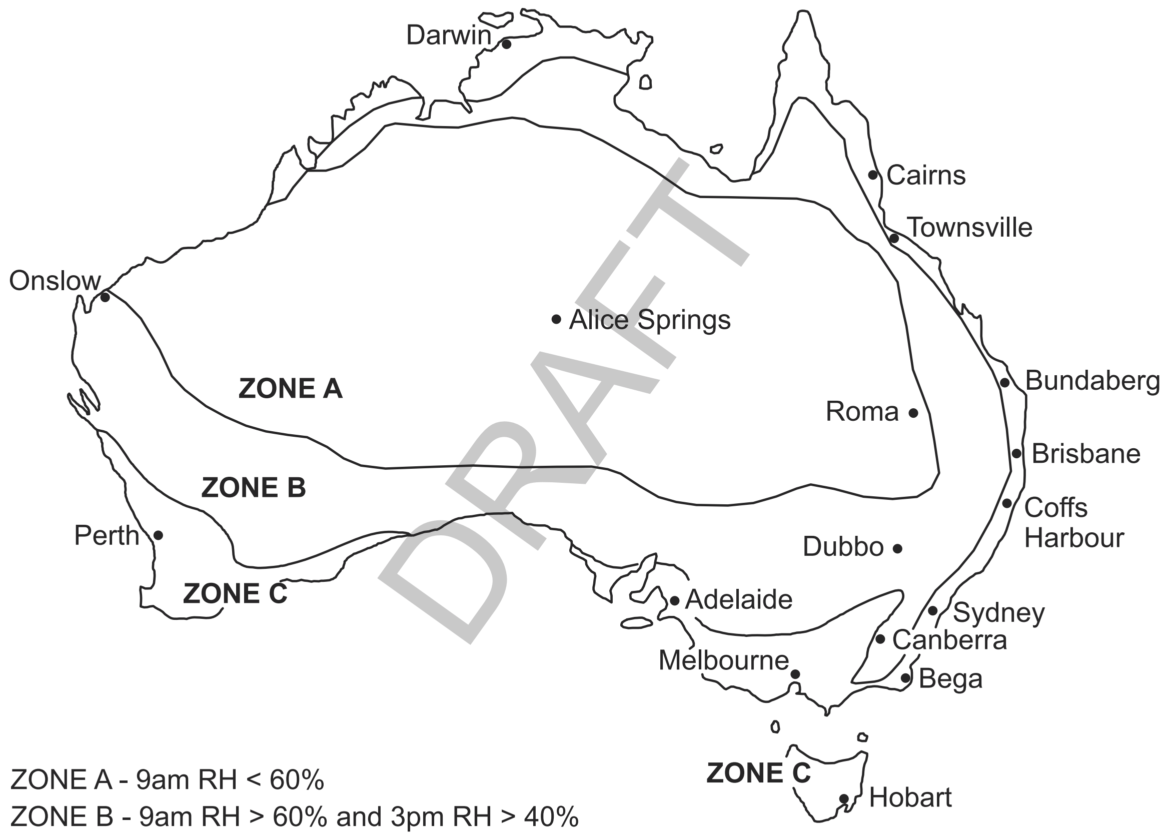
Table 6.2.1b: Ground clearance

Climatic zone (see Figure 6.2.1a)	Minimum ground clearance height where termite inspection or management system is not *required* (mm)	Minimum ground clearance height where termite inspection is *required* (mm)
A, B and C	150	400

Table Notes:

1. 400 mm clearance *required* only where termite management systems are installed that need to be inspected (see Part 2.2.4).
2. On sloping *sites* the 400 mm clearance *required* by 1 may be reduced to 150 mm within 2 m of *external walls* in accordance with Figure 6.2.1b.

Figure 6.2.1a: Climatic zones based on relative humidity



ZONE A - 9am RH < 60%
ZONE B - 9am RH > 60% and 3pm RH > 40%
ZONE C - 9am RH > 70% and 3pm RH > 60%
RH = Relative Humidity

Figure 6.2.1b: **Subfloor clearance requirements**

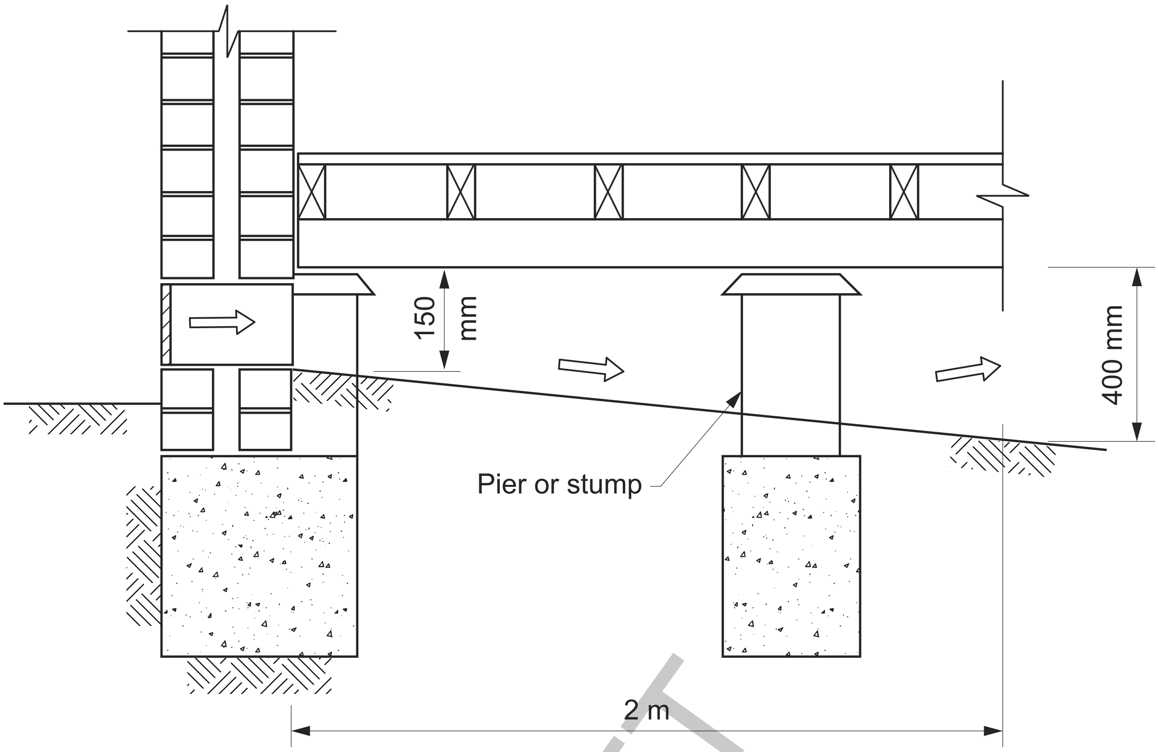


Figure Notes:

See notes to Tables 6.2.1a and 6.2.1b.

Figure 6.2.1c: **Subfloor clearance requirements – detail**

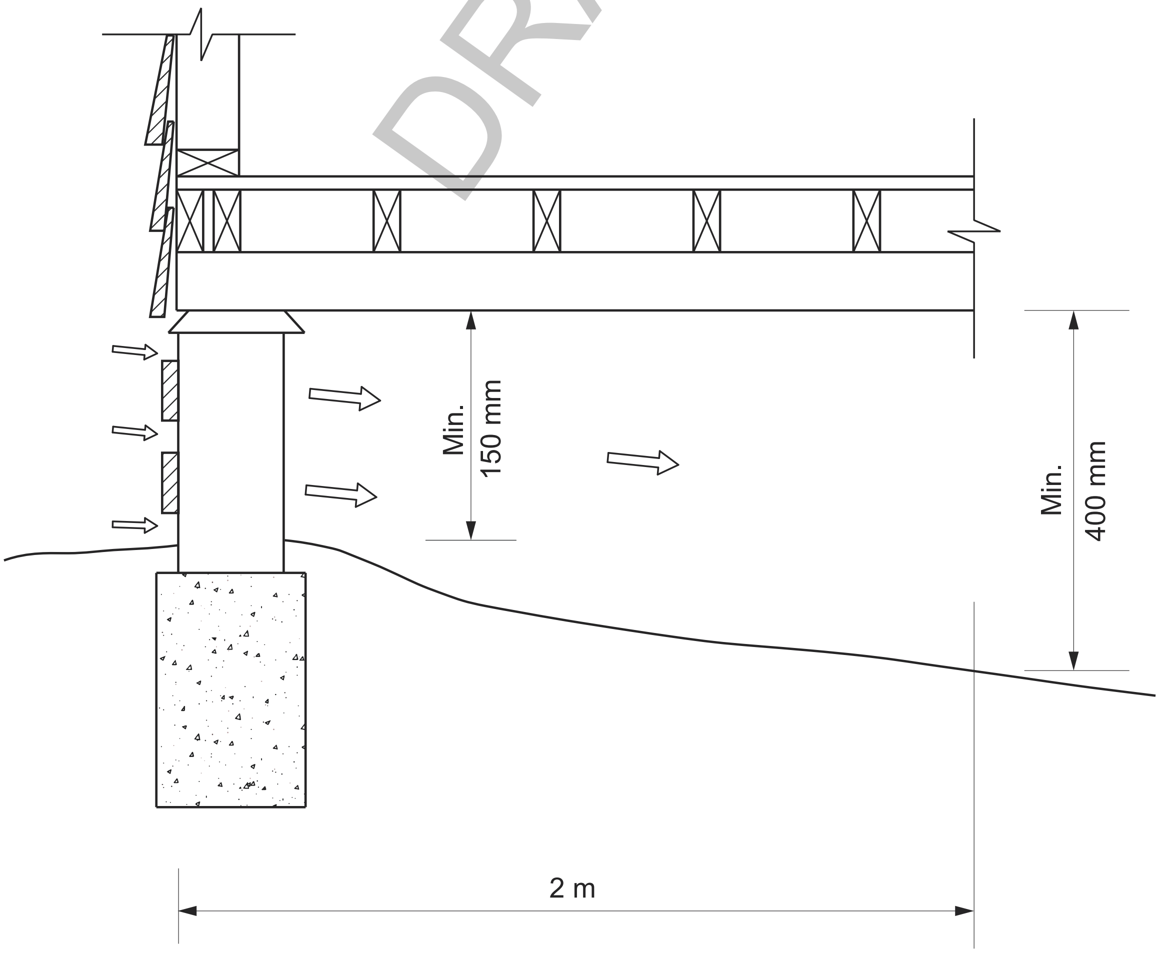
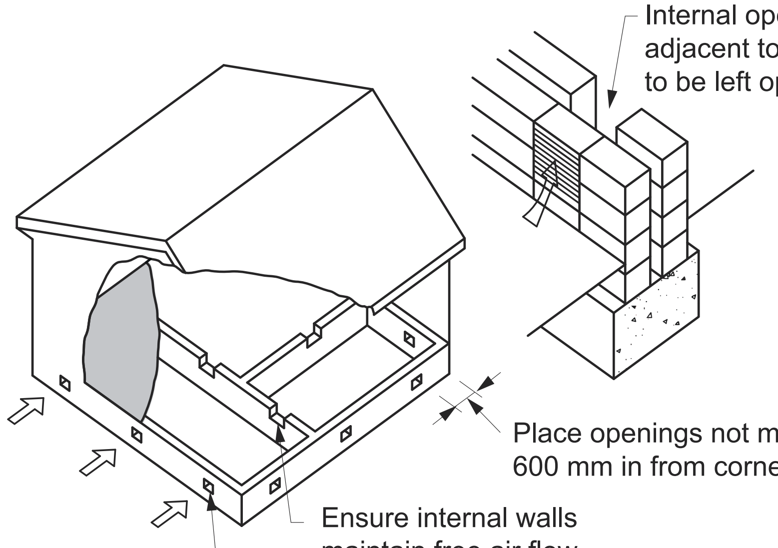


Figure Notes:

See notes to Tables 6.2.1a and 6.2.1b.

Figure 6.2.1d: Typical subfloor ventilation details — typical cross ventilation of subfloor area



Explanatory Information:

Subfloor ventilation is cross ventilation of the subfloor space between the underside of the subfloor and the ground surface under a building.

Ground moisture rising into or entering the subfloor space can create a damp environment which encourages timber rot, fungus growth and the potential for termite activity. Subfloor ventilation increases air flow, reducing any damaging water vapour in the subfloor space.

Factors that can affect achieving satisfactory levels of subfloor ventilation include height above ground, prevailing breezes (air transfer), differential temperature and humidity between the subfloor and the external environment and good building practice.

The amount of subfloor ventilation *required* for a building is related to the relative humidity likely to be encountered in that location. Figure 6.2.1a shows three broad climatic zones based on the prevailing relative humidity and includes a description of the relative humidity conditions which define each zone. If reliable weather data is available, these descriptions may be useful in determining which zone a particular location is in.

The zones shown in Figure 6.2.1a were determined by analysis of the average relative humidity at 9 am and 3 pm in January and July. The season with the highest relative humidity is used. Generally this will be July for southern Australia and January for northern Australia.

Table 6.2.1a and Table 6.2.1b specify the minimum amount of subfloor ventilation openings and height of subfloor framing members above ground level for the three climatic zones illustrated in Figure 6.2.1a. The table allows subfloor ventilation rates to be halved if the ground within the subfloor space is sealed by an impervious membrane because humidity levels in the space will not be affected by moisture from the soil.

Clause 6.2.1(5) specifies additional requirements for preventing deterioration of subfloor members where the ground or subfloor space is excessively damp, as would occur in areas with high water tables, poor drainage or in areas frequently affected by flooding or water inundation.

Part 6.3 Structural steel members

6.3.1 Application of Part 6.3

[New for 2022]

(1) Part 6.3, other than clause 6.3.4, applies subject to the limitations set out at H1D6(7).

(2) Part 6.3 need not be complied with if H1D6(6)(a) or (b) are complied with.

6.3.2 Structural steel members

[2019: 3.4.4.2]

(1) Structural steel members may be used as follows:

(a) Bearers supporting a timber floor or non-*loadbearing* stud wall — in accordance with ~~Figure 6.3.2a, Table 6.3.2a and Table 6.3.2b.~~6.3.3.

(b) Strutting beams supporting roof and ceiling loads — in accordance with ~~Figure 6.3.2b and Table 6.3.2c to Table 6.3.2d.~~6.3.4.

(c) Lintels supporting roof, ceiling, frame and timber floor — in accordance with ~~Figure 6.3.2c and Table 6.3.2e to Table 6.3.2f.~~6.3.5.

(d) Columns — in accordance with ~~6.3.3.~~6.3.6.

(2) Structural steel members in (1)(a), (b) and (c) must have a minimum nominal yield strength of 250 MPa.

(3) The yield strength of structural steel members in (1)(d) is nominated in 6.3.6.

(~~2~~4) Structural steel members described in this Part must be protected against corrosion in accordance with ~~6.3.4.~~6.3.9.

(~~3~~) ~~Joists, bearers and lintels must be restrained from lateral movement or twisting along their length by fixing rafters or joists to the top flange of the member so that it prevents that member from moving laterally.~~

(~~4~~) ~~End supports for joists, bearers and lintels must transfer loads to the footings and have a bearing distance as follows:~~

(a) ~~For single spans, the bearing distance must not be less than the width of the member.~~

(b) ~~For continuous spans, internal bearing must be not less than two times the width of the member.~~

Table 6.3.2a: ~~**Maximum acceptable bearer span (single span) – bearers supporting a timber floor and non-loadbearing stud wall**~~

~~Steel Section~~	~~1.8 EBS~~	~~2.4 EBS~~	~~3.0 EBS~~	~~3.6 EBS~~	~~4.2 EBS~~
~~125TFB m~~	~~4.1 m~~	~~3.8~~	~~3.6 m~~	~~3.4 m~~	~~3.2 m~~
~~180UB16.1~~	~~5.1 m~~	~~4.7 m~~	~~4.5 m~~	~~4.3 m~~	~~4.1 m~~
~~200UB18.2~~	~~5.6 m~~	~~5.2 m~~	~~5.0 m~~	~~4.7 m~~	~~4.6 m~~
~~250UB25.7~~	~~6.8 m~~	~~6.4 m~~	~~6.0 m~~	~~5.8 m~~	~~5.6 m~~
~~250x150x9.0 RHS~~	~~7.7 m~~	~~7.1 m~~	~~6.7 m~~	~~6.4 m~~	~~6.2 m~~
~~250x150x5.0 RHS~~	~~6.8 m~~	~~6.3 m~~	~~5.9 m~~	~~5.7 m~~	~~5.5 m~~
~~310UB32.0~~	~~7.9 m~~	~~7.3 m~~	~~7.0 m~~	~~6.7 m~~	~~6.4 m~~
~~125x75x2.0 RHS~~	~~3.1 m~~	~~2.8 m~~	~~2.6 m~~	~~2.5 m~~	~~2.4 m~~
~~125x75x3.0 RHS~~	~~3.5 m~~	~~3.2 m~~	~~3.0 m~~	~~2.8 m~~	~~2.7 m~~
~~150x50x2.0 RHS~~	~~3.4 m~~	~~3.1 m~~	~~2.8 m~~	~~2.7 m~~	~~2.5 m~~
~~150x50x3.0 RHS~~	~~3.7 m~~	~~3.4 m~~	~~3.2 m~~	~~3.0 m~~	~~2.9 m~~

~~Steel Section~~	~~1.8 EBS~~	~~2.4 EBS~~	~~3.0 EBS~~	~~3.6 EBS~~	~~4.2 EBS~~
~~100TFC~~	~~3.2 m~~	~~2.9 m~~	~~2.7 m~~	~~2.6 m~~	~~2.4 m~~
~~150PFC~~	~~4.8 m~~	~~4.5 m~~	~~4.2 m~~	~~4.0 m~~	~~3.9 m~~
~~180PFC~~	~~5.4 m~~	~~5.1 m~~	~~4.8 m~~	~~4.6 m~~	~~4.4 m~~
~~200PFC~~	~~5.9 m~~	~~5.5 m~~	~~5.2 m~~	~~5.0 m~~	~~4.8 m~~
~~250PFC~~	~~7.2 m~~	~~6.7 m~~	~~6.4 m~~	~~6.1 m~~	~~5.9 m~~
~~300PFC~~	~~8.1 m~~	~~7.6 m~~	~~7.2 m~~	~~6.9 m~~	~~6.6 m~~

Table Notes:

1. ~~EBS = Effective bearer spacing (m).~~
2. ~~Steel is base grade.~~
3. ~~Load must be evenly distributed along the member.~~
4. ~~See 6.3.2 for provisions that apply to suspended floors in single-storey and ground floor construction of suspended steel floor frames.~~
5. ~~Effective bearer spacing is a measure of the width of the load area being supported by the member (for single span members see Table H1D6a and Figure H1D6d.~~

Table 6.3.2b: ~~**Maximum acceptable bearer span (continuous span) - bearers supporting a timber floor and non-loadbearing stud wall**~~

~~Steel Section~~	~~1.8 EBS~~	~~2.4 EBS~~	~~3.0 EBS~~	~~3.6 EBS~~	~~4.2 EBS~~
~~125TFB~~	~~4.7 m~~	~~4.3 m~~	~~3.8 m~~	~~3.5 m~~	~~3.2 m~~
~~180UB16.1~~	~~5.9 m~~	~~5.5 m~~	~~5.2 m~~	~~5.0 m~~	~~4.7 m~~
~~200UB18.2~~	~~6.5 m~~	~~6.0 m~~	~~5.7 m~~	~~5.5 m~~	~~5.3 m~~
~~250UB25.7~~	~~7.9 m~~	~~7.4 m~~	~~7.0 m~~	~~6.7 m~~	~~6.4 m~~
~~250x150x9.0 RHS~~	~~8.8 m~~	~~8.2 m~~	~~7.8 m~~	~~7.0 m~~	~~7.1 m~~
~~250x150x5.0 RHS~~	~~7.8 m~~	~~7.2 m~~	~~6.8 m~~	~~6.5 m~~	~~6.3 m~~
~~310UB32.0~~	~~9.1 m~~	~~8.5 m~~	~~8.1 m~~	~~7.7 m~~	~~7.4 m~~
~~125x75x2.0 RHS~~	~~4.0 m~~	~~3.7 m~~	~~3.5 m~~	~~3.3 m~~	~~3.1 m~~
~~125X75X3.0 RHS~~	~~4.4 m~~	~~4.1 m~~	~~3.9 m~~	~~3.7 m~~	~~3.5 m~~
~~150x50x2.0 RHS~~	~~4.2 m~~	~~3.9 m~~	~~3.7 m~~	~~3.5 m~~	~~3.4 m~~
~~150x50x3.0 RHS~~	~~4.6 m~~	~~4.3 m~~	~~4.1 m~~	~~3.9 m~~	~~3.7 m~~
~~100TFC~~	~~3.7 m~~	~~3.2 m~~	~~2.8 m~~	~~2.6 m~~	~~2.4 m~~
~~150PFC~~	~~5.5 m~~	~~5.1 m~~	~~4.9 m~~	~~4.7 m~~	~~4.5 m~~
~~180PFC~~	~~6.3 m~~	~~5.9 m~~	~~5.6 m~~	~~5.3 m~~	~~5.1 m~~
~~200PFC~~	~~6.8 m~~	~~6.3 m~~	~~6.0 m~~	~~5.7 m~~	~~5.5 m~~
~~250PFC~~	~~8.4 m~~	~~7.8 m~~	~~7.4 m~~	~~7.1 m~~	~~6.8 m~~
~~300PFC~~	~~9.4 m~~	~~8.8 m~~	~~8.3 m~~	~~8.0 m~~	~~7.7 m~~

Table Notes:

1. ~~EBS = Effective bearer spacing (m).~~
2. ~~Steel is base grade.~~
3. ~~Load must be evenly distributed along the member.~~
4. ~~For continuous floor bearers, the variation in span length should not be more than 10%.~~
5. ~~See 6.3.2 for provisions that apply to suspended floors in single-storey and ground floor construction of suspended steel floor frames.~~

6. ~~Effective bearer spacing is a measure of the width of the load area being supported by the member (for continuous span members see Table H1D6b and Figure H1D6e).~~

Table 6.3.2c: ~~Maximum acceptable strutting beam span (steel sheet roof) – strutting beam supporting a roof and ceiling~~

~~Steel Section~~	~~1.8 SBS~~	~~2.4 SBS~~	~~3.0 SBS~~	~~3.6 SBS~~	~~4.2 SBS~~
~~125TFB~~	~~5.7 m~~	~~5.4 m~~	~~5.1 m~~	~~4.9 m~~	~~4.6 m~~
~~150UB14.0~~	~~6.4 m~~	~~6.0 m~~	~~5.7 m~~	~~5.4 m~~	~~5.1 m~~
~~200UB18.2~~	~~7.9 m~~	~~7.4 m~~	~~7.1 m~~	~~6.8 m~~	~~6.5 m~~
~~250UB31.4~~	~~10.0 m~~	~~9.4 m~~	~~9.0 m~~	~~8.7 m~~	~~8.4 m~~
~~310UB46.2~~	~~11.9 m~~	~~11.3 m~~	~~10.8 m~~	~~10.5 m~~	~~10.1 m~~
~~100TFC~~	~~4.6 m~~	~~4.4 m~~	~~4.2 m~~	~~3.9 m~~	~~3.7 m~~
~~150PFC~~	~~6.7 m~~	~~6.3 m~~	~~6.0 m~~	~~5.8 m~~	~~5.6 m~~
~~200PFC~~	~~8.2 m~~	~~7.7 m~~	~~7.4 m~~	~~7.1 m~~	~~6.8 m~~
~~250PFC~~	~~10.0 m~~	~~9.4 m~~	~~9.0 m~~	~~8.7 m~~	~~8.4 m~~
~~300PFC~~	~~11.1 m~~	~~10.5 m~~	~~10.1 m~~	~~9.7 m~~	~~9.4 m~~

Table Notes:

1. ~~SBS = Strutting beam spacing (m).~~
2. ~~If point load applied, then it must be located within the middle third of the strutting beam span.~~
3. ~~Top and bottom flanges of strutting beam must be laterally restrained at the loading point.~~
4. ~~Strutting beam must be tied down at the support point, in the case of steel sheet roofs.~~
5. ~~Steel is base grade.~~

Table 6.3.2d: ~~Maximum acceptable strutting beam span (tiled roof) – strutting beam supporting a roof and ceiling~~

~~Steel Section~~	~~1.8 SBS~~	~~2.4 SBS~~	~~3.0 SBS~~	~~3.6 SBS~~	~~4.2 SBS~~
~~125TFB~~	~~4.9 m~~	~~4.6 m~~	~~4.4 m~~	~~4.2 m~~	~~4.1 m~~
~~150UB14.0~~	~~5.5 m~~	~~5.2 m~~	~~4.9 m~~	~~4.7 m~~	~~4.5 m~~
~~200UB18.2~~	~~6.9 m~~	~~6.4 m~~	~~6.1 m~~	~~5.8 m~~	~~5.6 m~~
~~250UB31.4~~	~~8.8 m~~	~~8.2 m~~	~~7.8 m~~	~~7.5 m~~	~~7.2 m~~
~~310UB46.2~~	~~10.6 m~~	~~10.0 m~~	~~9.5 m~~	~~9.1 m~~	~~8.8 m~~
~~100TFC~~	~~4.0 m~~	~~3.7 m~~	~~3.6 m~~	~~3.4 m~~	~~3.2 m~~
~~150PFC~~	~~5.8 m~~	~~5.5 m~~	~~5.2 m~~	~~5.0 m~~	~~4.8 m~~
~~200PFC~~	~~7.2 m~~	~~6.7 m~~	~~6.4 m~~	~~6.1 m~~	~~5.9 m~~
~~250PFC~~	~~8.8 m~~	~~8.2 m~~	~~7.8 m~~	~~7.5 m~~	~~7.3 m~~
~~300PFC~~	~~9.8 m~~	~~9.3 m~~	~~8.8 m~~	~~8.4 m~~	~~8.2 m~~

Table Notes:

1. ~~SBS = Strutting beam spacing (m).~~
2. ~~If point load applied, then it must be located within the middle third of the strutting beam span.~~
3. ~~Top and bottom flanges of strutting beam must be laterally restrained at the loading point.~~
4. ~~Steel is base grade.~~

Table 6.3.2e: ~~Maximum acceptable lintel span (steel sheet roof) - lintel supporting roof, frames and timber floors (m)~~

~~Steel Section~~	~~1.8 ELW~~	~~2.4 ELW~~	~~3.0 ELW~~	~~3.6 ELW~~	~~4.2 ELW~~
~~125TFB~~	~~3.7 m~~	~~3.4 m~~	~~3.2 m~~	~~3.0 m~~	~~2.8 m~~
~~150UB14.0~~	~~4.1 m~~	~~3.9 m~~	~~3.7 m~~	~~3.5 m~~	~~3.3 m~~
~~200UB25.4~~	~~5.6 m~~	~~5.3 m~~	~~5.0 m~~	~~4.8 m~~	~~4.7 m~~
~~250UB31.4~~	~~6.6 m~~	~~6.2 m~~	~~5.9 m~~	~~5.7 m~~	~~5.5 m~~
~~100TFC~~	~~2.8 m~~	~~2.6 m~~	~~2.4 m~~	~~2.3 m~~	~~2.1 m~~
~~150PFC~~	~~4.4 m~~	~~4.1 m~~	~~3.9 m~~	~~3.7 m~~	~~3.6 m~~
~~200PFC~~	~~5.4 m~~	~~5.0 m~~	~~4.8 m~~	~~4.6 m~~	~~4.4 m~~
~~250PFC~~	~~6.6 m~~	~~6.2 m~~	~~5.9 m~~	~~5.7 m~~	~~5.5 m~~
~~75x75x5EA~~	~~1.3 m~~	~~1.2 m~~	~~1.1 m~~	~~N/A~~	~~N/A~~
~~90x90x6EA~~	~~1.9 m~~	~~1.6 m~~	~~1.5 m~~	~~1.3 m~~	~~1.2 m~~
~~100x100x6EA~~	~~2.0 m~~	~~1.8 m~~	~~1.6 m~~	~~1.5 m~~	~~1.4 m~~
~~125x756UA~~	~~2.3 m~~	~~2.0 m~~	~~1.8 m~~	~~1.7 m~~	~~1.5 m~~
~~150x100x10UA~~	~~3.9 m~~	~~3.6 m~~	~~3.2 m~~	~~2.9 m~~	~~2.7 m~~

Table Notes:

1. ~~ELW = Effective load width (m).~~
2. ~~Top flange of lintel must be laterally restrained at the loading points.~~
3. ~~Load must be evenly distributed along the member (e.g. joists).~~
4. ~~Angle lintels - first dimension corresponds to vertical leg (e.g. 100x75x6UA, 100 mm leg is vertical).~~
5. ~~For lintels supporting masonry walls, refer to H1D5(1).~~

Table 6.3.2f: ~~Maximum acceptable lintel span (tiled roof)—lintel supporting roof, frames and timber floors~~

~~Steel Section~~	~~1.8 ELW~~	~~2.4 ELW~~	~~3.0 ELW~~	~~3.6 ELW~~	~~4.2 ELW~~
~~125TFB~~	~~3.6 m~~	~~3.3 m~~	~~3.0 m~~	~~2.9 m~~	~~2.7 m~~
~~150UB14.0~~	~~4.0 m~~	~~3.7 m~~	~~3.5 m~~	~~3.3 m~~	~~3.2 m~~
~~200UB25.4~~	~~5.4 m~~	~~5.1 m~~	~~4.8 m~~	~~4.6 m~~	~~4.5 m~~
~~250UB31.4~~	~~6.3 m~~	~~6.0 m~~	~~5.7 m~~	~~5.4 m~~	~~5.2 m~~
~~100TFC~~	~~2.7 m~~	~~2.5 m~~	~~2.3 m~~	~~2.1 m~~	~~2.0 m~~
~~150PFC~~	~~4.2 m~~	~~3.9 m~~	~~3.7 m~~	~~3.6 m~~	~~3.4 m~~
~~200PFC~~	~~5.1 m~~	~~4.8 m~~	~~4.6 m~~	~~4.4 m~~	~~4.2 m~~
~~250PFC~~	~~6.3 m~~	~~6.0 m~~	~~5.7 m~~	~~5.4 m~~	~~5.3 m~~
~~75x75x5EA~~	~~1.3 m~~	~~1.1 m~~	~~N/A~~	~~N/A~~	~~N/A~~
~~90x90x6EA~~	~~1.7 m~~	~~1.5 m~~	~~1.4 m~~	~~1.3 m~~	~~1.2 m~~
~~100x100x6EA~~	~~1.9 m~~	~~1.7 m~~	~~1.5 m~~	~~1.4 m~~	~~1.3 m~~
~~125x75x6UA~~	~~2.2 m~~	~~1.9 m~~	~~1.7 m~~	~~1.6 m~~	~~1.4 m~~
~~150x100x10UA~~	~~3.7 m~~	~~3.3 m~~	~~3.0 m~~	~~2.8 m~~	~~2.6 m~~

Table Notes:

1. ~~ELW = Effective load width (m).~~
2. ~~Top flange of lintel must be laterally restrained at the loading points.~~
3. ~~Load must be evenly distributed along the member (e.g. joists).~~

4. ~~Angle lintels - first dimension corresponds to vertical leg (e.g. 100x75x6UA, 100 mm leg is vertical).~~
5. ~~For lintels supporting masonry walls, refer to H1D5(1).~~

Figure 6.3.2a: ~~Bearer supporting a timber floor and non-loadbearing stud wall~~

Bearer connection examples

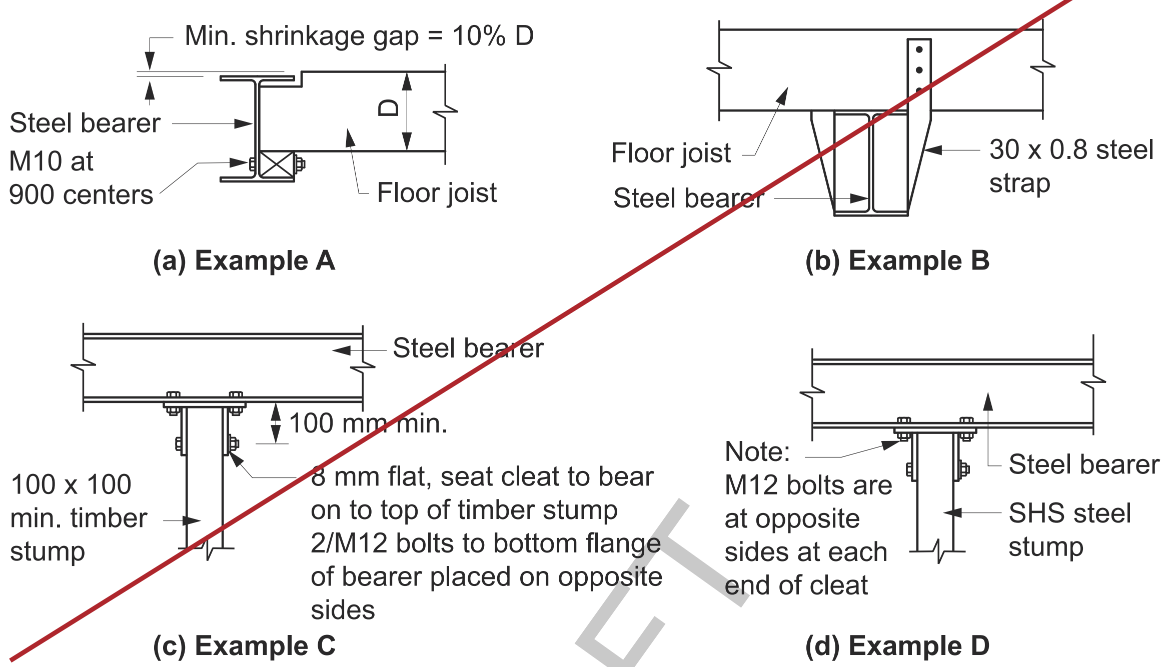


Figure 6.3.2b: ~~Strutting beam supporting a roof and ceiling~~

Strutting beam application

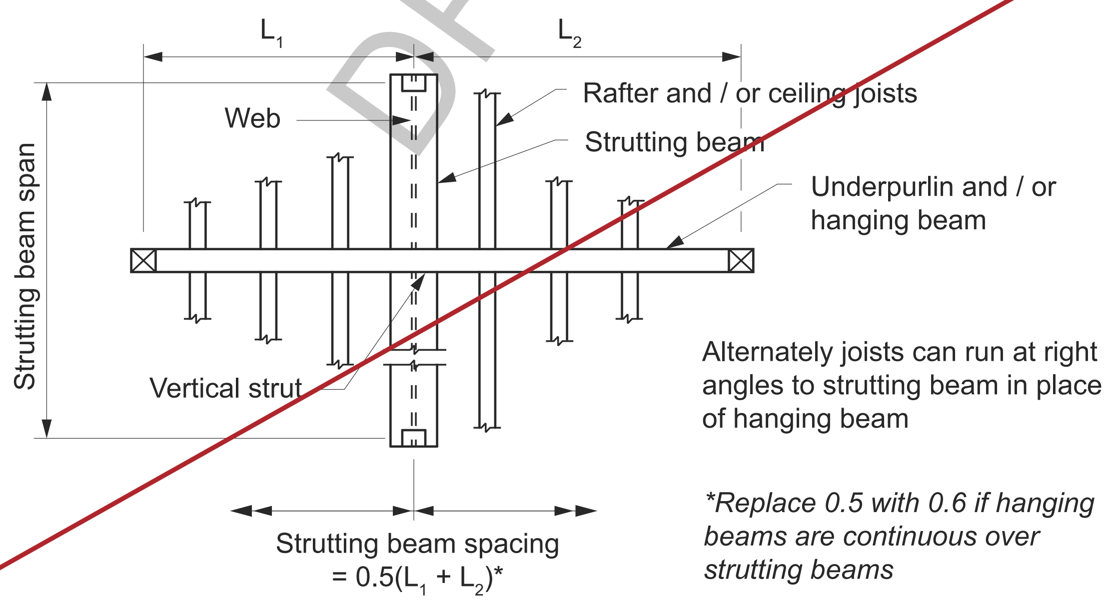
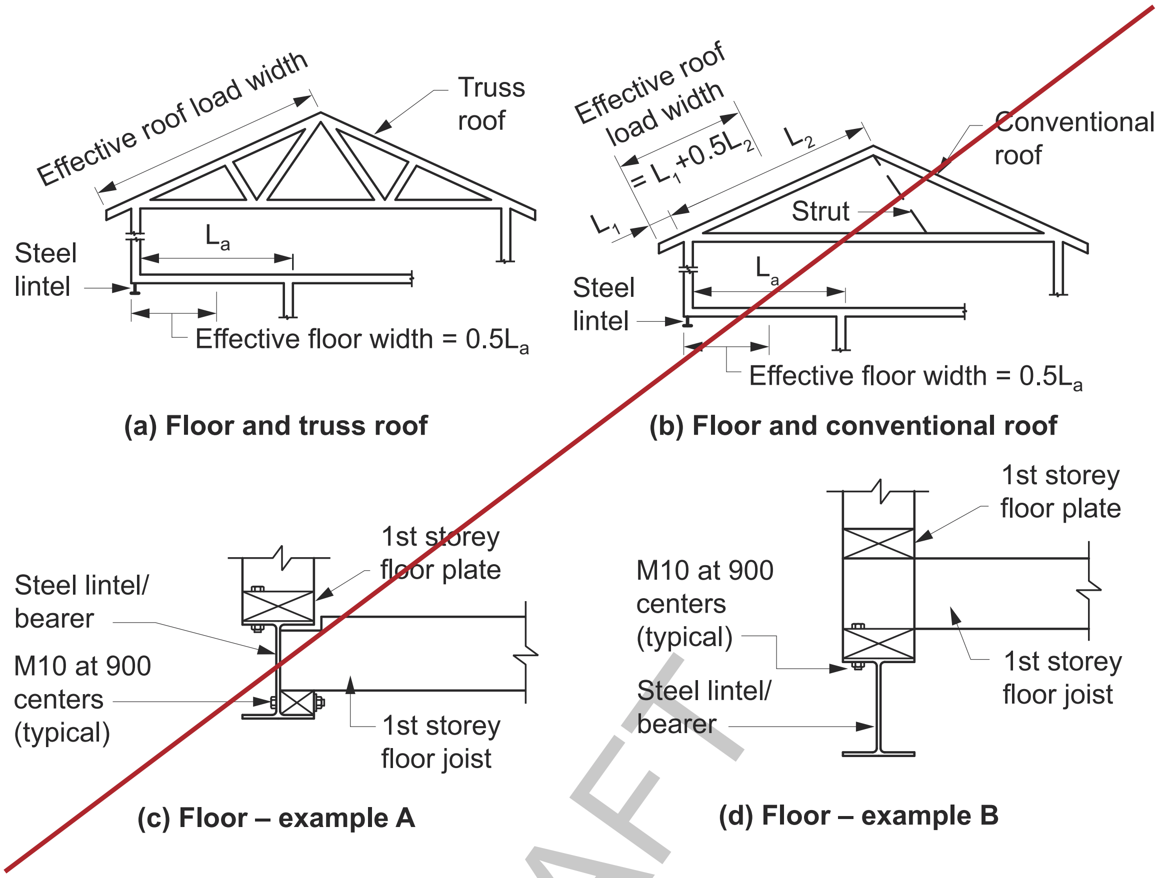


Figure 6.3.2c: ~~Lintels supporting roof, frames and timber floors~~



6.3.3 Bearers

[New for 2022]

Structural steel bearers must comply with the following:

(a) Effective bearer spacing must be determined in accordance with—

(i) for single span joists — Table H1D6a and Figure H1D6d; and

(ii) for continuous span joists — Table H1D6b and Figure H1D6e.

(b) Maximum acceptable bearer spans must be determined in accordance with—

(i) for single spans — Tables 6.3.3a and; and

(ii) for continuous spans — Tables 6.3.3b and.

(c) All loads along the bearer must be evenly distributed.

(d) The difference in distance between supports for continuous span bearers must not be more than 10% of the span.

(e) Fixing of joists and columns to structural steel bearers must comply with 6.3.7.

(f) Bearers must be supported by structural steel columns that comply with 6.3.6 and are fixed in accordance with 6.3.7.

Table 6.3.3a: **Maximum bearer span (m) — single span — bearer supporting timber floor and 3 m high non-loadbearing internal wall**

Steel section	Effective load width (m)				
	1.8	2.4	3.0	3.6	4.2
125 TFB	4.2	5.2	5.2	5.2	5.2

Steel section	Effective load width (m)				
	1.8	2.4	3.0	3.6	4.2
180 UB 16.1	5.6	6.8	6.8	6.8	6.8
200 UB 18.2	6.4	7.7	7.7	7.7	7.7
250 UB 25.7	8.3	10.2	10.2	10.2	10.2
250 x 150 x 9 RHS	9.3	12.4	12.4	12.4	12.4
250 x 150 x 5 RHS	8.0	9.5	9.5	9.5	9.5
310 UB 32.0	10.0	12.3	12.3	12.3	12.3
125 x 75 x 2 RHS	2.9	2.9	2.9	2.9	2.9
125 x 75 x 3 RHS	3.5	4.0	4.0	4.0	4.0
150 x 50 x 2 RHS	3.3	3.3	3.3	3.3	3.3
150 x 50 x 3 RHS	3.7	4.2	4.2	4.2	4.2
100 TFB	2.9	3.4	3.4	3.4	3.4
150 PFC	5.2	6.5	6.5	6.5	6.5
180 PFC	6.1	7.8	7.8	7.8	7.8
200 PFC	6.8	8.5	8.5	8.5	8.5
250 PFC	8.9	11.6	11.6	11.6	11.6
300 PFC	10.4	13.4	13.4	13.4	13.4

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 0.92 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed.
2. Load combinations included are 1.35G and 1.25G+1.5Q for ULS and G + 0.7Q for SLS with a maximum deflection of span/300.
3. Bearers are assumed to have intermediate lateral restraints at joist locations and are considered fully laterally restrained.

Table 6.3.3b: **Maximum bearer span (m) — continuous span — bearer supporting timber floor and 3 m high non-loadbearing internal wall**

Steel section	Effective load width (m)				
	1.8	2.4	3.0	3.6	4.2
125 TFB	5.2	4.6	4.2	3.9	3.6
180 UB 16.1	6.8	6.0	5.5	5.1	4.7
200 UB 18.2	7.7	6.9	6.2	5.8	5.4
250 UB 25.7	10.2	9.1	8.3	7.6	7.1
250 x 150 x 9 RHS	12.4	11.5	10.5	9.8	9.1
250 x 150 x 5 RHS	9.5	8.4	7.7	7.1	6.6
310 UB 32.0	12.3	11.0	10.0	9.2	8.6
125 x 75 x 2 RHS	2.9	2.6	2.3	2.2	2.0
125 x 75 x 3 RHS	4.0	3.5	3.2	2.9	2.7
150 x 50 x 2 RHS	3.3	2.9	2.6	2.4	2.3
150 x 50 x 3 RHS	4.2	3.7	3.4	3.1	2.9
100 TFB	3.4	3.0	2.7	2.5	2.4
150 PFC	6.5	5.8	5.3	4.9	4.6
180 PFC	7.8	6.9	6.3	5.8	5.4
200 PFC	8.5	7.6	6.9	6.4	5.9

Steel section	Effective load width (m)				
	1.8	2.4	3.0	3.6	4.2
250 PFC	11.6	10.4	9.5	8.7	8.2
300 PFC	13.4	12.0	10.9	10.1	9.4

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 0.92 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed.
2. Load combinations included are 1.35G and 1.25G+1.5Q for ULS and G + 0.7Q for SLS with a maximum deflection of span/300.
3. Bearers are assumed to have intermediate lateral restraints at joist locations and are considered fully laterally restrained.

Table 6.3.3c: Maximum bearer span (m) — single span — bearer supporting tiled floor and 3 m high non-loadbearing internal wall

Steel section	Effective load width (m)				
	1.8	2.4	3.0	3.6	4.2
125 TFB	3.9	3.7	3.5	3.4	3.3
180 UB 16.1	5.2	5.0	4.8	4.6	4.4
200 UB 18.2	5.9	5.6	5.4	5.2	5.0
250 UB 25.7	7.7	7.3	7.1	6.8	6.6
250 x 150 x 9 RHS	8.7	8.3	8.0	7.7	7.5
250 x 150 x 5 RHS	7.5	7.1	6.9	6.6	6.1
310 UB 32.0	9.3	8.9	8.5	8.2	8.0
125 x 75 x 2 RHS	2.7	2.4	2.2	2.0	1.9
125 x 75 x 3 RHS	3.2	3.0	2.9	2.7	2.5
150 x 50 x 2 RHS	3.0	2.7	2.4	2.2	2.1
150 x 50 x 3 RHS	3.4	3.3	3.1	2.9	2.7
100 TFB	2.7	2.6	2.5	2.3	2.2
150 PFC	4.8	4.6	4.4	4.2	4.1
180 PFC	5.7	5.4	5.2	5.0	4.9
200 PFC	6.3	6.0	5.8	5.6	5.4
250 PFC	8.3	7.9	7.6	7.3	7.1
300 PFC	9.7	9.2	8.9	8.6	8.3

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 0.92 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed.
2. Load combinations included are 1.35G and 1.25G+1.5Q for ULS and G + 0.7Q for SLS with a maximum deflection of span/300.
3. Bearers are assumed to have intermediate lateral restraints at joist locations and are considered fully laterally restrained.

Table 6.3.3d: **Maximum bearer span (m) — continuous span — bearer supporting tiled floor and 3 m high non-loadbearing internal wall**

Steel section	Effective load width (m)				
	1.8	2.4	3.0	3.6	4.2
125 TFB	4.8	4.3	3.9	3.6	3.3
180 UB 16.1	6.3	5.6	5.1	4.7	4.4
200 UB 18.2	7.2	6.4	5.8	5.3	5.0
250 UB 25.7	9.5	8.5	7.7	7.1	6.6
250 x 150 x 9 RHS	11.6	10.8	9.8	9.1	8.5
250 x 150 x 5 RHS	8.8	7.8	7.1	6.6	6.1
310 UB 32.0	11.5	10.2	9.3	8.5	8.0
125 x 75 x 2 RHS	2.7	2.4	2.2	2.0	1.9
125 x 75 x 3 RHS	3.7	3.3	3.0	2.7	2.5
150 x 50 x 2 RHS	3.1	2.7	2.4	2.2	2.1
150 x 50 x 3 RHS	3.9	3.4	3.1	2.9	2.7
100 TFB	3.2	2.8	2.5	2.3	2.2
150 PFC	6.1	5.4	4.9	4.5	4.2
180 PFC	7.2	6.4	5.8	5.4	5.0
200 PFC	8.0	7.1	6.4	5.9	5.5
250 PFC	10.9	9.7	8.8	8.1	7.6
300 PFC	12.5	11.2	10.1	9.4	8.7

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 0.92 kN/m permanent wall, permanent member self-weight, 1.5 kPa or 1.1 kN imposed.
2. Load combinations included are 1.35G and 1.25G+1.5Q for ULS and G + 0.7Q for SLS with a maximum deflection of span/300.
3. Bearers are assumed to have intermediate lateral restraints at joist locations and are considered fully laterally restrained.

6.3.4 Strutting beams

[New for 2022]

Structural steel strutting beams must comply with the following:

(a) Acceptable strutting beam spacing must be determined in accordance with—
  (i) for single span rafters — Table H1D6a and Figure H1D6d; and
  (ii) for continuous span rafters — Table H1D6b and Figure H1D6e.
(b) Maximum acceptable strutting beam spans must be determined in accordance with—
  (i) for metal sheet roofs — Tables 6.3.4a, 6.3.4b, 6.3.4c, 6.3.4d, 6.3.4e or 6.3.4f; and
  (ii) for tiled roofs — Tables 6.3.4g, 6.3.4h, 6.3.4i, 6.3.4j, 6.3.4k or 6.3.4l.
(c) Any point load applied must be located within the middle third of the strutting beam.
(d) Strutting beams must be tied down in accordance with H1D6(3) where supporting metal roofs.
(e) Fixing and any cutting of strutting beams must comply with 6.3.7.
(f) Strutting beams must be supported by structural steel columns that comply with 6.3.6 and be fixed in accordance with 6.3.7.

Table 6.3.4a: Maximum acceptable combined strutting/hanging beam span — combined strutting/hanging beam supporting metal sheet roof and gypsum ceiling — roof load area = 4 m^2

Section	Ceiling load width (m)		
	1.8	3.6	6.0
125 TFB	3.5	3.3	3.2
150 UB 14.0	3.6	3.4	3.3
200 UB 18.2	4.5	4.3	4.1
250 UB 31.4	6.8	6.5	6.2
310 UB 46.2	8.9	8.5	8.1
100 TFB	2.0	2.0	1.9
150 PFC	4.7	4.5	4.3
200 PFC	5.5	5.3	5.0
250 PFC	7.5	7.1	6.8
300 PFC	7.8	7.5	7.1

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.4 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.

Table 6.3.4b: Maximum acceptable combined strutting/hanging beam span — combined strutting/hanging beam supporting metal sheet roof and gypsum ceiling — roof load area = 8 m^2

Section	Ceiling load width (m)		
	1.8	3.6	6.0
125 TFB	2.6	2.6	2.5
150 UB 14.0	2.8	2.7	2.7
200 UB 18.2	3.6	3.5	3.4
250 UB 31.4	5.5	5.4	5.2
310 UB 46.2	7.3	7.1	6.9
100 TFB	1.4	1.4	1.4
150 PFC	3.7	3.6	3.5
200 PFC	4.4	4.3	4.1
250 PFC	6.0	5.8	5.7
300 PFC	6.3	6.2	6.0

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.4 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.

3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.

Table 6.3.4c: Maximum acceptable combined strutting/hanging beam span — combined strutting/hanging beam supporting metal sheet roof and gypsum ceiling — roof load area = 12 m^2

Section	Ceiling load width (m)		
	1.8	3.6	6.0
125 TFB	2.2	2.2	2.2
150 UB 14.0	2.4	2.3	2.3
200 UB 18.2	3.1	3.0	3.0
250 UB 31.4	4.8	4.7	4.6
310 UB 46.2	6.4	6.3	6.1
100 TFC	1.1	1.1	1.1
150 PFC	3.1	3.1	3.0
200 PFC	3.7	3.7	3.6
250 PFC	5.2	5.1	5.0
300 PFC	5.5	5.4	5.3

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.4 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.

Table 6.3.4d: Maximum acceptable counter-strutting beam span — counter-strutting beam supporting metal sheet roof and gypsum ceiling — roof load area = 4 m^2

Section	Ceiling load area (m^2)		
	0	6	12
125 TFB	3.9	3.5	3.2
150 UB 14.0	4.0	3.7	3.4
200 UB 18.2	5.4	4.9	4.6
250 UB 31.4	8.9	8.2	7.7
310 UB 46.2	12.0	11.3	10.7
100 TFB	2.0	1.8	1.6
150 PFC	5.9	5.3	4.9
200 PFC	7.1	6.5	6.0
250 PFC	10.1	9.3	8.7
300 PFC	10.5	9.8	9.2

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.4 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.

2. Load combinations included are 1.35G and 1.25G + 1.5Q, 1.25G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G+W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A ceiling load area of “0” must be used for strutting beams not supporting ceiling loads.

Table 6.3.4e: Maximum acceptable counter-strutting beam span — counter-strutting beam supporting metal sheet roof and gypsum ceiling — roof load area = 8 m^2

Section	Ceiling load area (m^2)		
	0	6	12
125 TFB	2.7	2.6	2.4
150 UB 14.0	2.9	2.8	2.6
200 UB 18.2	4.0	3.8	3.6
250 UB 31.4	6.8	6.5	6.2
310 UB 46.2	9.6	9.2	8.8
100 TFB	1.4	1.3	1.2
150 PFC	4.2	4.0	3.8
200 PFC	5.2	4.9	4.7
250 PFC	7.7	7.3	7.0
300 PFC	8.2	7.8	7.5

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.4 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G and 1.25G + 1.5Q, 1.25G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G+W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A ceiling load area of “0” must be used for strutting beams not supporting ceiling loads.

Table 6.3.4f: Maximum acceptable counter-strutting beam span — counter-strutting beam supporting metal sheet roof and gypsum ceiling — roof load area = 12 m^2

Section	Ceiling load area (m^2)		
	0	6	12
125 TFB	2.2	2.1	2.0
150 UB 14.0	2.4	2.3	2.2
200 UB 18.2	3.3	3.2	3.0
250 UB 31.4	5.7	5.5	5.3
310 UB 46.2	8.2	7.9	7.7
100 TFB	1.1	1.0	1.0
150 PFC	3.4	3.2	3.1
200 PFC	4.2	4.1	3.9
250 PFC	6.4	6.2	6.0
300 PFC	6.9	6.6	6.4

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.4 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G and 1.25G + 1.5Q, 1.25G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G+W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A ceiling load area of “0” must be used for strutting beams not supporting ceiling loads.

Table 6.3.4g: Maximum acceptable combined strutting/hanging beam span — combined strutting/hanging beam supporting tiled roof and gypsum ceiling — roof load area = 4 m^2

Section	Ceiling load width (m)		
	1.8	3.6	6.0
125 TFB	2.7	2.6	2.6
150 UB 14.0	2.8	2.8	2.7
200 UB 18.2	3.6	3.5	3.4
250 UB 31.4	5.5	5.4	5.2
310 UB 46.2	7.2	7.1	6.9
100 TFB	1.6	1.5	1.5
150 PFC	3.7	3.7	3.6
200 PFC	4.4	4.3	4.2
250 PFC	6.0	5.8	5.7
300 PFC	6.3	6.1	6.0

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.84 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.

Table 6.3.4h: Maximum acceptable combined strutting/hanging beam span — combined strutting/hanging beam supporting tiled roof and gypsum ceiling — roof load area = 8 m^2

Section	Ceiling load width (m)		
	1.8	3.6	6.0
125 TFB	2.0	2.0	2.0
150 UB 14.0	2.2	2.1	2.1
200 UB 18.2	2.8	2.8	2.7
250 UB 31.4	4.4	4.3	4.3
310 UB 46.2	5.8	5.7	5.6
100 TFB	1.1	1.1	1.1
150 PFC	2.8	2.8	2.8
200 PFC	3.4	3.3	3.3

Section	Ceiling load width (m)		
	1.8	3.6	6.0
250 PFC	4.7	4.6	4.6
300 PFC	5.0	4.9	4.8

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.84 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.

Table 6.3.4i: Maximum acceptable combined strutting/hanging beam span — combined strutting/hanging beam supporting tiled roof and gypsum ceiling — roof load area = 12 m²

Section	Ceiling load width (m)		
	1.8	3.6	6.0
125 TFB	1.7	1.7	1.7
150 UB 14.0	1.8	1.8	1.8
200 UB 18.2	2.4	2.4	2.4
250 UB 31.4	3.8	3.8	3.7
310 UB 46.2	5.0	5.0	4.9
100 TFB	0.9	0.9	0.9
150 PFC	2.4	2.4	2.3
200 PFC	2.9	2.8	2.8
250 PFC	4.0	4.0	3.9
300 PFC	4.3	4.2	4.2

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.84 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.

Table 6.3.4j: Maximum acceptable counter-strutting beam span — counter-strutting beam supporting tiled roof and gypsum ceiling — roof load area = 4 m²

Section	Ceiling load area (m²)		
	0	6	12
125 TFB	3.4	3.1	2.9
150 UB 14.0	3.5	3.3	3.0
200 UB 18.2	4.7	4.4	4.1
250 UB 31.4	7.9	7.4	7.0

Section	Ceiling load area (m^2)		
	0	6	12
310 UB 46.2	10.9	10.4	9.9
100 TFB	1.7	1.6	1.4
150 PFC	5.1	4.6	3.6
200 PFC	6.2	5.7	5.4
250 PFC	9.0	8.4	8.0
300 PFC	9.5	8.9	8.5

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.4 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A ceiling load area of "0" must be used for strutting beams not supporting ceiling loads.

Table 6.3.4k: Maximum acceptable counter-strutting beam span — counter-strutting beam supporting tiled roof and gypsum ceiling — roof load area = 8 m^2

Section	Ceiling load area (m^2)		
	0	6	12
125 TFB	2.3	2.2	2.1
150 UB 14.0	2.5	2.4	2.3
200 UB 18.2	3.4	3.3	3.2
250 UB 31.4	5.9	5.7	5.5
310 UB 46.2	8.5	8.2	7.9
100 TFB	1.2	1.1	1.0
150 PFC	3.6	3.4	3.3
200 PFC	4.4	4.2	4.1
250 PFC	6.7	6.4	6.2
300 PFC	7.2	6.9	6.7

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.4 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A ceiling load area of "0" must be used for strutting beams not supporting ceiling loads.

Table 6.3.4l: Maximum acceptable counter-strutting beam span — counter-strutting beam supporting tiled roof and gypsum ceiling — roof load area = 12 m²

Section	Ceiling load area (m²)		
	0	6	12
125 TFB	1.8	1.8	1.7
150 UB 14.0	2.0	1.9	1.9
200 UB 18.2	2.8	2.7	2.7
250 UB 31.4	5.0	4.8	4.7
310 UB 46.2	7.1	7.0	6.8
100 TFB	0.9	0.9	0.8
150 PFC	2.8	2.7	2.7
200 PFC	3.6	3.5	3.4
250 PFC	5.5	5.4	5.2
300 PFC	5.9	5.8	5.6

Table Notes:

1. Load accounted for includes 0.2 kPa permanent ceiling, 0.4 kPa permanent roof, permanent member self-weight, 0.25 kPa imposed roof, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Strutting beams are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A ceiling load area of “0” must be used for strutting beams not supporting ceiling loads.

6.3.5 Lintels

[New for 2022]

Structural steel lintels must comply with the following:

(a) Acceptable spans for lintels supporting roofs, frames and timber floors must be determined in accordance with—
  (i) for metal sheet roofs, Tables 6.3.5a, 6.3.5b or 6.3.5c; and
  (ii) for tiled roofs, Table 6.3.5d, 6.3.5e or 6.3.5f.

(b) Effective load widths for structural steel lintels must be determined in accordance with Figure 6.3.5 option (a) or (b).

(c) All loads along the structural steel lintel must be evenly distributed.

(d) The top flange of the structural steel lintel must be laterally restrained at the loading points.

(e) Fixing of structural steel lintels must comply with 6.3.7.

(f) Structural steel lintels used in masonry must also comply with H1D5.

(g) Lintel beams must be supported by structural steel columns that comply with 6.3.6.

Table 6.3.5a: Maximum acceptable lintel span — lintel supporting metal sheet roof, timber floor and 3 m high exterior wall — roof load width = 1.5 m

Section	Floor load width (m)		
	0	1.8	3.6
150 UB 14.0	4.4	3.0	2.5

Section	Floor load width (m)		
	0	1.8	3.6
200 UB 25.4	6.8	4.7	4.0
250 UB 31.4	7.7	5.3	4.6
100 TFB	2.8	1.8	1.5
150 PFC	5.7	3.8	3.2
200 PFC	6.5	4.3	3.7
250 PFC	8.4	5.7	4.9
75 x 75 x 5 EA	2.0	1.0	–
90 x 90 x 6 EA	3.0	1.5	1.0
100 x 100 x 6 EA	3.0	1.8	1.0
125 x 75 x 6 UA	3.0	1.8	1.3
150 x 100 x 10 UA	4.0	3.0	2.5

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 1.16 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G and 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Lintels are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A floor load of "0" must be used for lintels not supporting floor loads.

Table 6.3.5b: Maximum acceptable lintel span — lintel supporting metal sheet roof, timber floor and 3 m high exterior wall — roof load width = 4.5 m

Section	Floor load width (m)		
	0	1.8	3.6
150 UB 14.0	3.1	2.7	2.4
200 UB 25.4	4.9	4.3	3.8
250 UB 31.4	5.6	4.9	4.3
100 TFB	1.9	1.7	1.5
150 PFC	4.0	3.4	3.0
200 PFC	4.5	3.9	3.4
250 PFC	6.0	5.2	4.6
75 x 75 x 5 EA	1.0	–	–
90 x 90 x 6 EA	1.8	1.3	–
100 x 100 x 6 EA	1.8	1.3	–
125 x 75 x 6 UA	1.8	1.3	1.0
150 x 100 x 10 UA	3.0	2.5	2.0

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 1.16 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G and 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G

+ W_S.

3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Lintels are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A floor load of “0” must be used for lintels not supporting floor loads.

Table 6.3.5c: Maximum acceptable lintel span — lintel supporting metal sheet roof, timber floor and 3 m high exterior wall — roof load width = 7.5 m

Section	Floor load width (m)		
	0	1.8	3.6
150 UB 14.0	2.6	2.4	2.2
200 UB 25.4	4.1	3.8	3.6
250 UB 31.4	4.7	4.4	4.1
100 TFB	1.6	1.5	1.4
150 PFC	3.3	3.0	2.8
200 PFC	3.8	3.5	3.3
250 PFC	5.1	4.6	4.3
75 x 75 x 5 EA	–	–	–
90 x 90 x 6 EA	1.0	–	–
100 x 100 x 6 EA	1.0	–	–
125 x 75 x 6 UA	1.3	1.0	1.0
150 x 100 x 10 UA	2.5	2.0	2.0

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 1.16 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G and 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS and G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Lintels are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A floor load of “0” must be used for lintels not supporting floor loads.

Table 6.3.5d: Maximum acceptable lintel span — lintel supporting tiled roof, tiled floor and 3 m high exterior wall — roof load width = 1.5 m

Section	Floor load width (m)		
	0	1.8	3.6
150 UB 14.0	4.0	2.8	2.3
200 UB 25.4	6.2	4.4	3.7
250 UB 31.4	7.1	5.0	4.3
100 TFB	2.5	1.7	1.4
150 PFC	5.2	3.5	2.9
200 PFC	5.9	4.0	3.4
250 PFC	7.7	5.4	4.5
75 x 75 x 5 EA	2.0	–	–

Section	Floor load width (m)		
	0	1.8	3.6
90 x 90 x 6 EA	2.5	1.3	–
100 x 100 x 6 EA	3.0	1.3	–
125 x 75 x 6 UA	2.5	1.5	1.0
150 x 100 x 10 UA	4.0	2.5	2.0

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 1.16 kN/m permanent wall, 0.85 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS G + 0.7Q, G + W_S.
3. 0.9G + WS_S for SLS with a maximum deflection of span/300.
4. Lintels are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A floor load of “0” must be used for lintels not supporting floor loads.

Table 6.3.5e: **Maximum acceptable lintel span — lintel supporting tiled roof, tiled floor and 3 m high exterior wall — roof load width = 4.5 m**

Section	Floor load width (m)		
	0	1.8	3.6
150 UB 14.0	2.8	2.5	2.2
200 UB 25.4	4.4	3.9	3.5
250 UB 31.4	5.1	4.5	4.0
100 TFB	1.7	1.5	1.3
150 PFC	3.6	3.1	2.7
200 PFC	4.1	3.6	3.1
250 PFC	5.4	4.7	4.2
75 x 75 x 5 EA	–	–	–
90 x 90 x 6 EA	1.3	1.0	–
100 x 100 x 6 EA	1.5	1.0	–
125 x 75 x 6 UA	1.5	1.0	–
150 x 100 x 10 UA	2.5	2.0	1.8

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 1.16 kN/m permanent wall, 0.85 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Lintels are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A floor load of “0” must be used for lintels not supporting floor loads.

Table 6.3.5f: **Maximum acceptable lintel span — lintel supporting tiled roof, tiled floor and 3 m high exterior wall — roof load width = 7.5 m**

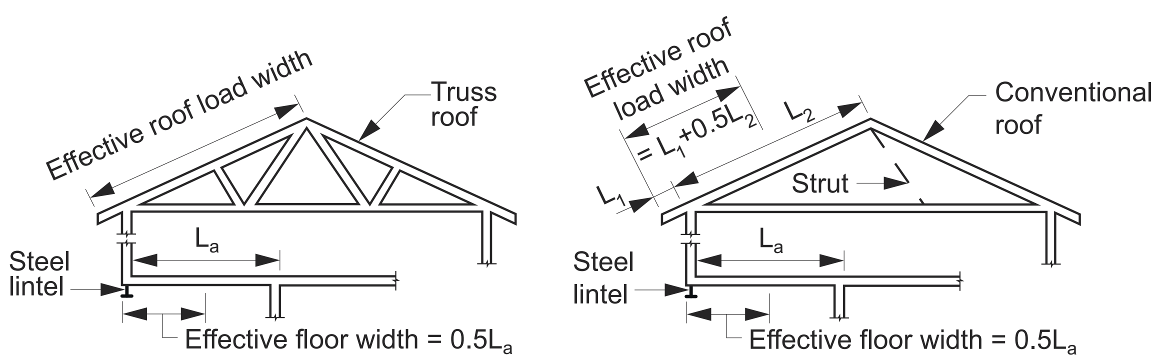
Section	Floor load width (m)		
	0	1.8	3.6
150 UB 14.0	2.4	2.2	2.0
200 UB 25.4	3.8	3.4	3.2
250 UB 31.4	4.3	4.0	3.7
100 TFB	1.5	1.3	1.2
150 PFC	3.0	2.7	2.5
200 PFC	3.4	3.1	2.9
250 PFC	4.6	4.2	3.9
75 x 75 x 5 EA	–	–	–
90 x 90 x 6 EA	–	–	–
100 x 100 x 6 EA	–	–	–
125 x 75 x 6 UA	1.0	–	–
150 x 100 x 10 UA	2.0	1.8	1.5

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 1.16 kN/m permanent wall, 0.85 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1 kN imposed floor, positive roof wind pressure of 0.95 kPa and negative roof wind pressure of -1.49 kPa.
2. Load combinations included are 1.35G, 1.2G + 1.5Q, 1.2G + W_U + 0.4Q, 0.9G + W_U for ULS G + 0.7Q, G + W_S.
3. 0.9G + W_S for SLS with a maximum deflection of span/300.
4. Lintels are assumed to be partially restrained at both ends with no rotational restraint and are designed as members without full lateral restraint.
5. A floor load of “0” must be used for lintels not supporting floor loads.

Figure 6.3.~~2c~~5: **Lintels supporting roof, frames and timber floors**

Lintels supporting roof and floors



(a) Floor and truss roof **(b) Floor and conventional roof**

6.3.~~3~~6 Columns

[2019: 3.4.4.3]

(~~1~~) ~~Columns may support the area provided for in Table 6.3.3a and Table 6.3.3b provided—~~

(a) ~~the effective height of the column is determined in accordance with Figure 6.3.3a and Table 6.3.3c; and~~

(b) ~~the floor area to be supported is determined in accordance with Figure 6.3.3b and Table 6.3.3d; and~~

(c) ~~the load eccentricity between the centre of the column and the applied vertical loading complies with .~~

(1) Structural steel columns must comply with the following:

(a) Columns must support the area provided for in—

(i) Tables 6.3.6a, 6.3.6b and 6.3.6c for columns supporting tiled floor and tiled roof load; and

(ii) Tables 6.3.6d, 6.3.6e and 6.3.6f for columns supporting timber floor and metal roof load.

(b) The floor area to be supported is to be determined in accordance with Table 6.3.6g and Figure 6.3.6a.

(c) The flooring system supported by structural steel columns must be fully braced to the footing level either by—

(i) subject to (d), adequately fixing the full height of the column to bracing walls of similar height in the two orthogonal directions of the building; or

(ii) a bracing system designed in accordance with AS 1684.2, AS 1684.3, AS/NZS 4600, NASH standard or AS 3700 as appropriate to the materials being used.

(d) For the purposes of (c)(i), the bracing walls must be capable of resisting racking forces in each direction not less than a proportion of the building's racking force equal to the proportion of floor area that the column is supporting compared to the total floor area of the building.

(e) Acceptable load eccentricity must not exceed 50% of the cross-sectional width plus 100 mm (see Figure 6.3.6b).

Table 6.3.3a: ~~Columns—supporting timber floor only~~

~~Column section~~	~~Column effective height (mm)~~	~~Floor area supported: 5 m2~~	~~Floor area supported: 10 m2~~	~~Floor area supported: 15 m2~~	~~Floor area supported: 20 m2~~	~~Floor area supported: 25 m2~~
~~CHS C250~~	~~600~~	~~60.3 x 3.6~~	~~88.9 x 4.0~~	~~101.6 x 5.0~~	~~114.43 x 5.4~~	~~139.7 x 5.0~~
~~CHS C250~~	~~1200~~	~~60.3 x 4.5~~	~~88.9 x 4.0~~	~~101.6 x 5.0~~	~~114.3 x 5.4~~	~~139.7 x 5.0~~
~~CHS C250~~	~~1800~~	~~60.3 x 4.5~~	~~88.9 x 4.0~~	~~101.6 x 5.0~~	~~114.3 x 5.4~~	~~139.7 x 5.0~~
~~CHS C250~~	~~2400~~	~~60.3 x 4.5~~	~~88.9 x 4.0~~	~~101.6 x 5.0~~	~~114.3 x 5.4~~	~~139.7 x 5.0~~
~~CHS C250~~	~~3600~~	~~76.1 x 3.6~~	~~101.6 x 4.0~~	~~114.3 x 4.5~~	~~139.7 x 5.4~~	~~139.7 x 5.0~~
~~CHS 350~~	~~600~~	~~60.3 x 2.9~~	~~88.9 x 2.6~~	~~101.6 x 3.2~~	~~114.3 x 3.6~~	~~139.7 x 3.5~~
~~CHS 350~~	~~1200~~	~~60.3 x 2.9~~	~~88.9 x 2.6~~	~~101.6 x 3.2~~	~~114.3 x 3.6~~	~~139.7 x 3.5~~
~~CHS 350~~	~~1800~~	~~60.3 x 2.9~~	~~101.6 x 2.6~~	~~114.3 x 3.2~~	~~114.3 x 3.6~~	~~139.7 x 3.5~~
~~CHS 350~~	~~2400~~	~~76.1 x 2.3~~	~~101.6 x 2.6~~	~~114.3 x 3.2~~	~~139.7 x 3.0~~	~~139.7 x 3.5~~
~~CHS 350~~	~~3600~~	~~88.9 x 2.6~~	~~101.6 x 2.6~~	~~114.3 x 3.2~~	~~139.7 x 3.0~~	~~165.1 x 3.0~~
~~SHS 350~~	~~600~~	~~50 x 50 x 2.5~~	~~75 x 75 x 2.5~~	~~75 x 75 x 4.0~~	~~100 x 100 x 4.0~~	~~100 x 100 x 4.0~~
~~SHS 350~~	~~1200~~	~~65 x 65 x 2.0~~	~~75 x 75 x 2.5~~	~~75 x 75 x 4.0~~	~~100 x 100 x 4.0~~	~~100 x 100 x 4.0~~
~~SHS 350~~	~~1800~~	~~65 x 65 x 2.0~~	~~75 x 75 x 3.0~~	~~100 x 100 x 3.0~~	~~100 x 100 x 4.0~~	~~100 x 100 x 4.0~~
~~SHS 350~~	~~2400~~	~~65 x 65 x 2.0~~	~~75 x 75 x 3.0~~	~~100 x 100 x 3.0~~	~~100 x 100 x 4.0~~	~~100 x 100 x 5.0~~
~~SHS 350~~	~~3600~~	~~65 x 65 x 2.5~~	~~75 x 75 x 4.0~~	~~100 x 100 x 3.0~~	~~100 x 100 x 4.0~~	~~100 x 100 x 5.0~~
~~SHS 450~~	~~600~~	~~50 x 50 x 1.6~~	~~65 x 65 x 2.5~~	~~75 x 75 x 3.0~~	~~100 x 100 x 2.8~~	~~100 x 100 x 3.3~~
~~SHS 450~~	~~1200~~	~~50 x 50 x 1.6~~	~~65 x 65 x 2.5~~	~~75 x 75 x 3.0~~	~~100 x 100 x 3.0~~	~~100 x 100 x 3.3~~
~~SHS 450~~	~~1800~~	~~50 x 50 x~~	~~75 x 75 x 2.3~~	~~75 x 75 x 3.3~~	~~100 x 100 x 3.0~~	~~100 x 100 x 3.8~~

~~Column section~~	~~Column effective height (mm)~~	~~Floor area supported: 5 m2~~	~~Floor area supported: 10 m2~~	~~Floor area supported: 15 m2~~	~~Floor area supported: 20 m2~~	~~Floor area supported: 25 m2~~
~~SHS 450~~	~~2400~~	~~65 x 65 x 2.0~~	~~75 x 75 x 2.5~~	~~75 x 75 x 3.5~~	~~100 x 100 x 3.0~~	~~100 x 100 x 3.8~~
~~SHS 450~~	~~3660.3 x 3.600~~	~~65 x 65 x 2.3~~	~~100 x 100 x 2.0~~	~~100 x 100 x 2.8~~	~~100 x 100 x 3.8~~	~~100 x 100 x 4.0~~

Table Notes:

~~Tabulated values are the column sections to be used.~~

Table 6.3.3b: ~~**Columns – supporting tile roof only**~~

~~Column section~~	~~Column effective height (mm)~~	~~5 m^2~~	~~10 m^2~~	~~15 m^2~~	~~20 m^2~~	~~25 m^2~~
~~CHS 250~~	~~600~~	~~60.3 x 3.6~~	~~60.3 x 3.6~~	~~76.1 x 3.6~~	~~76.1 x 4.5~~	~~88.9 x 4.0~~
~~CHS 250~~	~~1200~~	~~60.3 x 3.6~~	~~60.3 x 3.6~~	~~76.1 x 3.6~~	~~76.1 x 4.5~~	~~101.6 x 4.0~~
~~CHS 250~~	~~1800~~	~~60.3 x 3.6~~	~~60.3 x 3.6~~	~~76.1 x 3.6~~	~~76.1 x 4.5~~	~~101.6 x 4.0~~
~~CHS 250~~	~~2400~~	~~60.3 x 3.6~~	~~60.3 x 4.5~~	~~76.1 x 3.6~~	~~88.9 x 4.0~~	~~101.6 x 4.0~~
~~CHS 250~~	~~3600~~	~~60.3 x 3.6~~	~~76.1 x 3.6~~	~~76.1 x 4.5~~	~~88.9 x 4.0~~	~~101.6 x 4.0~~
~~CHS 350~~	~~600~~	~~60.3 x 2.3~~	~~60.3 x 2.3~~	~~76.1 x 2.3~~	~~88.9 x 2.6~~	~~101.6 x 2.6~~
~~CHS 350~~	~~1200~~	~~60.3 x 2.3~~	~~60.3 x 2.9~~	~~76.1 x 2.3~~	~~88.9 x 2.6~~	~~101.6 x 2.6~~
~~CHS 350~~	~~1800~~	~~60.3 x 2.3~~	~~60.3 x 2.9~~	~~88.9 x 2.6~~	~~88.9 x 2.6~~	~~101.6 x 2.6~~
~~CHS 350~~	~~2400~~	~~60.3 x 2.3~~	~~76.1 x 2.3~~	~~88.9 x 2.6~~	~~88.9 x 2.6~~	~~101.6 x 2.6~~
~~CHS 350~~	~~3600~~	~~60.3 x 2.3~~	~~76.1 x 2.3~~	~~88.9 x 2.6~~	~~101.6 x 2.6~~	~~101.6 x 2.6~~
~~SHS C350~~	~~600~~	~~50 x 50 x 2.0~~	~~50 x 50 x 2.5~~	~~65 x 65 x 2.5~~	~~75 x 75 x 2.5~~	~~75 x 75 x 3.0~~
~~SHS C350~~	~~1200~~	~~50 x 50 x 2.0~~	~~50 x 50 x 2.5~~	~~65 x 65 x 2.5~~	~~75 x 75 x 2.5~~	~~75 x 75 x 3.0~~
~~SHS C350~~	~~1800~~	~~50 x 50 x 2.0~~	~~65 x 65 x 2.0~~	~~65 x 65 x 2.5~~	~~75 x 75 x 2.5~~	~~75 x 75 x 3.0~~
~~SHS C350~~	~~2400~~	~~50 x 50 x 2.0~~	~~65 x 65 x 2.0~~	~~65 x 65 x 2.5~~	~~75 x 75 x 2.5~~	~~75 x 75 x 4.0~~
~~SHS C350~~	~~3600~~	~~50 x 50 x 2.5~~	~~65 x 65 x 2.5~~	~~75 x 75 x 2.5~~	~~75 x 75 x 3.0~~	~~75 x 75 x 4.0~~
~~SHS C450~~	~~600~~	~~50 x 50 x 1.6~~	~~50 x 50 x 2.0~~	~~65 x 65 x 2.0~~	~~65 x 65 x 2.3~~	~~65 x 65 x 2.8~~
~~SHS C450~~	~~1200~~	~~50 x 50 x 1.6~~	~~50 x 50 x 2.0~~	~~65 x 65 x 2.0~~	~~65 x 65 x 2.3~~	~~65 x 65 x 2.8~~
~~SHS C450~~	~~1800~~	~~50 x 50 x 1.6~~	~~65 x 65 x 1.6~~	~~65 x 65 x 2.0~~	~~65 x 65 x 2.5~~	~~75 x 75 x 2.5~~
~~SHS C450~~	~~2400~~	~~50 x 50 x 1.6~~	~~50 x 50 x 2.5~~	~~65 x 65 x 2.3~~	~~75 x 75 x 2.3~~	~~75 x 75 x 2.8~~
~~SHS C450~~	~~3600~~	~~50 x 50 x 2.0~~	~~65 x 65 x 2.0~~	~~75 x 75 x 2.3~~	~~100 x 100 x 2.0~~	~~100 x 100 x 2.3~~

Table Notes:

~~Tabulated values are the column sections to be used.~~

Table 6.3.3c: ~~**Determining effective column height—column height factor (F1)**~~

~~Base detail~~	~~Fully braced [1] construction~~	~~Unbraced construction (cantilever columns) [2]~~
~~Cast into footing~~	~~1.00~~	~~2.60~~
~~Fixed by bolts to footing or slab~~	~~1.20~~	~~must not be used~~
~~Fixed by intermediate floor or bracing in both directions~~	~~1:20~~	~~2.60~~

Table Notes:

1. ~~To determine the column effective height, the actual column height (H) in Figure 6.3.3a must be multiplied by a column height factor (F1) in Table 6.3.3c.~~
2. ~~H = Distance measured from the top of footing to underside of supported beam or bearer, or between intermediate lateral bracing points.~~
3. ~~The flooring system must be fully braced to footing level by —~~
   a. ~~a combination of column bracing sets, and timber or masonry bracing walls; or~~
   b. ~~the provision of cantilever steel columns only (i.e. no column bracing sets, timber or masonry bracing walls).~~

Table 6.3.6a: **Required column section — columns supporting tiled floor and tiled roof load — roof load area = 0 m^2**

Column section	Effective height (mm)	Floor load area (m^2)		
		4	10	16
CHS 250	2400	60.3 x 4.5 CHS	88.9 x 5 CHS	114.3 x 4.5 CHS
CHS 250	2700	60.3 x 4.5 CHS	88.9 x 5 CHS	114.3 x 4.5 CHS
CHS 250	3000	60.3 x 4.5 CHS	88.9 x 5 CHS	114.3 x 4.5 CHS
CHS 250	3300	60.3 x 5.4 CHS	88.9 x 5 CHS	114.3 x 5.4 CHS
CHS 250	3600	60.3 x 5.4 CHS	88.9 x 5 CHS	114.3 x 5.4 CHS
CHS 350	2400	60.3 x 2.9 CHS	88.9 x 3.2 CHS	114.3 x 3.2 CHS
CHS 350	2700	60.3 x 2.9 CHS	88.9 x 3.2 CHS	114.3 x 3.2 CHS
CHS 350	3000	60.3 x 2.9 CHS	88.9 x 3.2 CHS	114.3 x 3.2 CHS
CHS 350	3300	76.1 x 2.3 CHS	88.9 x 3.2 CHS	114.3 x 3.2 CHS
CHS 350	3600	76.1 x 2.3 CHS	101.6 x 2.6 CHS	114.3 x 3.2 CHS
SHS 350	2400	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 350	2700	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 350	3000	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 350	3300	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 350	3600	65 x 65 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 450	2400	50 x 50 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	2700	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3000	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3300	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3600	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 1.16 kN/m permanent wall, 0.85 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are 1.35G and 1.2G + 1.5Q for ULS.
3. Columns are assumed to be simply-supported at both ends with an effective length factor of 1.
4. A maximum load eccentricity of 100 mm has been accounted for in the columns.
5. A roof load area of “0” must be used for columns not supporting roof loads.
6. The length of wall load allowed for is equal to the square root of the floor area.

Table 6.3.6b: Required column section — columns supporting tiled floor and tiled roof load — roof load area = 9 m^2

Column section	Effective height (mm)	Floor load area (m^2)		
		4	10	16
CHS 250	2400	76.1 x 4.5 CHS	101.6 x 5 CHS	114.3 x 5.4 CHS
CHS 250	2700	76.1 x 4.5 CHS	101.6 x 5 CHS	114.3 x 5.4 CHS
CHS 250	3000	76.1 x 5.9 CHS	101.6 x 5 CHS	139.7 x 5 CHS
CHS 250	3300	76.1 x 5.9 CHS	101.6 x 5 CHS	139.7 x 5 CHS
CHS 250	3600	76.1 x 5.9 CHS	101.6 x 5 CHS	139.7 x 5 CHS
CHS 350	2400	76.1 x 3.2 CHS	101.6 x 3.2 CHS	139.7 x 3 CHS
CHS 350	2700	76.1 x 3.2 CHS	101.6 x 3.2 CHS	139.7 x 3 CHS
CHS 350	3000	76.1 x 3.2 CHS	114.3 x 3.2 CHS	139.7 x 3 CHS
CHS 350	3300	88.9 x 2.6 CHS	114.3 x 3.2 CHS	139.7 x 3 CHS
CHS 350	3600	88.9 x 2.6 CHS	114.3 x 3.2 CHS	139.7 x 3 CHS
SHS 350	2400	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 350	2700	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 350	3000	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 350	3300	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 350	3600	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 450	2400	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	2700	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3000	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 450	3300	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 450	3600	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 1.16 kN/m permanent wall, 0.85 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are 1.35G and 1.2G + 1.5Q for ULS.
3. Columns are assumed to be simply-supported at both ends with an effective length factor of 1.
4. A maximum load eccentricity of 100 mm has been accounted for in the columns.
5. A roof load area of "0" must be used for columns not supporting roof loads.
6. The length of wall load allowed for is equal to the square root of the floor area.

Table 6.3.6c: Required column section — columns supporting tiled floor and tiled roof load — roof load area = 18 m^2

Column section	Effective height (mm)	Floor load area (m^2)		
		4	10	16
CHS 250	2400	88.9 x 5 CHS	114.3 x 5.4 CHS	139.7 x 5 CHS
CHS 250	2700	88.9 x 5 CHS	114.3 x 5.4 CHS	139.7 x 5 CHS
CHS 250	3000	88.9 x 5 CHS	114.3 x 5.4 CHS	139.7 x 5 CHS
CHS 250	3300	88.9 x 5.9 CHS	114.3 x 5.4 CHS	139.7 x 5 CHS
CHS 250	3600	88.9 x 5.9 CHS	114.3 x 5.4 CHS	139.7 x 5 CHS
CHS 350	2400	101.6 x 2.6 CHS	114.3 x 3.6 CHS	139.7 x 3.5 CHS

Column section	Effective height (mm)	Floor load area (m^2)		
		4	10	16
CHS 350	2700	101.6 x 2.6 CHS	114.3 x 3.6 CHS	139.7 x 3.5 CHS
CHS 350	3000	101.6 x 3.2 CHS	114.3 x 3.6 CHS	139.7 x 3.5 CHS
CHS 350	3300	101.6 x 3.2 CHS	114.3 x 3.6 CHS	139.7 x 3.5 CHS
CHS 350	3600	101.6 x 3.2 CHS	114.3 x 3.6 CHS	139.7 x 3.5 CHS
SHS 350	2400	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS	100 x 100 x 4 SHS
SHS 350	2700	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS	100 x 100 x 4 SHS
SHS 350	3000	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS	100 x 100 x 5 SHS
SHS 350	3300	100 x 100 x 3 SHS	100 x 100 x 4 SHS	100 x 100 x 5 SHS
SHS 350	3600	100 x 100 x 3 SHS	100 x 100 x 4 SHS	100 x 100 x 5 SHS
SHS 450	2400	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 450	2700	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 450	3000	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 450	3300	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 450	3600	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS

Table Notes:

1. Load accounted for includes 0.98 kPa permanent floor, 1.16 kN/m permanent wall, 0.85 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are 1.35G and 1.2G + 1.5Q for ULS.
3. Columns are assumed to be simply-supported at both ends with an effective length factor of 1.
4. A maximum load eccentricity of 100 mm has been accounted for in the columns.
5. A roof load area of "0" must be used for columns not supporting roof loads.
6. The length of wall load allowed for is equal to the square root of the floor area.

Table 6.3.6d: **Required column section — columns supporting timber floor and metal roof load — roof load area = 0 m^2**

Column section	Effective height (mm)	Floor load area (m^2)		
		4	10	16
CHS 250	2400	60.3 x 3.6 CHS	76.1 x 5.9 CHS	101.6 x 5 CHS
CHS 250	2700	60.3 x 3.6 CHS	76.1 x 5.9 CHS	101.6 x 5 CHS
CHS 250	3000	60.3 x 4.5 CHS	76.1 x 5.9 CHS	101.6 x 5 CHS
CHS 250	3300	60.3 x 4.5 CHS	76.1 x 5.9 CHS	101.6 x 5 CHS
CHS 250	3600	60.3 x 4.5 CHS	88.9 x 5 CHS	101.6 x 5 CHS
CHS 350	2400	60.3 x 2.3 CHS	88.9 x 2.6 CHS	101.6 x 3.2 CHS
CHS 350	2700	60.3 x 2.9 CHS	88.9 x 2.6 CHS	114.3 x 3.2 CHS
CHS 350	3000	60.3 x 2.9 CHS	88.9 x 3.2 CHS	114.3 x 3.2 CHS
CHS 350	3300	60.3 x 2.9 CHS	88.9 x 3.2 CHS	114.3 x 3.2 CHS
CHS 350	3600	60.3 x 2.9 CHS	88.9 x 3.2 CHS	114.3 x 3.2 CHS
SHS 350	2400	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 350	2700	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 350	3000	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 350	3300	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 350	3600	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS

Column section	Effective height (mm)	Floor load area (m^2)		
		4	10	16
SHS 450	2400	50 x 50 x 2 SHS	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS
SHS 450	2700	50 x 50 x 2 SHS	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS
SHS 450	3000	50 x 50 x 2 SHS	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS
SHS 450	3300	50 x 50 x 2.5 SHS	89 x 89 x 3.5 SHS	89 x 89 x 3.5 SHS
SHS 450	3600	50 x 50 x 2.5 SHS	89 x 89 x 3.5 SHS	89 x 89 x 3.5 SHS

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 1.16 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are 1.35G and 1.2G + 1.5Q for ULS.
3. Columns are assumed to be simply-supported at both ends with an effective length factor of 1.
4. A maximum load eccentricity of 100 mm has been accounted for in the columns.
5. A roof load area of "0" must be used for columns not supporting roof loads.
6. The length of wall load allowed for is equal to the square root of the floor area.

Table 6.3.6e: **Required column section — columns supporting timber floor and metal roof load — roof load area = 9 m^2**

Column section	Effective height (mm)	Floor load area (m^2)		
		4	10	16
CHS 250	2400	60.3 x 5.4 CHS	88.9 x 5 CHS	114.3 x 4.5 CHS
CHS 250	2700	76.1 x 3.6 CHS	88.9 x 5 CHS	114.3 x 4.5 CHS
CHS 250	3000	76.1 x 3.6 CHS	88.9 x 5 CHS	114.3 x 4.5 CHS
CHS 250	3300	76.1 x 3.6 CHS	88.9 x 5 CHS	114.3 x 4.5 CHS
CHS 250	3600	76.1 x 4.5 CHS	88.9 x 5.9 CHS	114.3 x 5.4 CHS
CHS 350	2400	76.1 x 2.3 CHS	88.9 x 3.2 CHS	114.3 x 3.2 CHS
CHS 350	2700	76.1 x 2.3 CHS	101.6 x 2.6 CHS	114.3 x 3.2 CHS
CHS 350	3000	76.1 x 3.2 CHS	101.6 x 2.6 CHS	114.3 x 3.2 CHS
CHS 350	3300	76.1 x 3.2 CHS	101.6 x 3.2 CHS	114.3 x 3.2 CHS
CHS 350	3600	76.1 x 3.2 CHS	101.6 x 3.2 CHS	114.3 x 3.2 CHS
SHS 350	2400	65 x 65 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 350	2700	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 350	3000	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 350	3300	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 4 SHS
SHS 350	3600	75 x 75 x 2.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 450	2400	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	2700	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3000	65 x 65 x 2 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3300	65 x 65 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3600	65 x 65 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 1.16 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are 1.35G and 1.2G + 1.5Q for ULS.

3. Columns are assumed to be simply-supported at both ends with an effective length factor of 1.
4. A maximum load eccentricity of 100 mm has been accounted for in the columns.
5. A roof load area of “0” must be used for columns not supporting roof loads.
6. The length of wall load allowed for is equal to the square root of the floor area.

Table 6.3.6f: Required column section — columns supporting timber floor and metal roof load — roof load area = 18 m²

Column section	Effective height (mm)	Floor load area (m^2)		
		4	10	16
CHS 250	2400	76.1 x 4.5 CHS	101.6 x 5 CHS	114.3 x 5.4 CHS
CHS 250	2700	76.1 x 5.9 CHS	101.6 x 5 CHS	114.3 x 5.4 CHS
CHS 250	3000	76.1 x 5.9 CHS	101.6 x 5 CHS	114.3 x 5.4 CHS
CHS 250	3300	76.1 x 5.9 CHS	101.6 x 5 CHS	114.3 x 5.4 CHS
CHS 250	3600	76.1 x 5.9 CHS	101.6 x 5 CHS	114.3 x 5.4 CHS
CHS 350	2400	76.1 x 3.2 CHS	101.6 x 3.2 CHS	114.3 x 3.6 CHS
CHS 350	2700	76.1 x 3.2 CHS	101.6 x 3.2 CHS	114.3 x 3.6 CHS
CHS 350	3000	88.9 x 2.6 CHS	101.6 x 3.2 CHS	114.3 x 3.6 CHS
CHS 350	3300	88.9 x 2.6 CHS	101.6 x 3.2 CHS	114.3 x 3.6 CHS
CHS 350	3600	88.9 x 2.6 CHS	101.6 x 3.2 CHS	114.3 x 3.6 CHS
SHS 350	2400	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 350	2700	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 350	3000	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 350	3300	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 350	3600	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS	100 x 100 x 4 SHS
SHS 450	2400	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	2700	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3000	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3300	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS
SHS 450	3600	75 x 75 x 2.5 SHS	89 x 89 x 3.5 SHS	100 x 100 x 3 SHS

Table Notes:

1. Load accounted for includes 0.53 kPa permanent floor, 1.16 kN/m permanent wall, 0.4 kPa permanent roof, permanent member self-weight, 1.5 kPa or 1.1kN imposed floor and 0.25 kPa imposed roof.
2. Load combinations included are 1.35G and 1.2G + 1.5Q for ULS.
3. Columns are assumed to be simply-supported at both ends with an effective length factor of 1.
4. A maximum load eccentricity of 100 mm has been accounted for in the columns.
5. A roof load area of “0” must be used for columns not supporting roof loads.
6. The length of wall load allowed for is equal to the square root of the floor area.

Table 6.3.~~3d~~6g: Area supported by columns

Column descriptor (as shown in Figure 6.3.6a~~Figure 6.3.3b~~)	Total area supported
C1	~~0.375L1 x 0.375LA~~0.4L1 x 0.4LA
C2	~~0.625(L1 + L2) x 0.375LA~~0.7(L1 + L2) x 0.4LA
C3	~~0.375L1 x 0.625(LA + LB)~~0.4L1 x 0.7(LA + LB)

Column descriptor (as shown in Figure 6.3.6a~~Figure 6.3.3b~~)	Total area supported
C4	~~0.625(L1 + L2) x 0.625(LA + LB)~~0.7(L1 + L2) x 0.7(LA + LB)
C5	~~0.375L1 x (L cant + 0.5LC)~~0.4L1 + 0.4LC
C6	~~0.625(L1 + L2) x (L cant + 0.5LC)~~0.7(L1 + L2) x 0.4LC

Table Notes:

The total area supported equations marginally overestimate the total area to account for a difference between L1 and L2 by up to 30%.

1. ~~The total area supported depends on the position of the column in the structure as shown in Figure 6.3.3b.~~
2. ~~To calculate the correct area supported by a column, match the column's position with those shown in Figure 6.3.3b. which shows a plan view of a floor and then calculate the total area supported from Table 6.3.3d.~~

Figure 6.3.3a: ~~**Determining effective column height—Column height (H)**~~

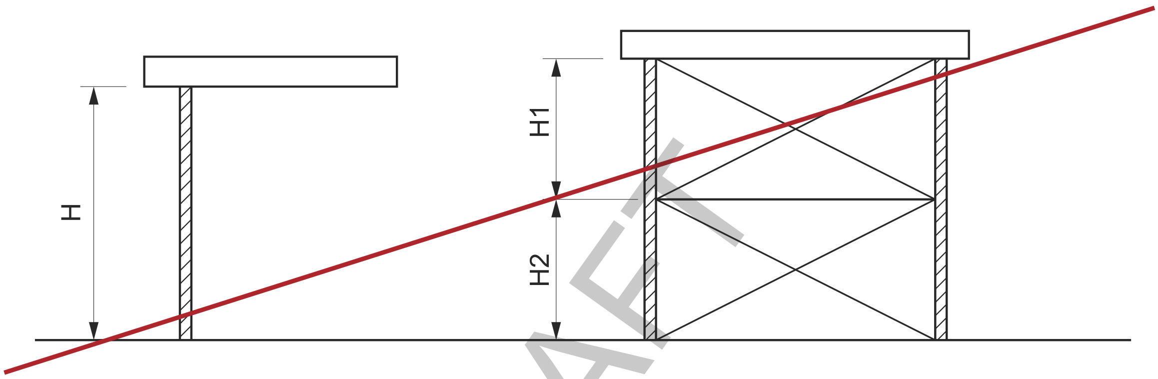


Figure 6.3.~~3b~~6a: **Determining floor area supported by columns**

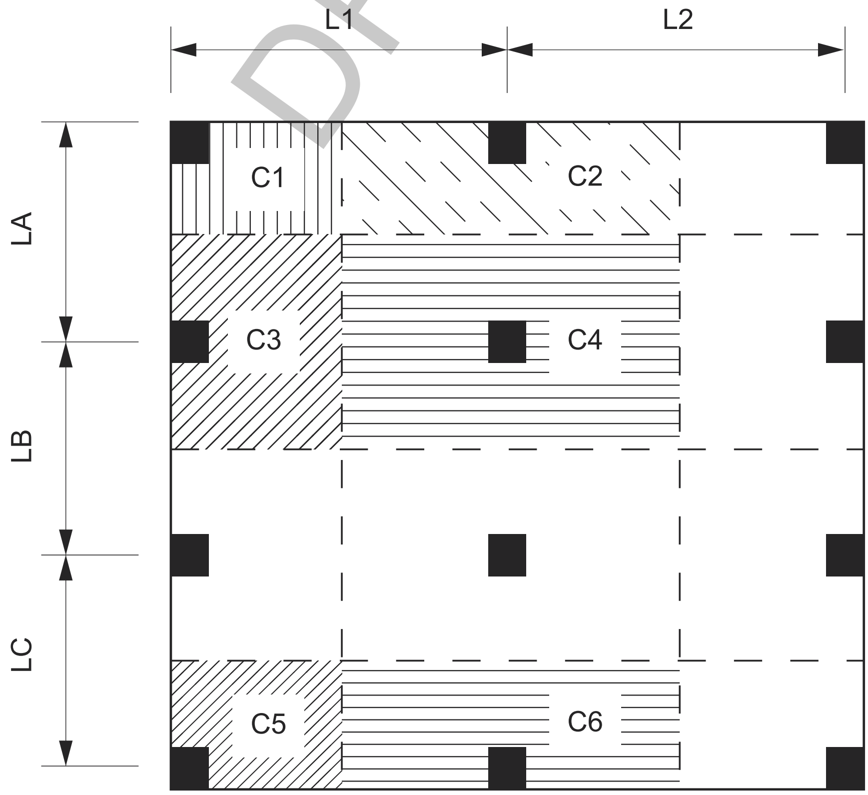
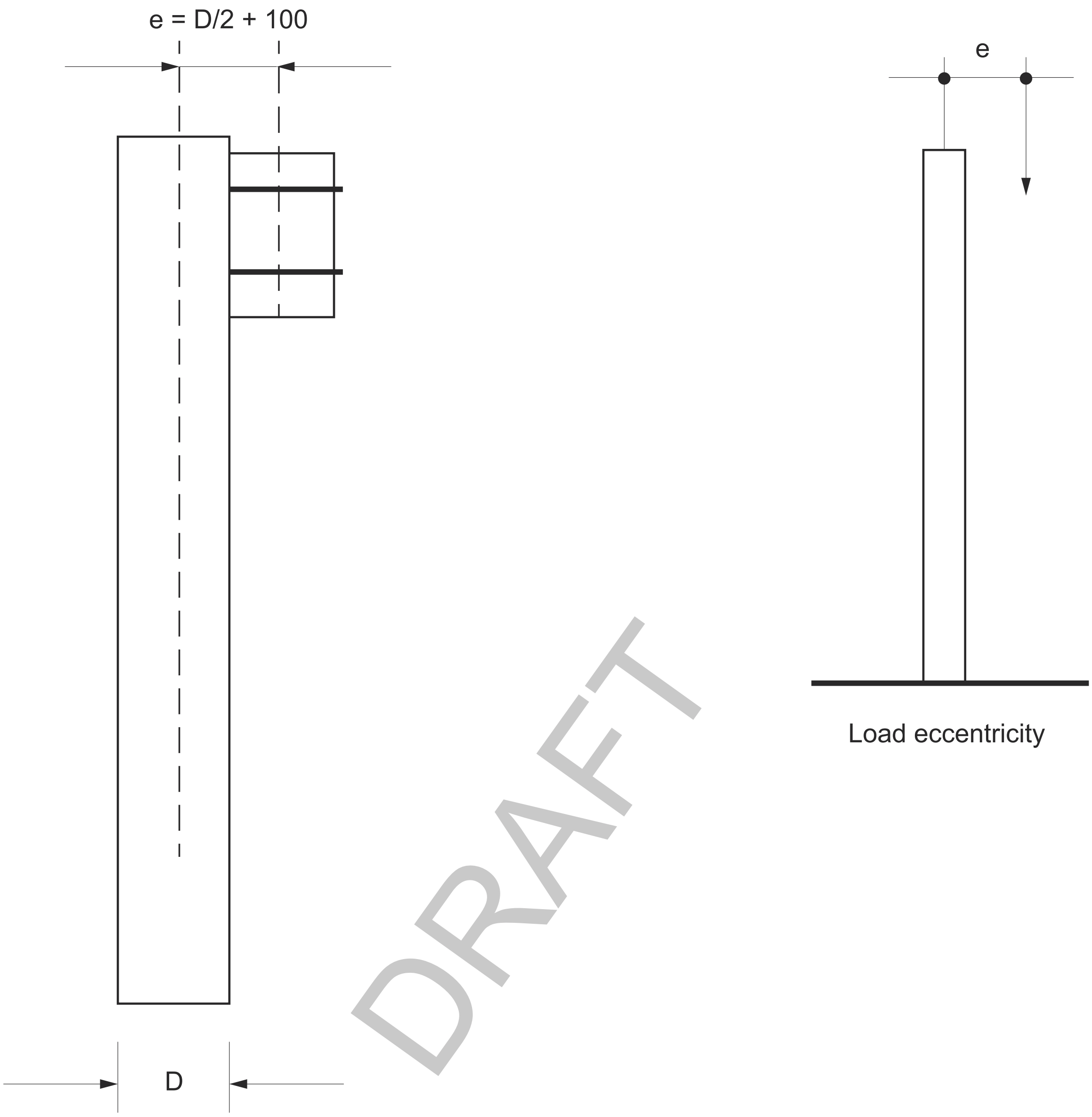


Figure 6.3.~~3c~~6b: **Acceptable load eccentricity for columns**



Explanatory Information: Cantilever columns

A cantilever column is not assisted by any lateral bracing element such as a column bracing set, timber or masonry wall.

Explanatory Information: Calculating column size

The following is an example of the steps required to calculate a suitable column to support typical floor loads in a residential building. It is proposed the column will—

- have an actual height of 1800 mm; and
- support a timber floor only; and
- be square in section; and
- be cast in to the footings; and
- be fully braced by column bracing sets.

Step 1 – Determining effective column height

The column height (H) is determined by multiplying the actual height by the relevant height factor (F1) in Tables 6.3.6d, 6.3.6e or 6.3.6f. In this case, the relevant value for F1 is 1.00 as the column is cast in to the footing and is fully braced.

Therefore:

- H = actual height x F1
- H = 1800 mm x F1
- H = 1800 mm (1.8 m)

Step 2 – Determine floor area to be supported

The column position selected is C4 as shown in Figure 6.3.6b and the dimensions of L1 and L2 are 2700 mm (2.7 m), LA is 1900 mm (1.9 m) and LB is 2100 mm (2.1 m).

The area supported by the column is determined by the formulae set out in Table 6.3.6g.

Therefore:

- Total area supported (A) is 0.625(L1 + L2) x 0.625(LA + LB)
- A = 0.625(2.7 m + 2.7 m) x 0.625 x (1.9 m + 2.1 m)
- A = (0.625 x 5.4 m) x (0.625 x 4.0 m)
- A = 3.38 m x 2.5 m
- A = 8.5 m^2

Step 3 – Select column size from Tables 6.3.6d, 6.3.6e or 6.3.6f

The column with an effective height of 1800 mm supporting a floor area of 8.5 m2 is selected from the 10 m2 column in Table 6.3.6d (“0” roof load area) giving a SHS 350 75 x 75 x 3 size.

It should be noted there is a choice of CHS 250 88.9 x 4 or CHS 350 101.6 x 2.6 should a different section be desired.

6.3.7 Fixings and bearing for structural steel members

[New for 2022]

(1) All bolts used in connections must be hot dip galvanised 300 g/m^2.

(2) Bearer connections must be fixed in accordance with Figure 6.3.7a.

(3) Joists, bearers and lintels must be restrained from lateral movement or twisting along their length by fixing rafters or joists to the top flange of the member so as to prevent the member from moving laterally.

(4) End supports for bearers and lintels must transfer loads to the footings and have a bearing distance as follows:

   (a) For single spans, the bearing distance must be not less than the width of the member.

   (b) For continuous spans, internal bearing must be not less than two times the width of the member.

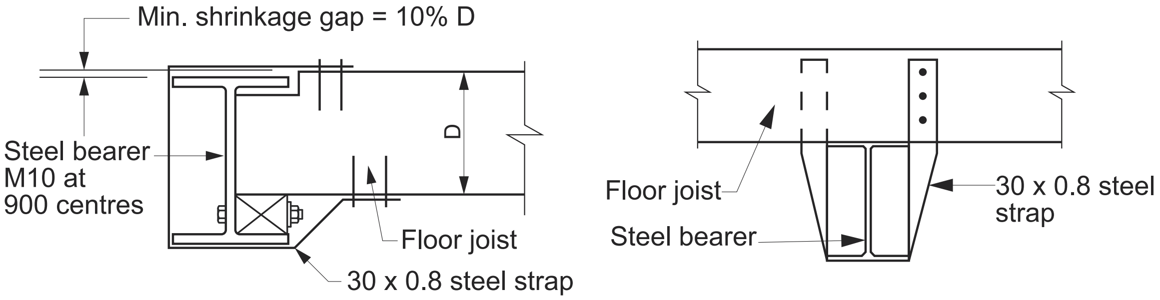
(5) Strutting beams must—

   (a) be supported and fixed in accordance with Figure 6.3.7b; and

   (b) where ends are cut to suit roof pitch, be cut in accordance with Figure 6.3.7c.

(6) Lintels must be fixed in accordance with Figures 6.3.7d, 6.3.7e, 6.3.7f, 6.3.7g and 6.3.7h.

Figure 6.3.~~2a~~7a: Bearer supporting a timber floor and non-loadbearing stud wall



(a) Example A **(b) Example B**

Figure 6.3.7b: Strutting beam supporting roof and ceiling

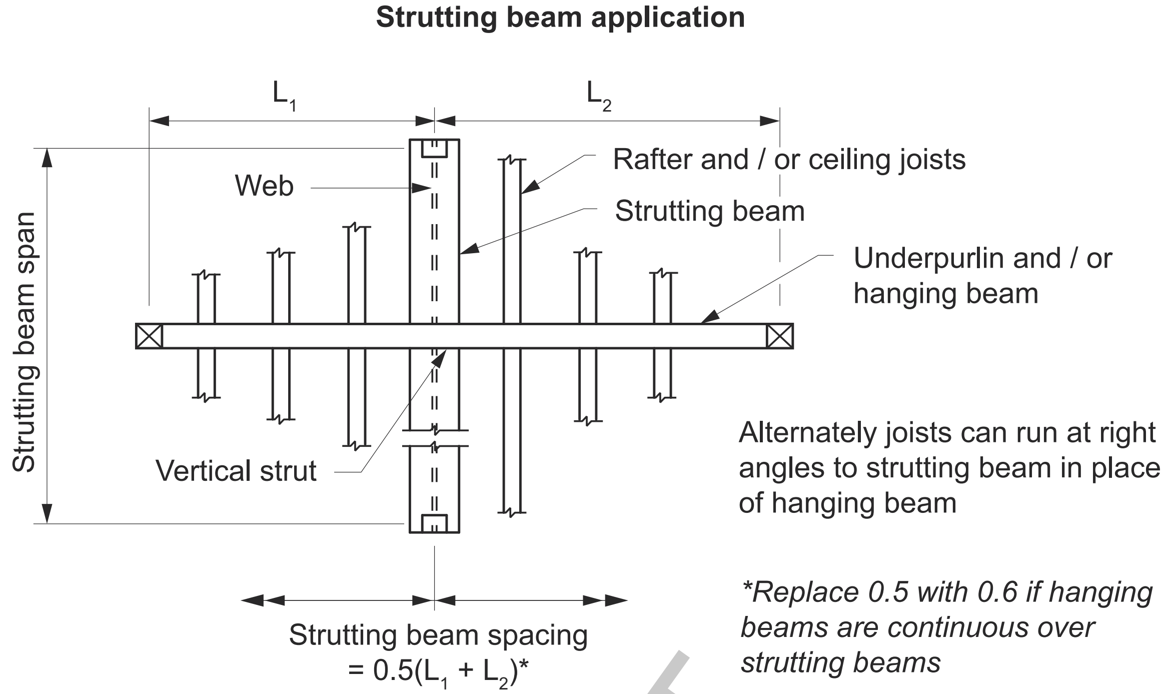


Figure 6.3.7c: End cuts to strutting beams

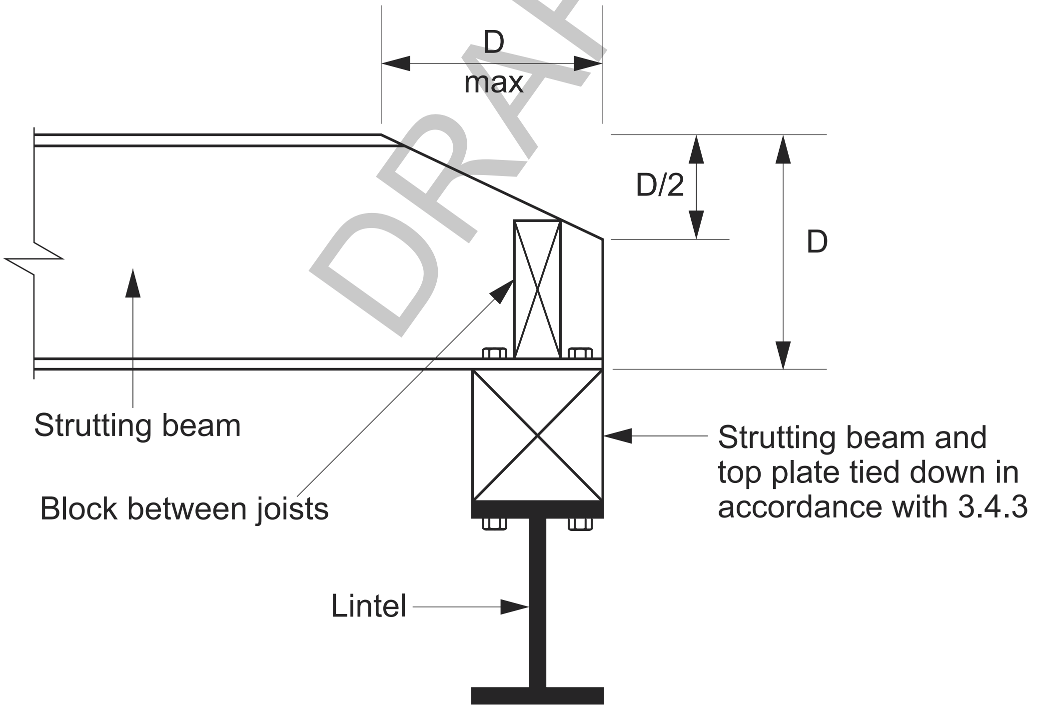
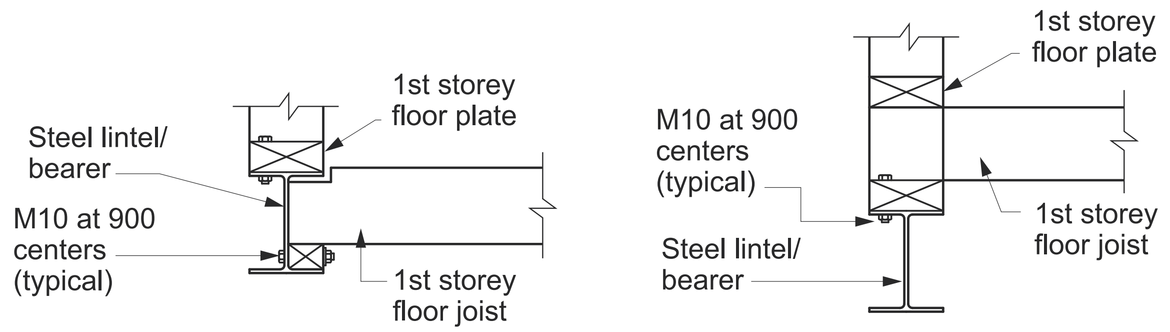


Figure 6.3.~~2c~~7d: Lintels supporting roof, frames and timber floors



(c) Floor – example A

(d) Floor – example B

Figure 6.3.7e: Lintels supporting roof, frames and timber floors — sections

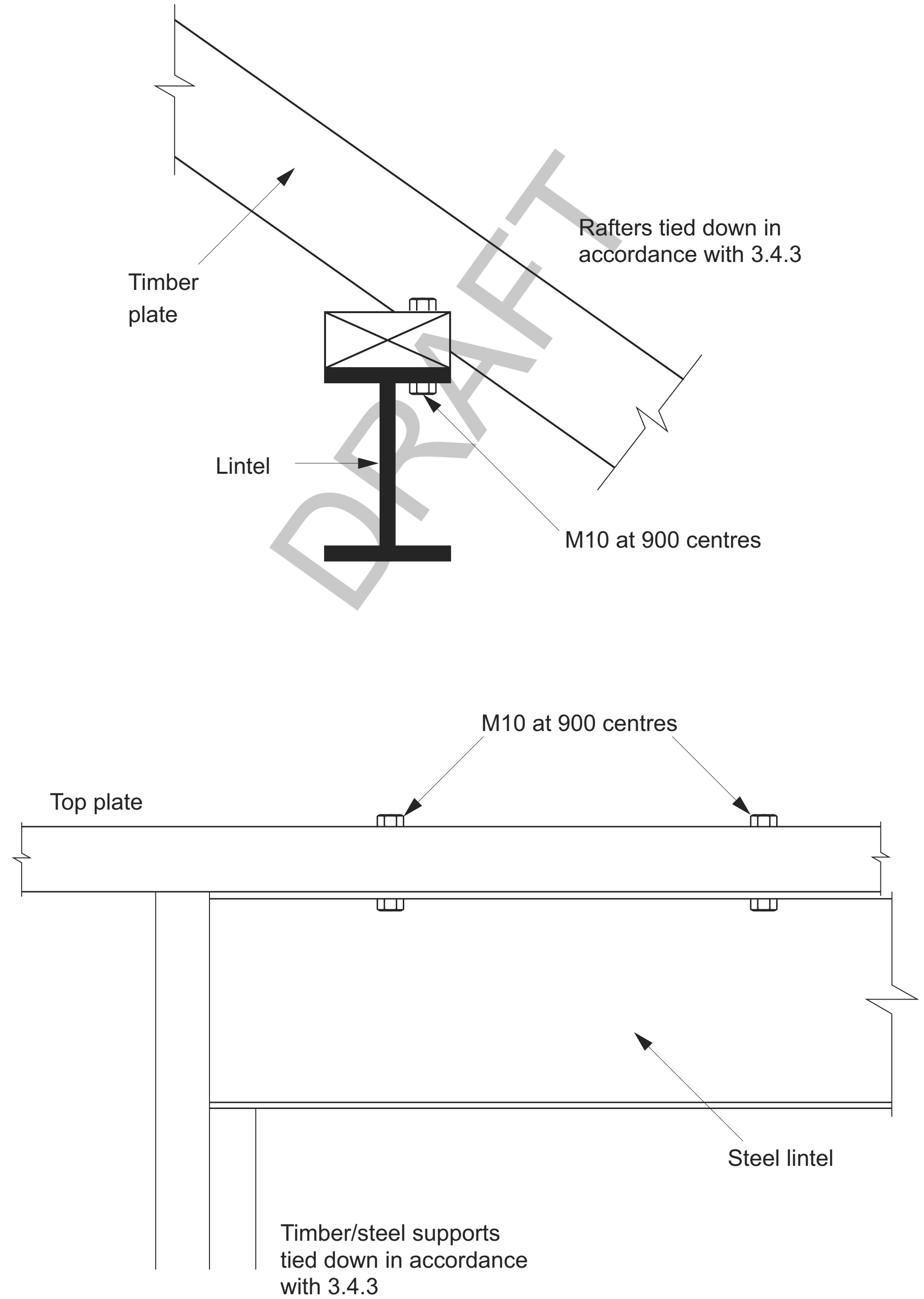


Figure 6.3.7f: Typical universal beam to column connection detail

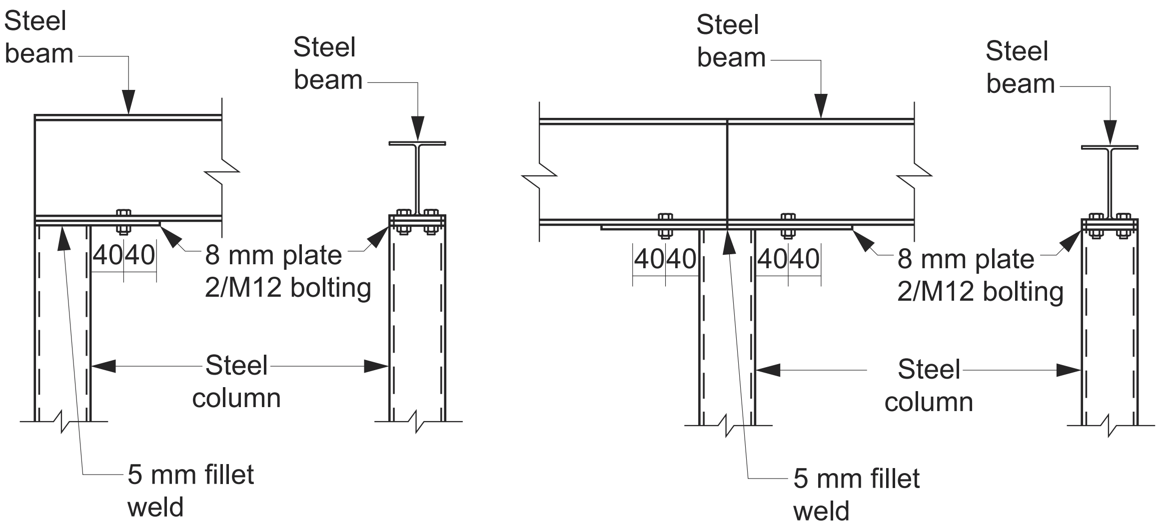


Figure Notes:

1. 8 mm steel plates to be welded to the top and bottom of the column using 5 mm fillet welds.
2. Plate width must be the greater of the column width or the beam width.
3. Plate length must be such that there is not less than 40 mm from the centreline of the bolts to the ends.
4. All bolting between structural steel members be not less than 2 M12 4.6/S.

Figure 6.3.7g: Typical PFC and RHS beam to column connection detail

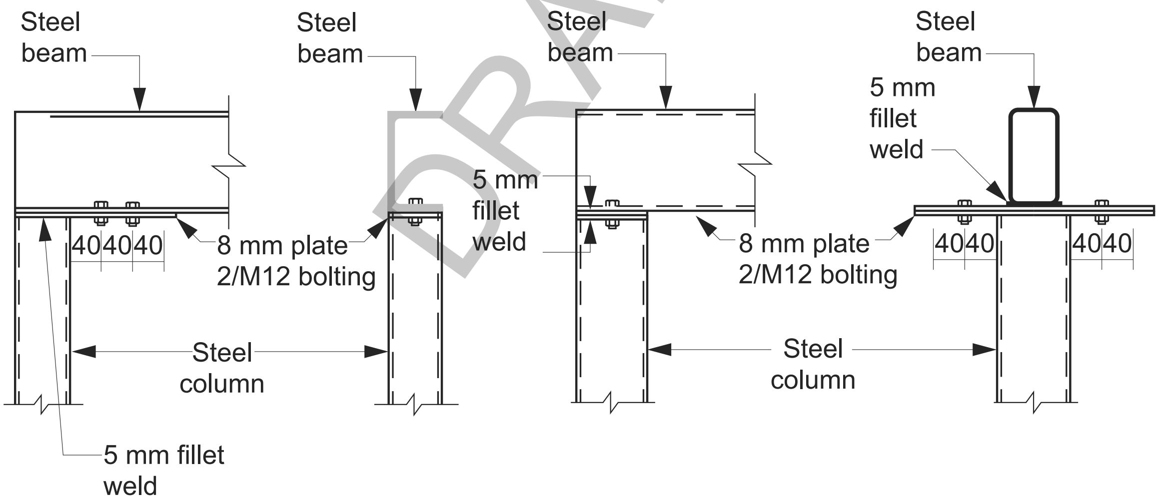
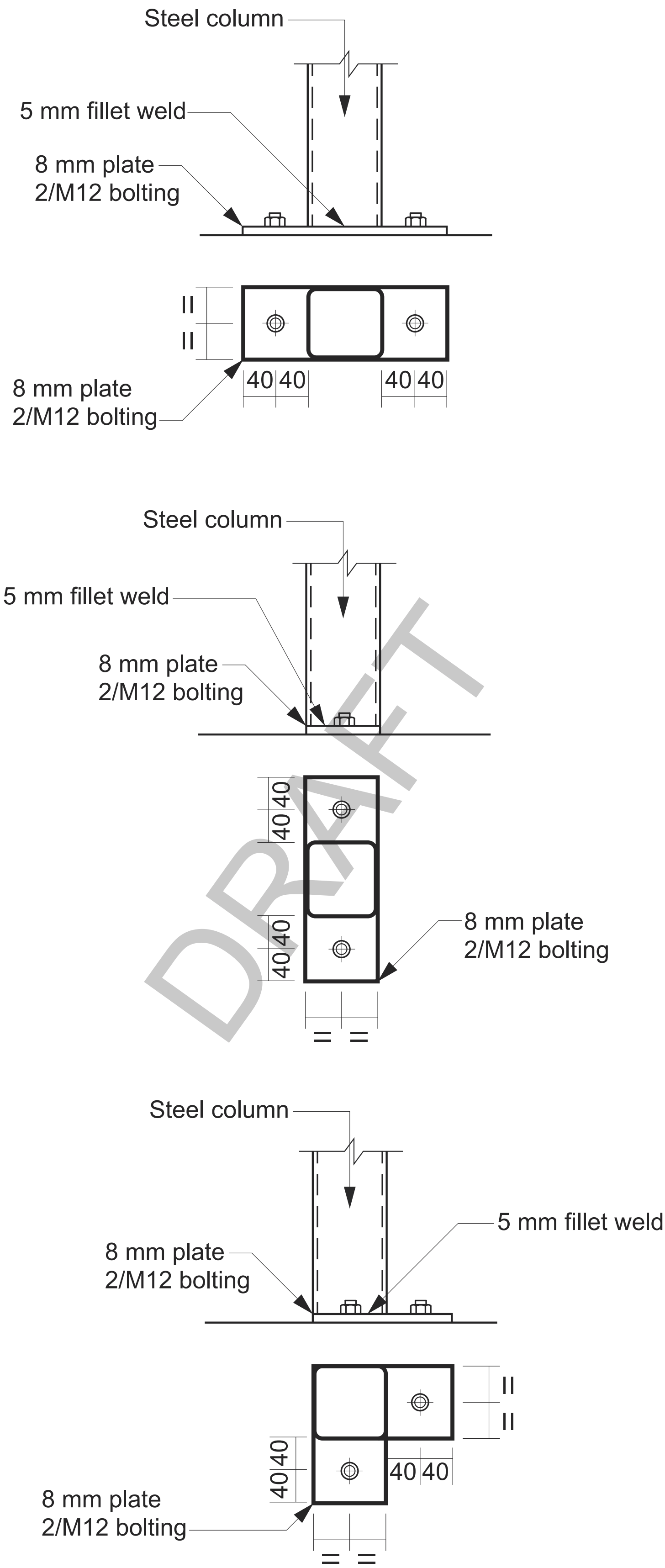


Figure Notes:

Fixing of the column base plate to the slab must be not less than 2 M12 4.6/S post-installed mechanical anchors.

Figure 6.3.7h: Typical column base plate detail



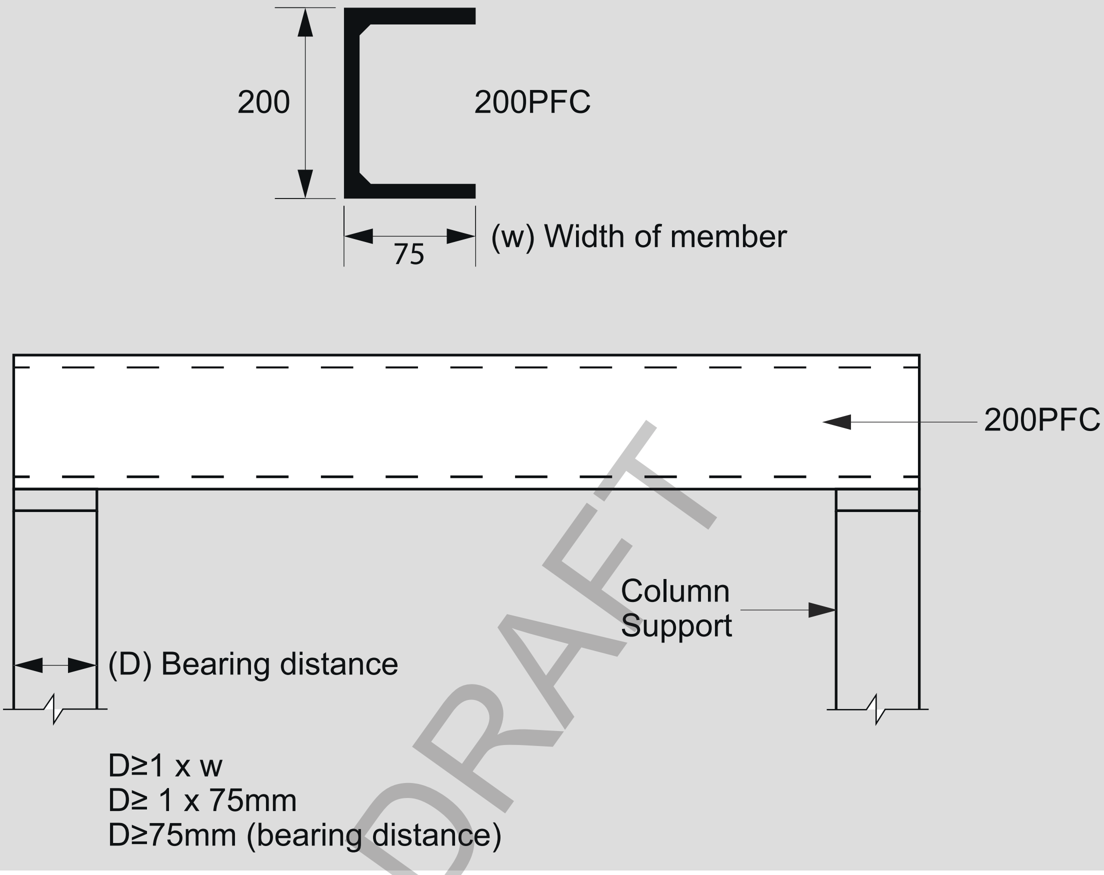
Explanatory Information:

The ends of bearers and lintels must be sufficiently supported to ensure structural loads are transferred to the footing system. The amount of horizontal bearing (measured in millimetres) required on the vertical supports will depend on the type of span of the bearer or lintel. For single spans, the amount of horizontal bearing is to be equal to or greater than the width of the bearer or lintel. For continuous spans it is to be twice the width of the bearer or lintel.

Bearing distance, see 6.3.7(4)(a) and (b).

Explanatory Figure 6.3.7 below depicts an example of a 200 PFC bearer or lintel supporting floor or roof loads over a single span.

Figure 6.3.7 (explanatory): Example of a 200 PFC bearer or lintel supporting floor or roof loads over a single span

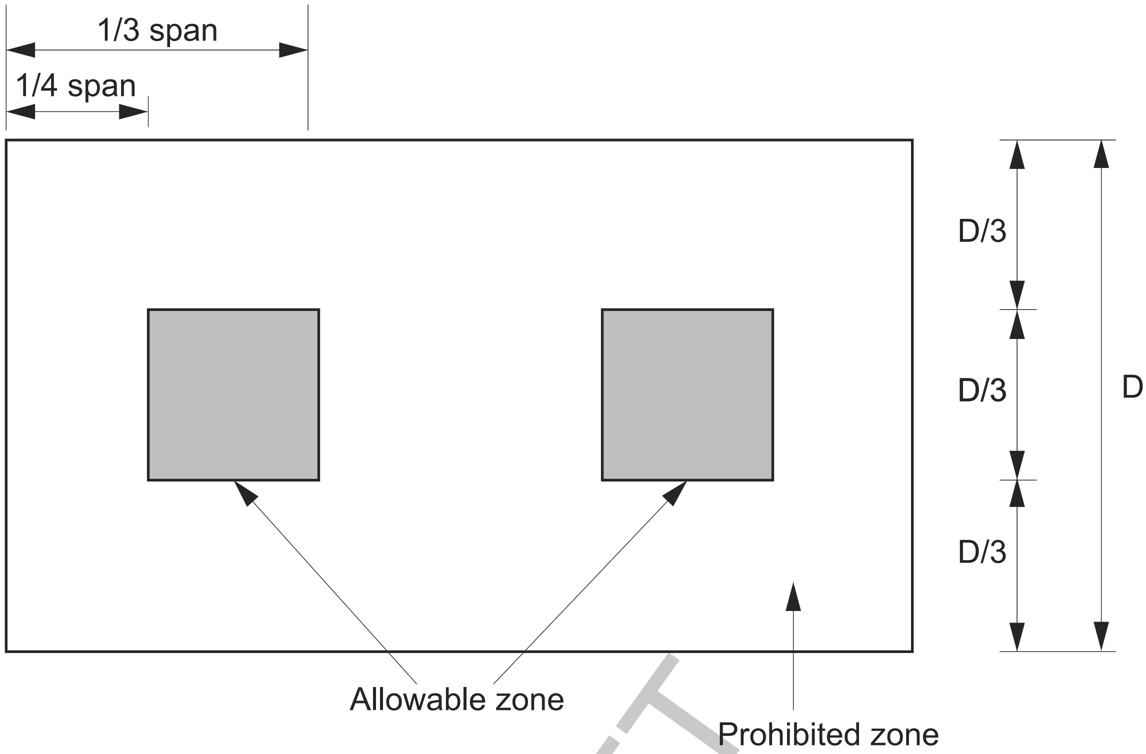


6.3.8 Cuts and penetrations through structural steel members

[New for 2022]

Penetrations through structural steel members must be within the allowable zones in Figure 6.3.8.

Figure 6.3.8: Allowable zones for penetrations through structural steel members



Explanatory Information:

Cutting and penetrations in structural steel should be avoided where possible. Figure 6.3.8 provides permissible zones for penetrations through structural steel and for end cuts to beams. However, it is recommended that a suitable qualified professional be consulted where penetrations or cuts are required to be made on site.

6.3.~~4~~9 Corrosion protection

[2019: 3.4.4.4]

(1) ~~Structural steel members that are not built into a masonry wall must be protected against corrosion in accordance with Table 6.3.4.~~

(1) Structural steel members that are not built in to a masonry wall must—

(a) be protected against corrosion in accordance with Tables 6.3.9a, 6.3.9b and 6.3.9c; and

(b) where a paint finish is applied to the surface, be free from rust; and

(c) where zinc coatings are applied to the surface, be provided with a barrier coat to prevent domestic enamels from peeling.

Table 6.3.9a: Minimum protective coatings for structural steel members

Environment	Location	Minimum protective coating		
		Option 1 (hot dip galvanising)	Option 2 (duplex system)	Option 3 (paint)
Low (mild steel corrosion rate 1.3 to 25 µm/year	Typically remote inland areas or more than 1 km from sheltered bays	HDG75	–	ACL2, ACC2, IZS1, PUR2A
Medium (mild steel corrosion rate 25 to	Typically more than 1 km from *breaking surf*	HDG225	–	ACL3, ACC4, ACC5, IZS1, PUR3, PUR4

Environment	Location	Minimum protective coating		
		Option 1 (hot dip galvanising)	Option 2 (duplex system)	Option 3 (paint)
High (mild steel corrosion rate 50 to 80 µm/year)	Typically more than 200 m from *breaking surf* or aggressive industrial areas or within 50 m from sheltered bays	HDG450	HDG150 (5 years) 4D (10-15 years) or HDG300 (10 years) 2D (5-10 years)	ACC6, IZS3, PUR5
Very High (mild steel corrosion rate 80 to 200 µm/year)	Typically extends from 100 m inland from *breaking surf* to 200 m inland from *breaking surf*, or within 200 m of aggressive industrial areas and within 100 m of *breaking surf*.	HDG900	HDG300 (5 years) 5D (10-15 years) or HDG600 (10 years) 4D (5-10 years)	ACC6 (C5-M only), PUR5

Table Notes:

Hot dip galvanising and duplex systems in accordance with AS 2312.2, paint systems in accordance with AS 2312.1.

Table 6.3.9b: Paint coating system specification

AS 2312.1 system	Surface preparation	1st coat		2nd coat		3rd coat		Total DFT
		Type of paint	DFT	Type of paint	DFT	Type of paint	DFT	
ACC2	Sa 2.5	Epoxy primer	75	Acrylic (2 pack)	50	–	–	125
ACC4	Sa 2.5	Epoxy primer	75	High build epoxy	125	Acrylic (2 pack)	50	250
ACC5	Sa 2.5	Zinc rich primer	75	High build epoxy	125	Acrylic (2 pack)	50	250
ACC6	Sa 2.5	Zinc rich primer	75	High build epoxy	200	Acrylic (2 pack)	50	325
ACL2	Sa 2.5	Zinc rich primer	75	Acrylic latex	40	Acrylic latex	40	155
ACL3	Sa 2.5	Zinc rich primer	75	High build epoxy	125	Acrylic latex	40	240
IZS1	Sa 2.5	Inorganic zinc silicate	75	–	–	–	–	75
IZS3	Sa 2.5	Inorganic zinc silicate	125	–	–	–	–	125
PUR2A	Sa 2.5	Zinc rich primer	75	High build polyurethane	75	–	–	150
PUR3	Sa 2.5	Epoxy primer	75	High build epoxy	125	Polyurethane gloss	50	250
PUR4	Sa 2.5	Zinc rich primer	75	High build epoxy	125	Polyurethane gloss	50	250
PUR5	Sa 2.5	Zinc rich primer	75	High build epoxy	200	Polyurethane gloss	50	325

Table Notes:

DFT refers to Dry Film Thickness, measured in μm.

Table 6.3.9c: **Duplex coating system specification**

AS 2312.2 duplex system	Surface preparation	1st coat		2nd coat		3rd coat		Total DFT
		Type of paint	DFT	Type of paint	DFT	Type of paint	DFT	
2D	Degrease, wash and dry, sweep blast clean	Epoxy primer (2 pack) inhibitive	75	Polyurethane or acrylic gloss (2 pack)	100	–	–	175
4D	Degrease, wash and dry, sweep blast clean	High-build epoxy (2 pack)	250	Polyurethane or acrylic gloss (2 pack)	100	–	–	350
5D	Degrease, wash and dry, sweep blast clean	Epoxy primer (2 pack) inhibitive	75	High-build epoxy (2 pack)	225	Polyurethane or acrylic gloss (2 pack)	100	400

Table Notes:

DFT refers to Dry Film Thickness, measured in µm.

Table 6.3.4: ~~**Protective coatings for steelwork**~~

~~Environment~~	~~Location~~	~~Minimum protective coating~~
~~Moderate~~ ~~[Note 1]~~	~~Internal~~	~~No protection *required* in a permanently dry location~~ ~~[Note 8]~~
~~Moderate~~ ~~[Note 1]~~	~~External~~	~~Option 1: 2 coats alkyd primer~~
		~~Option 2: 2 coats alkyd gloss~~
		~~Option 3: Hot dip galvanised 300 g/m² min~~
		~~Option 4: Hot dip galvanised 100 g/m² min plus either 1 coat solvent based vinyl primer or 1 coat vinyl gloss or alkyd~~
~~Severe~~ ~~[Note 2]~~	~~Internal~~	~~Option 1: 2 coats alkyd primer~~
		~~Option 2: 2 coats alkyd gloss~~
~~Severe~~ ~~[Note 2]~~	~~External~~	~~Option 1: Inorganic zinc primer plus 2 coats vinyl gloss finishing coats~~
		~~Option 2: Hot dip galvanised 300 g/m²~~
		~~Option 3: Hot dip galvanised 100 g/m² min plus either 2 coats solvent based vinyl primer, or 2 coats vinyl gloss or alkyd~~

Table Notes:

1. ~~Moderate = More than 1 km from *breaking surf* or more than 100 m from salt water not subject to *breaking surf* or non-heavy industrial areas.~~
2. ~~Severe = Within 1 km from *breaking surf* or within 100 m of salt water not subject to *breaking surf* or heavy industrial areas.~~
3. ~~Heavy industrial areas means industrial environments around major industrial complexes.~~

4. ~~The outer leaf and *cavity* of an external masonry wall of a building, including walls under open carports are considered to be external environments. A part of an internal leaf of an external masonry wall which is located in the roof space is considered to be in an internal environment.~~
5. ~~Where a paint finish is applied the surface of the steel, work must be hand or power tool cleaned to remove any rust immediately prior to painting.~~
6. ~~All zinc coatings (including inorganic zinc) require a barrier coat to stop conventional domestic enamels from peeling.~~
7. ~~Refer to the paint manufacturer where decorative finishes are required on top of the minimum coating specified in the table for protection of the steel against corrosion.~~
8. ~~Internal locations subject to moisture, such as in close proximity to kitchen or bathroom exhaust fans are not considered to be in a permanently dry location and protection as specified for external locations is *required*.~~
9. ~~For applications outside the scope of this table, seek specialist advice.~~

Notes:

Clause 3.4.4.4 and Table 3.4.4.7 from NCC Volume Two 2019 (Amendment 1) may be used in place of 6.3.7 and Tables 6.3.9a, 6.3.9b and 6.3.9c until 1 September 2023.

7 Roof and wall cladding

Part 7.1 Scope and application of Section 7

7.1.1 Scope

[New for 2022]

(1) This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for—

- (a) metal sheet roofing (see Part 7.2); and
- (b) roof tiles (see Part 7.3); and
- (c) gutters and downpipes (see Part 7.4); and
- (d) timber and composite wall cladding (see Part 7.5).

(2) For other roof and wall cladding provisions not included in this Section of the ABCB Housing Provisions, refer to the following *Deemed-to-Satisfy Provisions* in NCC Volume Two: metal wall cladding (see H1D7(6)).

Explanatory Information:

This Part contains requirements including weatherproofing and structural requirements, for wall and roof systems. Gutter and downpipe requirements are also contained in this Part.

It should be noted that other construction methods may be used to achieve the same results as specified in this Part provided they comply with the appropriate *Performance Requirement*.

7.1.2 Application

[New for 2022]

The application of Section 7 of the ABCB Housing Provisions is subject to the following:

- (a) The Governing Requirements of NCC 2022 Volume Two.
- (b) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 7 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practices for Parts 3.5.1 to 3.5.4 of NCC 2019 Volume Two.

NCC 2019 Volume Two did not include an acceptable construction practice for Part 3.5.5.

Part 7.2 Sheet roofing

7.2.1 Application of Part 7.2

[New for 2022]

(1) Part 7.2 applies subject to the limitations set out at H1D7(2)(c).

(2) Part 7.2 need not be complied with if H1D7(2)(a) or (b) is complied with.

Explanatory Information: Design wind speeds

Information on design wind speeds for particular areas may be available from the *appropriate authority*. Also see the table associated with the definition of 'design wind speed' for wind classes. A map indicating wind regions of Australia is contained in Part 2.2.

Explanatory Information: Other relevant sheet roof requirements

A number of other Volume Two provisions contain specific requirements relevant to sheet roofing, in addition to the provisions of this Part. They include—

(a) for the sizing and fixing of roof battens—

  (i) H1D6(2) for steel battens; and

  (ii) H1D6(3) for timber battens; and

(b) Housing Provisions Part 9.3 for requirements for roofing over a separating wall; and

(c) Housing Provisions Part 7.4 for gutters and downpipes.

7.2.2 Corrosion protection and compatibility requirements for roofing

[2019: 3.5.1.2]

(1) Metal sheet roofing must be protected from corrosion in accordance with Table 7.2.2a.

(2) Where different metals are used in a roofing system, including *flashings*, fasteners, guttering, downpipes, etc., they must be compatible with each other as described in Table 7.2.2b, Table 7.2.2c, Table 7.2.2d, to and Table 7.2.2e and—

  (a) no lead materials can be used upstream from aluminium/zinc coated materials; and

  (b) no lead materials can be used on roofs that form part of a potable (drinking) water catchment area; and

  (c) no copper materials can be used upstream from galvanized coated materials.

Table 7.2.2a: Acceptable corrosion protection for metal sheet roofing

Environment	Location	Minimum metal coating in accordance with AS 1397: Metallic coated steel	Minimum metal coating in accordance with AS 1397: Metallic and organic coated steel
Low (Mild steel corrosion rate 1.3 to 25 μm/y)	Typically remote inland areas or more than 1 km from sheltered bays.	Z450 galvanised or AZ150 aluminium/zinc or AM125 aluminium/zinc/magnesium	Z275 galvanised or AZ150 aluminium/zinc or AM100 aluminium/zinc/magnesium
Medium (Mild steel corrosion rate 25 to 50 μm/y)	Typically more than 1 km from *breaking surf* or aggressive industrial areas or more than 50 m from sheltered bays.	Z450 galvanised or AZ150 aluminium/zinc or AM125 aluminium/zinc/magnesium	Z275 galvanised or AZ150 aluminium/zinc or AM100 aluminium/zinc/magnesium

Environment	Location	Minimum metal coating in accordance with AS 1397: Metallic coated steel	Minimum metal coating in accordance with AS 1397: Metallic and organic coated steel
High (Mild steel corrosion rate 50 to 80 µm/y)	Typically more than 200 m from *breaking surf* or aggressive industrial areas or within 50 m from sheltered bays.	AZ150 aluminium/zinc or AM125 aluminium/zinc/magnesium	AZ150 aluminium/zinc or AM100 aluminium/zinc/magnesium
Very High (Mild steel corrosion rate 80 to 200 µm/y)	Typically extends from 100 m inland from *breaking surf* to 200 m inland from *breaking surf*, or within 200 m of aggressive industrial areas.	Not suitable	AZ200 aluminium/zinc or AM150 aluminium/zinc/magnesium
Very High (Mild steel corrosion rate 80 to 200 µm/y)	Typically within 100 m of *breaking surf* .Z450 galvanised or AZ150 aluminium/zinc or AM125 aluminium/zinc/ magnesium	Not suitable	Not suitable

Table Notes:

1. Low — remote inland includes dry rural areas remote from the coast or sources of pollution. Many areas of Australia beyond at least 50 km from the sea are in this category, including most cities and towns such as Canberra, Ballarat, Toowoomba, Alice Springs and some suburbs of cities on sheltered bays such as Melbourne, Hobart, Brisbane and Adelaide that are more than 1 km from the sea. However each of these have many exceptions which are in more corrosive categories.
2. Medium — urban inland, coastal or industrial typically coastal areas with low salinity around sheltered bays, such as Port Phillip Bay. This extends from about 50 m from the shoreline to a distance of about 1 km inland but seasonally or in semi-sheltered bays extends 3 to 6 km inland. Along ocean front areas with *breaking surf* and significant salt spray, it extends from 1 km inland to about 10 to 50 km depending on wind direction and topography. Much of the metropolitan areas of Wollongong, Sydney, Newcastle, Perth and the Gold Coast are in this category. This can extend to 30 to 70 km inland in South Australia while on some evidence, other southern Australian coastal zones are in this, or a more severe category. This also includes urban and industrial areas with low pollution and for several kilometres around large industries such as steel works and smelters.
3. High typically occurs on the coast around sheltered bays. Category high extends up to 50 m inland from the shoreline. In areas of rough seas and surf it extends from several hundred metres to about 1 km inland. As with other categories the extent depends on wind, wave action and topography. The category will also be found inside industrial plants and can influence a distance of 1.5 km down wind of the plant.
4. Very high is typical of offshore conditions and is found on the beachfront in regions of rough seas and surf beaches. It can extend inland for several hundred metres. It is also found in aggressive industrial areas with a pH of less than 5.
5. All locations described in the table contain variations of greater corrosion severity. If significant, this must be addressed by designing for the most severe environment.
6. In locations where metallic coatings are not a suitable form of corrosion protection, the roof sheeting must be of a type that has been designed and manufactured for such environments.

Table 7.2.2b: Acceptability of contact between different roofing materials – Stainless steel accessory or fastener

Cladding material	Atmosphere classification - Medium to very high as per Table 7.2.2a	Atmosphere classification - Low as per Table 7.2.2a
Copper and copper alloys	No	Yes
Stainless steel (300 series)	Yes	Yes
Zinc-coated steel and zinc	No	Yes

Cladding material	Atmosphere classification - Medium to very high as per Table 7.2.2a	Atmosphere classification - Low as per Table 7.2.2a
Zinc/aluminium coated steel	No	Yes
Aluminium/zinc (AZ) and aluminium/zinc/magnesium (AM) coated steel	No	Yes
Lead	Yes	Yes

Table Notes:

1. No — means the metal cannot be used in association with the other metal.
2. Yes — means the metal can be used in association with the other metal.

Table 7.2.2c: Acceptability of contact between different roofing materials – Zinc-coated steel and zinc accessory or fastener

Cladding material	Atmosphere classification - Medium to very high as per Table 7.2.2a	Atmosphere classification - Low as per Table 7.2.2a
Copper and copper alloys	No	No
Stainless steel (300 series)	No	No
Zinc-coated steel and zinc	Yes	Yes
Zinc/aluminium coated steel	Yes	Yes
Aluminium/zinc (AZ) and aluminium/zinc/magnesium (AM) coated steel	Yes	Yes
Lead	No	Yes

Table Notes:

1. No — means the metal cannot be used in association with the other metal.
2. Yes — means the metal can be used in association with the other metal.

Table 7.2.2d: Acceptability of contact between different roofing materials – Zinc/aluminium coated steel or aluminium/zinc (AZ) and aluminium/zinc/magnesium (AM) coated steel accessory or fastener

Cladding material	Atmosphere classification - Medium to very high as per Table 7.2.2a	Atmosphere classification - Low as per Table 7.2.2a
Copper and copper alloys	No	No
Stainless steel (300 series)	No	No
Zinc-coated steel and zinc	Yes	Yes
Zinc/aluminium coated steel	Yes	Yes
Aluminium/zinc (AZ) and aluminium/zinc/magnesium (AM) coated steel	Yes	Yes
Lead	No	No

Table Notes:

1. No — means the metal cannot be used in association with the other metal.
2. Yes — means the metal can be used in association with the other metal.

Table 7.2.2e: Acceptability of contact between different roofing materials – Lead accessory or fastener

Cladding material	Atmosphere classification - Medium to very high as per Table 7.2.2a	Atmosphere classification - Low as per Table 7.2.2a
Copper and copper alloys	No	Yes
Stainless steel (300 series)	No	Yes
Zinc-coated steel and zinc	No	Yes
Zinc/aluminium coated steel	No	No
Aluminium/zinc (AZ) and aluminium/zinc/magnesium (AM) coated steel	No	No
Lead	Yes	Yes

Table Notes:

1. No — means the metal cannot be used in association with the other metal.
2. Yes — means the metal can be used in association with the other metal.

Explanatory Information:

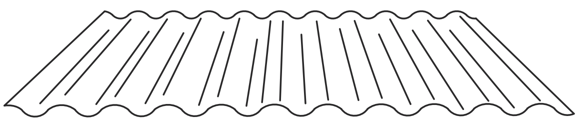
To prevent corrosion due to adverse chemical reaction of materials used, 7.2.2(2) ensures that the metal roofing and other materials that come in to contact with it, i.e. fasteners, *flashings* and cappings, etc. are compatible with each other.

7.2.3 Minimum pitches for metal sheet roofing profiles

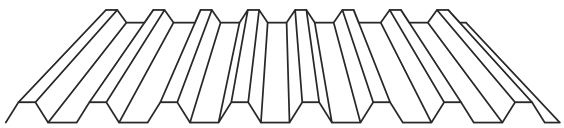
[2019: 3.5.1.3]

Metal sheet roofing must comply with the minimum pitch requirements for the associated roof profile in accordance with Figure 7.2.3.

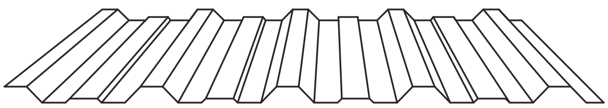
Figure 7.2.3: Minimum pitch requirements for metal roofing profiles – Roof slope and pitch drainage capacity



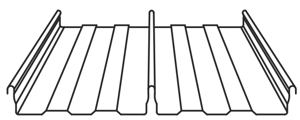
Corrugated
Minimum pitch – 5 degrees



Close pitched trapezoidal
Minimum pitch – 3 degrees



Trapezoidal
Minimum pitch – 3 degrees



Concealed fastened
Minimum pitch – 1 degree

Figure Notes:

1. For minimum end lap requirements see 7.2.6(b)(ii).
2. Consideration should be given to the drainage run off capacity of the roof sheeting when determining the minimum pitch and total length of the roof sheet.

7.2.4 Maximum spans

[2019: 3.5.1.4]

Metal sheet roofing must comply with the maximum span limitations between roofing supports in accordance with Table 7.2.4 and Figure 7.2.4.

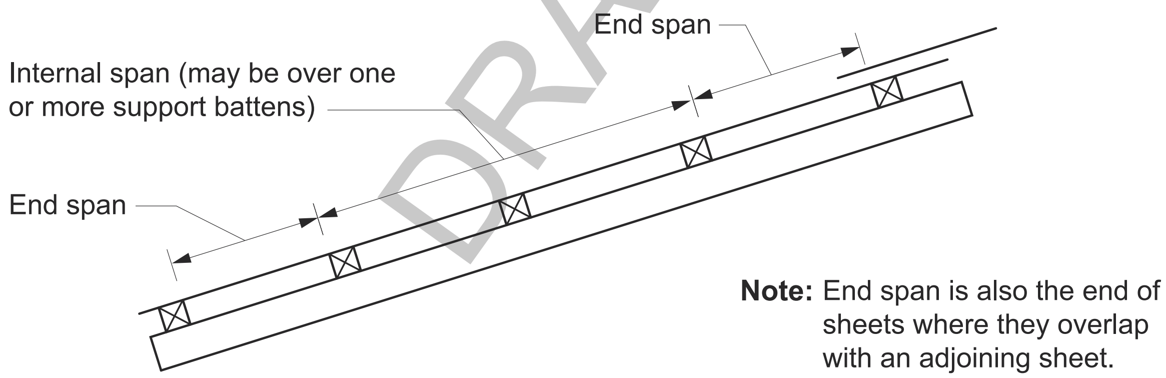
Table 7.2.4: Maximum roofing spans between supports

Sheet roofing profile	Sheet roofing base metal thickness (mm)	Max. end span (mm) Note 1	Max. internal span (mm) Note 1
Corrugated	0.42	900	1200
Close pitched trapezoidal	0.42	1800	2400
Trapezoidal	0.42	1300	1700
Concealed fasteners — narrow sheet	0.42	1750	2100
Concealed fasteners — wide sheet	0.48	1800	2100

Table Notes:

1. Refer to Figure 7.2.4 for determination of end span and internal spans.
2. Thermal expansion - Maximum sheet run for pierced fixed metal roofing profiles must be not greater than 25 m when measured between the fasteners at the ends of the sheet.

Figure 7.2.4: Maximum spans for roofing between supports



7.2.5 Fixing of metal sheet roofing

[2019: 3.5.1.5]

Metal sheet roofing must—

(a) be either fixed through the roofing (crest fastening) or have concealed fasteners; and

(b) be fixed at spacings in accordance with Table 7.2.5; and

(c) use fixings of a compatible metal to the roof in accordance with Tables 7.2.2b to 7.2.2e; and

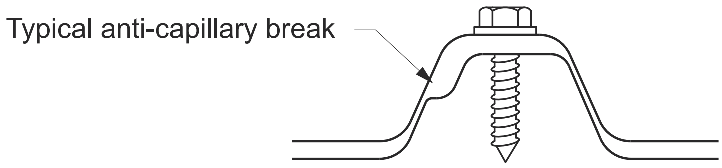
(d) when using both clipped and pierced fastening systems, employ an anti-capillary feature in the side lap of the sheet (see Figure 7.2.5).

Table 7.2.5: Fixing requirements for sheet roofing

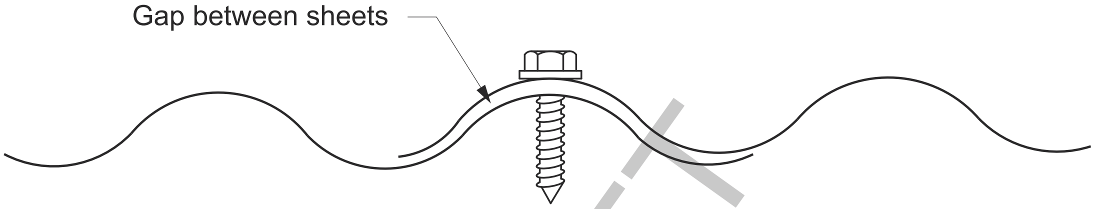
Sheet roofing profile	Fixing: End span	Fixing: Internal spans
Corrugated	Side lap and every second rib	Side lap and every third rib

Sheet roofing profile	Fixing: End span	Fixing: Internal spans
Close pitched trapezoidal	Side lap and every second rib	Side lap and every third rib
Trapezoidal	Every rib	Every rib
Concealed fasteners	Every rib	Every rib

Figure 7.2.5: Side lap fastening detail



(a) Trapezoidal profile



(b) Corrugated profile

> **Explanatory Information:**
>
> An anti-capillary feature in the side lap of the sheet is used to prevent capillary action drawing moisture into the lap and to allow the lap to drain. This can also be achieved by not over tightening the sheet fixing.
>
> Wherever possible, consideration should be given to laying the metal sheet roofing so that the side lap is facing away from prevailing weather.

7.2.6 Installation of roofing sheets

[2019: 3.5.1.6]

Sheets must be—

(a) laid wherever possible using complete lengths from the fascia to ridge; or

(b) where a complete length cannot be laid—

  (i) each run must be laid from bottom to top before moving on to the next run (see Figure 7.2.6); and

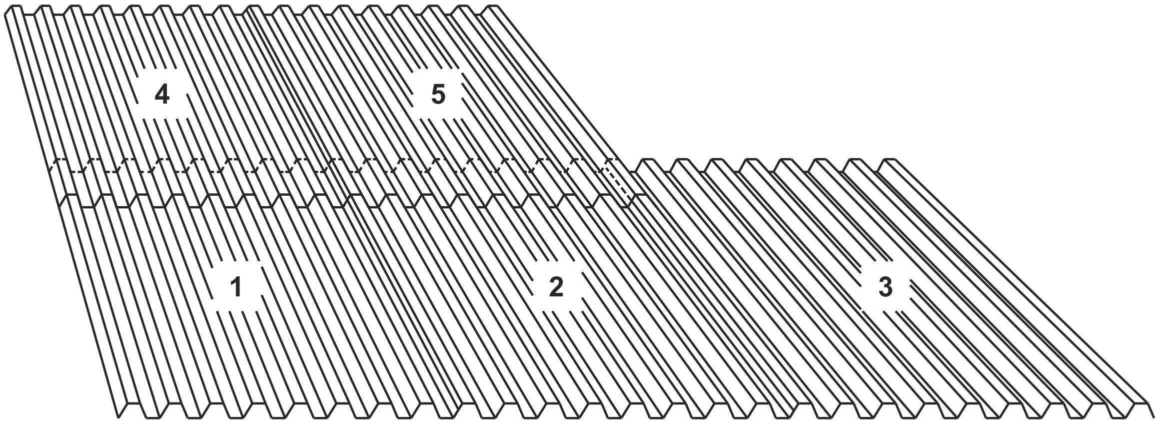
  (ii) the minimum end lap must be—

    (A) for roof slopes above 15 degrees (1:4) – 150 mm; and

    (B) for roof slopes between 5–15 degrees (1:12-1:4) – 200 mm; and

(c) stop ended (i.e. each valley turned up 60 degrees) at the ridge line of each length.

Figure 7.2.6: **Sheet laying sequence**



7.2.7 Flashings and cappings

[2019: 3.5.1.7]

(1) Sheet metal roof *flashings* and cappings must comply with the following:

(a) Roof *flashings* and cappings must be purpose made, machine-folded sheet metal sections of material compatible with all up and downstream metal roof covering materials in accordance with 7.2.2(2).

(b) The type of fasteners for *flashing* and cappings must comply with 7.2.5.

(c) The fastener and fixing frequency for *flashings* and cappings must comply with Table 7.2.7.

(d) Joints in *flashings* and cappings must be not less than 75 mm, lapped in the direction of the fall of the roof, and fastened at intervals not more than 40 mm.

(e) Wall and step *flashings* must be fastened into masonry walls with galvanized or zinc/aluminium sheet metal wedges at each end of each length and at intermediate intervals of not more than 500 mm and must overlap by not less than 75 mm in the direction of flow.

(f) Lead *flashings* must not be used with prepainted steel or zinc/aluminium steel or on any roof if the roof is part of a potable (drinking) water catchment area.

(g) Anti-capillary breaks must be installed in accordance with Figure 7.2.7a and be—

(i) for flat surfaces – 10 mm/30 degree fold; and

(ii) all other surfaces – 10 mm/90 degree or 135 degree fold.

(h) Acceptable *flashing* configurations are shown in Figure 7.2.7b and Figure 7.2.7c.

(2) *Flashing* of penetrations must comply with the following:

(a) Collar *flashings* must permit the total drainage of the area above the penetration.

(b) On completion of installation, the roof structure must be restored to its original strength by installing roof trimmers and soaker supports as necessary.

(c) The type of fasteners for *flashings* and cappings must comply with 7.2.5.

(d) Lead *flashings* must not be used with prepainted steel or zinc/aluminium steel or on any roof if the roof is part of a potable *drinking water* catchment area.

(e) Acceptable *flashings* for penetrations are shown in Figure 7.2.7d, Figure 7.2.7e and Figure 7.2.7f.

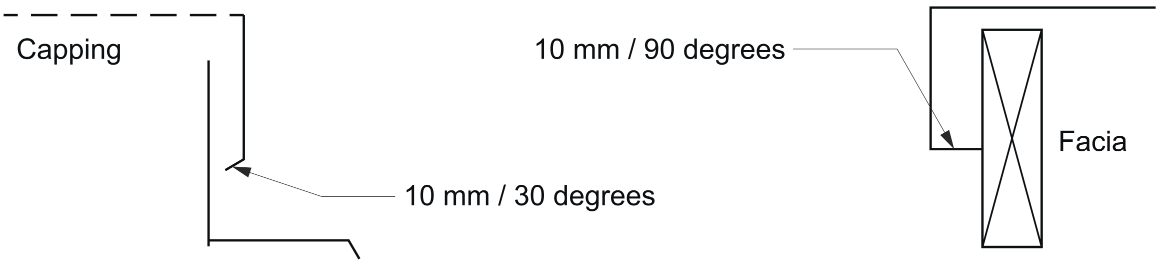
(f) Clearance for heating appliance roof support members must be in accordance with Part 12.4.

Table 7.2.7: **Fastener frequency for flashings and cappings**

Roof type	Fixing frequency	Fastener type
Concealed fastener roofs	Every rib	Rivets and self-drilling screws
Pierced fastener roofs	Every second rib	Self-drilling screws or rivets

Roof type	Fixing frequency	Fastener type
Corrugated roofs	Every fourth rib	Self-drilling screws or rivets

Figure 7.2.7a: **Anti-capillary breaks**



(a) Roof capping **(b) Facia flashing**

Figure 7.2.7b: **Parapet flashing—Acceptable flashing details**

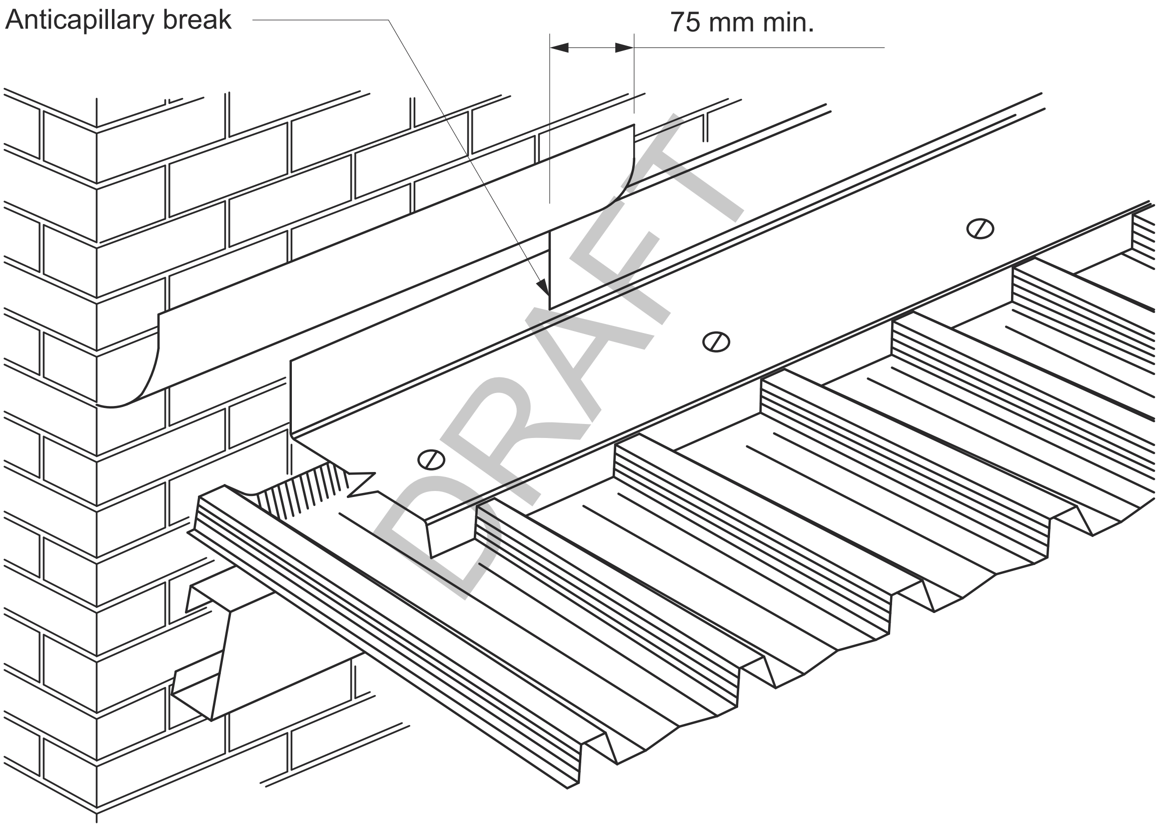


Figure 7.2.7c: Parapet and end wall flashing—Acceptable flashing details

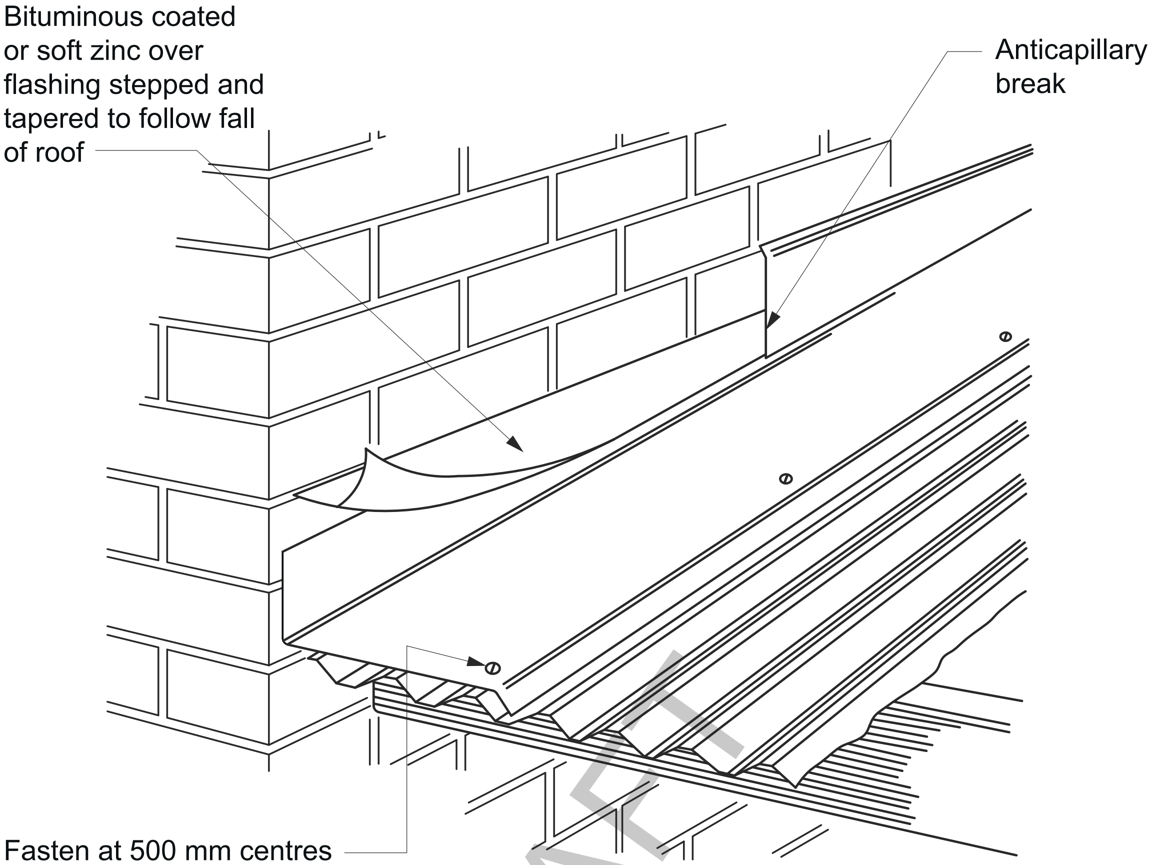


Figure 7.2.7d: PVC aprons—Typical roof penetration flashing details

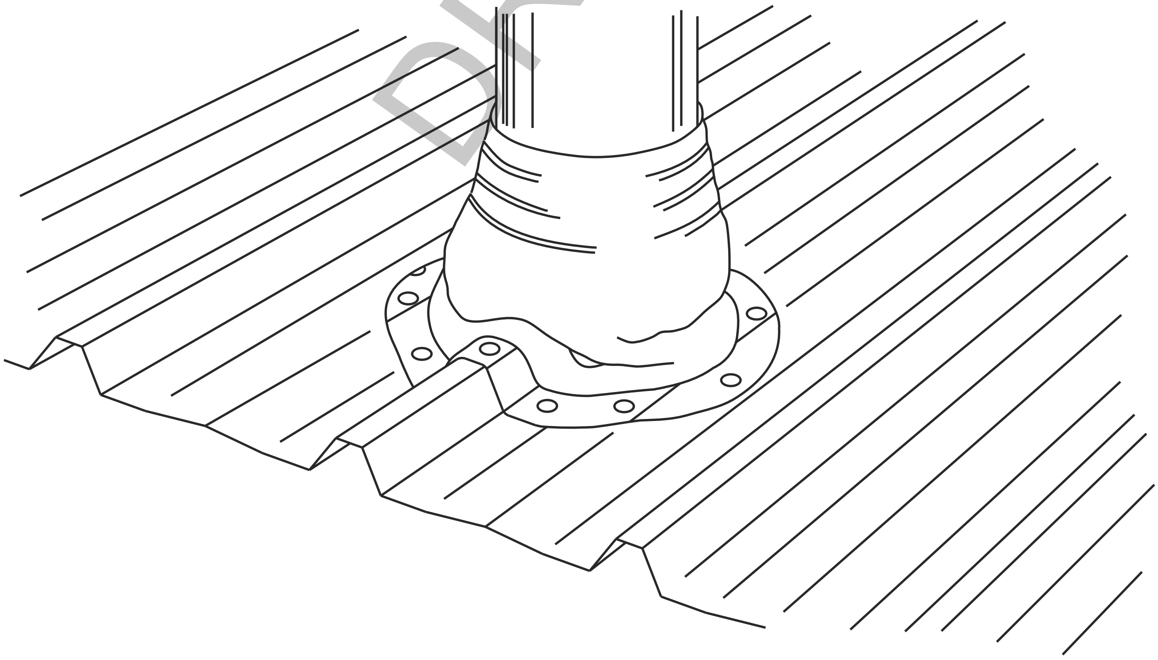


Figure 7.2.7e: **Collar flashings—Typical roof penetration flashing details**

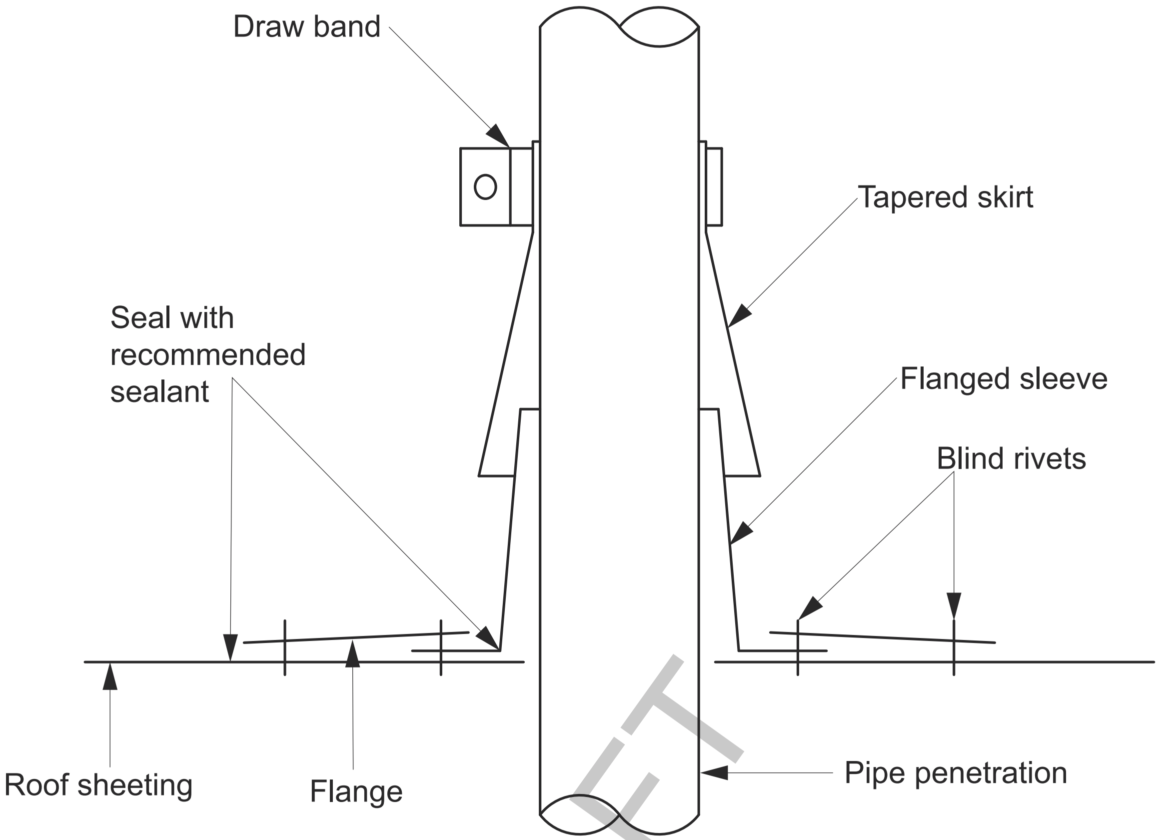
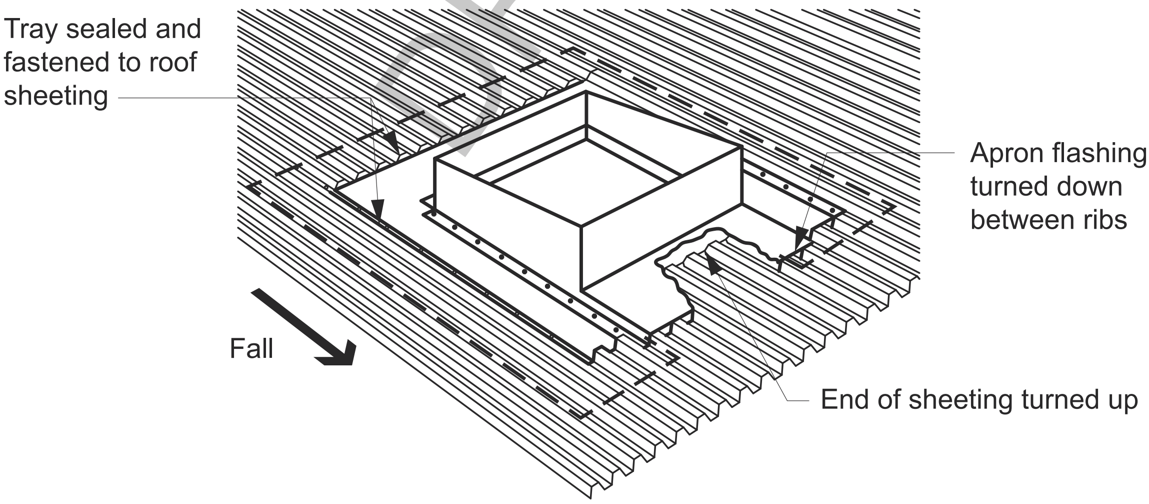


Figure 7.2.7f: **Large penetrations using apron—typical roof penetration flashing details**



7.2.8 Water discharge

[2019: 3.5.1.8]

Where an eaves gutter is provided in accordance with H1D7(4), sheets must overhang the fascia, or end batten where there is no fascia, by not less than 35 mm.

Part 7.3 Roof tiles and shingles

7.3.1 Application of Part 7.3

[New for 2022]

(1) Part 7.3 applies subject to the limitations set out at H1D7(3)(c).

(2) Part 7.3 need not be complied with if H1D7(3)(a) or (b) is complied with.

Explanatory Information: Design wind speeds

Information on design wind speeds for particular areas may be available from the *appropriate authority*. Also see the table associated with the definition of 'design wind speed' for wind classes. A map indicating wind regions of Australia is contained in Part 2.2.

Explanatory Information: Other relevant roof tile requirements

A number of other Volume Two provisions contain specific requirements relevant to roof tiles, in addition to the provisions of this Part. They include—

(a) for the sizing and fixing of roof battens—
   (i) H1D6(2) for steel battens; and
   (ii) H1D6(3) for timber battens; and

(b) Housing Provisions Part 9.3 for requirements for roofing over a *separating wall*; and

(c) Housing Provisions Part 7.4 for gutters and downpipes.

7.3.2 Fixing of roof tiles and ancillaries

[2019: 3.5.2.2]

(1) Roof tiles and hip, ridge, barge and capping tiles must be fixed in accordance with Table 7.3.2 and Figures 7.3.2a to 7.3.2e.

(2) Fixing *required* by Table 7.3.2 must consist of one or a combination of the following:
   (a) Galvanized clout nails with a minimum diameter of 2.8 mm and of a length so that the nail will penetrate not less than 15 mm into the batten.
   (b) Self embedding head screws of 8-18 gauge and of a length so that the screw will penetrate not less than 15 mm into the batten.
   (c) Purpose made clips of non-ferrous metal, stainless steel or steel protected from corrosion in accordance with Tables 7.2.2a and 7.2.2b.
   (d) Flexible pointing material complying with AS 2050.

Table 7.3.2: Minimum fixing requirements

Design wind speed	Tile fixing - edge of roof	Tile fixing - field of roof	Ridge, hip, barge and valley tiles including capping (see Figure 7.3.2d and 7.3.2e)
N1 and N2	Fix every full tile in second course in from the edge of roof.	In field of roof fix every second tile in every course, or every tile in each alternative course. (see	Fix each tile

Design wind speed	Tile fixing - edge of roof	Tile fixing - field of roof	Ridge, hip, barge and valley tiles including capping (see Figure 7.3.2d and 7.3.2e)
N3	Fix each full tile in every	Fix every second full tile in	Fix each tile

Table Notes:

Refer to Figure 7.3.2a for determination of "edge of roof" and "field of roof".

Figure 7.3.2a: Fixing of tile requirements — Identification of field and edge of roof

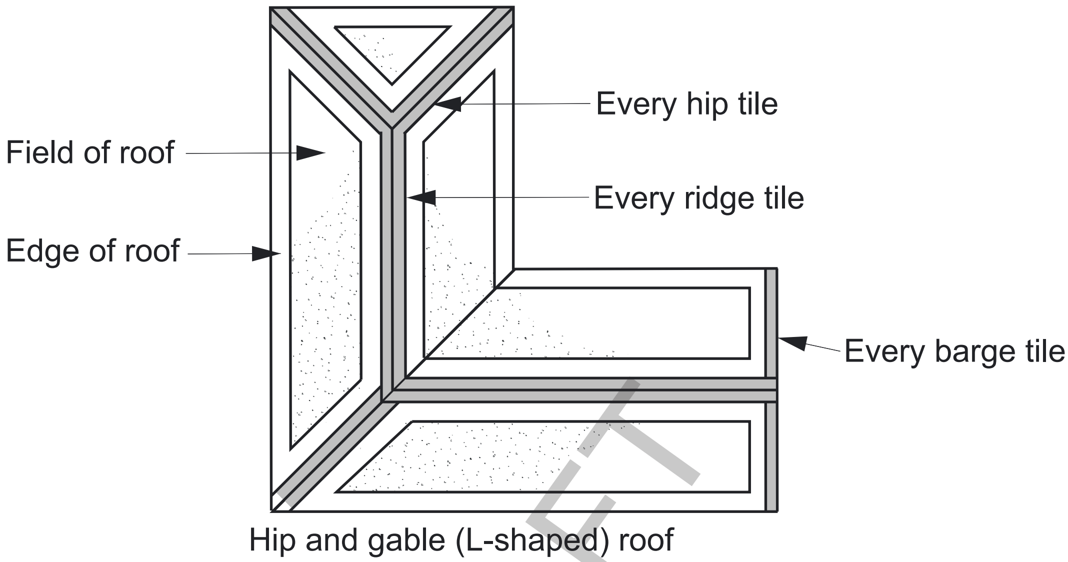


Figure 7.3.2b: Fixing of tile requirements — Minimum tile fixing requirements N1/N2

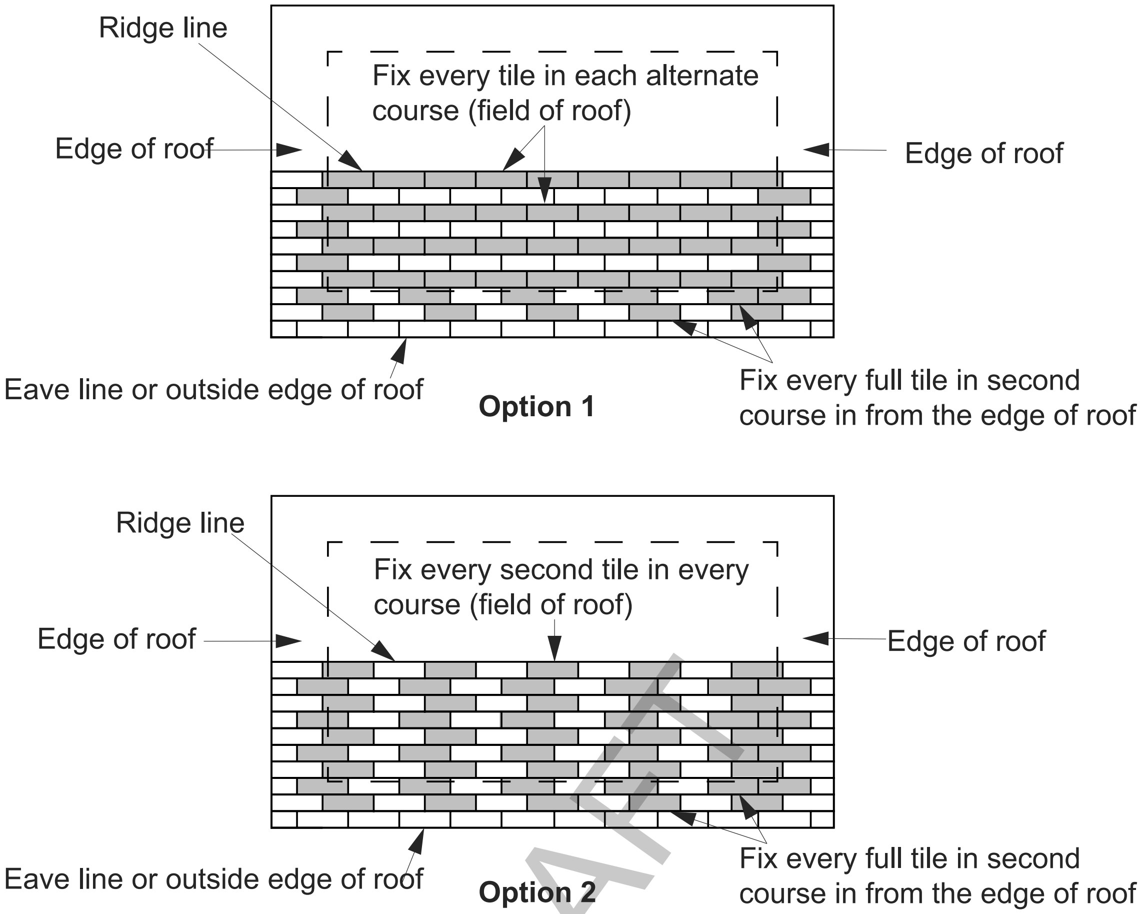


Figure 7.3.2c: Fixing of tile requirements — Minimum tile fixing requirements N3

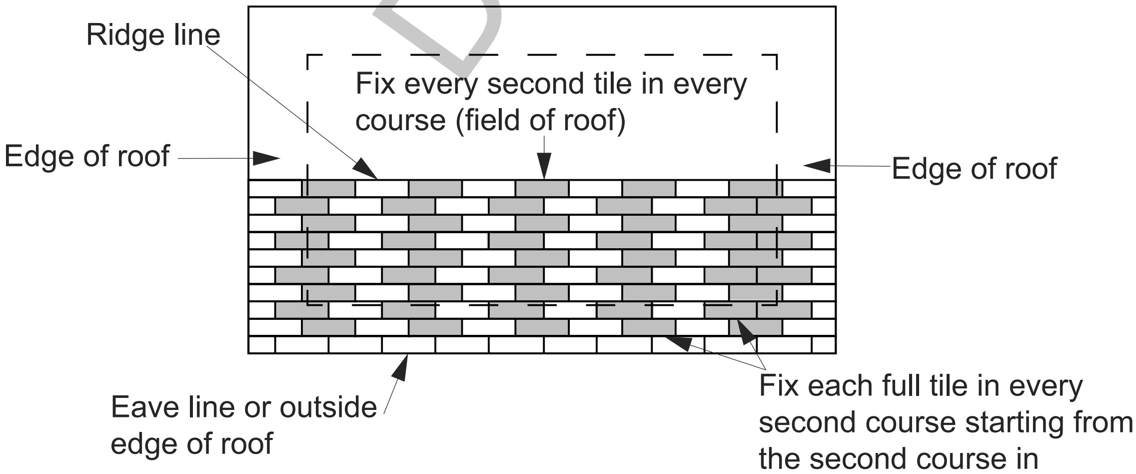


Figure 7.3.2d: Fixing of ridge capping — ridge clip fixing

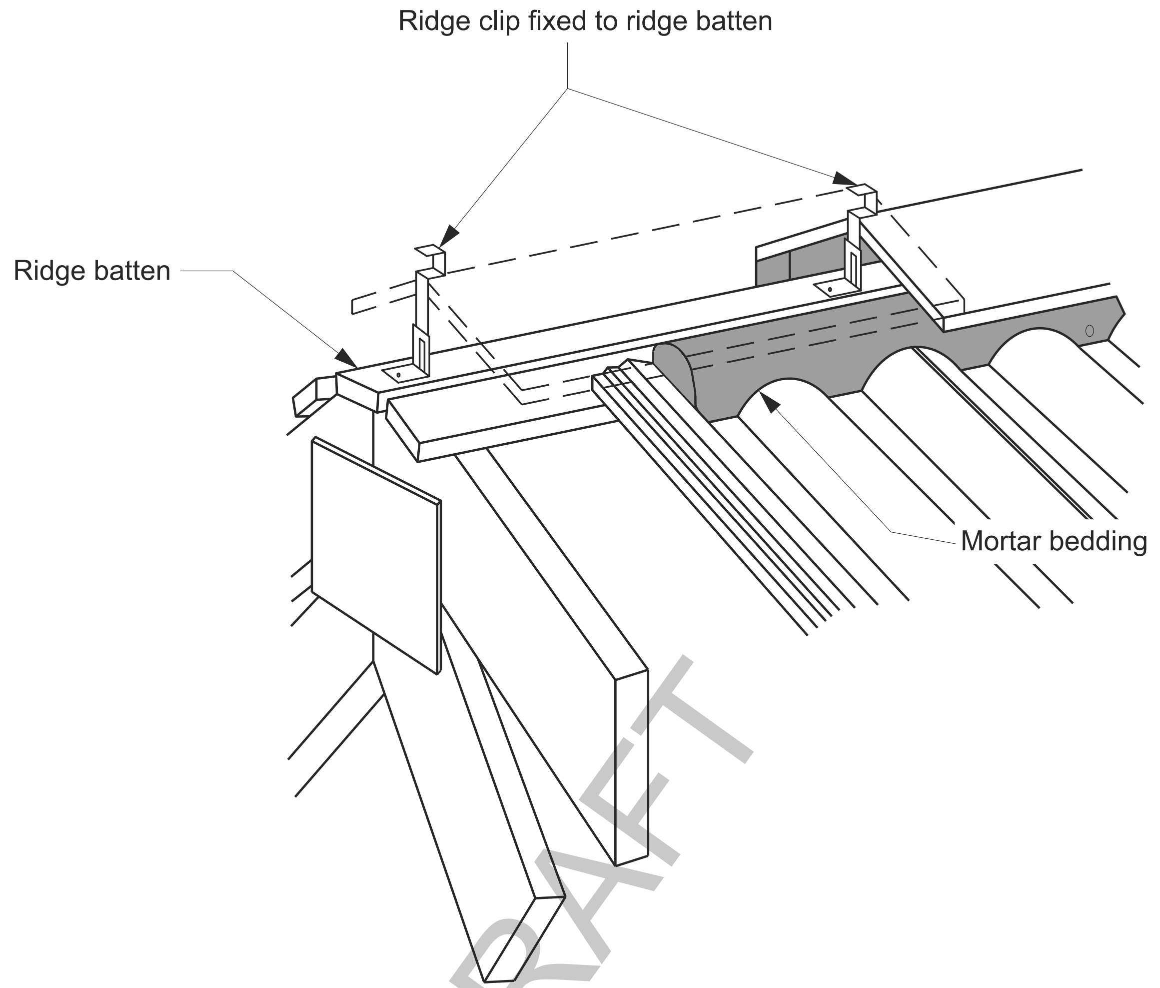
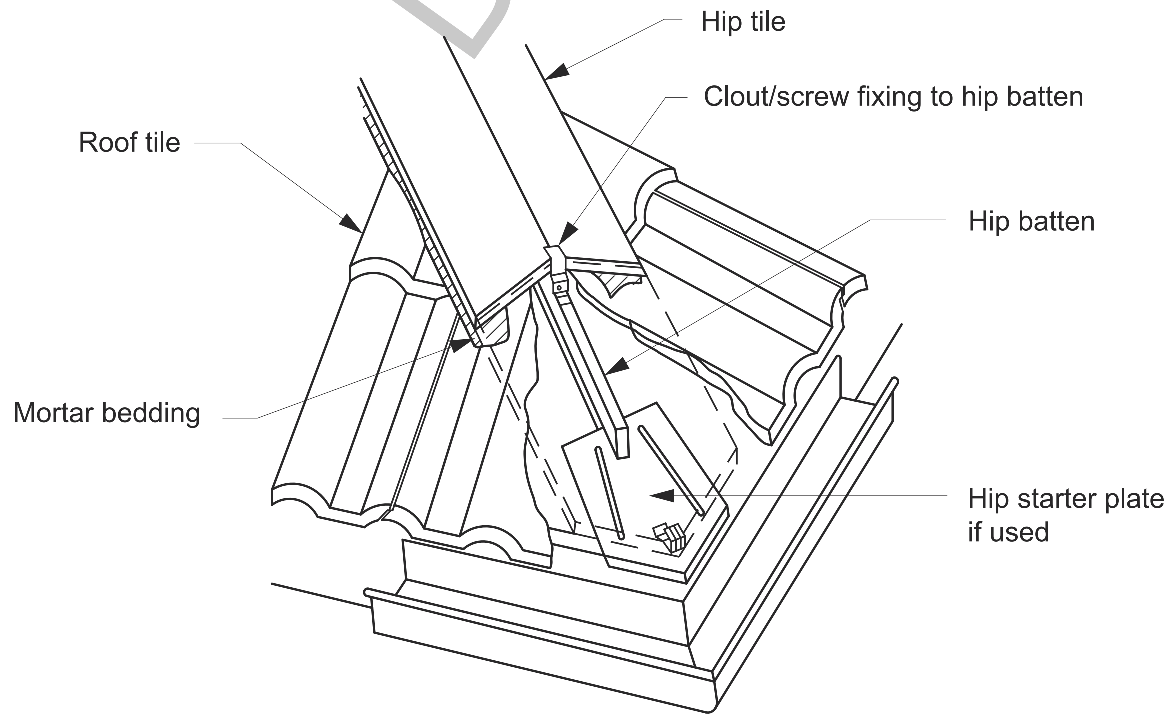


Figure 7.3.2e: Fixing of hip capping — clout or screw fixing



Explanatory Information:

For the purposes of Figures 7.3.2a, 7.3.2b and 7.3.2c, "edge of roof" is a 1.2 m wide band bounded by the eaves, hips and barge measured toward the "ridge of roof".

7.3.3 Flashing

[2019: 3.5.2.3]

(1) *Flashing* for roof tiles must comply with (2) to (7).

(2) Wall and step *flashings*:

(a) For masonry or similar walls, *flashing* must—

(i) follow the roof line, allowing not less than 75 mm upturn to the wall and a minimum of 150 mm in width and moulded into the tiles; and

(ii) have a horizontal overflashing, stepped overflashing or raked overflashing built into the masonry leaf or veneer, except that one continuous *flashing* may be used as both an apron *flashing* or an overflashing; and

(iii) have joints overlap the one below by not less than 75 mm in the direction of flow.

(b) For *flashing* where the upturn can be fixed to or behind the supporting frame or cladding, it must—

(i) follow the roof line, allowing not less than 75 mm upturn to the wall and a minimum of 150 mm in width and moulded into the tiles; and

(ii) be fastened into or behind the wall cladding at each end and at a maximum of 600 mm centres; and

(iii) have joints overlap the one below by not less than 75 mm in the direction of flow.

(3) *Flashing* of penetrations must—

(a) be either collar, apron or other purpose made *flashings*; and

(b) have a minimum upturn on the penetration of not less than 75 mm and a minimum of 150 mm in width surrounding the penetration and be moulded into the tiles; and

(c) permit the total drainage of the area above the penetration.

(4) Joints in *flashing* must be not less than 75 mm and lapped in the direction of fall of the roof.

(5) Fixings for *flashings* must be compatible with the *flashing* material.

(6) Lead *flashings* must not be used on any roof that is part of a *drinking water* catchment area.

(7) Acceptable *flashing* configurations, including typical details for standard, and bedded and pointed valleys, are shown in Figures 7.3.3a to 7.3.3g.

Figure 7.3.3a: Flashing abutting a masonry wall

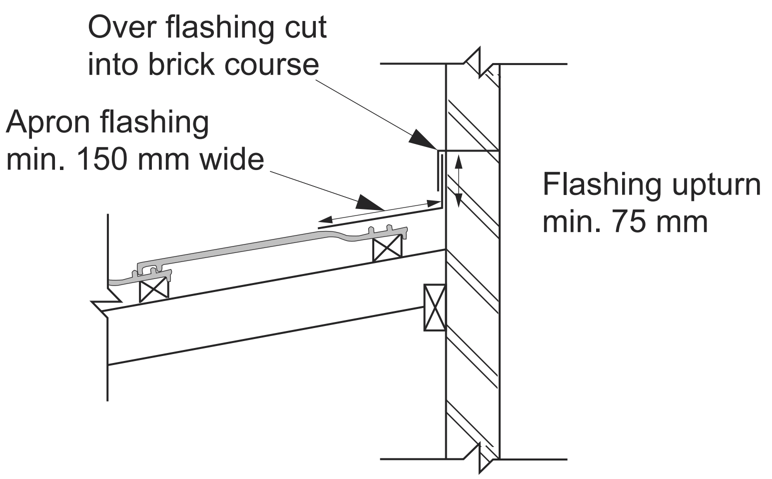


Figure 7.3.3b: **Flashing abutting a weatherboard wall or similar cladding**

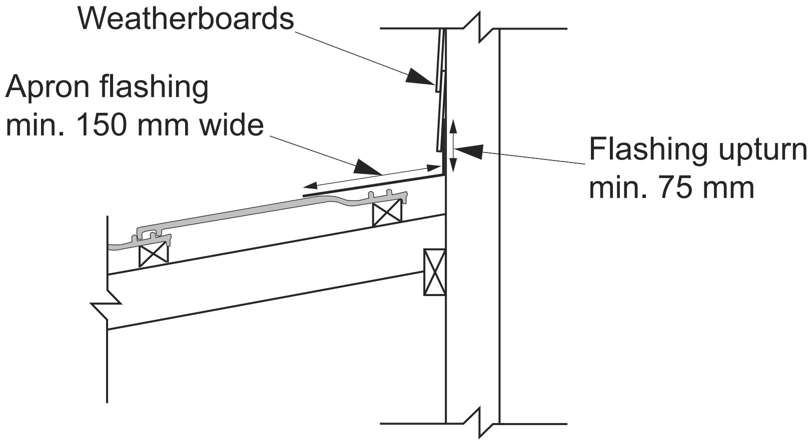


Figure 7.3.3c: **Stepped flashing to a masonry wall**

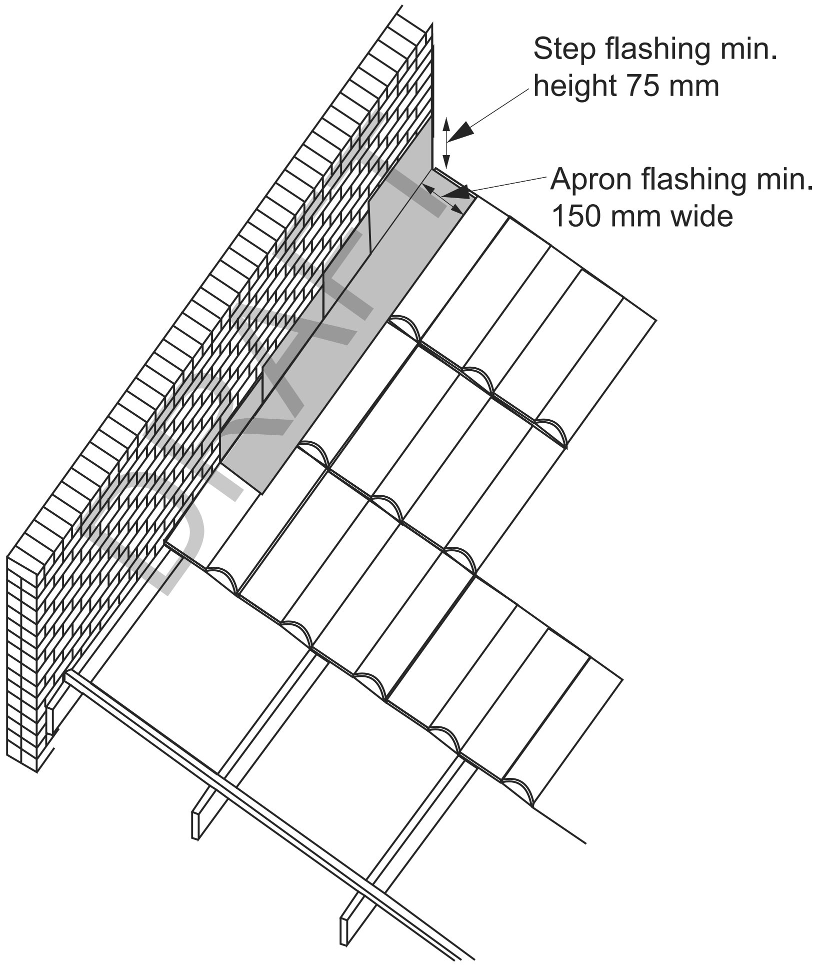


Figure 7.3.3d: Pipe penetration flashing

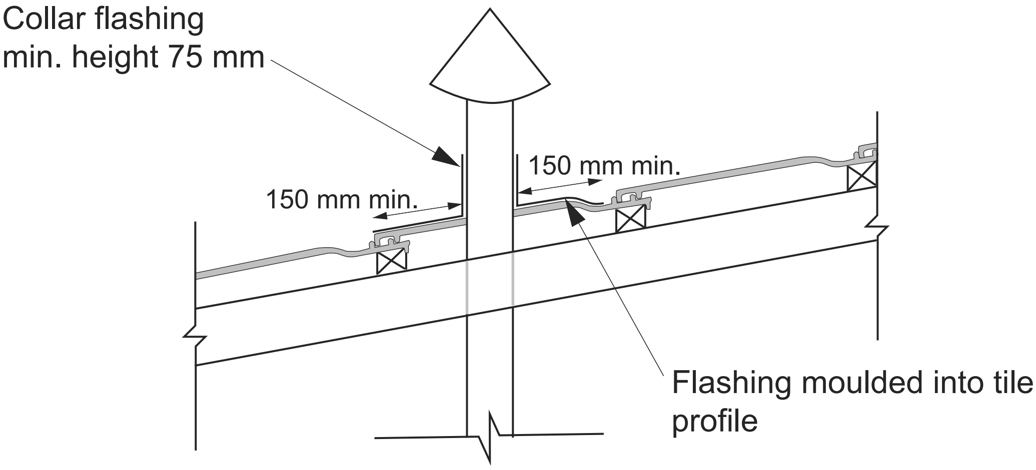
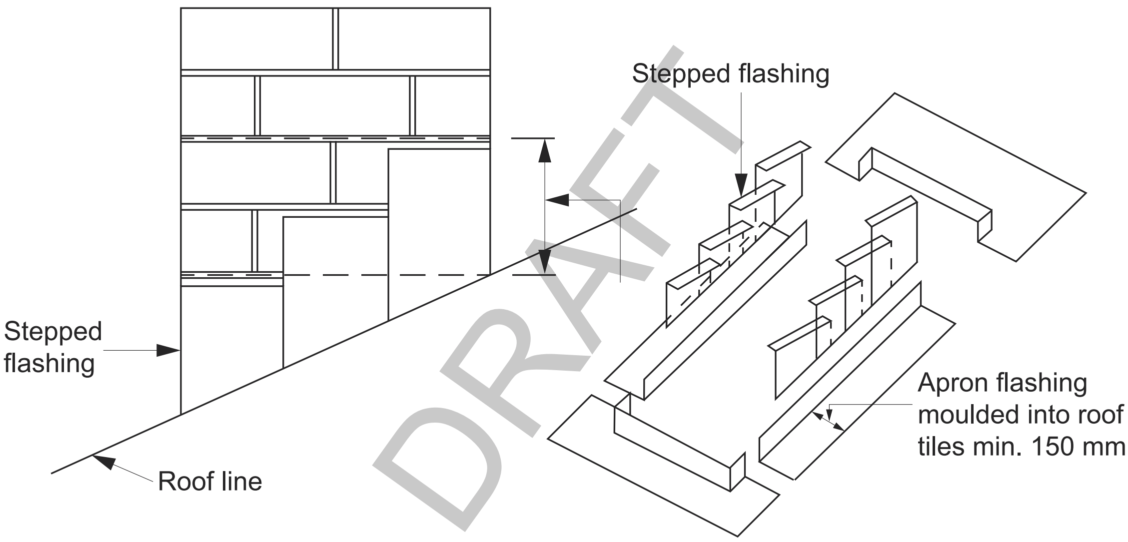


Figure 7.3.3e: Chimney flashing



Expanded view of flashing

Figure 7.3.3f: Standard valley

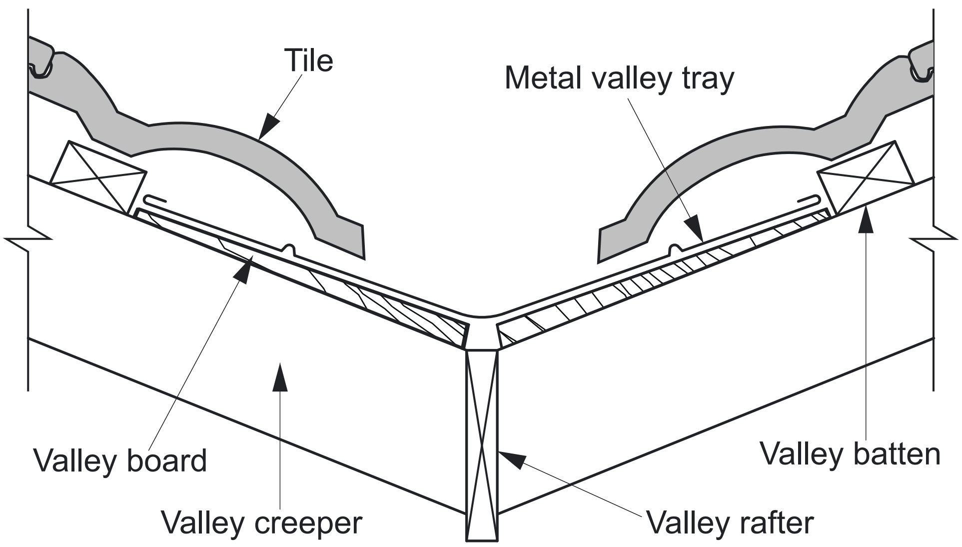
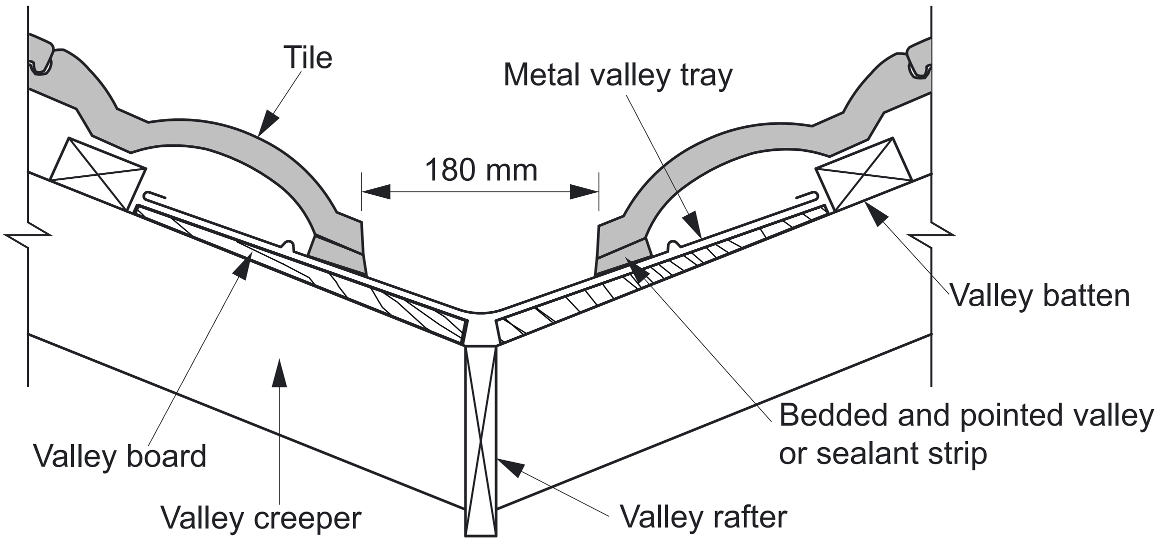


Figure 7.3.3g: **Bedded and pointed valley for high rainfall areas (refer definition of low rainfall intensity area)**



7.3.4 Sarking

[2019: 3.5.2.4]

Sarking must—

(a) be provided in accordance with Table 7.3.4; and

(b) comply with AS/NZS 4200.1 and be installed with—

(i) each adjoining sheet or roll being—

(A) overlapped not less than 150 mm; or

(B) taped together; and

(ii) sarking fixed to supporting members at not more than 300 mm centres; and

(iii) no sags greater than 40 mm in the sarking.

Table 7.3.4: **Sarking requirements for tiled roofs**

Roof pitch	Maximum rafter/truss top chord length without sarking (mm) Note 1
<18°	N/A Note 2
≥18° <20°	4 500
≥20° <22°	5 500
≥22°	6 000

Table Notes:

1. The maximum rafter/truss top chord length is measured from the topmost point of the rafter/truss i.e. the apex downwards. Where the maximum length is exceeded, sarking must be installed over the remainder of the rafter/truss top chord length towards the eave line of the roof, or equivalent where the building has no eaves.
2. All tiled roofs with a pitch less than 18 degrees must be provided with sarking, regardless of rafter/truss chord length.

Explanatory Information:

Where sarking is also provided as *reflective insulation* for the purpose of energy efficiency, Section 13 of the ABCB Housing Provisions contains *required R-Values* and the necessary airspaces adjoining the *reflective insulation*.

7.3.5 Anti-ponding device/board

[2019: 3.5.2.5]

(1) An anti-ponding device/board must be provided where sarking is installed on—

(a) roofs with a pitch less than 20°; and

(b) roofs with no eaves overhang, regardless of the roof pitch.

(2) An anti-ponding device *required* by (1) must be *water resistant* and fixed along the eaves line from the top of the fascia back up the rafter with a clearance of approximately 50 mm below the first batten (See Figure 7.3.5).

Figure 7.3.5: Typical installation of anti-ponding device/board

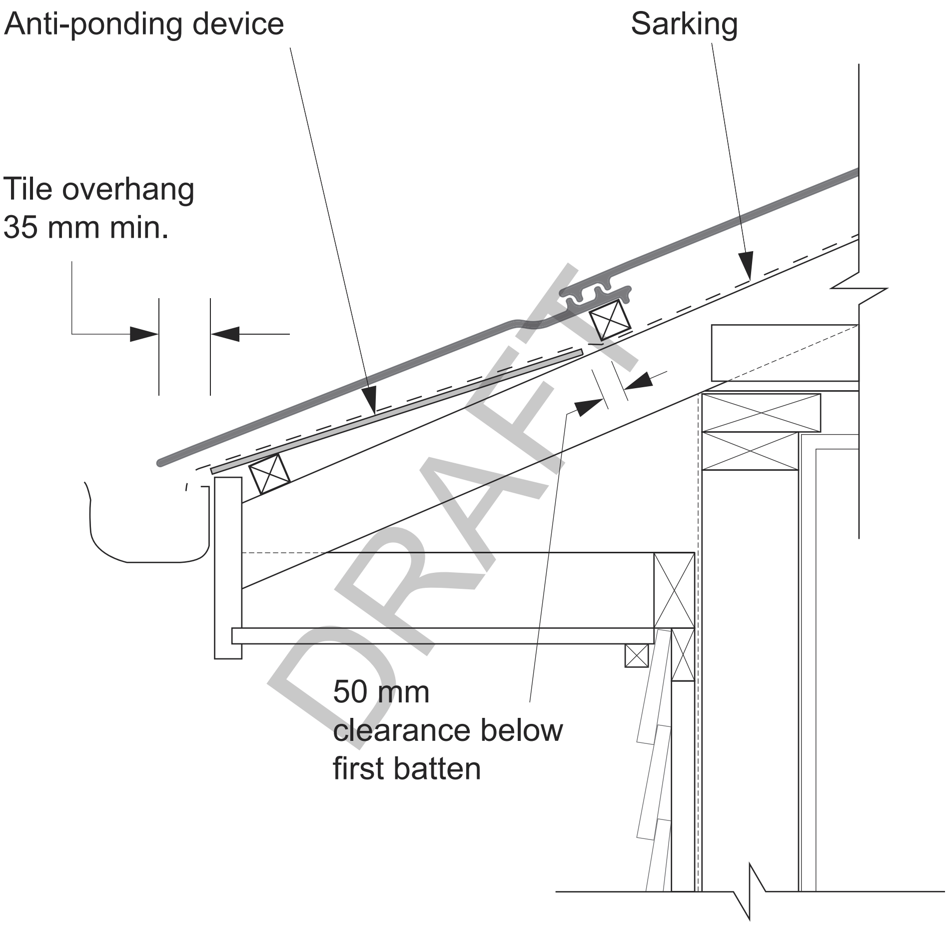


Figure Notes:

1. Sarking is *required* by 7.3.4.
2. Anti-ponding device is *required* by 7.3.5.

7.3.6 Water discharge

[2019: 3.2.5.6]

Where an eaves gutter is provided in accordance with H1D7(4), tiles must overhang the fascia or tiling batten by not less than 35 mm (See Figure 7.3.5).

Part 7.4 Gutters and downpipes

7.4.1 Application of Part 7.4

[New for 2022]

(1) Part 7.4 applies subject to the limitations set out at H1D7(5).

(2) Part 7.4 need not be complied with if H1D7(4)(a) is complied with.

Explanatory Information:

1. The requirement to install drainage systems from roofs and sub-soil drains should be confirmed with the *appropriate authority*. These provisions need only be applied when drainage systems are necessary.
2. Information on drainage requirements outside the allotment can be obtained from the *appropriate authority*.
3. Where box gutters are proposed to be installed, AS/NZS 3500.3 may be used to calculate minimum sizes, falls and overflow requirements.
4. For Class 10 buildings it may not be necessary to comply with the requirements for removing *surface water* for a Class 10 building where the Class 10 building is not connected to a Class 1 building. For example, where a Class 10 garage is attached to a Class 1 dwelling, the run-off from the garage would most likely directly impact the dwelling and therefore be required to be removed. However, a garage that is separated by a reasonable distance from the dwelling so as to not have an impact would not necessarily have to comply with the requirements for removal of surface water.
5. The following are a number of other Parts of the ABCB *Housing Provisions* that contain requirements relative to drainage and roofing in addition to the provisions of this Part—
   a. 7.5.8 for parapet cappings; and
   b. 7.3.6 for water discharge; and
   c. 7.2.7 for flashings and cappings as they relate to penetrations through roofs; and
   d. Part 3.3 for drainage requirements.

Explanatory Information: Design of stormwater drainage systems

Stormwater drainage systems specified in the NCC Volume Two and the ABCB *Housing Provisions* are not designed to remove all water to an appropriate outfall during exceptionally heavy rain, particularly in tropical areas. Specifically, eaves gutter systems are designed to remove water arising from rainfall events with an *annual exceedance probability*~~average recurrence interval~~ of ~~20 years~~ 5% provided they are not blocked.

Accordingly, it is necessary to design and install the system to incorporate overflow measures so that when overflowing occurs, during a rainfall event with an *annual exceedance probability*~~average recurrence interval~~ of up to ~~100 years~~1%, any water is directed away in a manner which ensures it does not pond against, enter or damage the building, even if the stormwater drainage system is blocked.

Insufficient and poorly located downpipes are a frequent cause of poor roof drainage system performance. The installation of downpipes, especially near valley gutters, is designed to ensure rainwater from areas on the roof that have concentrated water flows is adequately removed.

Particular consideration needs to be given to box gutters, valley gutters etc. located above the internal areas of a building. There are several options available to designers using the requirements of NCC Volume Two and the ABCB *Housing Provisions*. The designer will need to choose an overflow system that will cope with the rainfall intensity for the particular location. Consideration needs to be given to the total capacity of overflow measures on lower level roofs where overflow measures adopted for a higher roof catchment will result in overflow to a lower one. Overflow discharge onto lower roofs may also require consideration of sarking, flashing and other weatherproofing precautions to the lower roof area.

The acceptable overflow measures in Table 7.4.4a and Table 7.4.4b were calculated using the following formulas:

- For continuous slots or rainhead:

$$Q = CdA\sqrt{2gh}$$

where—

A = Area (m^2)

Cd = Discharge coefficient = 0.61

g = Gravity = 9.81 m/s^2

h = Effective head (m)

Q = Flow rate (m^3/s)

- For front face weir, end stop weir, inverted nozzle, front bead or controlled gap:

$$Q = 0.67Cdb\sqrt{2g}\,h^{1.5}$$

where—

b = Width (m)

Cd = Discharge coefficient = 0.63

g = Gravity = 9.81 m/s^2

h = Effective head (m)

Q = Flow rate (m^3/s)

7.4.2 Materials

[2019: 3.5.3.2]

Gutters, downpipes and *flashings* must—

(a) be manufactured in accordance with AS/NZS 2179.1 for metal; and

(b) be manufactured in accordance with AS 1273 for UPVC components; and

(c) be compatible with all upstream roofing materials in accordance with 7.2.2(2); and

(d) not contain any lead if used on a roof forming part of a *drinking water* catchment area.

7.4.3 Selection of guttering

[2019: 3.5.3.3]

The size of guttering must—

(a) for eaves gutters, be in accordance with Table 7.4.3a, Table 7.4.3b and Table 7.4.3c; and

(b) ~~for box gutters, be in accordance with AS/NZS 3500.3; and~~

(c) be suitable to remove rainwater falling at the appropriate 5 minute duration rainfall intensity listed in Table 7.4.3d to Table 7.4.3k as follows—

(i) for eaves gutters — ~~20 year average recurrence interval~~*5% annual exceedance probability*; and

(ii) for eaves gutter overflow measures — ~~100 year average recurrence interval~~*1% annual exceedance probability*.~~; and~~

(iii) ~~for box and valley gutters — 100 year *average recurrence interval*.~~

Table 7.4.3a: **Size of gutter required to drain roof catchment area into one (1) downpipe for various rainfall intensities and roof catchment areas (A, B, C, D, E and F defined in Table 7.4.3b)**

Design rainfall intensity (mm/h) (as per Table 7.4.3d to Table 7.4.3k)	Roof catchment area per downpipe — 30 m^2	Roof catchment area per downpipe — 40 m^2	Roof catchment area per downpipe — 50 m^2	Roof catchment area per downpipe — 60 m^2	Roof catchment area per downpipe — 70 m^2
90 mm/h	A or C	A or C	A or C	A or C	A or C
120 mm/h	A or C	A or C	A or C	A or C	A or D
140 mm/h	A or C	A or C	A or C	A or D	B or E
160 mm/h	A or C	A or C	A or C	A or E	B or E
175 mm/h	A or C	A or C	A or D	B or E	E
200 mm/h	A or C	A or C	A or D	B or E	F
225 mm/h	A or C	A or C	A or B	E	F
255 mm/h	A or C	A or D	B or E	E	F
275 mm/h	A or C	A or D	B or E	F	F
325 mm/h	A or C	B or E	F	F	F
425 mm/h	A or C	E	F	F	F

Table 7.4.3b: **Gutter sizes for various rainfall intensities**

Gutter type	Gutter description	Minimum cross-sectional area (mm^2)
A	Medium rectangular gutter	6500
B	Large rectangular gutter	7900
C	115 mm D gutter	5200
D	125 mm D gutter	6300
E	150 mm D gutter	9000
F	Gutter must be designed in accordance with AS/NZS 3500.3	N/A

Table 7.4.3c: **Downpipe selection for gutter types (A, B, C, D, E and F defined in Table 7.4.3b)**

Downpipe section	Gutter type A	Gutter type B	Gutter type C	Gutter type D	Gutter type E
75 mm dia.	Yes	Yes	Yes	Yes	No
100 mm x 50 mm	Yes	Yes	Yes	Yes	Yes
90 mm dia.	Yes	Yes	Yes	Yes	Yes
100 mm x 75 mm	Yes	Yes	Yes	Yes	Yes

Table Notes:

1. Yes — downpipe is suitable for the eaves gutter selection.
2. No — downpipe is not suitable for the eaves gutter selection.

Table 7.4.3d: **5 minute duration rainfall intensities for the Australian Capital Territory**

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Canberra	143	192~~3~~

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Gungahlin	137	179
Tuggeranong	148	210

Table Notes:

Locations used in this table are based on the nearest Bureau of Meteorology grid cell latitude and longitude to the central Post Office of each city or town.

Table 7.4.3e: 5 minute duration rainfall intensities for New South Wales

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Albury	139	180
Broken Hill	142~~3~~	217~~9~~
Goulburn	120~~1~~	154~~6~~
Kiama	225~~6~~	320~~19~~
Newcastle	225~~6~~	316
Orange	141~~2~~	186
Sydney	201~~0~~	262
Avalon, Sydney	210~~06~~	287~~78~~
Campbelltown, Sydney	166~~7~~	223~~2~~
Penrith, Sydney	178~~80~~	240~~4~~
Windsor, Sydney	175	234~~3~~
Tweed Heads	252	332~~0~~
Wollongong	218~~7~~	311~~08~~

Table Notes:

Locations used in this table are based on the nearest Bureau of Meteorology grid cell latitude and longitude to the central Post Office of each city or town.

Table 7.4.3f: 5 minute duration rainfall intensities for the Northern Territory

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Alice Springs	165~~6~~	239
Darwin	233	274
Katherine	216	250

Table Notes:

Locations used in this table are based on the nearest Bureau of Meteorology grid cell latitude and longitude to the central Post Office of each city or town.

Table 7.4.3g: 5 minute duration rainfall intensities for Queensland

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Bamaga	252	298

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Brisbane	236~~4~~	306~~5~~
Ipswich, Brisbane	211	278
Victoria Point, Brisbane	245	320
Bundaberg	266~~5~~	339~~40~~
Cairns	230~~29~~	279~~8~~
Cloncurry	218	278
Innisfail	248	302~~1~~
Mackay	250	315~~6~~
Mt Isa	201~~199~~	262~~0~~
Noosa Heads	258	332~~1~~
Rockhampton	229	300
Toowoomba	203	268
Townsville	235	300
Weipa	238~~9~~	281~~3~~

Table Notes:

Locations used in this table are based on the nearest Bureau of Meteorology grid cell latitude and longitude to the central Post Office of each city or town.

Table 7.4.3h: 5 minute duration rainfall intensities for South Australia

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Adelaide	120~~4~~	17~~8~~4
Gawler, Adelaide	111~~0~~	158
Mt Gambier	103	144
Murray Bridge	120	177~~8~~
Port Augusta	133	199
Port Pirie	123~~2~~	183~~1~~
Yorketown	115~~55~~	166

Table Notes:

Locations used in this table are based on the nearest Bureau of Meteorology grid cell latitude and longitude to the central Post Office of each city or town.

Table 7.4.3i: 5 minute duration rainfall intensities for Tasmania

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Burnie	128	178~~80~~
Flinders Island	124~~2~~	167~~6~~
Hobart	86~~5~~	120~~16~~
Launceston	91~~0~~	123~~1~~
Queenstown	94	

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)

Table Notes:

Locations used in this table are based on the nearest Bureau of Meteorology grid cell latitude and longitude to the central Post Office of each city or town.

Table 7.4.3j: 5 minute duration rainfall intensities for Victoria

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Ballarat	134~~1~~	192~~88~~
Benalla	146	194
Geelong	103~~2~~	143~~4~~
Horsham	121~~0~~	173
Lakes Entrance	145	199~~8~~
Melbourne	132	187
Hastings, Melbourne	112~~7~~	145
Sorrento, Melbourne	106	140
Mildura	142	219~~8~~
Stawell	130	187~~6~~

Table Notes:

Locations used in this table are based on the nearest Bureau of Meteorology grid cell latitude and longitude to the central Post Office of each city or town.

Table 7.4.3k: 5 minute duration rainfall intensities for Western Australia

Locality	Annual exceedance probability, 5% ~~average recurrence interval, once in 20 years~~ (mm/h)	Annual exceedance probability, 1% ~~average recurrence interval, once in 100 years~~ (mm/h)
Albany	127~~5~~	179~~8~~
Broome	232	287
Bunbury	147	198~~9~~
Derby	211	256
Geraldton	138	194~~3~~
Kalgoorlie	136~~7~~	204
Perth	129~~30~~	172
Joondalup, Perth	133	180
Midland, Perth	122	164~~3~~
Port Hedland	168	232~~0~~
Tom Price	138	182

Table Notes:

Locations used in this table are based on the nearest Bureau of Meteorology grid cell latitude and longitude to the central Post Office of each city or town.

Explanatory Information:

The cross sectional area referred to in Table 7.4.3b is measured up to the lowest part of the relevant overflow facility including the lower edge of a slot, gutter back, end-stop weir, inverted nozzle, front-face weir or overflow opening in a rainhead.

Explanatory Information: Worked example — determining appropriate overflow measures

The location of a proposed building is in Wollongong, NSW. Using Table 7.4.3e the 5 minute duration rainfall intensity for a ~~100 year~~ 1% *annual exceedance probability*~~average recurrence interval~~ is 311~~08~~ mm/h. The 5 minute duration rainfall intensities in Table 7.4.4a and Table 7.4.4b are provided in 25 mm/h increments, therefore for the purpose of the worked example 325 mm/h will be used.

Table 7.4.4a and Table 7.4.4b provide *required* overflow volumes in both litres per second for dedicated overflow measures and litres per second per metre for continuous overflow measures. Extrapolation of the values in these tables can be used to inform a *Performance Solution* complying with the Governing Requirements of the NCC. Where both dedicated and continuous measures are proposed, Table 7.4.4b can be used to determine the *required* overflow volume.

1. Multiple overflow measures are proposed to be used with a roof catchment area of 60 m^2, incorporating a 10 m eaves gutter.
2. Using Table 7.4.4b for a 325 mm/h 5 minute duration rainfall intensity, the overflow volume in litres per second (L/s) for a roof catchment area of 60 m^2 is 5.4 L/s.
3. Select an acceptable dedicated overflow measure from 7.4.7.
   a. The selected dedicated overflow measure is an end-stop weir which provides 0.5 L/s.
   b. One end-stop weir does not achieve the *required* overflow volume of 5.4 L/s, and additional overflow measures are *required* to remove the overflow volume.
4. To achieve the *required* overflow volume a continuous overflow measure is also selected from 7.4.6.
   a. A front face slotted gutter is the selected overflow measure as it provides 0.5 L/s/m.
   b. Taking account of the eaves gutter length (10 m), the combined overflow measures (0.5 L/s for the end-stop weir and 0.5 L/s/m × 10 m) will remove up to 5.5 L/s.
5. The 5.5 L/s capacity provided by the selected overflow measures exceeds the *required* 5.4 L/s overflow volume.

7.4.4 Installation of gutters

[2019: 3.5.3.4]

(1) Eaves g~~G~~utters must be~~installed with a fall of not less than—~~

(a) installed with a fall of not less than 1:500; and

(b) supported by brackets securely fixed at stop ends and at not more than 1.2 m centres; and

(c) fitted with overflow measures capable of removing the overflow volume specified in Table 7.4.4a and Table 7.4.4b.

(a) ~~1:500 for eaves gutters, unless fixed to metal fascias; and~~

(b) ~~1:100 for box gutters.~~

(~~2~~) ~~Eaves gutters must be—~~

(a) ~~supported by brackets securely fixed at stop ends and at not more than 1.2 m centres; and~~

(b) ~~be capable of removing the overflow volume specified in Table 7.4.4a and Table 7.4.4b.~~

(2) Overflow measures in accordance with 7.4.6 and 7.4.7 are deemed to be capable of removing the overflow volume specified in those provisions.

(3) Where the overflow volume values for ridge-to-gutter lengths in Table 7.4.4a and roof catchment areas in Table 7.4.4b are not stated, interpolation may be used to determine the applicable overflow values.

(4~~3~~) Valley gutters must~~on a roof with a pitch—~~

(a) be installed on a roof with a pitch more than 12.5 degrees; and

(b) have dimensions in accordance with Table 7.4.4c for the relevant rainfall intensity; and

(c) have minimum upturns along the edges of not less than 15 mm; and

(d) have a side angle of not less than 12.5 degrees.

(a) ~~more than 12.5 degrees — must have width of not less than 400 mm and be wide enough to allow the roof covering to overhang not less than 150 mm each side of the gutter; or~~

(b) ~~not more than 12.5 degrees — must be designed as a box gutter.~~

(5~~4~~) The requirement of (1)(c) does not apply to eaves gutters fixed to a verandah or an eave that is greater than 450 mm in width, which—

(a) has no lining; or

(b) is a raked verandah or a raked eave with a lining sloping away from the building.

Table 7.4.4a: Overflow volume for continuous measure (L/s/m)

Design 5 minute duration rainfall intensity (mm/h) (from Table 7.4.3d to Table 7.4.3k)	Ridge to gutter length — 2 m	Ridge to gutter length — 4 m	Ridge to gutter length — 6 m	Ridge to gutter length — 8 m	Ridge to gutter length — 10 m	Ridge to gutter length — 12 m	Ridge to gutter length — 14 m	Ridge to gutter length — 16 m
150 mm/h	0.08 L/s/m	0.17 L/s/m	0.25 L/s/m	0.33 L/s/m	0.42 L/s/m	0.50 L/s/m	0.58 L/s/m	0.67 L/s/m
175 mm/h	0.10 L/s/m	0.19 L/s/m	0.29 L/s/m	0.39 L/s/m	0.49 L/s/m	0.58 L/s/m	0.68 L/s/m	0.78 L/s/m
200 mm/h	0.11 L/s/m	0.22 L/s/m	0.33 L/s/m	0.44 L/s/m	0.56 L/s/m	0.67 L/s/m	0.78 L/s/m	0.89 L/s/m
225 mm/h	0.13 L/s/m	0.25 L/s/m	0.38 L/s/m	0.50 L/s/m	0.63 L/s/m	0.75 L/s/m	0.88 L/s/m	1.0 L/s/m
250 mm/h	0.14 L/s/m	0.28 L/s/m	0.42 L/s/m	0.56 L/s/m	0.69 L/s/m	0.83 L/s/m	0.97 L/s/m	1.1 L/s/m
275 mm/h	0.15 L/s/m	0.31 L/s/m	0.46 L/s/m	0.61 L/s/m	0.76 L/s/m	0.92 L/s/m	1.1 L/s/m	1.2 L/s/m
300 mm/h	0.17 L/s/m	0.33 L/s/m	0.50 L/s/m	0.67 L/s/m	0.83 L/s/m	1.0 L/s/m	1.2 L/s/m	1.3 L/s/m
325 mm/h	0.18 L/s/m	0.36 L/s/m	0.54 L/s/m	0.72 L/s/m	0.90 L/s/m	1.1 L/s/m	1.3 L/s/m	1.4 L/s/m
350 mm/h	0.19 L/s/m	0.39 L/s/m	0.58 L/s/m	0.78 L/s/m	0.97 L/s/m	1.2 L/s/m	1.4 L/s/m	1.6 L/s/m
375 mm/h	0.21 L/s/m	0.42 L/s/m	0.63 L/s/m	0.83 L/s/m	1.0 L/s/m	1.3 L/s/m	1.5 L/s/m	1.7 L/s/m
400 mm/h	0.22 L/s/m	0.44 L/s/m	0.67 L/s/m	0.89 L/s/m	1.1 L/s/m	1.3 L/s/m	1.6 L/s/m	1.8 L/s/m

Table 7.4.4b: Overflow volume for dedicated measure (L/s)

Design 5 minute duration rainfall intensity (mm/h) (from Table 7.4.3d to Table 7.4.3k)	Roof catchment area — 30 m^2	Roof catchment area — 40 m^2	Roof catchment area — 50 m^2	Roof catchment area — 60 m^2	Roof catchment area — 70 m^2
150 mm/h	1.3 L/s	1.7 L/s	2.1 L/s	2.5 L/s	2.9 L/s
175 mm/h	1.5 L/s	1.9 L/s	2.4 L/s	2.9 L/s	3.4 L/s
200 mm/h	1.7 L/s	2.2 L/s	2.8 L/s	3.3 L/s	3.9 L/s
225 mm/h	1.9 L/s	2.5 L/s	3.1 L/s	3.8 L/s	4.4 L/s
250 mm/h	2.1 L/s	2.8 L/s	3.5 L/s	4.2 L/s	4.9 L/s
275 mm/h	2.3 L/s	3.1 L/s	3.8 L/s	4.6 L/s	5.3 L/s
300 mm/h	2.5 L/s	3.3 L/s	4.2 L/s	5.0 L/s	5.8 L/s
325 mm/h	2.7 L/s	3.6 L/s	4.5 L/s	5.4 L/s	6.3 L/s
350 mm/h	2.9 L/s	3.9 L/s	4.9 L/s	5.8 L/s	6.8 L/s
365 mm/h	3.1 L/s	4.2 L/s	5.2 L/s	6.3 L/s	7.3 L/s
400 mm/h	3.3 L/s	4.4 L/s	5.6 L/s	6.7 L/s	7.8 L/s

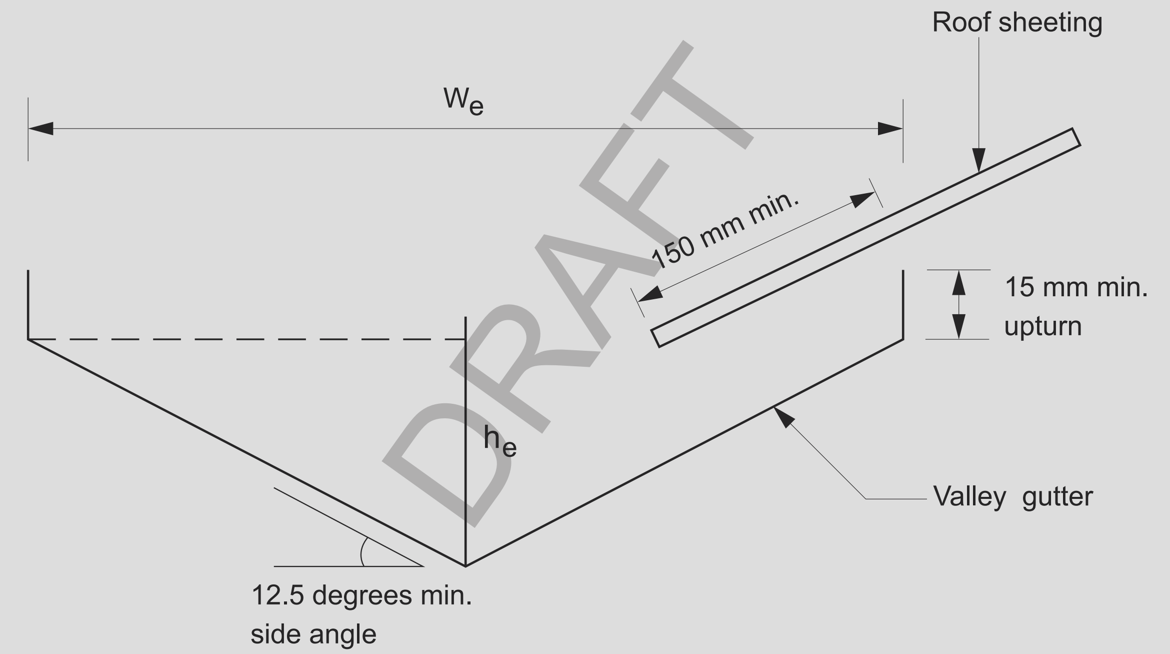
Table 7.4.4c: Valley gutters — Dimensions

Design rainfall intensity mm/h	Sheet width (minimum, mm)	Effective depth (h_e), (minimum, mm)	Effective width (w_e), (minimum, mm)
≤200	355	32	215
>200 to ≤ 250	375	35	234
>250 to ≤300	395	38	254
>300 to ≤350	415	40	273
>350 to ≤400	435	43	292

Explanatory Information: Valley gutters

1. Where roofs have pitches of 12.5 degrees valley gutters may be designed as box gutters in accordance with AS/NZS 3500.3 or as a Performance Solution by a professional engineer or other appropriately qualified person.
2. An example of a valley gutter profile is shown in Explanatory Figure 7.4.4.

Figure 7.4.4 (explanatory): Valley gutter profile



7.4.5 Downpipes – size and installation

[2019: 3.5.3.5]

Downpipes must—

(a) not serve more than 12 m of gutter length for each downpipe; and

(b) be located as close as possible to valley gutters; and

(c) be selected in accordance with the appropriate eaves gutter section as shown in Table 7.4.3a, Table 7.4.3b and Table 7.4.3c.

Explanatory Information:

A maximum 12 m gutter length served by each downpipe is to ensure effective fall and adequate capacity to discharge all water anticipated during a storm having an *annual exceedance probability*~~average recurrence interval~~ of ~~20 years~~5%.

Where a rainhead overflow device is incorporated in the top of the downpipe, its overflow discharge should be directed away from the building.

7.4.6 Acceptable continuous overflow measure

[2019: Table 3.5.3.4a]

(1) For a front face slotted gutter with—
  (a) a minimum slot opening area of 1200 mm^2 per metre of gutter; and
  (b) the lower edge of the slots installed a minimum of 25 mm below the top of the fascia,

  the acceptable overflow capacity must be 0.5 L/s/m, constructed in accordance with Figure 7.4.6a.

(2) For a controlled back gap with—
  (a) a permanent minimum 10 mm spacer installed between the gutter back and the fascia; and
  (b) one spacer per bracket, with the spacer not more than 50 mm wide; and
  (c) the back of the gutter installed a minimum of 10 mm below the top of the fascia,

  the acceptable overflow capacity must be 1.5 L/s/m, constructed in accordance with Figure 7.4.6b.

(3) For the controlled back gap option, the spacer can be a proprietary clip or bracket that provides the *required* offset of the gutter from the fascia.

(4) For controlled front bead height with the front bead of the gutter installed a minimum of 10 mm below the top of the fascia, the acceptable overflow capacity is 1.5 L/s/m constructed in accordance with Figure 7.4.6c.

Figure 7.4.6a: Construction of front face slotted gutter

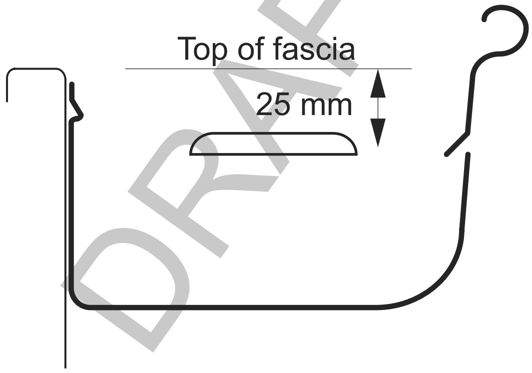


Figure 7.4.6b: Construction of controlled back gap

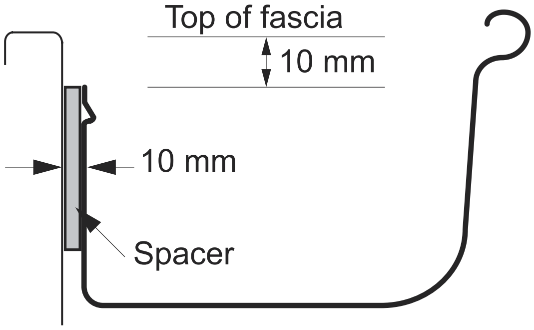


Figure 7.4.6c: Construction of controlled front bead height

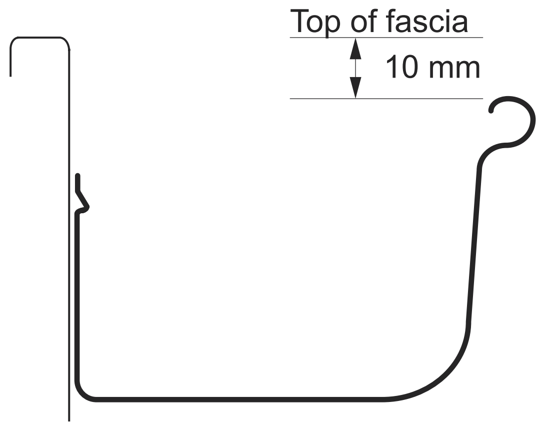


Figure Notes:

Front bead of gutter to be a minimum of 10 mm below the top of the fascia.

7.4.7 Acceptable dedicated overflow measure per downpipe

[2019: Table 3.5.3.4b]

(1) For an end-stop weir with—

(a) a minimum clear width of 100 mm; and

(b) the weir edge installed a minimum 25 mm below the top of the fascia,

the acceptable overflow is 0.5 L/s constructed in accordance with Figure 7.4.7a.

(2) An end-stop weir is not suitable where the end-stop abuts a wall.

(3) For an inverted nozzle installed within 500 mm of a gutter high point with—

(a) a minimum nozzle size of 100 mm × 50 mm positioned lengthways in the gutter; and

(b) the top of the nozzle installed a minimum of 25 mm below the top of the fascia,

the acceptable overflow is 1.2 L/s constructed in accordance with Figure 7.4.7b.

(4) For a front face weir with—

(a) a minimum clear width of 200 mm; and

(b) a minimum clear height of 20 mm; and

(c) the weir edge installed a minimum of 25 mm below the top of the fascia,

the acceptable overflow capacity is 1.0 L/s constructed in accordance with Figure 7.4.7c.

(5) For a rainhead with—

(a) a 75 mm diameter hole in the outward face of the rainhead; and

(b) the centreline of the hole positioned 100 mm below the top of the fascia,

the acceptable overflow capacity is 3.5 L/s constructed in accordance with Figure 7.4.7d.

(6) The rainhead should be detailed to avoid nuisance discharge from the overflow at rainfall intensities below the normal design level.

Figure 7.4.7a: **Construction of end-stop weir**

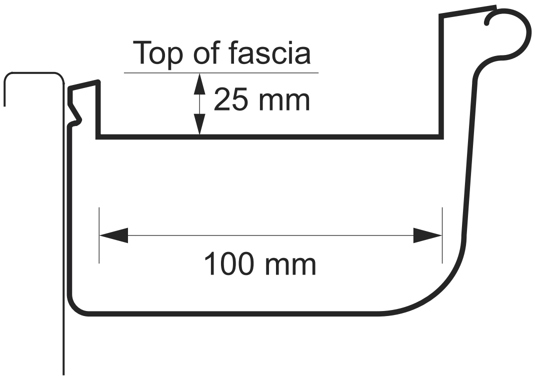


Figure 7.4.7b: **Construction of inverted nozzle**

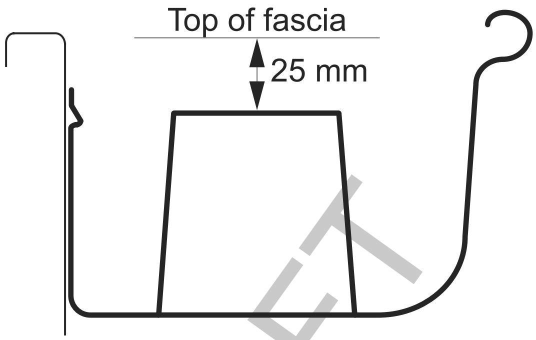


Figure 7.4.7c: **Construction of front face weir**

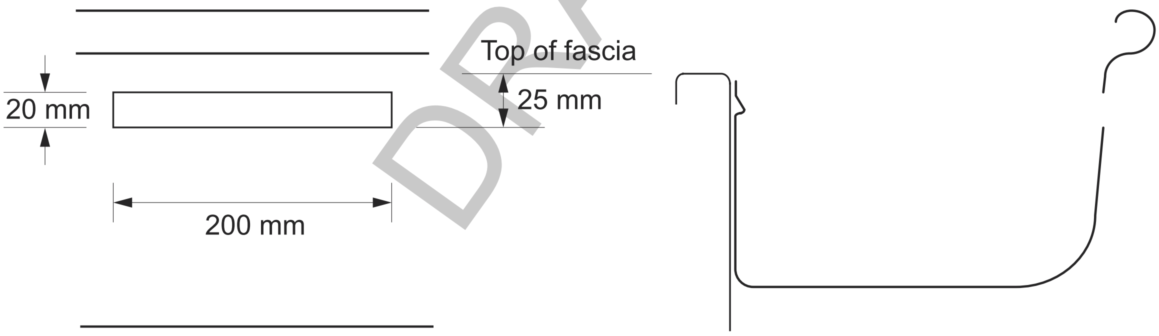
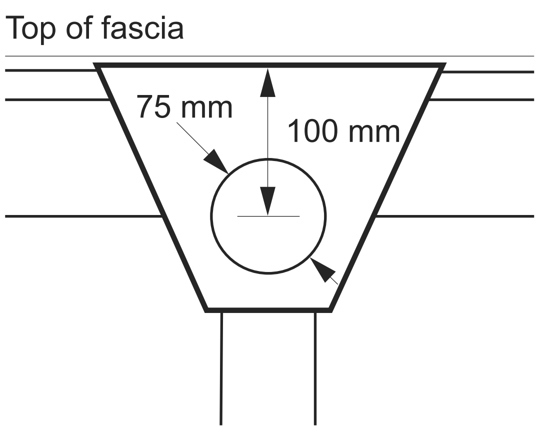


Figure 7.4.7d: **Construction of rainhead**



Part 7.5 Timber and composite wall cladding

7.5.1 Application of Part 7.5

[2019: 3.5.4.1]

(1) Compliance with Part 7.5 for wall cladding is achieved if—

(a) it is installed in accordance with—

(i) 7.5.2 for timber cladding, including weatherboards and profiled boards; and

(ii) 7.5.3 for fibre-cement and hardboard wall cladding boards; and

(iii) 7.5.4 for fibre-cement, hardboard and plywood sheet wall cladding; and

(b) fibre-cement sheet eaves where provided, are installed in accordance with 7.5.5; and

(c) openings and penetrations in cladding are flashed in accordance with 7.5.6; and

(d) the bottom surface of the cladding terminates in accordance with 7.5.7; and

(e) parapets, where provided, are flashed in accordance with 7.5.8.

(2) Part 7.5 need not be complied with if H1D7(6)(a) is complied with.

Explanatory Information: Masonry wall cladding

Masonry wall cladding, including masonry veneer, is not covered by this Part but is covered by H1D5 and Section 5 of the ABCB Housing Provisions.

Explanatory Information: Alternative wall cladding materials and systems

The provisions of this Part and those of H1D5 and Section 5 (Masonry) of the ABCB Housing Provisions do not cover all of the wall cladding materials that may be used for a Class 1 or Class 10 building.

Wall cladding materials and systems not covered by the *Deemed-to-Satisfy Provisions* may be considered under a *Performance Solution* that complies with the relevant *Performance Requirements*.

One of the *Assessment Methods* that may be used to demonstrate compliance with the *Performance Requirements* is the use of documentary evidence in accordance with Part A5.

7.5.2 Timber wall cladding

[2019: 3.5.4.2]

(1) Timber wall cladding must be installed in accordance with (2), (3), (4) and (5).

(2) Splayed timber weatherboards must be fixed in accordance with Figure 7.5.2a and Figure 7.5.2b and with a lap not less than—

(a) 30 mm for hardwood, Cypress and treated pine; and

(b) 20 mm for Western Red Cedar; and

(c) 25 mm for Baltic Pine.

(3) Profiled timber boards must be—

(a) fixed in a horizontal, vertical or diagonal direction with the overlap and groove closely fitted, where provided; and

(b) with tongue and groove profile, fixed with tongue edge up, where they are fixed in a horizontal or diagonal direction; and

(c) where fixed in a vertical or diagonal direction, provided with a vapour permeable sarking complying with AS/NZS 4200.1 (see Figure 7.5.2c) installed behind boards with—

(i) each adjoining sheet or roll being—

(A) overlapped not less than 150 mm; or

(B) taped together; and

(i) sarking fixed to supporting members at not more than 300 mm centres.

(4) Splayed and profiled timber weatherboards must be fixed in accordance with Table 7.5.2, with—

(a) one fixing at each stud or equivalent framing member for splayed timber weatherboards; and

(b) one fixing provided at each stud or equivalent framing member for profiled timber boards not more than 130 mm wide; and

(c) two fixings provided at each stud or equivalent framing member for profiled timber board more than 130 mm wide; and

(d) fixings located so that the fixing does not penetrate the tip or thinner edge of the board beneath.

(5) Fixings used for timber cladding must comply with the following:

(a) Where fixings are punched or countersunk and filled prior to painting, fixings must be standard steel flat head nails or standard steel self embedding head screws.

(b) Uncoated copper or steel fixings must not be used for Western Red Cedar (silicon bronze, monel metal, stainless steel or hot-dipped galvanised are suitable).

(c) Where the building is located within 200 m of *breaking surf*, fixings must be—

(i) stainless steel when fixed into timber framing members; or

(ii) hot-dipped galvanized (min 600 g/m^2) when fixed into steel framing members.

(d) In all other cases, fixings must be hot-dipped galvanised (min. 600 g/m^2) flat head nails or hot dipped galvanised (min 600 g/m^2) self embedding head or wafer head screws.

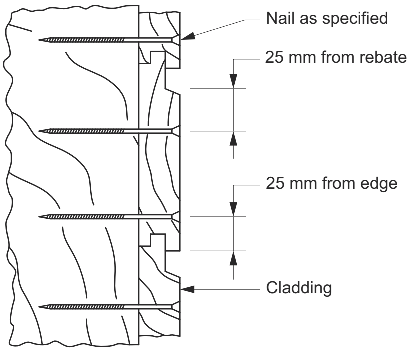
Table 7.5.2: Fixing requirements—Splayed and profiled timber weatherboards

Design wind speed	Maximum stud spacing (mm)	Minimum nominal stud fixings
N1 - N3	600	Timber: 2.8 G or (8-18) S
		Steel: (8-18) S

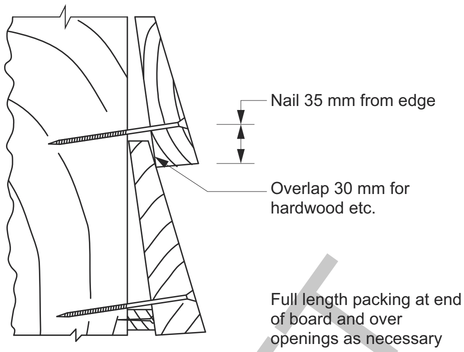
Table Notes:

1. G = galvanised plain shank, threaded or equivalent nails.
2. S = self embedding head or wafer head screw.
3. Fasteners must penetrate not less than 30 mm into timber frames and not less than two full screw threads through steel frames.
4. Wall cladding may be fixed through timber or metal battens attached to the wall frame in accordance with AS 1684.2, AS 1684.3, AS 1684.4 or NASH standard as appropriate (see fixing requirements for roof battens) so long as the minimum penetration into the wall frame is achieved.
5. Steel framing members must have a base metal thickness (BMT) not less than ~~1.2 mm~~ that *required* for a roof batten in NASH standard.

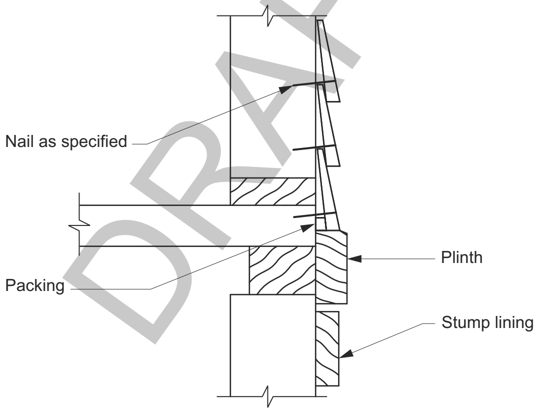
Figure 7.5.2a: Fixing of wall cladding — Timber cladding



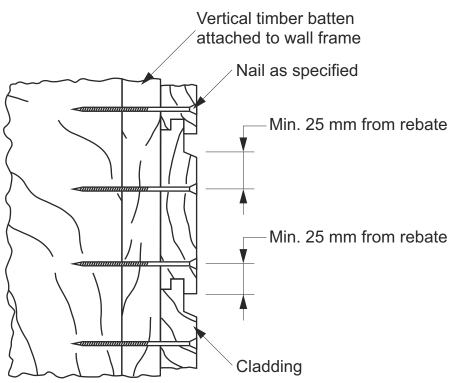
Shiplap weather board



Splayed weather board

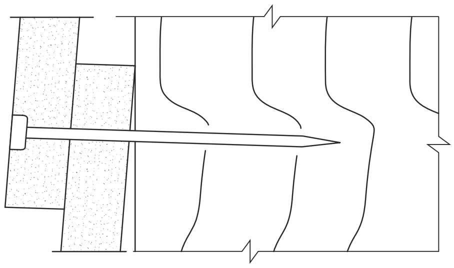


Section at lower part of weatherboard building

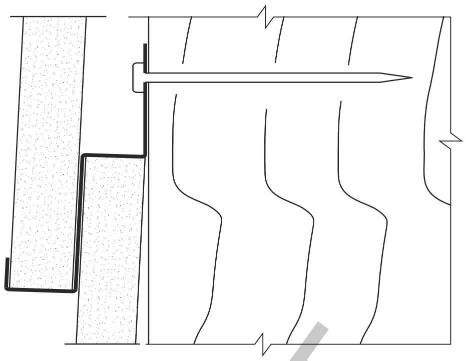


Shiplap weather board fixed through batten

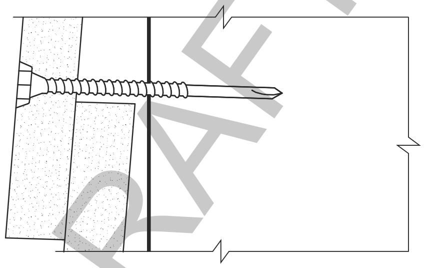
Figure 7.5.2b: Fixing of wall cladding — Wall cladding boards



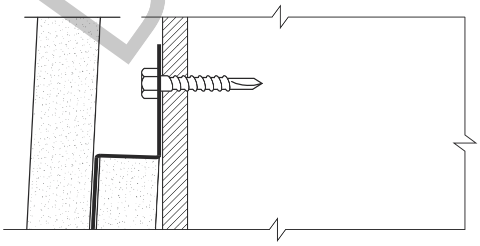
Timber stud nailing



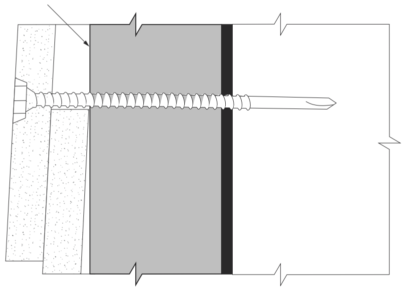
Timber stud clip



Steel stud screwing

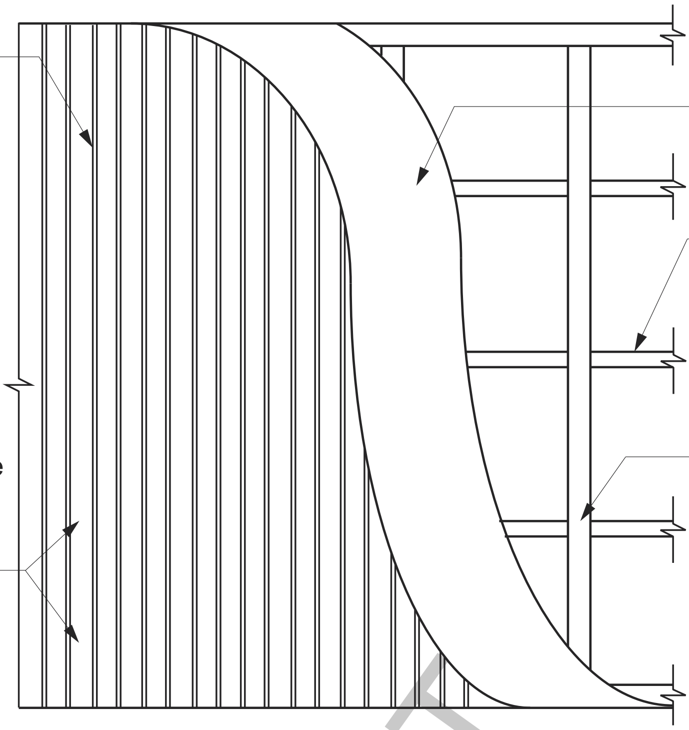


Steel stud clip



Steel stud screw through batten

Figure 7.5.2c: Fixing of vertical wall cladding



Explanatory Information: Fixing of wall cladding

7.5.2(4)(d) ensures the fixing of the wall cladding does not split the wall cladding board below. For example, for a 30 mm lap, fix 35 mm from the butt or 5 mm above the corresponding overlapping board (see Figure 7.5.2a).

Explanatory Information: Timber cladding profiles

7.5.2 covers the following types of timber cladding profiles:

- Horizontal bevel-back.
- Horizontal rebated bevel-back.
- Horizontal rusticated.
- Vertical and horizontal shiplap.
- Tongue and groove.

Explanatory Information: Machine and hand driven nails

Table 7.5.2 applies to both machine and hand driven nails.

7.5.3 Wall cladding boards

[2019: 3.5.4.3]

Wall cladding boards must—

(a) for 7.5 mm (minimum) thick fibre-cement — comply with AS/NZS 2908.2 or ISO 8336; and

(b) for 9.5 mm (minimum) thick hardboard — comply with AS/NZS 1859.4 for exterior grade; and

(c) be fixed in accordance with Table 7.5.3a and Table 7.5.3b with—

(i) one fixing provided at each stud or equivalent framing member for wall cladding boards not more than 130 mm wide; and

(ii) two fixings provided at each stud or equivalent framing member for wall cladding boards greater than 130 mm wide; and

(iii) fixings located along the studs at not more than 100 mm centres; and

(iv) fixings located so that they do not penetrate the tip or thinner edge of the board beneath; and

(d) have a lap not less than—

(i) for 7.5 mm (minimum) thick fibre-cement — 25mm; or

(ii) for 9.5 mm (minimum) thick hardboard — 20 mm.

Table 7.5.3a: Fixing requirements—Minimum 7.5 mm thick fibre-cement wall cladding boards

Design wind speed	Maximum stud spacing (mm)	Minimum nominal stud fixings
N1 - N3	600	Timber: 2.8 GC
		Steel: (8-18) S

Table Notes:

1. GC = galvanised fibre-cement nail.
2. S = self embedding or wafer head screw.
3. Fasteners must penetrate not less than 30 mm into timber frames and not less than two full screw threads through steel frames.
4. Steel framing members must have a base metal thickness (BMT) not less than ~~1.2 mm~~ that *required* for a roof batten in NASH standard.
5. Wall cladding may be fixed through timber or metal battens attached to the wall frame in accordance with AS 1684.2, AS 1684.3, AS 1684.4 or NASH standard as appropriate (see fixing requirements for roof battens) so long as the minimum penetration into the wall frame is achieved.

Table 7.5.3b: Fixing requirements—Minimum 9.5 mm thick hardboard wall cladding boards

Design wind speed	Maximum stud spacing (mm)	Minimum nominal stud fixings
N1 - N3	600	Timber: 2.8 GC
		Steel: (8-18) S

Table Notes:

1. GC = galvanised fibre-cement nail.
2. S = self embedding or wafer head screw.
3. Fasteners must penetrate not less than 30 mm into timber frames and not less than two full screw threads through steel frames.
4. Steel framing members must have a base metal thickness (BMT) not less than ~~1.2 mm~~ that *required* for a roof batten in NASH standard.
5. Wall cladding may be fixed through timber or metal battens attached to the wall frame in accordance with AS 1684.2, AS 1684.3, AS 1684.4 or NASH standard as appropriate (see fixing requirements for roof battens) so long as the minimum penetration into the wall frame is achieved.

Explanatory Information:

Where the wall cladding boards contain a shiplap join as opposed to a lapped join, 7.5.3(d) does not apply, and the joins between the boards are *required* to have the overlap and groove closely fitted.

7.5.4 Sheet wall cladding

[2019: 3.5.4.4]

(1) Fibre-cement sheet wall cladding must—

(a) comply with AS/NZS 2908.2 or ISO 8336; and
(b) be fixed in accordance with Table 7.5.4a.

(2) Hardboard sheet wall cladding must—
(a) comply with AS/NZS 1859.4 for exterior grade; and
(b) be fixed in accordance with Table 7.5.4b.

(3) Structural plywood wall cladding must—
(a) comply with AS/NZS 2269.0; and
(b) be fixed in accordance with Table 7.5.4c.

Table 7.5.4a: Stud and fixing spacings for 6 mm fibre-cement sheet wall cladding

Design wind speed	Maximum stud spacing (mm)	Maximum nail spacing within 1.2 m of the external corners of the building (mm) Note 1	Maximum nail spacing elsewhere (mm) Note 1
N1	≤ 1.2 m of external building corners: 600 Elsewhere: 600	Body: 300, Edges: 200	Body: 300, Edges: 200
N2	≤ 1.2 m of external building corners: 600 Elsewhere: 600	Body: 200, Edges: 200	Body: 300, Edges: 200
N3	≤ 1.2 m of external building corners: 450 Elsewhere: 600	Body: 200, Edges: 200	Body: 200, Edges: 200

Table Notes:

1. Maximum nail spacing using 2.8 mm fibre-cement nails.
2. Fixings must be located not less than 50 mm from the edge of all corners.
3. Fasteners must penetrate not less than 30 mm into a timber frame.
4. Wall cladding may be fixed through timber or metal battens attached to the wall frame in accordance with AS 1684.2, AS 1684.3, AS 1684.4 or NASH standard as appropriate (see fixing requirements for roof battens) so long as the minimum penetration into the wall frame is achieved.

Table 7.5.4b: Stud and fixing spacings for 9.5 mm thick hardboard sheet wall cladding

Design wind speed	Maximum stud spacing (mm)	Maximum nail spacing within 1.2 m of the external corners of the building (mm) Note 1	Maximum nail spacing elsewhere (mm) Note 1
N1	600	Body: 300, Edges: 150	Body: 300, Edges: 150
N2	600	Body: 300, Edges: 150	Body: 300, Edges: 150
N3	600	Body: 300, Edges: 150	Body: 300, Edges: 150

Table Notes:

1. Maximum nail spacing using 2.8 mm galvanised clouts or flat head nails.
2. Fixings must be positioned a minimum of 12 mm from the edge of the sheet and not less than 50 mm from the edge of all corners.
3. Fasteners must penetrate not less than 30 mm into the timber frame.
4. Wall cladding may be fixed through timber or metal battens attached to the wall frame in accordance with AS 1684.2, AS 1684.3, AS 1684.4 or NASH standard as appropriate (see fixing requirements for roof battens) so long as the minimum penetration into the wall frame is achieved.

Table 7.5.4c: Stud and fixing spacings for plywood wall cladding equal to or greater than 6.5 mm thick

Design wind speed	Maximum stud spacing (mm)	Maximum nail spacing within 1.2 m of the external corners of the building (mm) Note 1	Maximum nail spacing elsewhere (mm) Note 1
N1	600	Body: 200, Edges: 100	Body: 200, Edges: 150
N2	600	Body: 200, Edges: 100	Body: 200, Edges: 150
N3	600	Body: 150, Edges: 100	Body: 200, Edges: 150

Table Notes:

1. Maximum nail spacing using 2.8 mm or 3.5 mm galvanised clouts or flat head nails.
2. Fixings must be positioned a minimum of 12 mm from the edge of the sheet and not less than 50 mm from the edge of all corners.
3. Fasteners must penetrate not less than 30 mm into the timber frame
4. Wall cladding may be fixed through timber or metal battens attached to the wall frame in accordance with AS 1684.2, AS 1684.3, AS 1684.4 or NASH standard as appropriate (see fixing requirements for roof battens) so long as the minimum penetration into the wall frame is achieved.

Explanatory Information:

Where sheet bracing is also acting as structural bracing, fixing requirements are listed in AS 1684 and NASH Standard – Residential and Low-Rise Steel Framing, Part 2.

7.5.5 Eaves and soffit linings

[2019: 3.5.4.5]

Where provided, external fibre-cement sheets and linings used as eaves and soffit linings must—

(a) comply with AS/NZS 2908.2 or ISO 8336; and

(b) be fixed in accordance with Table 7.5.5 and Figure 7.5.5 using—

(i) 2.8 × 30 mm fibre-cement nails; or

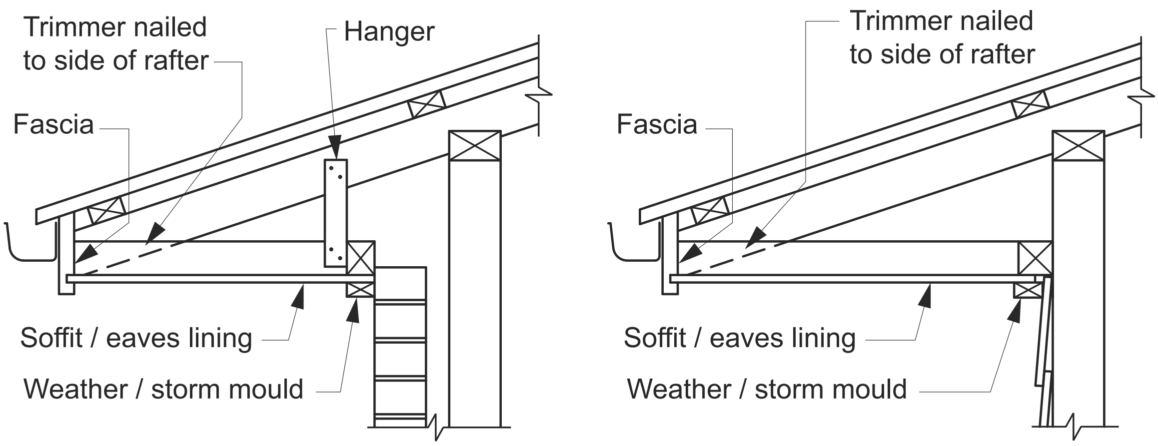
(ii) No. 8 wafer head screws (for 4.5 mm and 6 mm sheets only); or

(iii) No. 8 self embedding head screws (for 6 mm sheets only).

Table 7.5.5: Trimmer and fastener spacings for 4.5 mm and 6 mm fibre-cement eaves and soffit linings

Maximum eaves width	*Design wind speed*	Maximum trimmer spacings (mm)		Maximum fastener spacings (mm)	
		Within 1200 mm of the external corners of the building	Elsewhere	Within 1200 mm of the external corners of the building	Elsewhere
600	N1	600	900	200	300
	N2	600	800	200	300
	N3	500	700	200	300
1200	N1	600	750	200	300
	N2	600	700	200	300
	N3	500	650	200	300

Figure 7.5.5: **Eaves trimmer detail**



(a) Masonry-veneer construction **(b) Clad frame construction**

7.5.6 Flashings to wall openings

[2019: 3.5.4.6]

Openings in *external wall* cladding exposed to the weather must be flashed with materials complying with AS/NZS 2904 and in accordance with the following:

(a) *Flashings* must be provided to bottom, tops and sides of openings, except as permitted by (d), and must be installed so that the *flashing*—
   (i) extends not less than 110 mm beyond the reveals on each side of the opening where practicable; and
   (ii) is attached to the *window* and wall framing; and
   (iii) at the top and bottom of the opening, drains to the outside face of the wall or cladding.

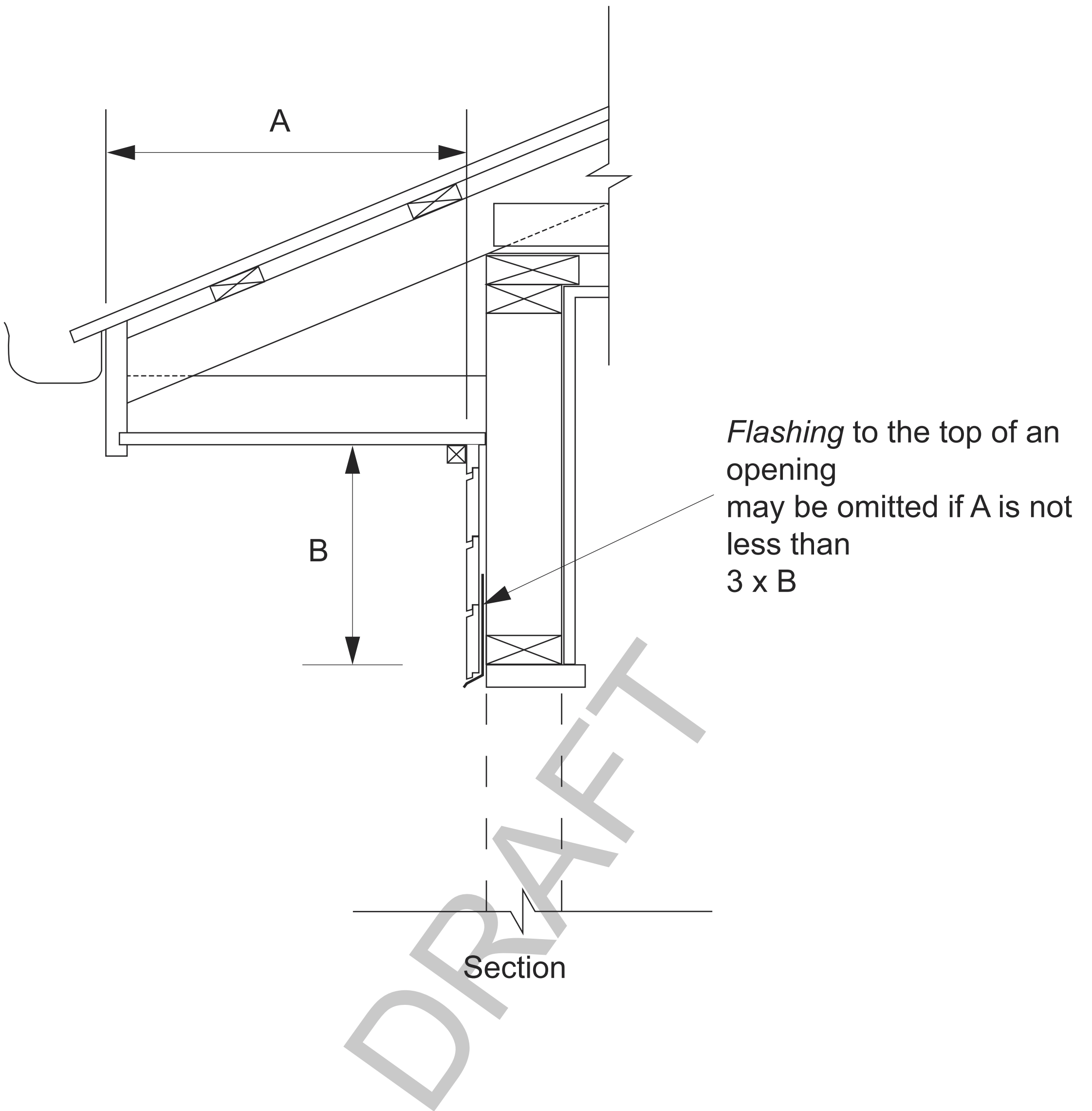
(b) Joins in the *flashing* must—
   (i) overlap by not less than 75 mm in the direction of flow; and
   (ii) be securely fastened at intervals of not more than 40 mm; and
   (iii) have sealant installed between laps.

(c) The method of *flashing* must be suitable for the framing and cladding used and any reveal for the *window* or door system or any architrave or finishing trims that may be installed.

(d) The top of an opening need not be flashed where it is adequately protected by an eave of a width more than 3 times the height of the cladding above the opening (See Figure 7.5.6).

(e) *Flashings* must be securely fixed at least 25 mm under the cladding and extend over the ends and edges of the framing of the opening.

Figure 7.5.6: **Weather protection of openings**



> **Explanatory Information:**
>
> 7.5.6(a)(i) applies 'where practicable' because it is often impractical to extend the *flashing* 110 mm beyond the reveal; for example, where openings are positioned adjacent to a corner or where two *windows* are within 110 mm of each other. In such cases consideration should be given to ensure the *flashing* prevents the penetration of water into the *external wall*.

7.5.7 Clearance between cladding and ground

[2019: 3.5.4.7]

(1) The minimum clearance from the bottom of the wall cladding to the adjoining finished ground level must be—

(a) 100 mm in *low rainfall intensity areas* or sandy, well-drained areas; or

(b) 50 mm above impermeable (paved or concreted) areas that slope away from the building in accordance with 3.3.3(a); or

(c) 150 mm in any other case.

(2) Wall cladding must extend a minimum of 50 mm below the bearer or lowest horizontal part of the suspended floor framing.

Explanatory Information:

The 7.5.7 clearances may also be subject to other requirements for drainage in Part 3.3, clearances for inspection zones for termite management in Part 3.4 and screening and sealing of gap requirements for construction in bushfire prone areas in H7D4, where appropriate.

7.5.8 Parapet cappings

[2019: 3.5.4.8]

Where a wall cladding is used to form a parapet wall, the cladding must be attached to a supporting frame and have a capping installed that complies with the following:

(a) Cappings must—
  (i) be purpose made, machine-folded sheet metal or equivalent sections of a material compatible with all up and downstream metal roof covering materials in accordance with 7.2.2(2); and
  (ii) extend not less than 50 mm down the sides of the parapet; and
  (iii) be separated from the supporting framing by a vapour permeable sarking installed in accordance with (f); and
  (iv) be fixed with either self drilling screws or rivets with rubber washers at intervals of not more than 500 mm that do not penetrate the top of cappings, except at joints and corners.

(b) The top of the capping must slope a minimum of 5 degrees.

(c) Joints in cappings must—
  (i) overlap by not less than 50 mm in the direction of flow; and
  (ii) be securely fastened at intervals of not more than 40 mm; and
  (iii) have sealant installed between laps.

(d) Fixing for cappings must be compatible with the capping material.

(e) Lead cappings must not be used with prepainted steel or zinc/aluminium steel or on any roof if the roof is part of a potable (drinking) water catchment area.

(f) Sarking must comply with AS/NZS 4200.1 and be installed behind all wall cladding where parapets are installed, with—
  (i) each adjoining sheet or roll being—
    (A) overlapped not less than 150 mm; or
    (B) taped together; and
  (i) sarking fixed to supporting members at not more than 300 mm centres.

Explanatory Information:

For the purposes of 7.5.8(f), sarking is *required* to be installed to the whole *external wall* which contains the parapet and extend to the top and back of the parapet. A gap should be provided between the sarking and the parapet capping to help control *condensation*.

8 Glazing

Part 8.1 Scope and application of Section 8

8.1.1 Scope

[New for 2022]

This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for—

(a) ~~glazing~~*windows* and external glazed doors (see Part 8.2); and

(b) glass (see Part 8.3); and

(c) human impact safety requirements for glazing (see Part 8.4~~Part 8.3~~).

Explanatory Information:

These provisions relate to the design, manufacture and installation of *windows* in *external walls* and the use of glass in Class 1 and 10 buildings. The selection of glass in Part 8.3 applies to other assemblies that may not be in an *external wall* of a Class 1 or 10 building.

The terms *windows* and glazed assemblies are used throughout Section 8. The term *window* is defined in the NCC and relates to a device which is capable of transmitting natural light directly from outside a building or room when it is in the closed position. This is distinct from glazed assemblies which may also include elements located in internal parts of a building. These may be glazed panels, splash-backs, mirrors, shower screens or *window*-type assemblies that are not subject to wind loads and weatherproofing requirements.

A number of other parts of NCC Volume Two and the ABCB Housing Provisions also contain requirements relating to glazing in addition to this Part. They include:

- H1D5 and Part 5.2 of the ABCB Housing Provisions for flashing material requirements.
- H7D2 for glazed barriers for *swimming pool* enclosures.
- H7D4 for *windows* in buildings in *designated bushfire prone areas*.
- Part 13.3 of the ABCB Housing Provisions for glazing subject to energy efficiency requirements.

8.1.2 Application

[New for 2022]

The application of Section 8 of the ABCB Housing Provisions is subject to the following:

(a) The Governing Requirements of NCC 2022 Volume Two.

(b) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 8 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practice for Part 3.6 of NCC 2019 Volume Two.

Part 8.2 ~~Glazing~~Windows and external glazed doors

8.2.1 Application of Part 8.2

[New for 2022]

(1) Part 8.2 applies subject to the limitations set out at ~~H1D8(3)~~H1D8(1) and (2).

(2) Part 8.2 need not be complied with if ~~H1D8(1) or (2)~~H1D8(2)(a) is complied with.

(3) Glazed assemblies subject to this Part must comply with—

- (a) 8.2.2 for the installation of *windows*; and
- (b) 8.2.3 for fixings; and
- (c) 8.2.4 for the number of fixings; and
- (d) 8.2.5 for flashings.

Explanatory Information:

~~This Part applies to the selection of glass only and does not include the installation of windows or framed glazed doors. This is due to window systems relying on the design and testing of structural system members to withstand wind loads (e.g. mullions, transoms, and meeting rails and stiles) and the perimeter frame design, sealants and gaskets to resist water penetration.~~

This Part does not cover the installation of assemblies that are internal or revolving doors, fixed louvres, skylights, rooflights and *windows* not installed in the vertical plane, *windows* in greenhouses or horticultural buildings or frameless sliding doors.

The term 'one piece framing' in H1D8(1)(d) generally refers to glazing installed in the *external wall* of a building where the external fabric is forming the frame.

~~8.2.2 Glazing sizes and installation~~

[~~2019: 3.6.2~~]

~~Glazing used in buildings must comply with the following:~~

- (a) ~~Glazing used in the *perimeter of buildings* and supported on all sides must comply with the appropriate provisions listed in 8.2.3.~~
- (b) ~~Glazing used in areas where the potential for human impact could occur must comply with the appropriate provisions listed in 8.3.1.~~
- (c) ~~For 3 mm monolithic annealed glass, the maximum area must not be more than 0.85 m^2.~~
- (d) ~~For 3 mm annealed glass used in Insulated Glass Units (IGU), the maximum area must not be more than 1.36 m^2.~~
- (e) ~~All exposed edges must have sharp edges removed.~~

Explanatory Information:

~~An Insulated Glass Unit consists of two or more panes of glass spaced apart and factory sealed with dry air or special gases in the cavity. The term is often abbreviated to IGU.~~

~~The selection of glass thickness relies not just on limit state wind loads but on a number of geometric criteria that include the influence of aspect ratio and slenderness factors. These factors are taken into account in Tables 8.2.3a, 8.2.3b and 8.2.3c.~~

8.2.2 Installation of windows

[New for 2022]

Windows must be installed in accordance with the following:

(a) *Window* assemblies are to be fixed in accordance with 8.2.3 and 8.2.4.

(b) Structural building loads must not be transferred to the *window* assembly.

(c) A minimum 10 mm gap must be provided between the top of the *window* assembly and any *loadbearing* framing or masonry wall element.

(d) The requirements of (c) may be increased where necessary to allow for frame settlement over wide openings.

(e) Gaps between the *window* assembly and the adjoining walls, sills or heads must be sealed with a flexible material to prevent the ingress of water.

(f) Packing, if provided between each *window* assembly and the frame, must be—

  (i) located along each side and bottom; and

  (ii) fixed to ensure the sides and bottom of the *window* assembly remain straight; and

  (iii) clear of any flashing material.

(g) Where aluminium sills may come into contact with masonry, they must be separated to prevent corrosion.

(h) *Window* assemblies must be flashed in accordance with 8.2.5.

Explanatory Information:

It is important for *windows* to be fixed correctly in the external frame or wall of a building to prevent buckling, diagonal distortion or twisting that may compromise weathertightness around the perimeter of the opening. Correct installation is also critical to ensure *windows* resist deign wind pressures that the external walls of the building are subject to over its expected life. Consideration should be given to any additional details for systems designed specifically to meet acoustic or energy efficiency requirements.

Window assemblies should be installed so they are as close as possible to being perpendicular with the vertical and horizontal planes and where all corners form right-angles, have equal distances when measured diagonally to ensure they are square.

A gap provided between the top of the assembly and the external wall frame will allow for settlement after construction and prevent the transfer of structural loads. Where packing is used between the openings in the external wall and the *window* assembly, it should be of a material that is compatible with both the frame and the *window* assembly. It should also be positioned and fixed to stay in place permanently and ensure the sides and sills remain straight.

Where aluminium sills of a *window* assembly may contact masonry, particularly mortar, an isolating material such as bituminous membranes or paints and caulking compounds containing zinc chromates should be used. Care must be taken to minimise any gaps between sills and external skins to prevent excessive ingress of water.

Explanatory Figure 8.2.2 provide guidance on the installation of *windows* and positioning of relevant fixing points.

Figure 8.2.2 (explanatory): Guidance for the installation of windows and positioning of relevant fixing points

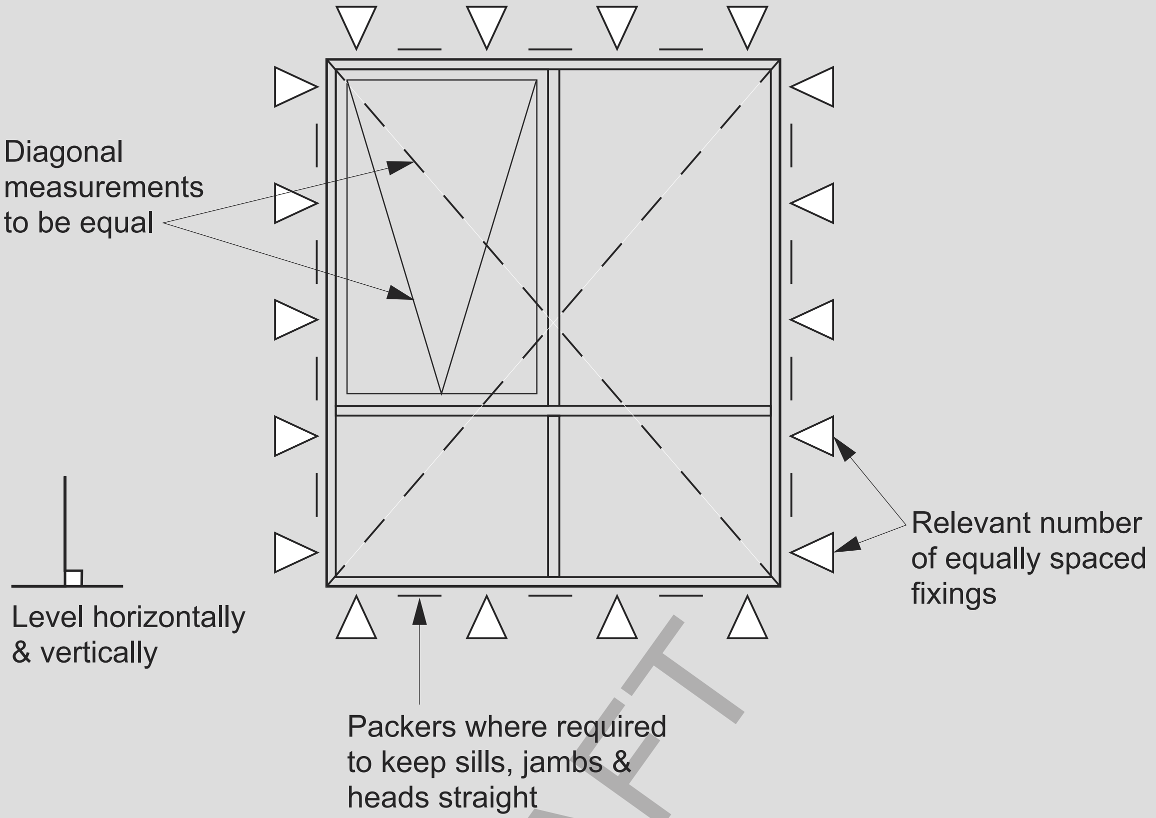


Figure Notes:

Fixings to be in accordance with 8.2.4.

~~8.2.3 Fully framed glazing installed in perimeter of buildings~~

[~~2019: 3.6.3~~]

~~Fully framed (supported on all sides) ordinary annealed glass (including annealed patterned glass) installed in the perimeter of buildings must comply with —~~

(a) ~~if the building is located in an area with a wind class not exceeding N1 — Table 8.2.3a; or~~

(b) ~~if the building is located in an area with a wind class not exceeding N2 — Table 8.2.3b; or~~

(c) ~~if the building is located in an area with a wind class not exceeding N3 — Table 8.2.3c.~~

Table 8.2.3a: ~~Glass thickness for wind class not exceeding N1: ordinary annealed glass (mm)~~

~~Edge (mm)~~	~~300~~	~~450~~	~~600~~	~~750~~	~~900~~	~~1050~~	~~1200~~	~~1350~~	~~1500~~	~~1650~~
~~300~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~
~~450~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~
~~600~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~4~~	~~4~~
~~750~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~
~~900~~	~~3~~	~~3~~	~~3~~	~~3~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~
~~1050~~	~~3~~	~~3~~	~~3~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~
~~1200~~	~~3~~	~~3~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~
~~1350~~	~~3~~	~~3~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~

Edge (mm)	300	450	600	750	900	1050	1200	1350	1500	1650
1500	3	3	4	4	4	4	4	4	4	4
1650	3	3	4	4	4	4	4	4	4	4
1800	3	3	4	4	4	4	4	4	4	4
1950	3	4	4	4	4	4	4	4	4	4
2100	3	4	4	4	4	4	4	4	4	4
2250	3	4	4	4	4	4	4	4	4	4
2400	3	4	4	4	4	4	4	4	4	4
2550	3	4	4	4	4	4	4	4	4	4
2700	3	4	4	4	4	4	4	4	4	4

Table 8.2.3b: ~~Glass thickness for wind class not exceeding N2: ordinary annealed glass (mm)~~

Edge (mm)	300	450	600	750	900	1050	1200	1350	1500	1650
300	3	3	3	3	3	3	3	3	3	3
450	3	3	3	3	3	3	3	3	3	3
600	3	3	3	3	3	3	3	3	4	4
750	3	3	3	3	3	3	4	4	4	4
900	3	3	3	3	3	4	4	4	4	4
1050	3	3	3	3	4	4	4	4	4	4
1200	3	3	3	4	4	4	4	4	4	4
1350	3	3	3	4	4	4	4	4	4	4
1500	3	3	4	4	4	4	4	4	4	4
1650	3	3	4	4	4	4	4	4	4	4
1800	3	3	4	4	4	4	4	4	4	4
1950	3	4	4	4	4	4	4	4	4	4
2100	3	4	4	4	4	4	4	4	4	5
2250	3	4	4	4	4	4	4	4	4	5
2400	3	4	4	4	4	4	4	4	4	5
2550	3	4	4	4	4	4	4	4	5	5
2700	3	4	4	4	4	4	4	4	5	5

Table 8.2.3c: ~~Glass thickness for wind class not exceeding N3: ordinary annealed glass (mm)~~

Edge (mm)	300	450	600	750	900	1050	1200	1350	1500	1650
300	3	3	3	3	3	3	3	3	3	3
450	3	3	3	3	3	3	3	3	3	3
600	3	3	3	3	3	3	3	3	4	4
750	3	3	3	3	3	3	4	4	4	4
900	3	3	3	3	3	4	4	4	4	4
1050	3	3	3	3	4	4	4	4	4	4
1200	3	3	3	4	4	4	4	4	4	4
1350	3	3	3	4	4	4	4	4	4	5

~~Edge (mm)~~	~~300~~	~~450~~	~~600~~	~~750~~	~~900~~	~~1050~~	~~1200~~	~~1350~~	~~1500~~	~~1650~~
~~1500~~	~~3~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~5~~	~~5~~
~~1650~~	~~3~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~5~~	~~5~~	~~5~~
~~1800~~	~~3~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~5~~	~~5~~	~~5~~
~~1950~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~5~~	~~5~~	~~5~~	~~5~~
~~2100~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~5~~	~~5~~	~~5~~	~~6~~
~~2250~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~5~~	~~5~~	~~5~~	~~6~~
~~2400~~	~~3~~	~~4~~	~~4~~	~~4~~	~~4~~	~~4~~	~~5~~	~~5~~	~~6~~	~~6~~
~~2550~~	~~3~~	~~4~~	~~4~~	~~4~~	~~5~~	~~5~~	~~5~~	~~5~~	~~6~~	~~6~~
~~2700~~	~~3~~	~~4~~	~~4~~	~~4~~	~~5~~	~~5~~	~~5~~	~~5~~	~~6~~	~~6~~

Explanatory Information:

1. ~~For other types of perimeter glazing including toughened, wired, laminated and unframed glazing refer to AS 1288.~~
2. ~~For ordinary annealed patterned glass thickness measurement refer to AS 1288.~~

8.2.3 Fixings

[New for 2022]

Fixings used in 8.2.4 must be—

(a) positioned as evenly as practicable around the *window* assembly; and

(b) at a distance from the edge of framing, brick or block masonry that is not less than five times their shaft diameter, and if fitted into—

  (i) timber or masonry walls, be embedded into the frame to a minimum of ten times the diameter of the fixing; and

  (ii) lightweight steel frames, be positioned in accordance with NASH Standard Part 2; and

(c) galvanised plain shank, threaded or equivalent nails or self embedding head or wafer head screws; and

(d) where the building is located within 200 m of *breaking surf*—

  (i) for nails, stainless steel when fixed into timber members; or

  (ii) in all other cases, hot-dipped galvanised (min. 350 g/m^2) nails or hot-dipped galvanised (min. 350 g/m^2) selfembedding head or wafer head screws.

Explanatory Information: **Edge distance of fixings**

The edge distance of fixings can be calculated using the following formula:

$$e \geq 5D$$

Where—

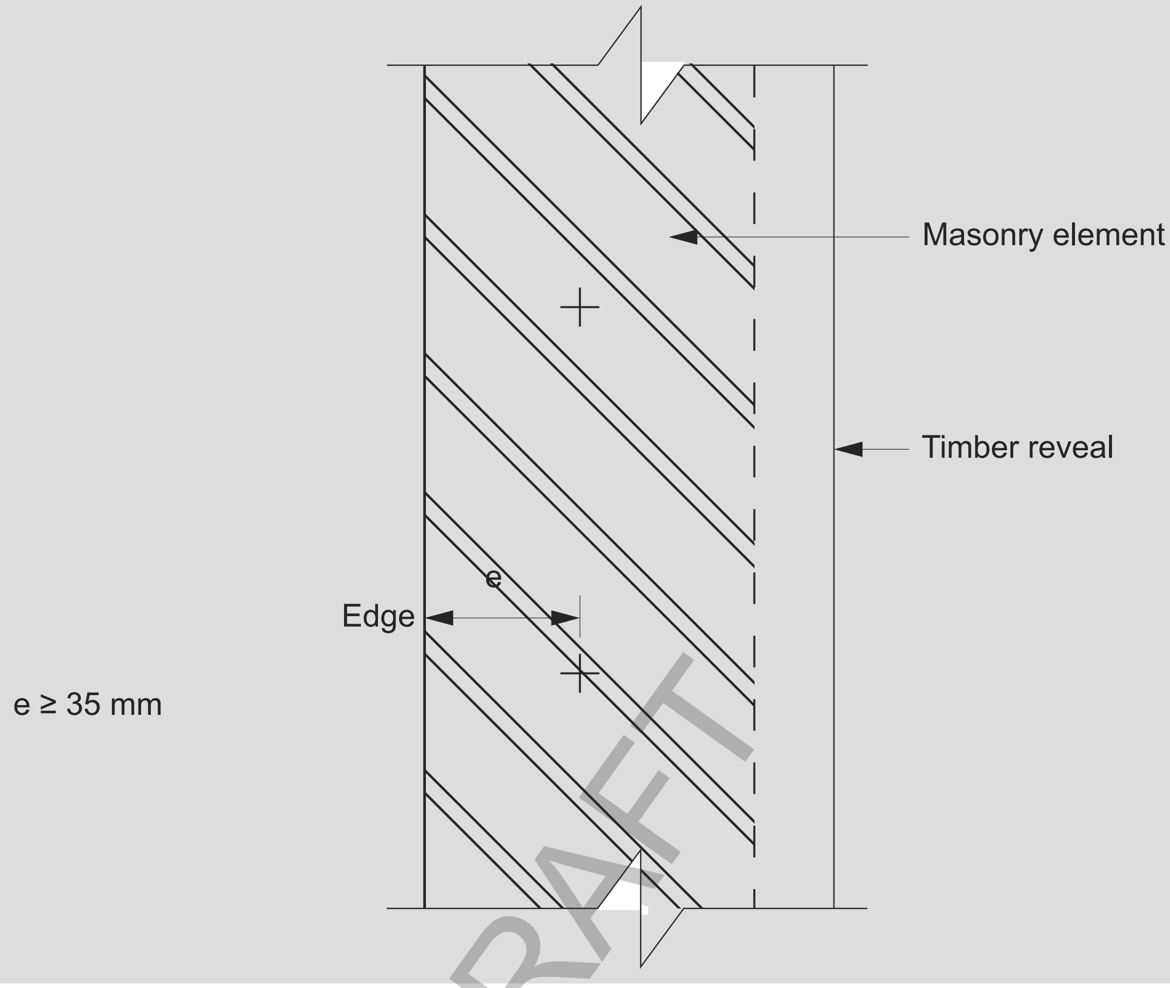
- e = distance from the edge of timber frame ~~or masonry~~ wall member
- D = diameter of main shaft of nail or screw.

For example, for a *window* using 7 mm masonry screw (anchor) into a masonry wall element:

$$e \geq 5 \times 7mm$$

therefore, , as depicted in Explanatory Figure 8.2.3a, where the distance from the edge of the masonry wall element the fixing is being placed into must be at least 35 mm. This distance can be from either of the edges of the masonry wall element to suit the width of the *window* assembly frame.

Figure 8.2.3a (explanatory): Example of 7 mm masonry screw into masonry wall element



Explanatory Information: Embedment

The embedment depth of fixings to comply with 8.2.3(b)(i) can be calculated using the following formula:

$$E \geq 10D$$

where—

- E = embedment

- = diameter of nail or screw

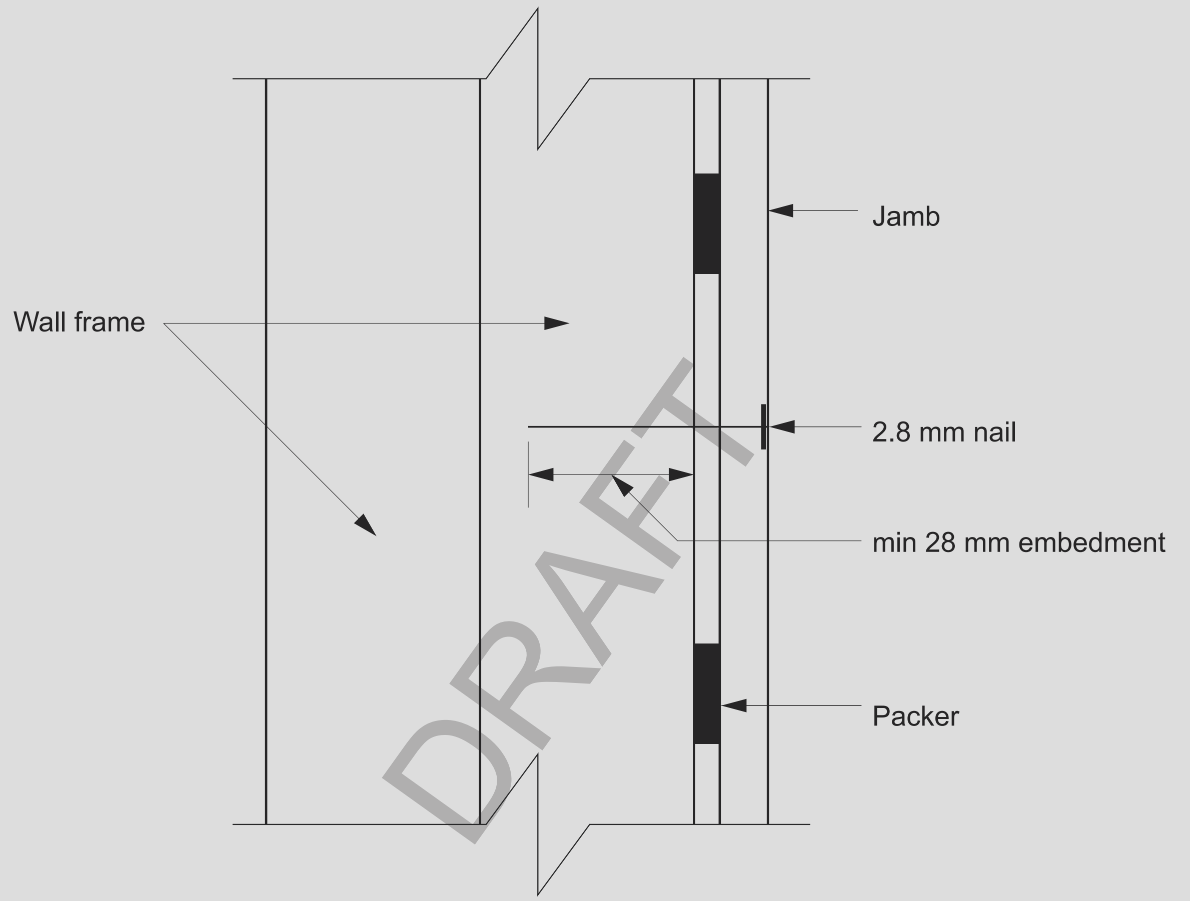
For example, for a *window* using 2.8 mm diameter nails into a timber frame—

$$E \geq 10 \times 2.8$$

therefore, $E \geq 28$ mm, as depicted in Explanatory Figure 8.2.3b.

The embedment of the 2.8 mm nails into the timber jamb studs forming the framed opening of the *window* will need to be a minimum of 28 mm. The nail length will need to be established giving consideration to the calculated embedment depth, thickness of the *window* assembly jambs and the distance between the timber jamb stud and the *window* jamb after packing.

Figure 8.2.3b (explanatory): Example of window using 2.8 mm nails into a timber frame



8.2.4 Number of fixings

[New for 2022]

The minimum number fixings for *windows* must comply with, if the building is in an area with a wind speed not exceeding—

(a) N1 — Tables 8.2.4a, 8.2.4b or 8.2.4c; or

(b) N2 — Tables 8.2.4d, 8.2.4e or 8.2.4f; or

(c) N3 — Tables 8.2.4g, 8.2.4h or 8.2.4i.

Table 8.2.4a: Number of fixings for wind class N1 with 2.8 mm diameter nails into timber frames

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	4	4	4	4	6	6	6	6
900	4	4	4	4	6	6	6	8	8	8	10
1200	4	4	4	6	6	8	8	10	10	10	12

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
1500	4	4	6	6	8	8	10	12	12	14	14
1800	4	6	6	8	10	10	12	14	14	16	18
2100	4	6	8	8	10	12	14	16	16	18	20
2400	4	6	8	10	12	14	16	18	18	20	22
2700	6	8	10	12	14	16	18	20	22	24	26
3000	6	8	10	12	14	16	18	22	24	26	28

Table Notes:

Where the entire *window* is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Table 8.2.4b: **Number of fixings for wind class N1 with 10 gauge screw fixings into timber frames**

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	4	4	4	4	4	4	4	4
900	4	4	4	4	4	4	4	4	4	4	6
1200	4	4	4	4	4	4	4	6	6	6	6
1500	4	4	4	4	4	6	6	6	6	8	8
1800	4	4	4	4	6	6	6	8	8	8	10
2100	4	4	4	6	6	6	8	8	10	10	10
2400	4	4	4	6	6	8	8	10	10	12	12
2700	4	4	6	6	8	8	10	10	12	12	14
3000	4	4	6	6	8	10	10	12	12	14	16

Table Notes:

Where the entire *window* is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Table 8.2.4c: **Number of fixings for wind class N1 with 10 gauge screw fixings into lightweight steel frames**

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	4	4	4	4	4	4	4	4
900	4	4	4	4	4	4	4	4	4	4	6
1200	4	4	4	4	4	4	4	6	6	6	6
1500	4	4	4	4	4	6	6	6	6	8	8
1800	4	4	4	4	6	6	6	8	8	8	10
2100	4	4	4	6	6	6	8	8	10	10	10
2400	4	4	4	6	6	8	8	10	10	12	12
2700	4	4	6	6	8	8	10	10	12	12	14
3000	4	4	6	6	8	10	10	12	12	14	16

Table Notes:

Where the entire *window* is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Table 8.2.4d: **Number of fixings for wind class N2 with 2.8 mm diameter nails into timber frames**

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	4	4	6	6	6	8	8	8
900	4	4	4	6	6	8	8	10	10	12	12
1200	4	4	6	8	8	10	10	12	14	14	16
1500	4	6	8	8	10	12	14	14	16	18	20
1800	4	6	8	10	12	14	16	18	20	22	24
2100	6	8	10	12	14	16	18	20	22	24	26
2400	6	8	10	12	14	18	20	24	26	28	30
2700	6	10	12	14	18	20	24	26	28	32	34
3000	8	10	14	16	20	22	26	28	32	36	38

Table Notes:

Where the entire *window* is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Table 8.2.4e: **Number of fixings for wind class N2 with 10 gauge screw fixings into timber frames**

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	4	4	4	4	4	4	4	4
900	4	4	4	4	4	4	4	6	6	6	6
1200	4	4	4	4	4	6	6	6	8	8	8
1500	4	4	4	6	6	6	8	8	10	10	10
1800	4	4	4	6	6	8	8	10	10	12	12
2100	4	4	6	6	8	8	10	12	12	14	14
2400	4	4	6	8	8	10	12	12	14	16	16
2700	4	6	6	8	10	12	12	14	16	18	18
3000	4	6	8	10	10	12	14	16	18	18	20

Table Notes:

Where the entire *window* is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Table 8.2.4f: **Number of fixings for wind class N2 with 10 gauge screw fixings into lightweight steel frames**

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	4	4	4	4	4	4	4	4
900	4	4	4	4	4	4	4	6	6	6	6
1200	4	4	4	4	4	6	6	6	8	8	8
1500	4	4	4	6	6	6	8	8	10	10	10
1800	4	4	4	6	6	8	8	10	10	12	12
2100	4	4	6	6	8	8	10	12	12	14	14
2400	4	4	6	8	8	10	12	12	14	16	16

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
2700	4	6	6	8	10	12	12	14	16	18	18
3000	4	6	8	10	10	12	14	16	18	18	20

Table Notes:

Where the entire *window* is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Table 8.2.4g: Number of fixings for wind class N3 with 2.8 mm diameter nails into timber frames

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	6	6	8	8	10	10	12	12
900	4	6	6	8	10	12	12	14	16	16	18
1200	4	6	8	10	12	14	16	18	20	22	24
1500	6	8	10	14	16	18	20	22	26	28	30
1800	6	10	12	16	18	22	24	28	30	32	36
2100	8	12	14	18	22	24	28	32	34	38	42
2400	8	12	16	20	24	28	32	36	40	44	48
2700	10	14	18	22	28	32	36	40	44	48	54
3000	10	16	20	26	30	34	40	44	50	54	58

Table Notes:

Where the entire *window* is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Table 8.2.4h: Number of fixings for wind class N3 with 10 gauge screw fixings into timber frames

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	4	4	4	6	6	6	6	8
900	4	4	4	4	6	6	8	8	8	10	10
1200	4	4	6	6	8	8	10	10	12	12	14
1500	4	4	6	8	8	10	12	12	14	14	16
1800	4	6	8	8	10	12	14	14	16	18	20
2100	4	6	8	10	12	14	16	16	18	20	22
2400	6	8	10	12	14	16	18	20	22	24	26
2700	6	8	10	12	14	16	20	22	24	26	28
3000	6	8	12	14	16	18	22	24	26	28	32

Table Notes:

Where the entire *window* is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Table 8.2.4i: Number of fixings for wind class N3 with 10 gauge screw fixings into lightweight steel frames

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	4	4	4	6	6	6	6	8
900	4	4	4	4	6	6	8	8	8	10	10
1200	4	4	6	6	8	8	10	10	12	12	14
1500	4	4	6	8	8	10	12	12	14	14	16
1800	4	6	8	8	10	12	14	14	16	18	20
2100	4	6	8	10	12	14	16	16	18	20	22
2400	6	8	10	12	14	16	18	20	22	24	26
2700	6	8	10	12	14	16	20	22	24	26	28
3000	6	8	12	14	16	18	22	24	26	28	32

Table Notes:

Where the entire *window* is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Explanatory Information: Intent

The intent of Tables 8.2.4a to 8.2.4i is to provide the number of fixings required for different sizes of *windows* in varying *external wall* types for wind classes N1, N2 and N3.

Explanatory Information: Number of fixings

The number of fixings set out in Tables 8.2.4a to 8.2.4i refer to the number for each *window* rather than for each side, top and bottom face.

The number of fixings per *window* is dependent on the wind classification of the *site*, Ultimate Limit State (ULS) wind pressure set out in AS 4055, *window* dimensions and diameter of fixings. AS 4055 has higher ULS wind pressures for parts of *external walls* within 1200 mm of external corners. The number of fixings in the tables are based on these higher ULS wind pressures and can be used for *windows* in the general length of walls and where 25% or more of the width of a single panel of a *window* is within 1200 mm of an external corner.

Explanatory Information: Size of fixings

For each wind classification, Tables 8.2.4a to 8.2.4i provide the minimum number of 2.8 mm nail and 10 gauge screw fixings for *windows*. These sizes have been included as they represent a common range of fixings used in residential construction however, larger or smaller fixings can also be used. Where the diameter sizes selected are greater than those included in the tables, their use is still permissible under this Part and will result in a conservative solution.

In cases where windows are to be fixed to masonry walls, installers should refer to masonry insert manufacturers'documentation.

Where diameter sizes selected are less than those included in the tables, they will be required to demonstrate compliance with the relevant *Performance Requirements*. The *Performance Solution* used can be achieved by using one or a combination of the *Assessment Methods* in A2G2.

8.2.5 Flashings

[New for 2022]

Windows in *external walls* must—

(a) be flashed in accordance with 5.2.8(3) and 7.5.6; and

(b) for masonry veneer, comply with Figures 8.2.5a and 8.2.5b; and

(c) for cavity masonry, comply with Figures 8.2.5c and 8.2.5d; and
(d) for walls clad in accordance with Part 7.5, comply with Figures 8.2.5e and 8.2.5f.

Figure 8.2.5a: Flashing locations — masonry veneer: window

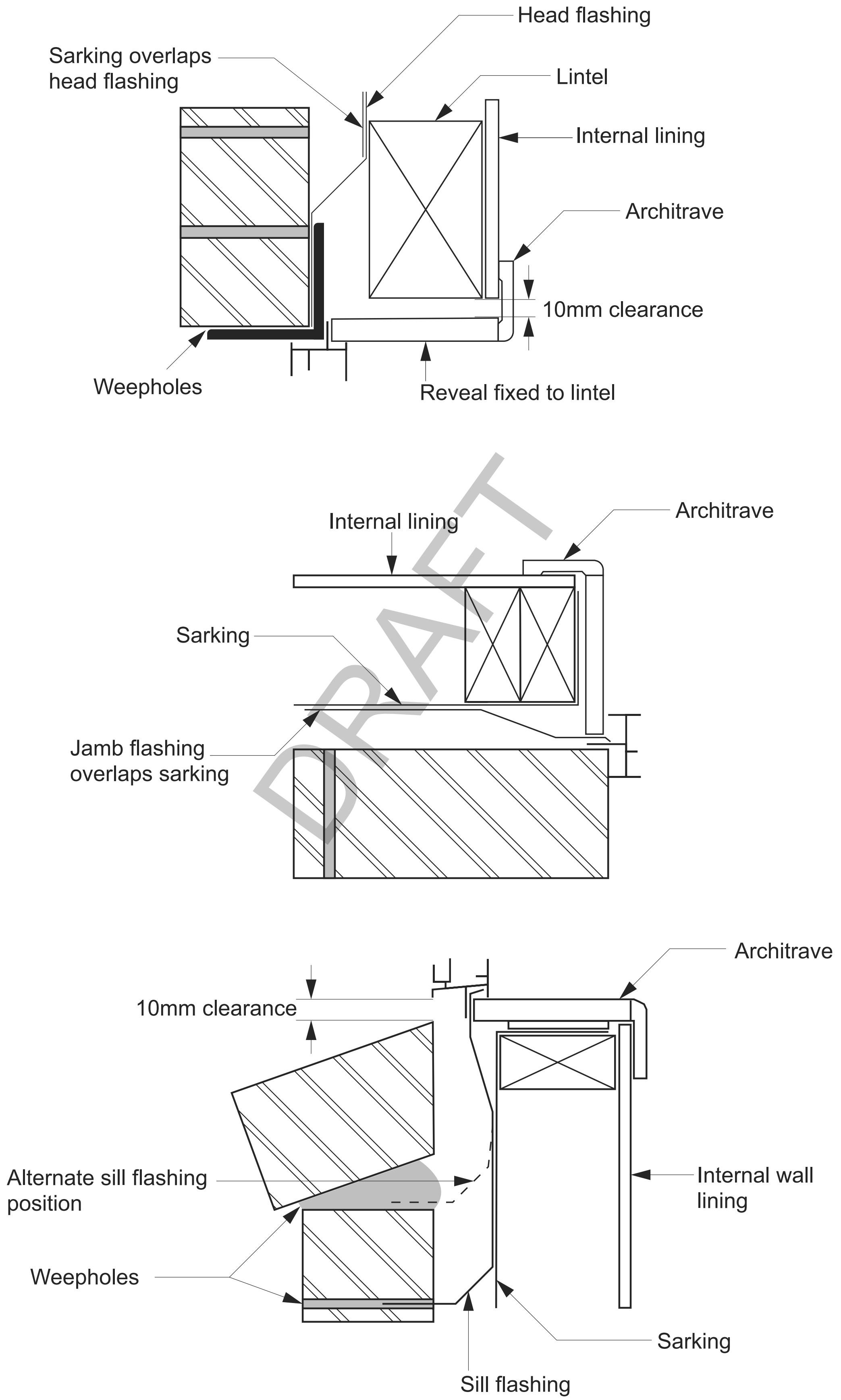


Figure Notes:

1. Head flashing to be in accordance with 8.2.5.
2. Weepholes to be in accordance with 5.7.5.
3. Reveal to be fixed to lintel in accordance with 8.2.2.
4. Sill flashing to be in accordance with 8.2.5.

Figure 8.2.5b: Flashing locations — masonry veneer: door

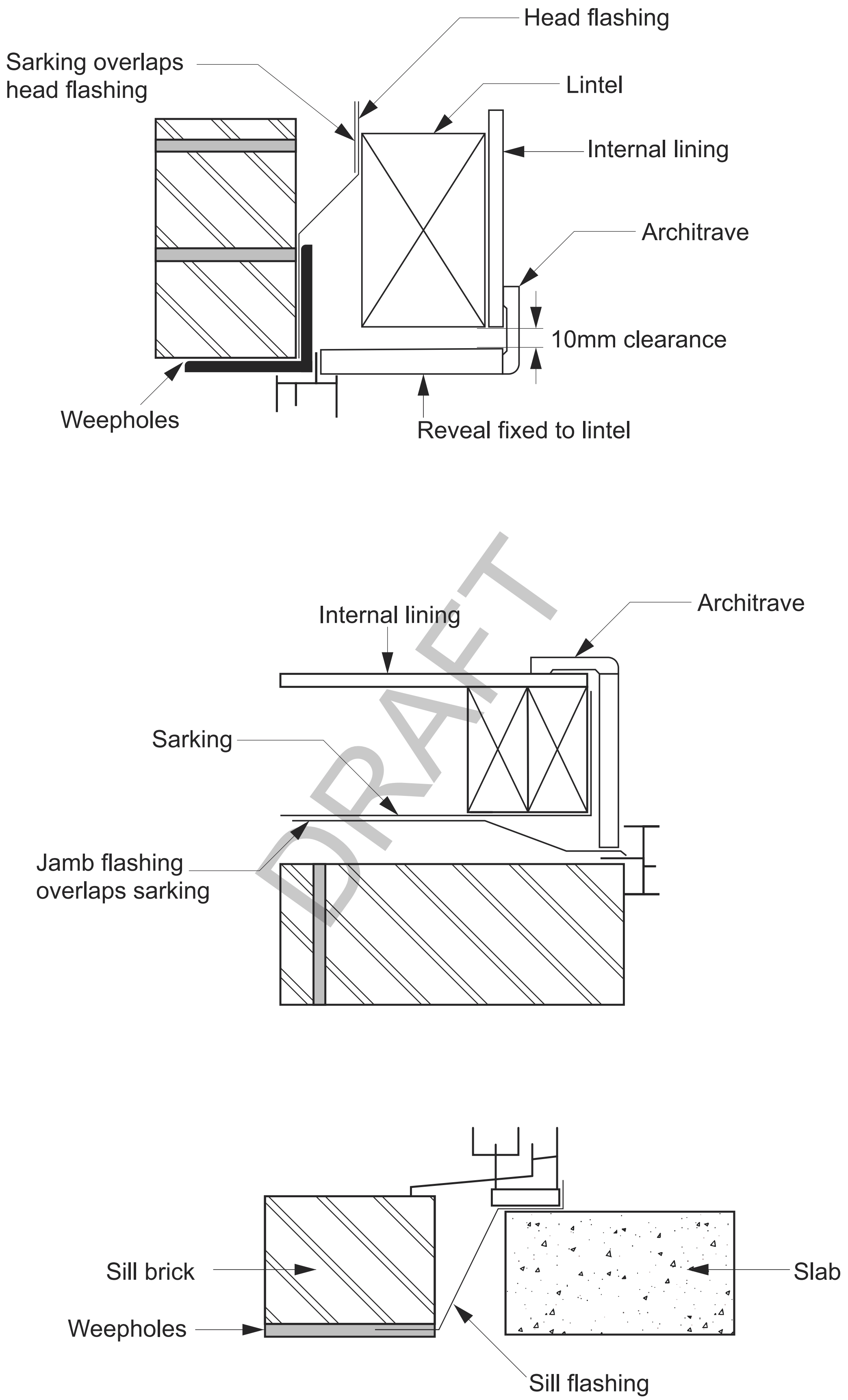


Figure Notes:

1. Head flashing to be in accordance with 8.2.5.
2. Weepholes to be in accordance with 5.7.5.

3. Reveal to be fixed to lintel in accordance with 8.2.2.
4. Jamb flashing to be in accordance with 8.2.5.

Figure 8.2.5c: Flashing locations — cavity masonry: window

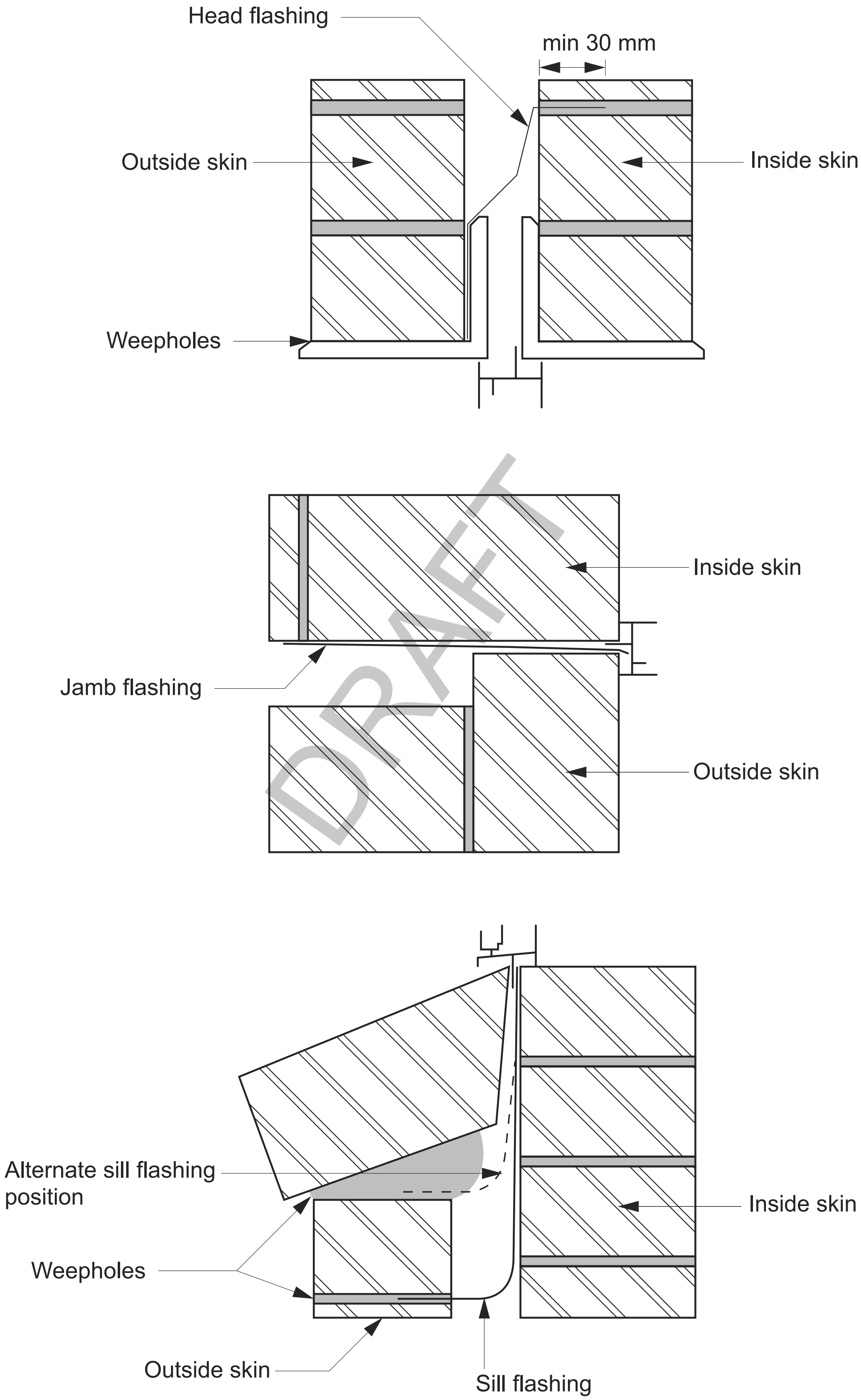


Figure Notes:

1. Head flashing to be in accordance with 8.2.5.
2. Weepholes to be in accordance with 5.7.5.
3. Jamb flashing to be in accordance with 8.2.5.
4. Sill flashing to be in accordance with 8.2.5.

Figure 8.2.5d: Flashing locations — cavity masonry: door

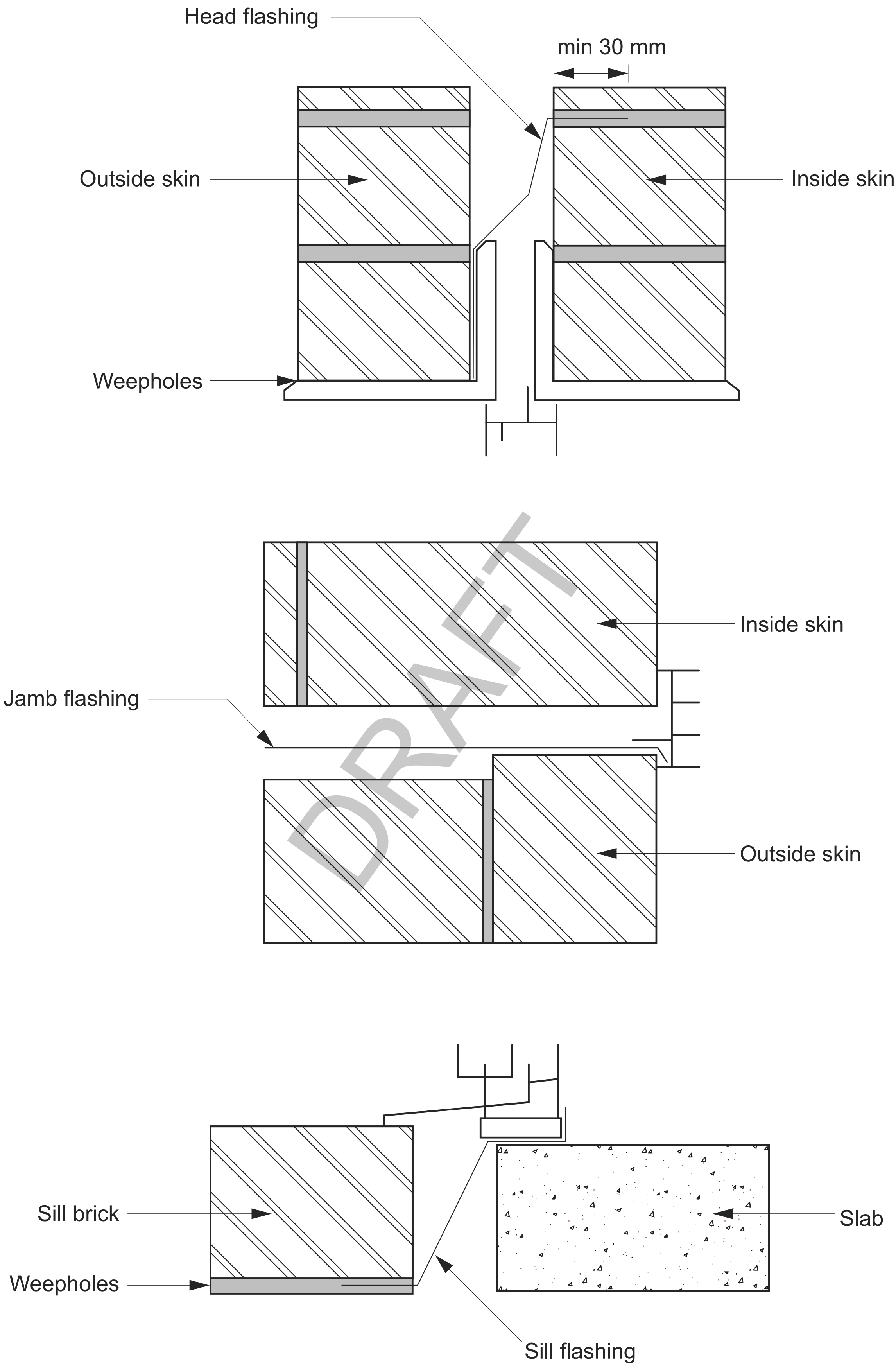


Figure Notes:

1. Head flashing to be in accordance with 8.2.5.
2. Weepholes to be in accordance with 5.7.5.

3. Jamb flashing to be in accordance with 8.2.5.
4. Sill flashing to be in accordance with 8.2.5.

Figure 8.2.5e: Flashing locations — clad timber frame: window

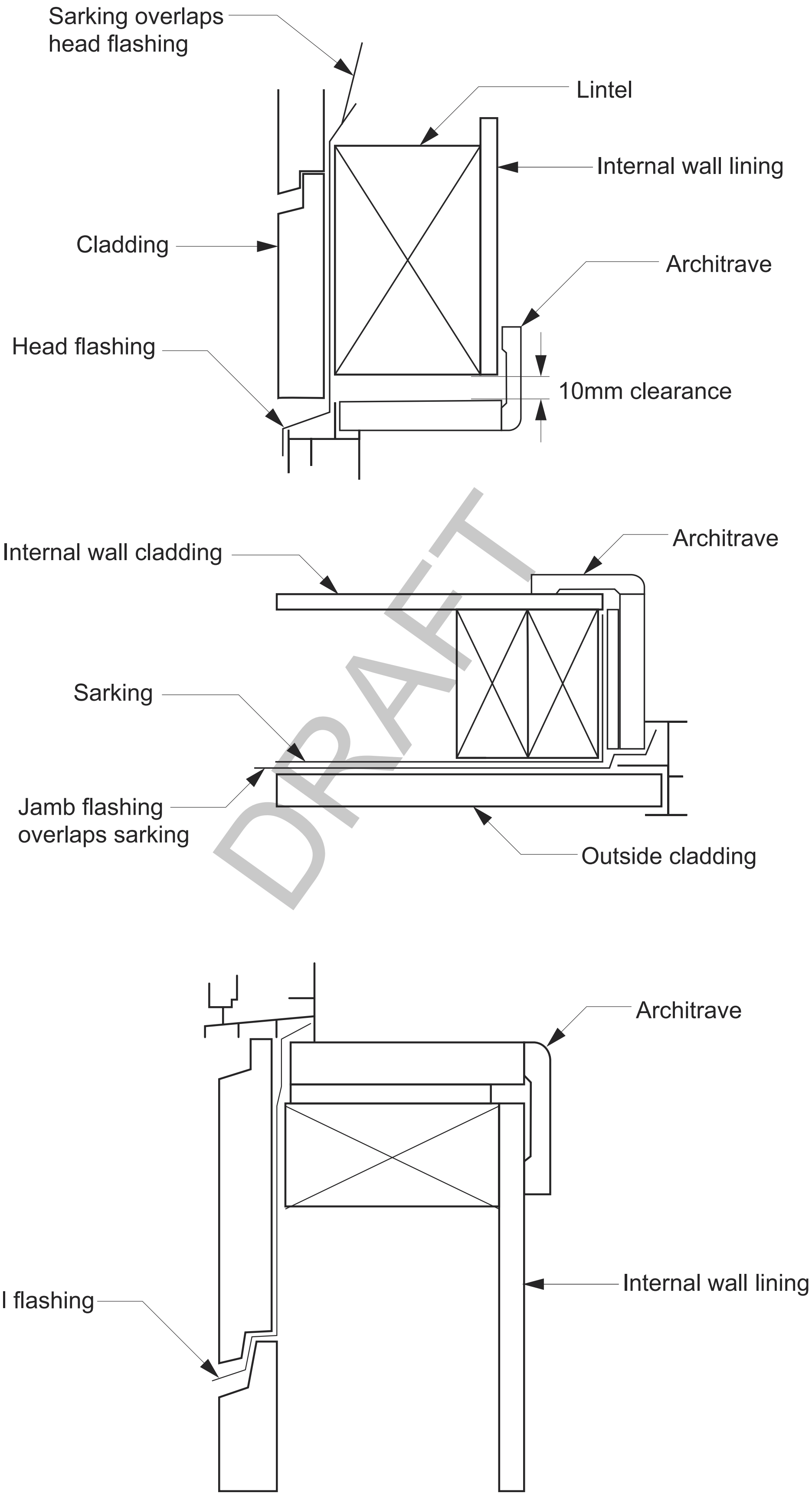


Figure Notes:

Flashing to be in accordance with 8.2.5.

Figure 8.2.5f: Flashing locations — clad timber frame: door

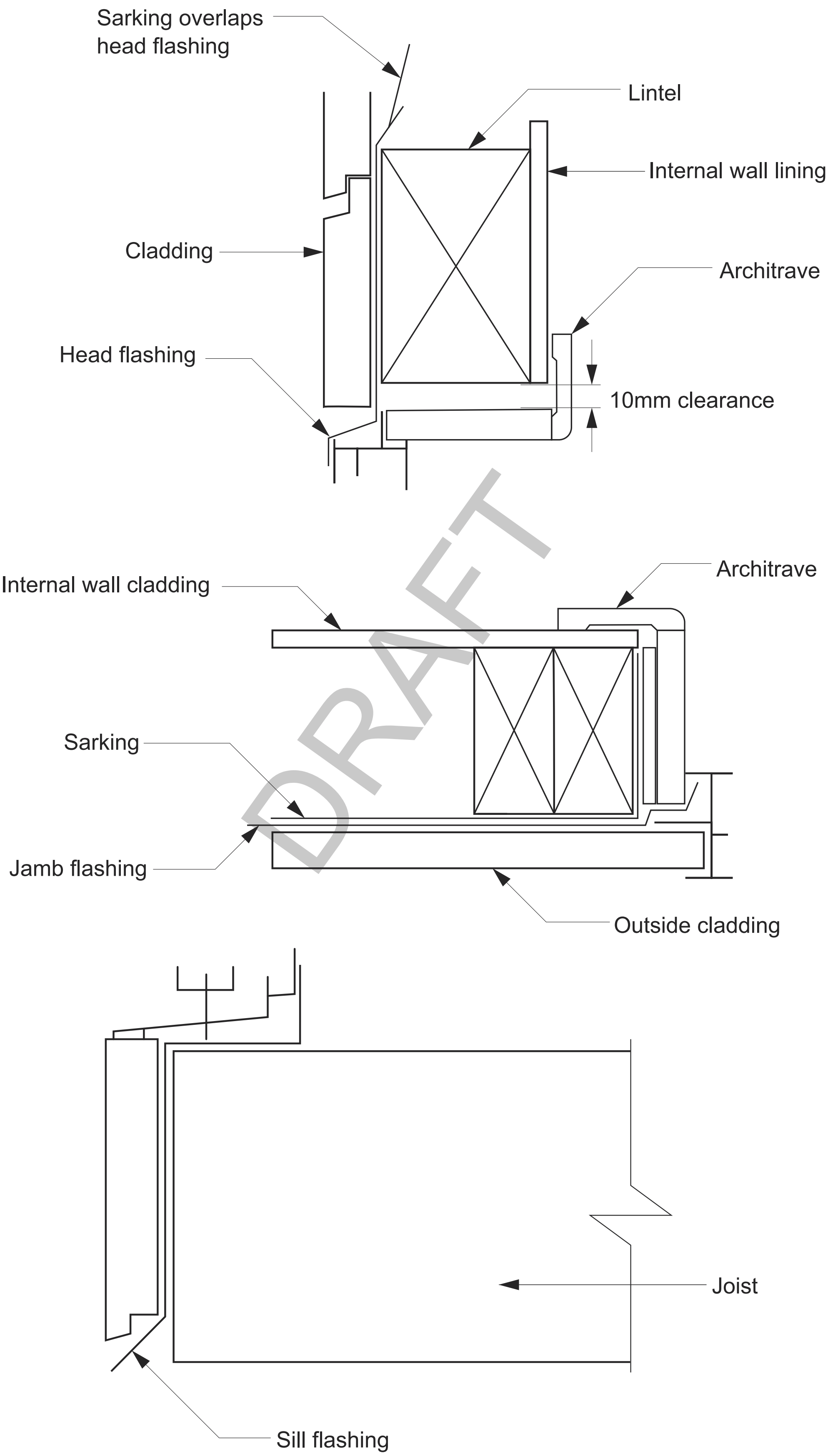


Figure Notes:

Flashing to be in accordance with 8.2.5.

Part 8.3 Glass

8.3.1 Application of Part 8.3

[2019: 3.6.4]

(~~1~~) ~~The thickness and type of glazing installed in areas of a building that have a high potential for human impact (an area of a building frequented by the occupants during everyday activities in which a person could fall into or against the glazed panel) must comply as follows:~~

- (a) ~~Doors — in accordance with 8.3.2.~~
- (b) ~~Door side panels — in accordance with 8.3.3.~~
- (c) ~~Full height glass panels — in accordance with 8.3.4.~~
- (d) ~~Glazed panels, other than doors or side panels, on the perimeter of rooms — in accordance with 8.3.5.~~
- (e) ~~Bathrooms, ensuite and spa room glazing — in accordance with 8.3.6.~~
- (f) ~~Visibility of glazing — in accordance with 8.3.7.~~

(1) Glazing must comply with the following:

- (a) 8.3.2 for glass sizes and installation.
- (b) 8.3.3 for fully framed glazing installed in the perimeter of buildings.
- (c) Part 8.4 for glazed assemblies subject to human impact.
- (d) Glass used must be of a type within the scope of AS 1288.
- (e) Glass used in barriers, except a *window* serving as a barrier, must withstand loading forces in accordance with AS 1170.1.
- (f) Safety glass must be—
  - (i) legibly marked in accordance with 8.4.7; and
  - (ii) made visible in accordance with 8.4.8.

Explanatory Information:

1. This Part applies to the selection of glass only and does not include the installation of *windows* or framed glazed doors. This is due to *window* systems relying on the design and testing of structural members to withstand wind loads (e.g. mullions, transoms, and meeting rails and stiles) and the perimeter frame design, sealants and gaskets to resist water penetration.
2. This Part does not cover glazing in assemblies that are constructed on site and are architectural one-off *windows* which are not design tested in accordance with AS 2047 or other assemblies that are second-hand, reused, recycled or heritage.
3. Information on *design wind speed* for particular areas may be available from the *appropriate authority*.
4. For glazing in *high wind areas*, refer to Part 2.2.

8.~~2.2~~3.2 Glazing sizes and installation

[2019: 3.6.2]

Glazing used in buildings must comply with the following:

- (a) Glazing used in the *perimeter of buildings* and supported on all sides must comply with the appropriate provisions listed in ~~8.2.3~~8.3.3.
- (b) Glazing used in areas where the potential for human impact could occur must comply with the appropriate provisions listed in ~~8.3.1~~Part 8.4.
- (c) For 3 mm monolithic annealed glass, the maximum area must not be more than 0.85 m^2.

(d) ~~For 3 mm annealed glass used in Insulated Glass Units (IGU), the maximum area must not be more than 1.36 m².~~

(e) ~~All exposed edges must have sharp edges removed.~~

Explanatory Information:

~~An Insulated Glass Unit consists of two or more panes of glass spaced apart and factory sealed with dry air or special gases in the cavity. The term is often abbreviated to IGU.~~

The selection of glass thickness relies not just on limit state wind loads but on a number of geometric criteria that include the influence of aspect ratio and slenderness factors. These factors are taken into account in ~~Tables 8.2.3a, 8.2.3b and 8.2.3c~~Tables 8.3.3a, 8.3.3b and 8.3.3c.

8.~~2.3~~3.3 Fully framed glazing installed in perimeter of buildings

[2019: 3.6.3]

Fully framed (supported on all sides) ~~ordinary~~monolithic annealed glass ~~(including annealed patterned glass)~~ installed in the *perimeter of buildings* must comply with—

(a) if the building is located in an area with a wind class not exceeding N1 –Table 8.3.3a ~~Table 8.2.3a~~~~Table 8.3.3a~~; or

(b) if the building is located in an area with a wind class not exceeding N2 – Table 8.3.3b~~Table 8.2.3b~~; or

(c) if the building is located in an area with a wind class not exceeding N3 – Table 8.3.3c~~Table 8.2.3c~~.

Table 8.~~2.3a~~3.3a: Glass thickness for wind class not exceeding N1: ~~ordinary~~monolithic annealed glass (mm)

Edge (mm)	300	450	600	750	900	1050	1200	1350	1500	1650
300	3	3	3	3	3	3	3	3	3	3
450	3	3	3	3	3	3	3	3	3	3
600	3	3	3	3	3	3	3	3	4	4
750	3	3	3	3	3	3	4	4	4	4
900	3	3	3	3	3	4	4	4	4	4
1050	3	3	3	3	4	4	4	4	4	4
1200	3	3	3	4	4	4	4	4	4	4
1350	3	3	3	4	4	4	4	4	4	4
1500	3	3	4	4	4	4	4	4	4	4
1650	3	3	4	4	4	4	4	4	4	4
1800	3	3	4	4	4	4	4	4	4	4
1950	3	4	4	4	4	4	4	4	4	4
2100	3	4	4	4	4	4	4	4	4	4
2250	3	4	4	4	4	4	4	4	4	4
2400	3	4	4	4	4	4	~~4~~5	~~4~~5	4	~~4~~5
2550	3	4	4	4	4	4	~~4~~5	~~4~~5	4	~~4~~5
2700	3	4	4	4	4	4	~~4~~5	~~4~~5	~~4~~6	~~4~~5

Table 8.~~2.3b~~3.3b: Glass thickness for wind class not exceeding N2: ~~ordinary~~monolithic annealed glass (mm)

Edge (mm)	300	450	600	750	900	1050	1200	1350	1500	1650
300	3	3	3	3	3	3	3	3	3	3
450	3	3	3	3	3	3	3	3	3	3
600	3	3	3	3	3	3	3	3	4	4
750	3	3	3	3	3	3	4	4	4	4
900	3	3	3	3	3	4	4	4	4	4
1050	3	3	3	3	4	4	4	4	4	4
1200	3	3	3	4	4	4	4	4	4	4
1350	3	3	3	4	4	4	4	4	4	4
1500	3	3	4	4	4	4	4	4	4	4
1650	3	3	4	4	4	4	4	4	4	~~4~~~~5~~4
1800	3	3	4	4	4	4	4	4	44~~5~~	~~4~~5
1950	3	4	4	4	4	4	4	~~4~~~~5~~4	~~4~~5	~~4~~5
2100	3	4	4	4	4	4	4	~~4~~5	~~4~~5	~~5~~6
2250	3	4	4	4	4	4	~~4~~5	~~4~~5	~~4~~5	~~5~~6
2400	3	4	4	4	4	4	~~4~~5	~~4~~5	~~4~~5	~~5~~6
2550	3	4	4	4	4	4	~~4~~5	~~4~~5	5	~~5~~6
2700	3	4	4	4	~~4~~5	~~4~~5	~~4~~5	~~4~~5	~~5~~6	~~5~~6

Table 8.~~2.3c~~3.3c: Glass thickness for wind class not exceeding N3: ~~ordinary~~monolithic annealed glass (mm)

Edge (mm)	300	450	600	750	900	1050	1200	1350	1500	1650
300	3	3	3	3	3	3	3	3	3	3
450	3	3	3	3	3	3	3	3	3	3
600	3	3	3	3	3	3	3	3	4	4
750	3	3	3	3	3	3	4	4	4	4
900	3	3	3	3	3	4	4	4	4	4
1050	3	3	3	3	4	4	4	4	~~4~~5	~~4~~5
1200	3	3	3	4	4	4	4	~~4~~5	~~4~~5	~~4~~5
1350	3	3	3	4	4	4	~~4~~5	~~4~~5	~~4~~5	5
1500	3	3	4	4	4	~~4~~5	~~4~~5	~~4~~5	~~5~~5	~~5~~6
1650	3	3	4	4	4	~~4~~5	~~4~~5	~~5~~6	~~5~~6	~~5~~6
1800	3	3	4	4	4	~~4~~5	~~4~~5	~~5~~6	~~5~~6	~~5~~6
1950	3	4	4	4	~~4~~5	~~4~~5	5	~~5~~6	~~5~~6	~~5~~6
2100	3	4	4	~~4~~5	~~4~~5	~~4~~5	~~5~~6	~~5~~6	~~5~~6	~~6~~8
2250	3	4	4	~~4~~5	~~4~~5	~~4~~5	~~5~~6	~~5~~6	~~5~~8	~~6~~8
2400	3	4	4	~~4~~5	~~4~~5	~~4~~5	~~5~~6	~~5~~6	~~6~~8	~~6~~8
2550	3	4	4	~~4~~5	5	5	~~5~~6	~~5~~6	~~6~~8	~~6~~8
2700	3	4	4	~~4~~5	~~5~~6	~~5~~6	~~5~~6	~~5~~8	~~6~~8	~~6~~8

Explanatory Information:

1. For other types of perimeter glazing including toughened, wired, laminated~~ and ~~, unframed glazing and insulated glass units, refer to AS 1288.
2. For ~~ordinary~~monolithic annealed patterned glass thickness measurement refer to AS 1288.
3. The thickness of glass in Tables 8.3.3a, 8.3.3b and 8.3.3c is dependent on the wind classification of the *site*, Ultimate Limit State (ULS) wind pressure set out in AS 4055, and the dimensions of the glass panel. AS 4055 has higher ULS wind pressures for parts of *external walls* within 1200 mm of external corners. The thickness of glass in Tables 8.3.3a, 8.3.3b and 8.3.3c is based on these higher ULS wind pressures and can also be used for glass in the general length of walls.

Part 8.~~3~~4 ~~Human impact safety requirements for glazing~~Glazing human impact

8.4.1 Application of Part 8.4

[New for 2022]

(1) Part 8.4 applies subject to the limitations set out at H1D8(1).

(2) Part 8.4 need not be complied with if H1D8(4)(a) is complied with.

(3) The thickness and type of glazing installed in areas of a building that have a high potential for human impact (an area of a building frequented by the occupants during everyday activities in which a person could fall into or against the glazed panel) must comply as follows:

- (a) Door — in accordance with 8.4.2.
- (b) Door side panels — in accordance with 8.4.3.
- (c) Full height glass panels — in accordance with 8.4.4.
- (d) Glazed panels, other than doors or side panels, on the perimeter of rooms — in accordance with 8.4.5.
- (e) Bathrooms, ensuite and spa room glazing —- in accordance with 8.4.6.
- (f) Visibility of glazing — in accordance with 8.4.7.
- (g) Identification of safety glass — in accordance with 8.4.8.

8.~~3.2~~4.2 Doors

[2019: 3.6.4.1]

Glass in doors must be Grade A safety glazing material in accordance with ~~Table 8.3.2~~Table 8.4.2 and ~~Figure 8.3.2~~Figure 8.4.2, except that—

- (a) unframed doors, other than those incorporated in shower screens or bath enclosures, must be glazed with toughened safety glass with a minimum nominal thickness of 10 mm or laminated toughened safety glass with a minimum total thickness of 10 mm; and
- (b) individual pieces of ~~ordinary~~monolithic annealed glass incorporated in leadlights may be used, to a maximum area of 0.05 m^2 with a minimum nominal thickness of 3 mm; and
- (c) for annealed and annealed decorated glass panels in doors—
  - (i) for 3 mm and 4 mm annealed glass, the maximum area must not be more than 0.1 m^2 with a maximum panel width of 125 mm; and
  - (ii) for 5 mm and 6 mm annealed glass, the maximum area must not be more than 0.26 m^2 with a maximum panel width of 300 mm; and
- (d) for annealed glass in fully framed panels with a thickness of 10 mm or more, with or without bevelled edges, the maximum area must not be more than 0.5 m^2; and
- (e) doors in bathrooms, ensuites and spa rooms must be glazed in accordance with ~~8.3.6~~8.4.6.

Table 8.~~3.2~~4.2: Maximum areas of glazing material for framed glass doors, framed glass side panels and other framed glazed panels

Type of glass	Minimum nominal thickness (mm)	Maximum area of pane (m^2)
Patterned or clear ~~ordinary~~monolithic annealed glass	5	0.3
Patterned or clear ~~ordinary~~monolithic annealed glass	6	0.9
Grade A toughened and toughened	3	1

Type of glass	Minimum nominal thickness (mm)	Maximum area of pane (m^2)
Grade A toughened and toughened laminated safety glass	4	2
Grade A toughened and toughened laminated safety glass	5	3
Grade A toughened and toughened laminated safety glass	6	4
Grade A laminated safety glass	5.38	2.2
Grade A laminated safety glass	6.38	3
Grade A laminated safety glass	8.38	5

Figure 8.~~3.2~~4.2: Identification of glazing requirements for doors and side panels

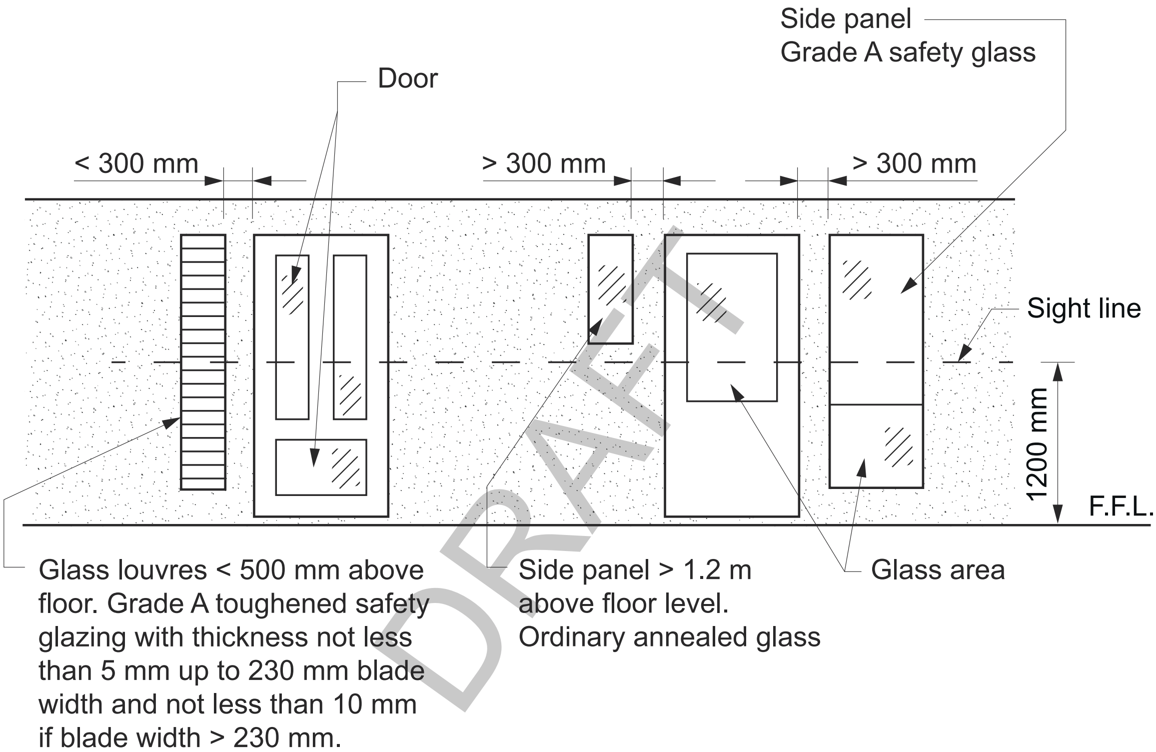


Figure Notes:

1. Door and side panel glazing areas – see Table 8.3.2.
2. Monolithic annealed glass – see Table 8.4.3.

Explanatory Information:

Larger areas of ~~ordinary~~monolithic annealed glass in leadlights are not permitted regardless of glass thickness.

8.~~3.3~~4.3 Door side panels

[2019: 3.6.4.2]

(1) All framed glass (except leadlight panels) in side panels with their nearest vertical sight line less than 300 mm from the nearest edge of the doorway opening must be Grade A safety glazing material in accordance with ~~Table 8.3.2~~Table 8.4.2 and ~~Figure 8.3.2~~Figure 8.4.2, except that—

(a) where the lowest visible sight line is less than 1.2 m ~~or more~~ above the highest abutting finished floor level, ~~ordinary~~monolithic annealed glass with a minimum thickness of 5 mm and an area of 0.3 m^2 ~~in accordance with Table 8.3.3~~~~Table 8.4.3~~ may be used; or

(b) where the lowest visible sight line is less than 1.2 m above the highest abutting finished floor level, ~~ordinary~~monolithic annealed glass with a minimum thickness of 10 mm in accordance with ~~Table 8.3.3~~Table 8.4.3, with an area of not more than 0.5 m^2, may be used; or

(c) where the side panel consists of glass louvres with exposed edges or where the louvres are installed less than 500 mm above the highest abutting finished floor level—

(i) for blade widths not more than 230 mm with blade lengths not more than 1 m, Grade A toughened safety glazing not less than 5 mm thick must be used; and

(ii) for blade widths more than 230 mm, Grade A toughened safety glazing not less than 10 mm thick must be used.

(2) Framed glass panels with the nearest vertical sight line not less than 300 mm from the nearest edge of the door opening are not considered to be side panels for the purposes of (1).

Table 8.~~3.3~~4.3: Maximum areas of ~~ordinary~~monolithic annealed glass in side panels

Minimum nominal thickness (mm)	Maximum area of pane (m^2)
3	0.8
4	1.4
5	2.2
6	3.3

8.~~3.4~~4.4 Full height framed glazed panels

[2019: 3.6.4.3]

(1) A glazed panel located in a building so that it is capable of being mistaken for an *unobstructed opening* must be glazed with~~—~~Grade A safety glazing material in accordance with ~~Table 8.3.2~~Table 8.4.2.~~; or~~

(a) ~~ordinary~~~~monolithic annealed glass complying with Table 8.3.2~~~~Table 8.4.2~~~~ provided the glazed area is not more than 0.9 m2.~~

(2) Glazed panels are not considered an *unobstructed opening* where any of the following apply:

(a) The clear opening width is not more than 500 mm.

(b) The lowest sight line of the opening is not less than 500 mm above the highest abutting finished floor level.

(c) The glass is made apparent by means of transoms, colonial bars, other components of the glazing system, permanent motifs or other decorative treatment on or etched into the glass, of sufficient magnitude to be readily apparent, or the glass is opaquely coloured or patterned to indicate its presence.

(d) A chair rail or handrail not less than 40 mm thick, or the like, is provided at a height of no less than~~865~~700 mm above the adjoining ground level.

(e) The difference in floor level on either side of the panel is greater than ~~500~~1000 mm.

8.~~3.5~~4.5 Glazed panels, other than doors or side panels, on the perimeter of rooms

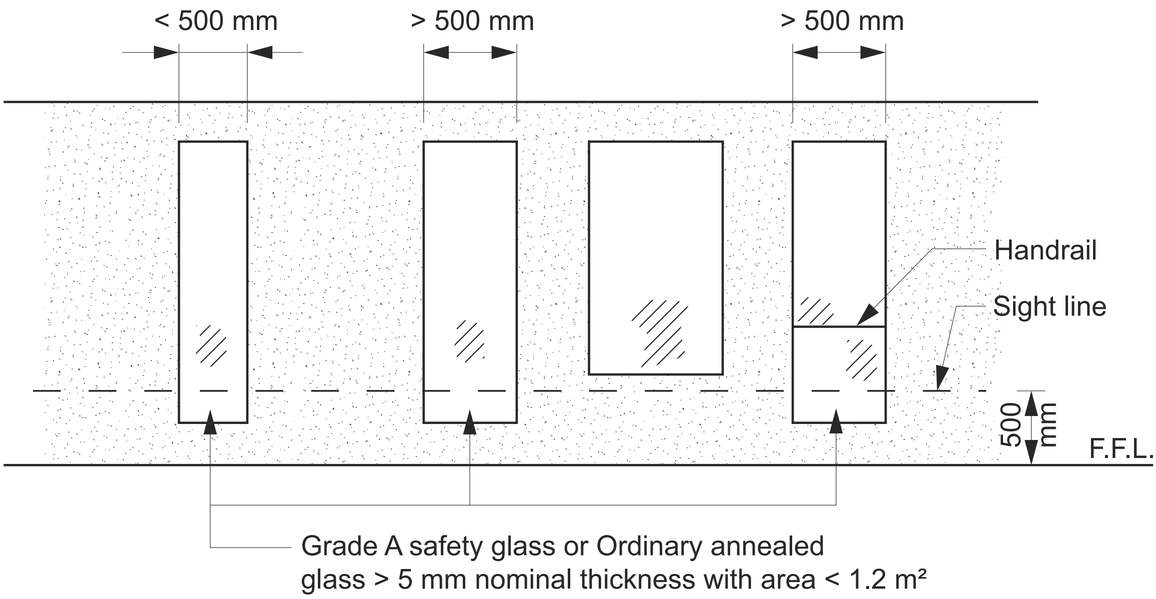
[2019: 3.6.4.4]

All framed glazing where the lowest sight line of the glazing panel is less than 500 mm from the highest abutting finished floor level (see ~~Figure 8.3.5~~Figure 8.4.5) must be—

(a) Grade A safety glazing material in accordance with ~~Table 8.3.2~~Table 8.4.2; or

(b) ~~ordinary~~monolithic annealed glass not less than 5 mm nominal thickness provided that the area of the glazing panel is not more than 1.2 m^2.

Figure 8.~~3.5~~4.5: Identification of glazing requirements for glazed panels



8.~~3.6~~4.6 Bathroom, ensuite, ~~and~~ spa room and splash-black glazing

[2019: 3.6.4.5]

(1) All glazing in bathrooms, ensuites, spa rooms or the like, including shower doors, shower screens, bath enclosures, and associated *windows*~~,~~ and doors, where the lowest sight line is less than 2.0 m above the highest abutting finished level of the floor, bottom of the bath, or shower base, must—

(a) for framed panels, be glazed with~~—~~ Grade A safety glazing material in accordance with Table 8.4.2; or

(i) ~~Grade A safety glazing material in accordance with Table 8.3.2; or~~

(ii) ~~Grade B safety glazing material in accordance with Table 8.3.6 (see also Figure 8.3.6); or~~

(b) for panels or doors with any edge exposed, be toughened safety glass in accordance with Table 8.4.2~~Table 8.3.2~~ with a minimum nominal thickness of 6 mm.

(~~2~~) ~~Windows referred to in (1), may incorporate annealed glass panels of not less than 4 mm thickness, provided that they are not more than 0.1 m2 in area.~~

(~~3~~2) ~~Ordinary~~Monolithic annealed glass may be used for—~~, including mirror, may be used provided a fixed vanity or bench with a height of not less than 760 mm, depth of not less than 300 mm and extending the full width of the glass or mirror is located in front of the glass or mirror.~~

(a) mirrors, provided a fixed vanity or bench with a height of not less than 760 mm, depth of not less than 300 mm and extending the full width of the glass or mirror is, located in front of the glass or mirror; or

(b) splash-backs, provided it is fully backed by and continuously adhered to a solid wall material or a fixed cabinet or bench that is—

(i) a height not less than 760 mm; and

(ii) a depth not less than 300 mm; and

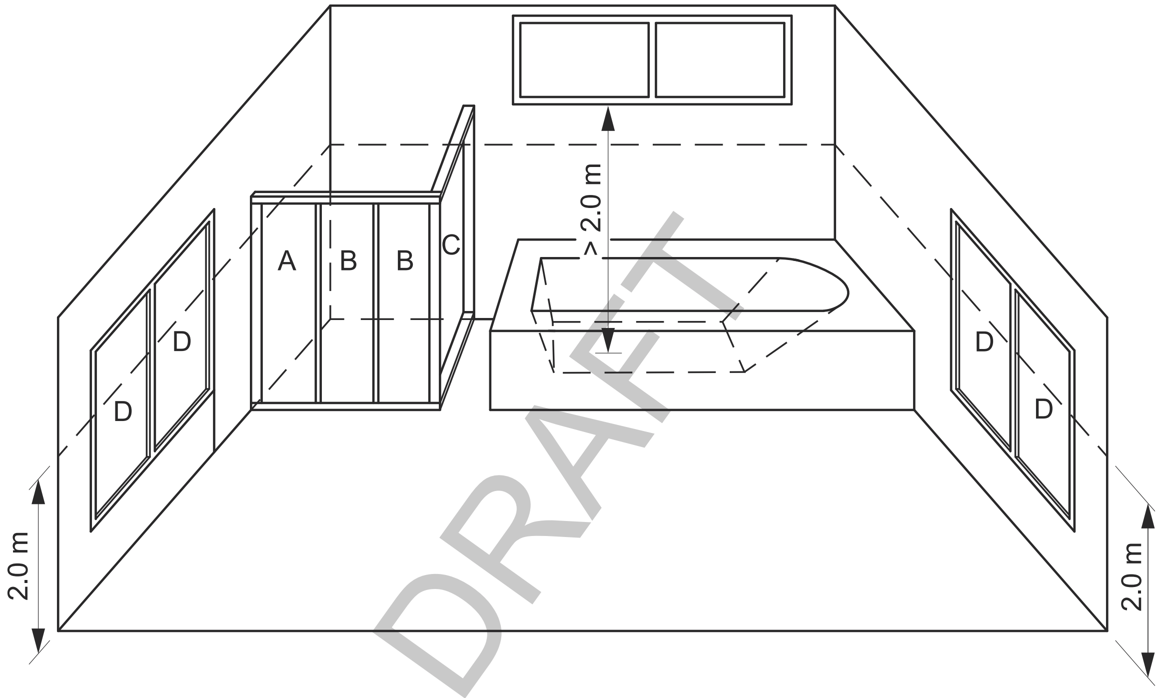
(iii) extending the full width of the splash-back; and

(iv) located in front of the splash back.

Table 8.~~3.6~~4.6: **Maximum areas of ~~grade B~~ safety glazing materials for shower doors, shower screens and bath enclosures**

Type of glass	Standard nominal thickness (mm)	Maximum area of pane (m^2)	Area (~~Figure 8.3.6~~Figure 8.4.6)
~~Safety wired glass~~	~~≥ 6~~	~~2.5~~	~~A, B, C~~
Safety organic coated glass	3	1	A, B, C, D
Safety organic coated glass	4	1.5	A, B, C, D
Safety organic coated glass	5	2	A, B, C, D
Safety organic coated glass	≥ 6	3	A, B, C, D

Figure 8.~~3.6~~4.6: **Identification of glazing requirements for bathrooms, ensuites and spa rooms**



Explanatory Information:

Care should be taken when using showers fitted with ~~safety wired glass,~~ safety organic-coated glass~~,~~ and laminated safety glass products that are liable to damage from thermal shock. Thermal shock occurs from hot water from the shower hitting the shower screen during cold weather.

8.~~3.7~~4.7 Visibility of glazing

[2019: 3.6.4.6]

(1) If the presence of glazing in a door, side panel or panel capable of being mistaken for a doorway or opening is not made apparent in accordance with 8.3.4(2)(c), the glass must be marked to make it readily visible in accordance with (2).

(2) Marking must be in the form of an opaque band not less than 20 mm in height located so that—

(a) the upper edge is not less than 700 mm above the floor; and

(b) the lower edge is not more than 1.2 m above the floor.

(3) A band or marking is not *required* where any of the following applies:

(a) The height of the glazing is not more than 1 m in any part.

(b) The width of the glazing panel is not more than 500 mm in any part.

(c) There is no glazing within ~~700~~500 mm of the floor.

(d) The glazing is provided with not less than one fixed glazing bar which must—

(i) be firmly attached to the styles to locate and protect each face of the glass; and

(ii) be located with its upper edge not less than 500 mm and its bottom edge not more than 1 m above the floor; and

(iii) have a face width not less than 40 mm.

Explanatory Information:

1. Making the glass visible by marking is not a substitute for the use of safety glazing in accordance with this Part.
2. A broken line or patterns may be an acceptable form of marking provided it meets the criteria set out in ~~8.3.7(2)~~8.4.7(2).

8.4.8 Identification of safety glass

[New for 2022]

All safety glazing material in Tables 8.4.2 and 8.4.6 installed in accordance with this Part must comply with the following:

(a) Safety glass must be marked in the form of either permanent etching or a label that cannot be reused once removed.

(b) The permanent etching or label must state the following information:

(i) The Standard to which the safety glass has been tested.

(ii) Registered name of the manufacturer or supplier.

(iii) Grade of the safety glass.

(iv) Nominal thickness of the safety glass.

Explanatory Information:

The labelling of safety glass is not intended to remain after completion of construction. Labelling complying with 8.4.8 should remain in place on safety glass to allow relevant practitioners to confirm and certify that the correct type of safety glass has been installed in a specific area of the building.

If a label is able to be removed from the glass, it must be comprised of a material that self-destructs upon removal so as to prevent it being reused on other glass panels.

9 Fire safety

Part 9.1 Scope and application of Section 9

9.1.1 Scope

[New for 2022]

(1) This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for—

(a) fire separation of *external walls* (see Part 9.2); and

(b) fire protection of separating walls (see Part 9.3); and

(c) fire separation of garage top dwellings (see Part 9.4); and

(d) smoke alarms and evacuation lighting (see Part 9.5).

(2) For other fire safety provisions not included in this Section of the ABCB Housing Provisions, refer to the following *Deemed-to-Satisfy Provisions* in NCC Volume Two: fire hazard properties (see H3D2(1) and (2)).

9.1.2 Application

[New for 2022]

The application of Section 9 of the ABCB Housing Provisions is subject to the following:

(a) The Governing Requirements of NCC 2022 Volume Two.

(b) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 9 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practice for Parts 3.7.2 to 3.7.5 of NCC 2019 Volume Two.

The content of Part 3.7.1 has been retained within Part H3 NCC Volume Two as it contains requirements which affect how other provisions referenced in Part H3 are applied.

Part 9.2 Fire separation of external walls

SA 9.2.1

9.2.1 External walls of Class 1 buildings

[2019: 3.7.2.2]

An *external wall* of a Class 1 building, and any openings in that wall, must comply with 9.2.3 if the wall is less than—

(a) 900 mm from an allotment boundary other than the boundary adjoining a road alignment or other public space; or

(b) 1.8 m from another building on the same allotment other than a Class 10 building associated with the Class 1 building or a detached part of the same Class 1 building.

9.2.2 Measurement of distances

[2019: 3.7.2.3]

(1) The distance from any point on an *external wall* of a building to an allotment boundary or another building is the distance to that point measured along a line at right angles from the allotment boundary or *external wall* of the other building which intersects that point without being obstructed by a wall complying with 9.2.3.

(2) Where a wall within a specified distance is *required* to comply with 9.2.3, only that part of the wall (including any openings) within the specified distance need be constructed in that manner (see Figure 9.2.2a, Figure 9.2.2b and Figure 9.2.2c).

(3) Where the distance measured is between attached or detached buildings of different heights, the distance must be taken from the *external wall* with the highest elevation measured at right angles to a point that intersects the nearest part of a vertical projection above the adjacent building, excluding any eave overhang (see Figure 9.2.2d and Figure 9.2.2e).

SA 9.2.2(4)

Figure 9.2.2a: Walls at right angles to the boundary

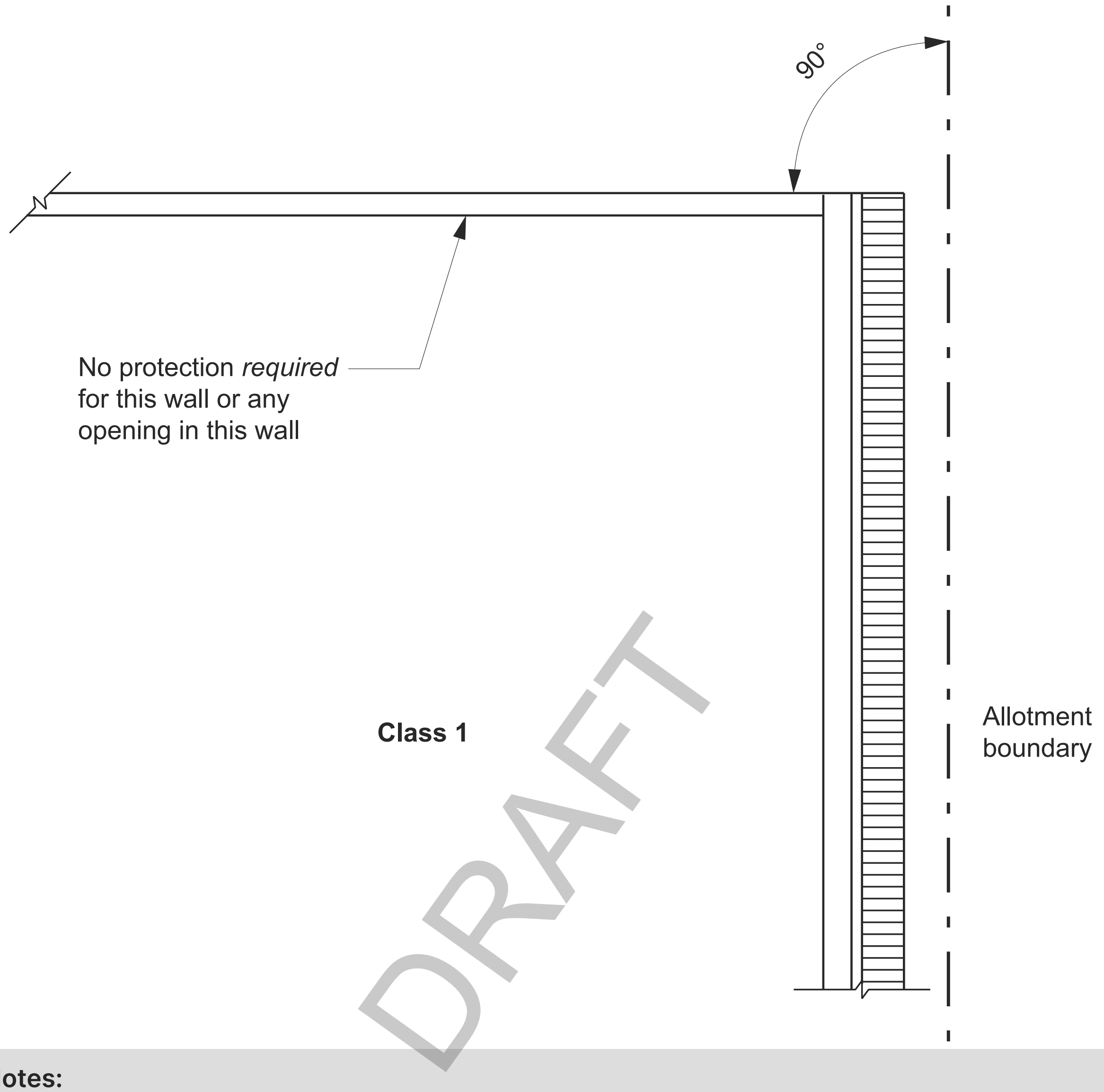


Figure Notes:

1. No protection *required* for the wall at right angles or more to the boundary.
2. For protection of encroachments refer to 9.2.9.

Figure 9.2.2b: Measurement of distances — Full wall protection (Plan view)

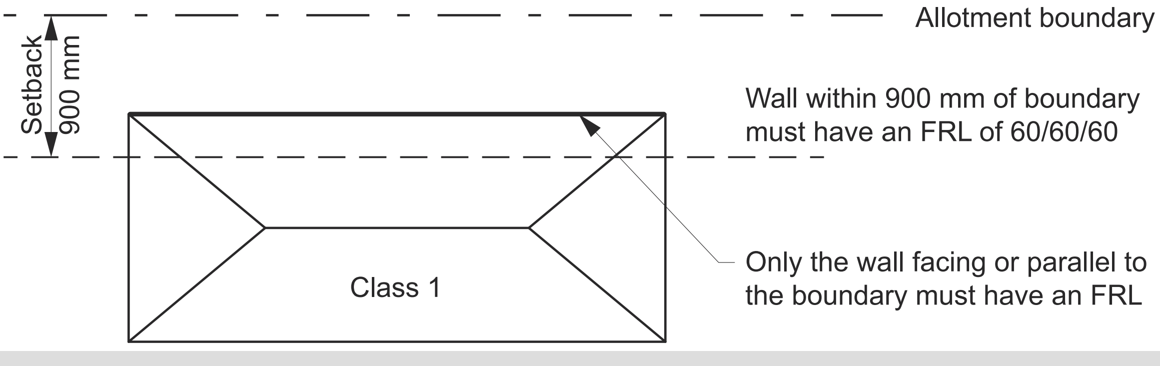


Figure Notes:

Setback distance is measured at right angles to the boundary.

Figure 9.2.2c: **Measurement of distances — Part walls protection (Plan view)**

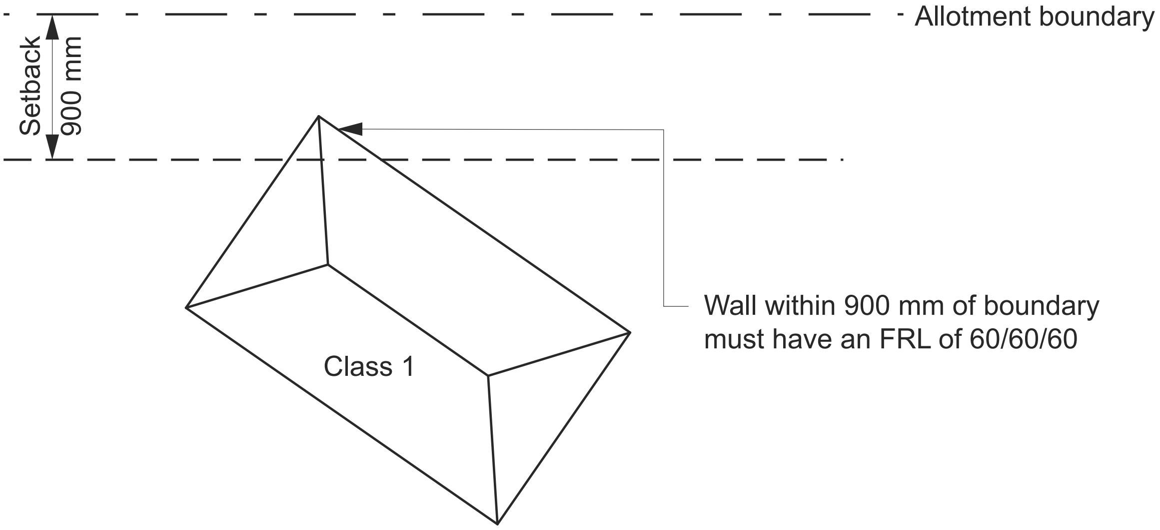


Figure Notes:

Setback distance is measured at right angles to the boundary.

Figure 9.2.2d: **Measurement of distance — Buildings of different heights — Class 1 buildings on same allotment**

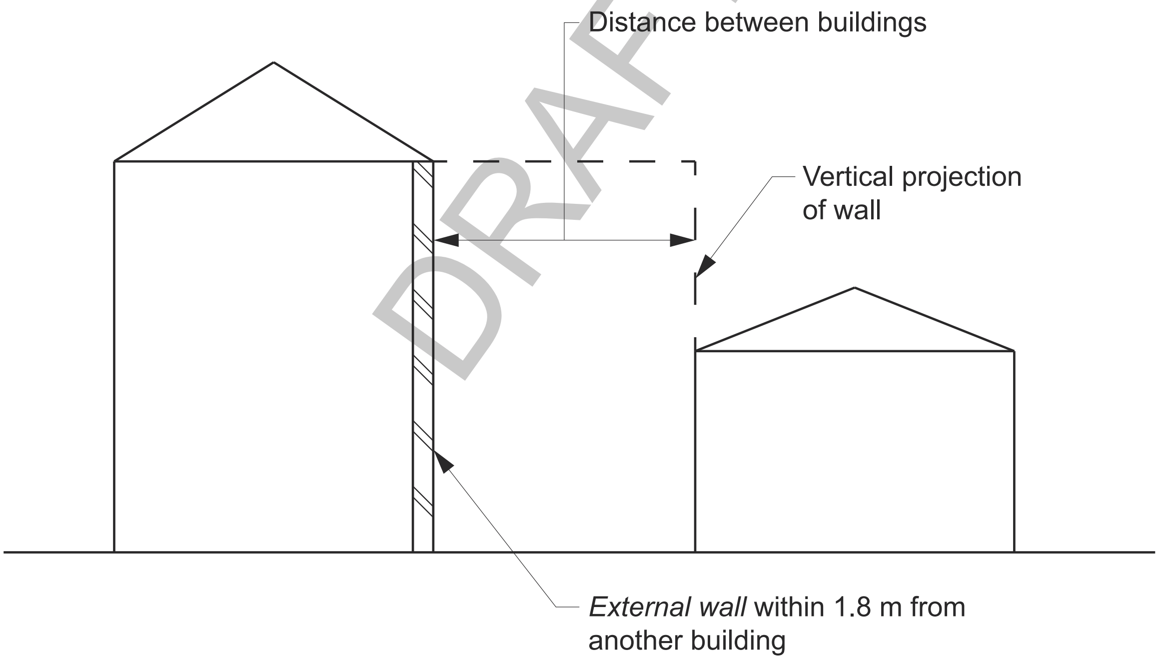
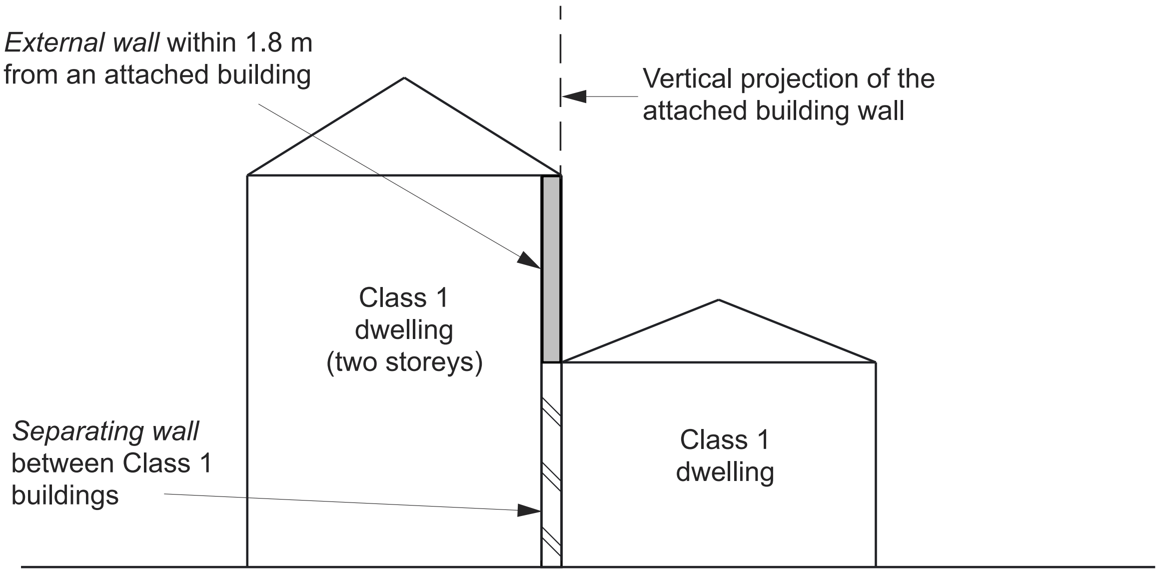


Figure 9.2.2e: Measurement of distance — Buildings of different heights — Attached Class 1 buildings on same allotment



9.2.3 Construction of external walls

[2019: 3.7.2.4]

(1) *External walls* (including gables) *required* to be (referred to in 9.2.1 or 9.2.4) must—

(a) commence at the footings or ground slab, except where the *external wall* commences above a *separating wall* complying with 9.3.1 (see Figure 9.2.2d); and

(b) extend to—

(i) the underside of a *non-combustible* roof covering, except that a wall may terminate not more than 200 mm from the underside of a *non-combustible* roof covering, where the area between the *external wall* and underside of the roof covering is sealed with a *non-combustible* fascia, gutter or flashing; or

(ii) the underside of a *non-combustible* eaves lining (See Figures 9.2.3a and b); and

(c) be constructed in accordance with (2).

(2) A wall *required* by (1) must—

(a) have an FRL of not less than 60/60/60 when tested from the outside; or

(b) be of masonry-veneer construction in which the external masonry veneer is not less than 90 mm thick; or

(c) be of masonry construction not less than 90 mm thick.

(3) Openings in *external walls required* to be (referred to in 9.2.1 or 9.2.4) must be protected by—

(a) non-openable fire *windows* or other construction with an FRL of not less than –/60/–; or

(b) solid core doors not less than 35 mm thick.

(4) The requirements of (3) do not apply to a window in a non-*habitable room* that is located adjacent to and not less than 600 mm from the boundary of an adjoining allotment or 1200 mm from another building on the same allotment provided that—

(a) in a bathroom, laundry or toilet, the opening has an area of not more than 1.2 m^2; or

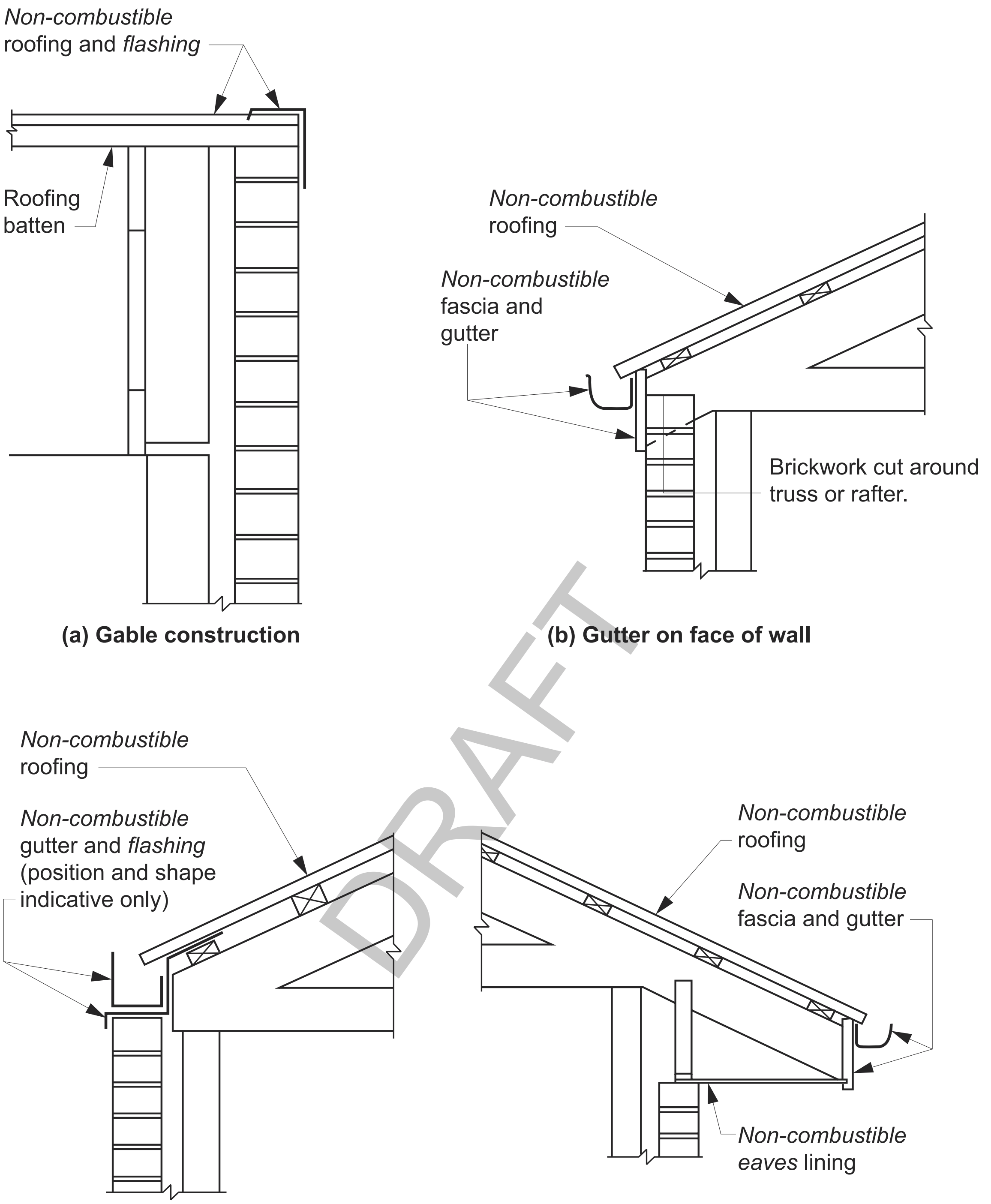
(b) in a room other than one referred to in (a), the opening has an area of not more than 0.54 m2 and—

(i) the *window* is steel-framed, there are no opening sashes and it is glazed in wired glass; or

(ii) the opening is enclosed with translucent hollow glass blocks.

(5) Subfloor vents, roof vents, weepholes, control joints, construction joints and penetrations for pipes, conduits and the like need not comply with (3).

Figure 9.2.3a: **Typical construction of external walls**



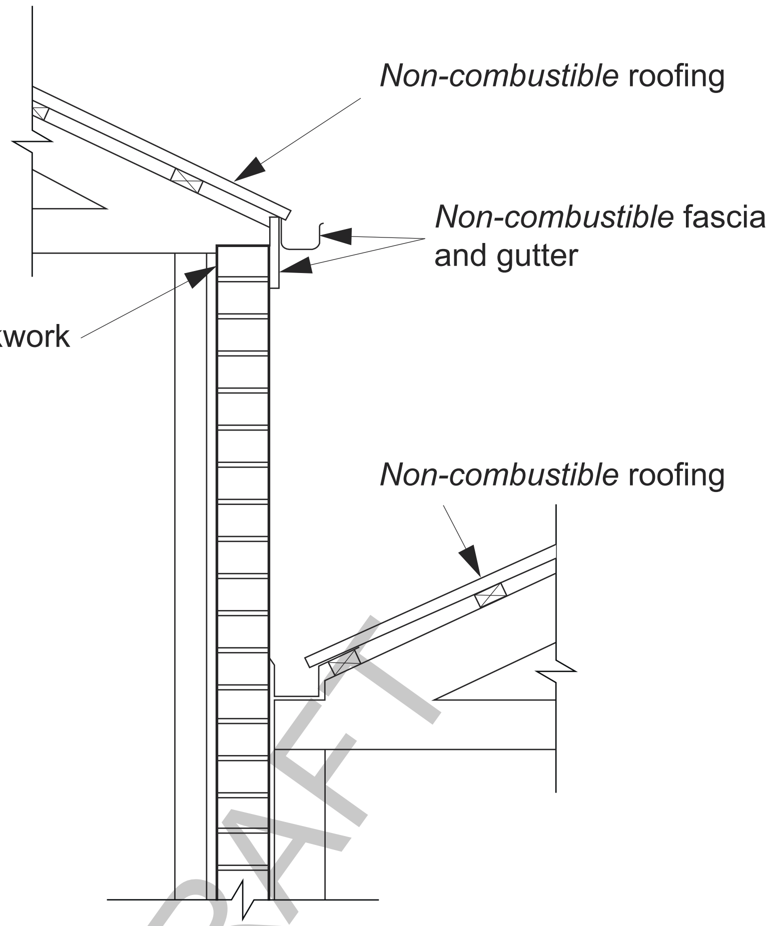
(a) Gable construction **(b) Gutter on face of wall**

(c) Gutter on top of wall **(d) Eaves construction**

Figure Notes:

1. The *external wall* is deemed to extend to the underside of *non-combustible* roof covering, or *non-combustible* eaves lining, when constructed as shown.
2. Where sarking is installed it must be located so that ponding of water is avoided between the fascia and the first roofing batten.
3. The location of flashing and framing is indicative only.
4. Brickwork shown in diagram (b) is to be terminated in accordance with 9.2.3(1)(b).

Figure 9.2.3b: **Typical construction of external walls — attached Class 1 buildings on the same allotment**



(e) Attached Class 1 buildings on the same allotment

Figure Notes:

1. The *external wall* is deemed to extend to the underside of *non-combustible* roof covering, or *non-combustible* eaves lining, when constructed as shown.
2. Where sarking is installed it must be located so that ponding of water is avoided between the fascia and the first roofing batten.
3. The location of flashing and framing is indicative only.
4. Brickwork shown in diagram (b) is to be terminated in accordance with 9.2.3(1)(b).

Explanatory Information:

1. A *Performance Solution* must be used where an *external wall required* to be *fire-resisting* does not commence in accordance with 9.2.3(1)(a).
2. The intent of the typical construction details shown in Figures 9.2.3a and b is to ensure that combustible materials (external or internal) are not directly exposed to fire at the junction of the wall and *non-combustible* roof, eaves lining, guttering and the like. Other forms of construction may also be acceptable provided that they achieve this intent.
3. See Figure 9.2.2a and clause 10.7.3 for internal *separating wall* construction under one common roof.

9.2.4 Class 10a buildings

[2019: 3.7.2.5]

(1) A Class 1 building must be protected by a method in—

(a) 9.2.5 where a Class 10a building is located between or adjacent to a Class 1 building and a boundary alignment that is not a boundary with a road alignment or other public space; or

(b) 9.2.6 where a Class 10a building is located between or adjacent to a Class 1 building it is associated with and another building on the same allotment; or

(c) 9.2.7 where two or more Class 10a buildings on the same allotment are located between and are associated with different Class 1 buildings.

(2) A Class 10a building must not significantly increase the risk of spread of fire between Class 2 to 9 buildings.

SA 9.2.4(3)

SA 9.2.4(4)

Explanatory Information:

9.2.4(1)(a) ensures that when a Class 10 building is located between an allotment boundary and a Class 1 building or another building on the same allotment, either directly or indirectly, that the Class 1 building be protected by a wall with an FRL.

The intention is to prevent the spread of fire from an allotment boundary (fire source feature) to a Class 1 building via a Class 10a building. Where a Class 10a building is not sited directly and wholly between the allotment boundary and the Class 1 building (see 9.2.5), the potential of fire spreading from the allotment boundary to the Class 1 still exists. Therefore, fire separation would be *required*.

9.2.4 does not apply to a boundary that adjoins a road or public space such as parklands, lakes, rivers and the like where the construction of buildings is unlikely.

9.2.5 Protection of Class 1 buildings — Class 10a between Class 1 and the allotment boundary

[2019: Figure 3.7.2.4]

The following methods are acceptable for the protection of a Class 1 building where a Class 10a building is located between or adjacent to a Class 1 building and a boundary alignment that is not a boundary with a road alignment or other public space:

(a) The Class 10a building is not less than 900 mm from the allotment boundary, other than the boundary adjoining a road alignment or other public space, as shown in Figure 9.2.5a.

(b) An *external wall* of the Class 10a building which is less than 900 mm from an allotment boundary, other than the boundary adjoining a road alignment or other public space, complies with 9.2.3 as shown in Figure 9.2.5b.

(c) An *external wall* of the Class 10a building, which is less than 900 mm from the Class 1 building, complies with 9.2.3 as shown in Figure 9.2.5c.

(d) The Class 1 building is not less than 900 mm from the Class 10a building, as shown in Figure 9.2.5d.

(e) An *external wall* of the Class 1 building, which is less than 900 mm from the Class 10a building, complies with 9.2.3, as shown in Figure 9.2.5e.

(f) An *external wall* of the Class 10a building which is less than 900 mm from an allotment boundary other than the boundary adjoining a road alignment or other public space, complies with 9.2.3, as shown in Figure 9.2.5f.

(g) An *external wall* of the Class 10a building, which is less than 900 mm from the *external wall* of the Class 1 building, complies with 9.2.3, as shown in Figure 9.2.5g.

(h) An *external wall* of the Class 1 building, which is less than 900 mm from a Class 10a building that is situated less than 900 mm from an allotment boundary, complies with 9.2.3, as shown in Figure 9.2.5h.

(i) The *external wall* of the Class 1 and Class 10a building which are less than 900 mm from an allotment boundary, other than the boundary adjoining a road alignment or other public space, complies with 9.2.3 as shown in Figure 9.2.5i.

Figure 9.2.5a: **Class 10a building 900 mm from allotment boundary**

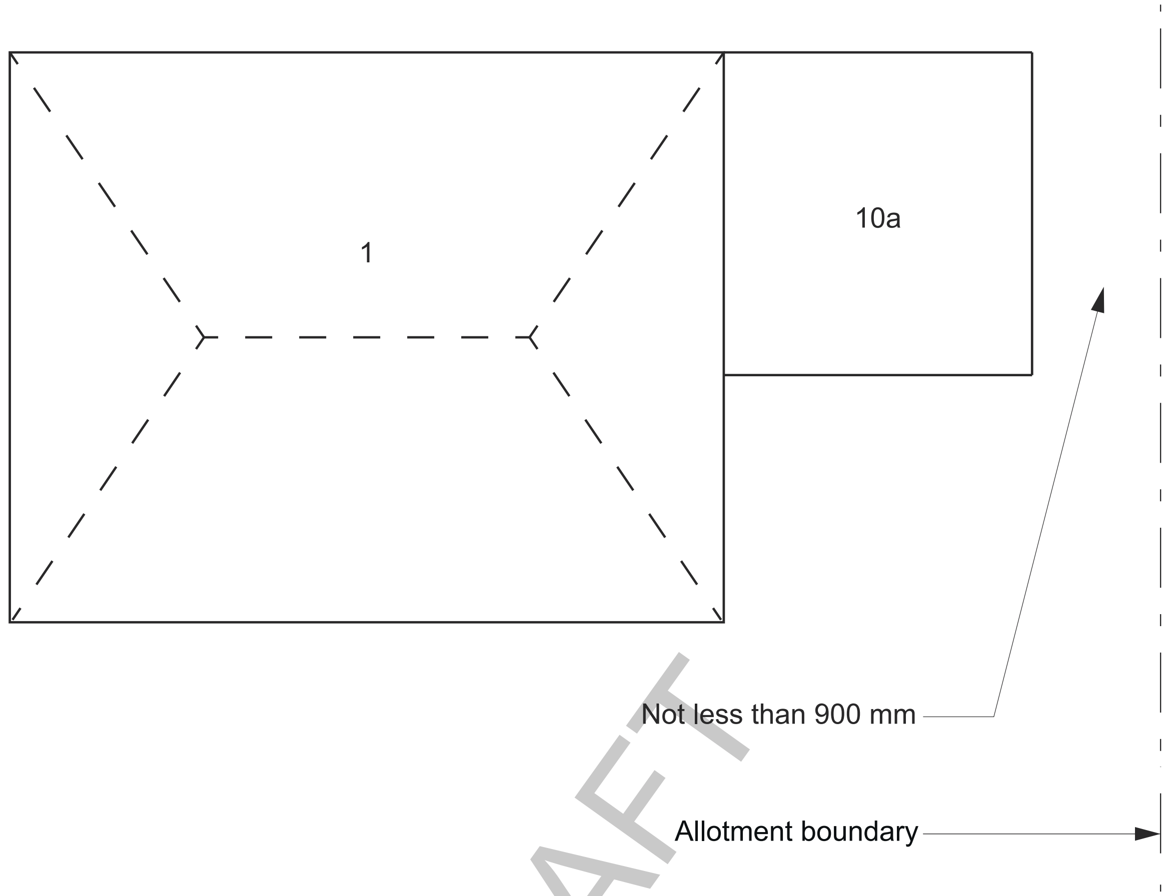
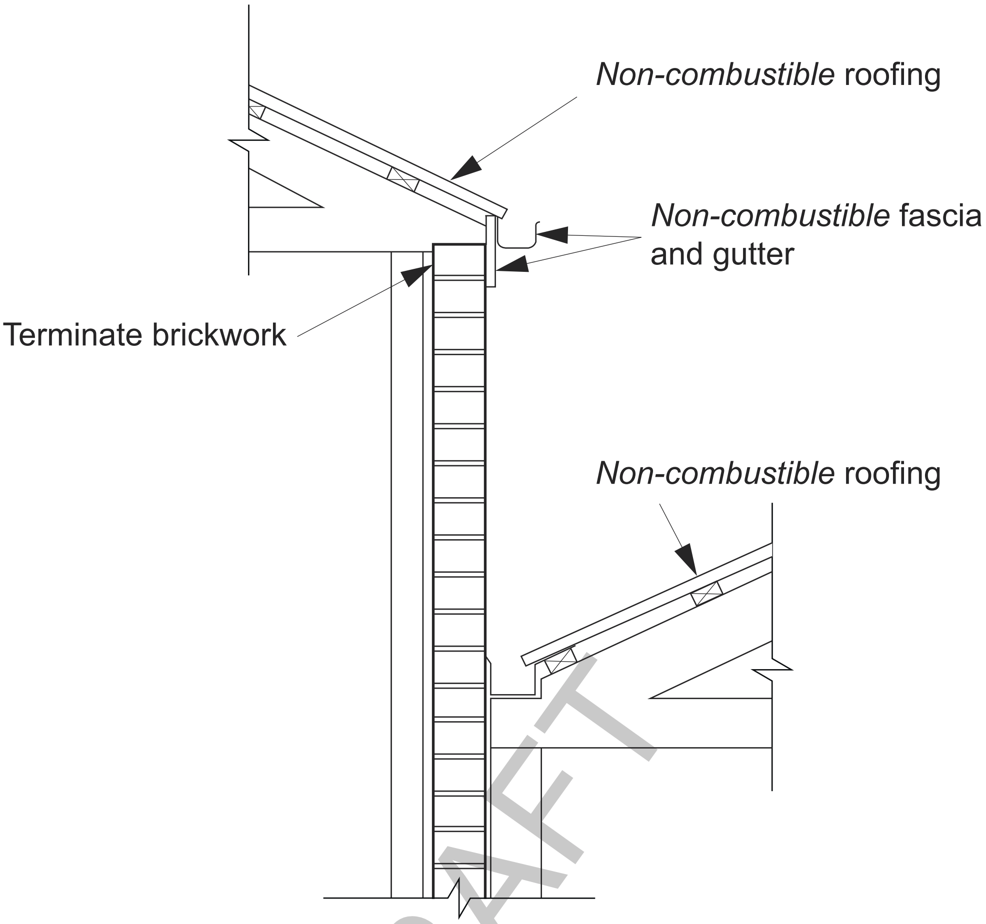


Figure 9.2.5b: **External wall to Class 10a building with FRL (method 1)**



(e) Attached Class 1 buildings on the same allotment

Figure 9.2.5c: **External wall to Class 10a building with FRL (method 2)**

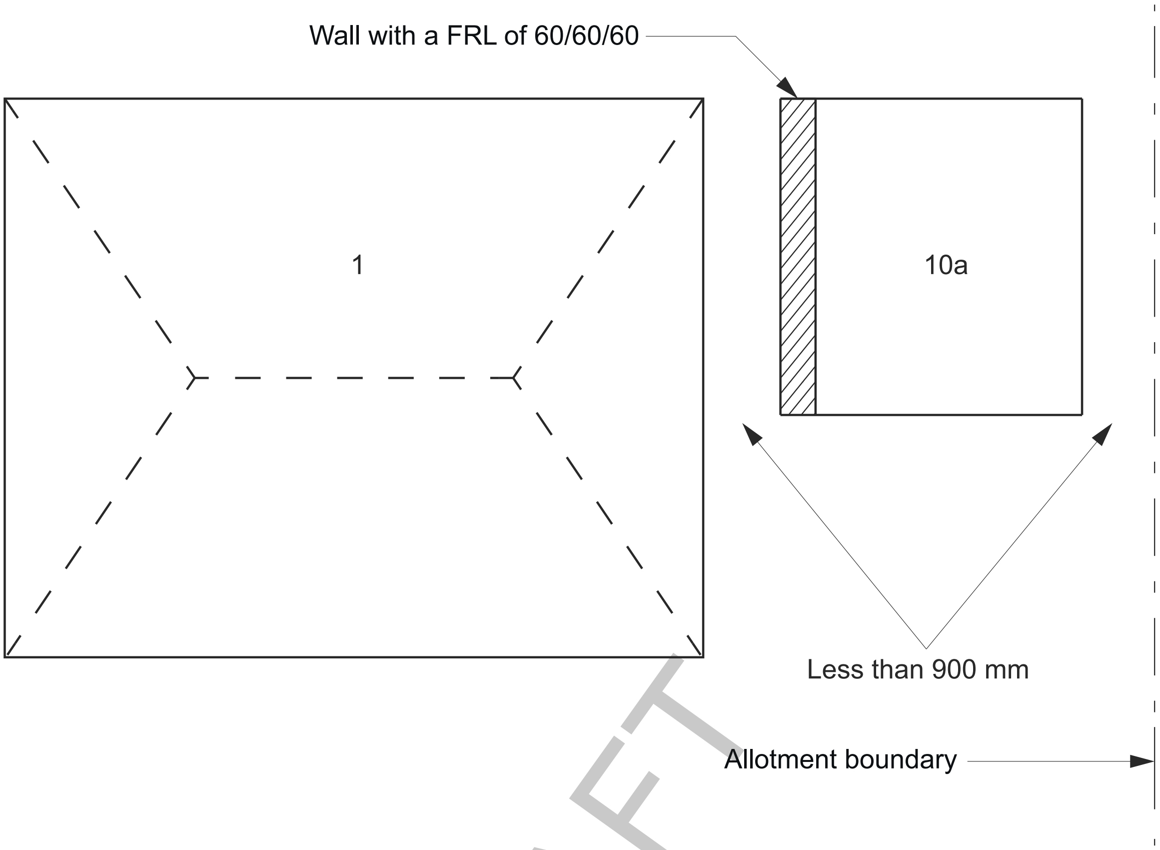


Figure 9.2.5d: **900 mm separation between buildings**

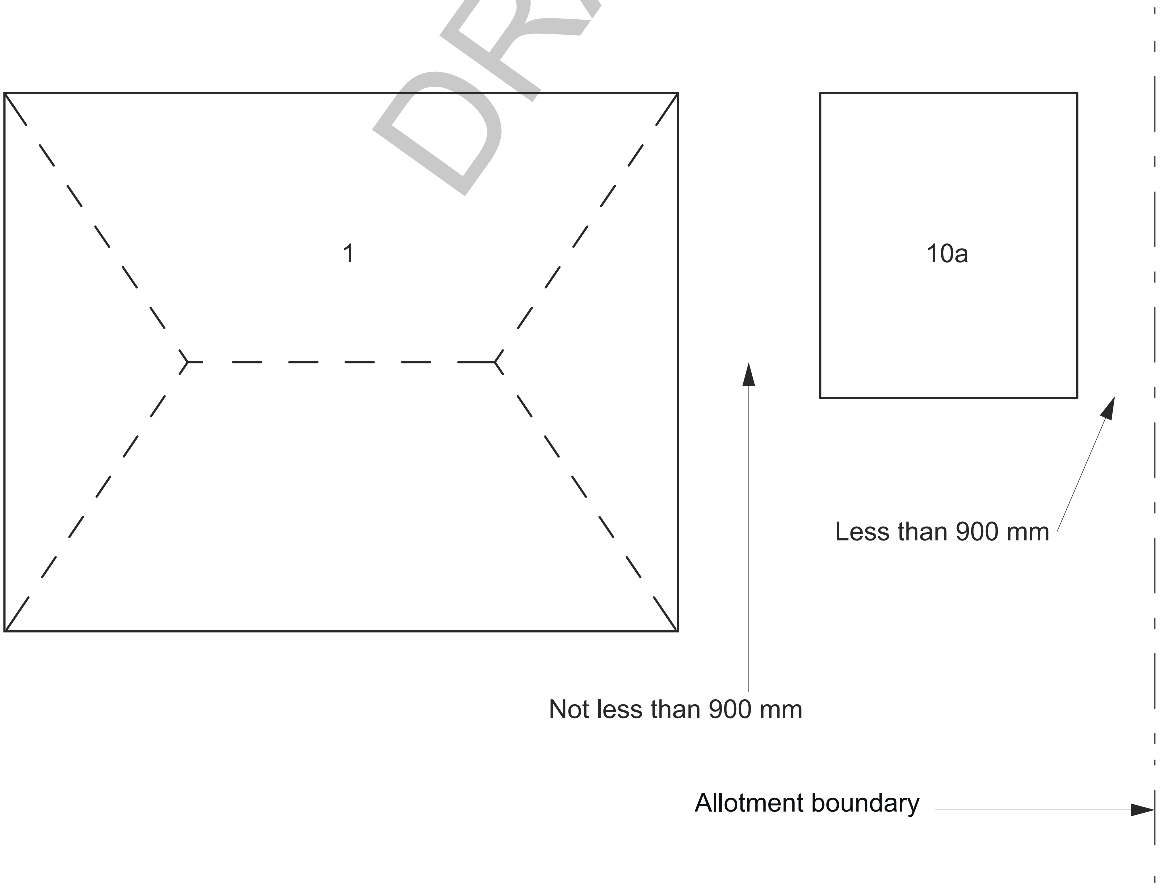


Figure 9.2.5e: Class 1 building with FRL to external wall

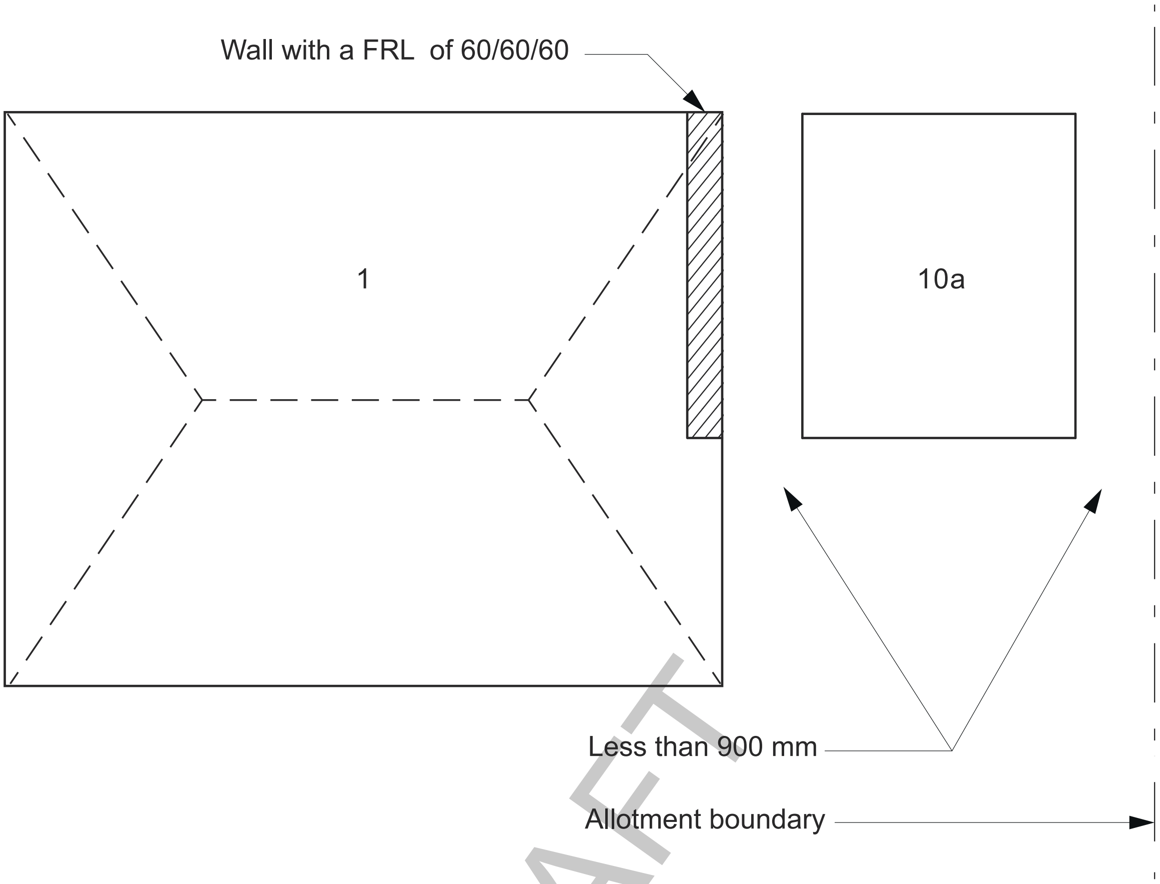


Figure 9.2.5f: **External wall of adjacent Class 10a building with FRL (method 1)**

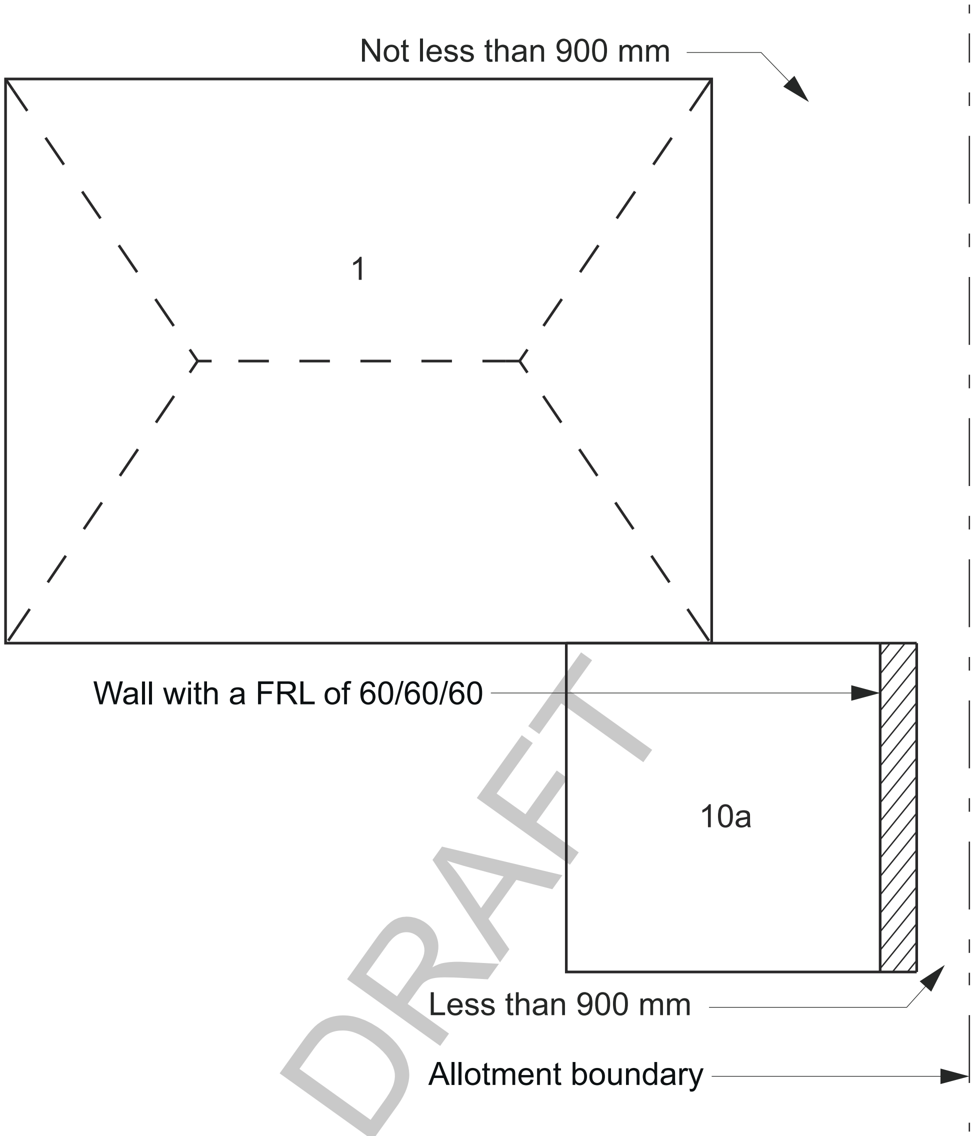


Figure 9.2.5g: External wall of adjacent Class 10a building with FRL (method 2)

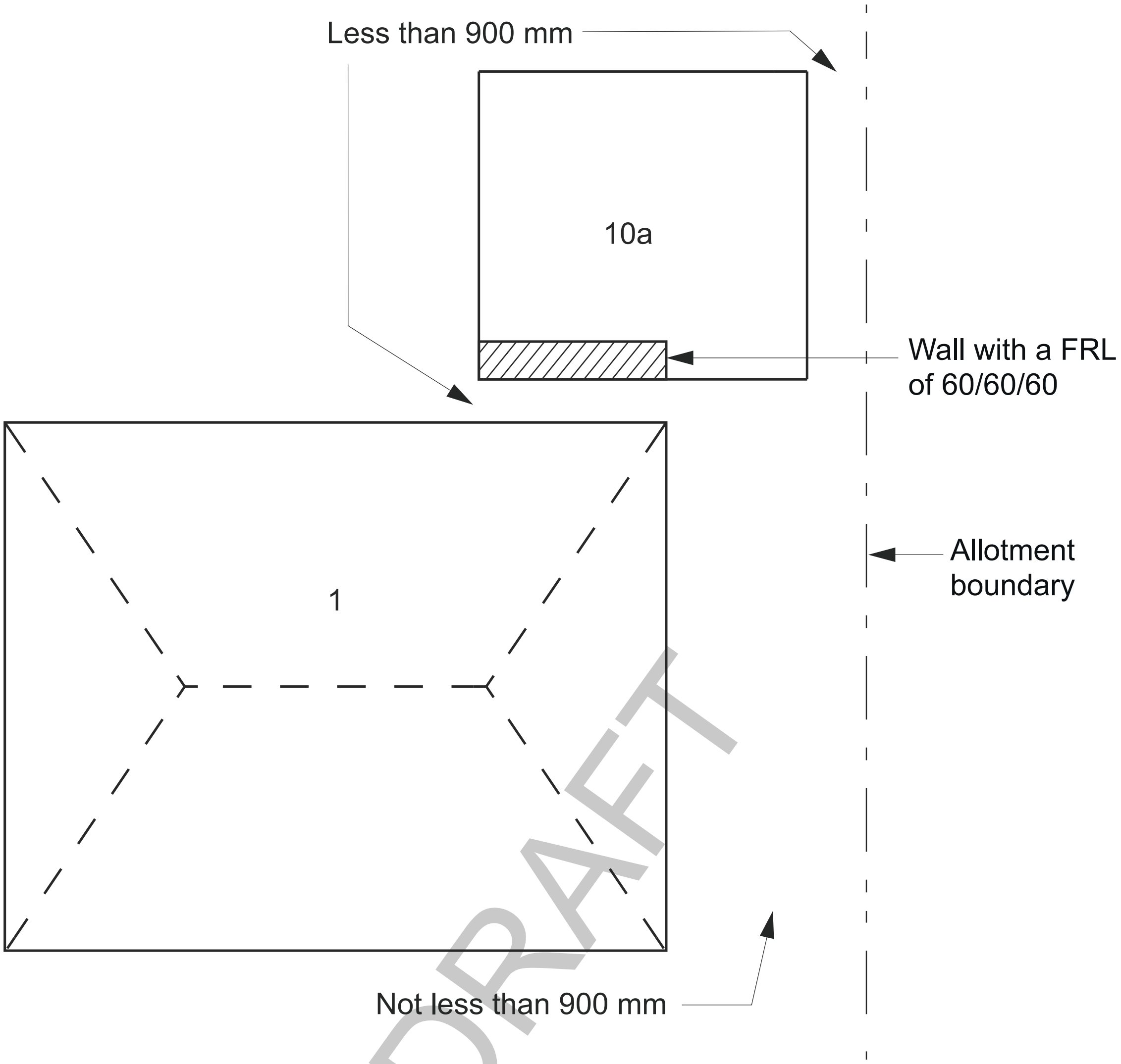


Figure 9.2.5h: Class 1 building with FRL to external wall

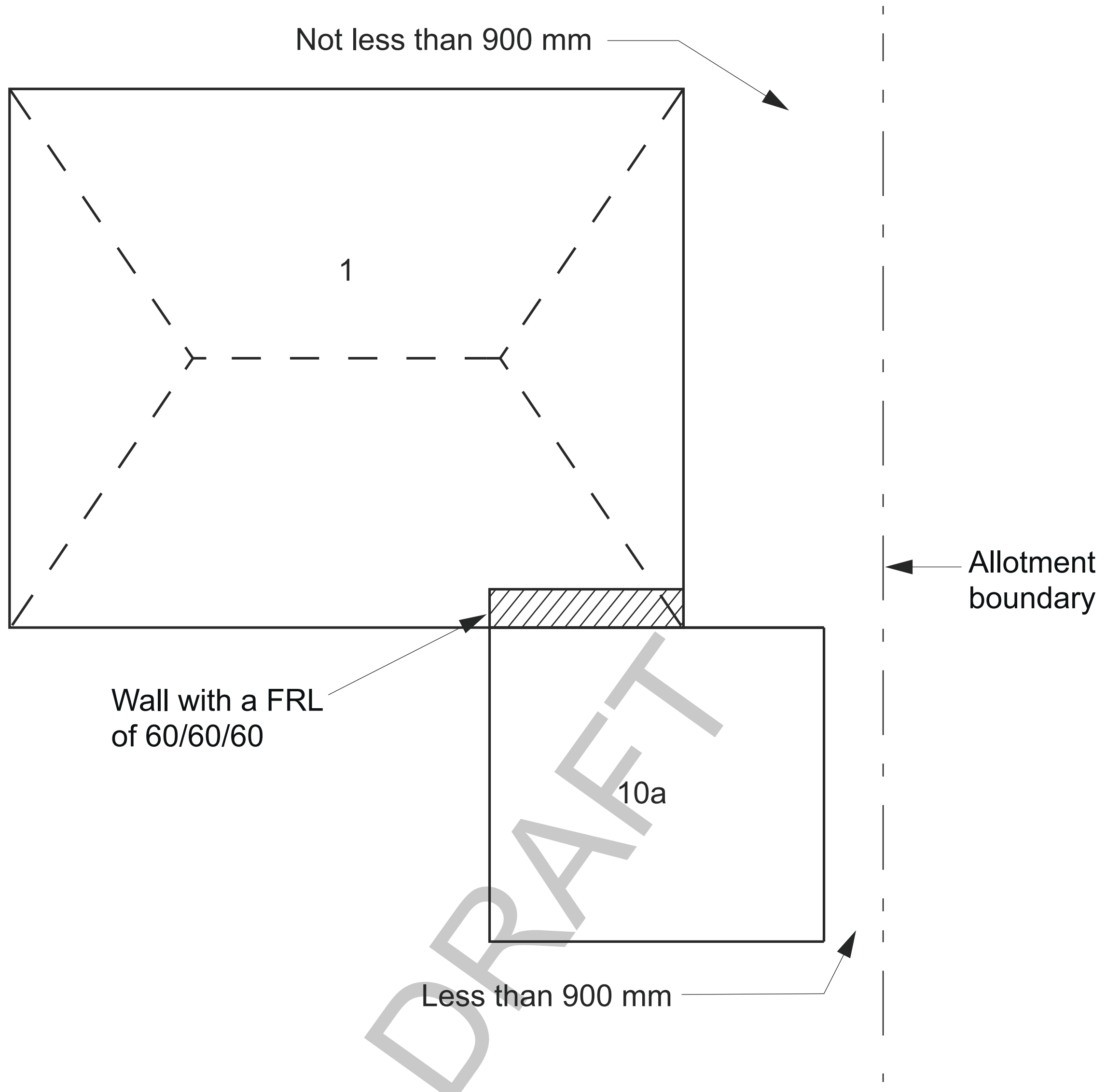
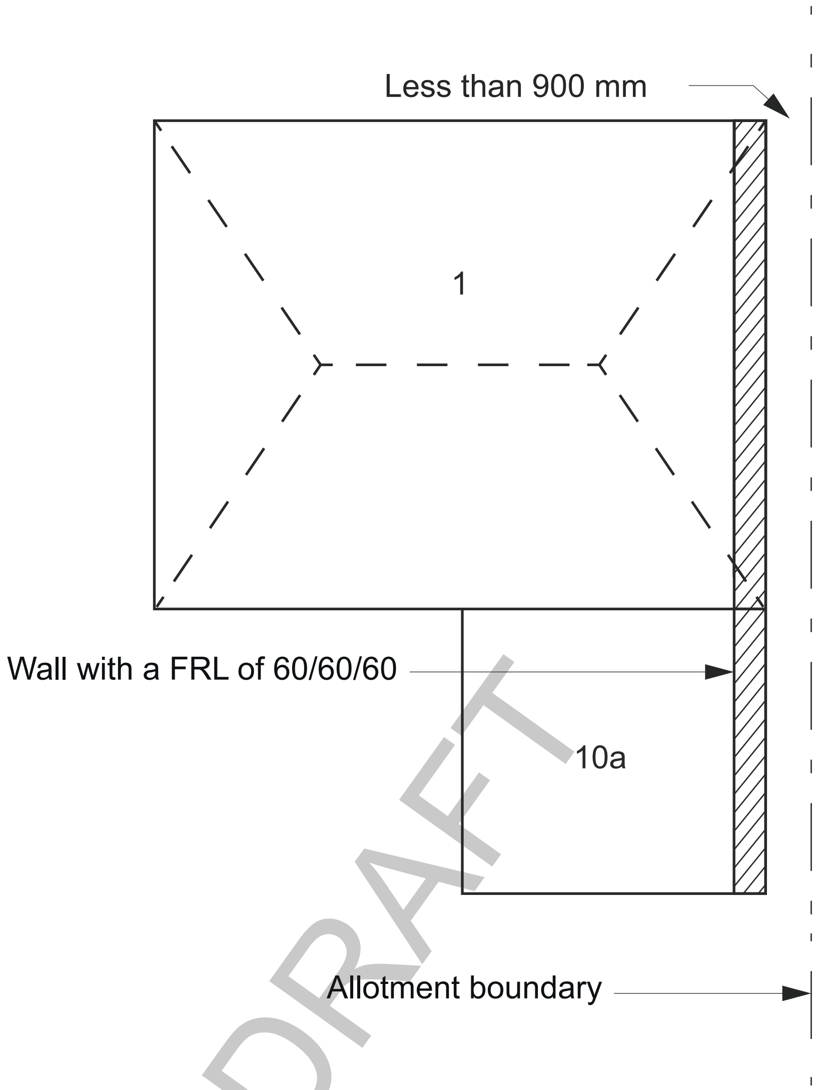


Figure 9.2.5i: External wall to Class 10 building with FRL



9.2.6 Protection of Class 1 buildings—Class 10a between Class 1 and other buildings on allotment

[2019: Figure 3.7.2.5]

The following methods are acceptable for the protection of a Class 1 building where a Class 10a building is located between or adjacent to a Class 1 building it is associated with and another building on the same allotment:

(a) The Class 10a building is not less than 1.8 m from the other building, as shown in Figure 9.2.6a.

(b) An *external wall* of the Class 10a building, which is less than 1.8 m from the other building, complies with 9.2.3, as shown in Figure 9.2.6b.

(c) An *external wall* of the Class 10a building, which is less than 1.8 m from the Class 1 building, complies with 9.2.3, as shown in Figure 9.2.6c.

(d) The Class 1 building is not less than 1.8 m from the Class 10a building, as shown in Figure 9.2.6d.

(e) An *external wall* of the Class 1 building, which is less than 1.8 m from the Class 10a building, complies with 9.2.3, as shown in Figure 9.2.6e.

(f) An *external wall* of the Class 10a building, which is less than 1.8 m from the *external wall* of the other building, complies with 9.2.3, as shown in Figure 9.2.6f.

(g) An *external wall* of the Class 10a building, which is less than 1.8 m from the *external wall* of the Class 1 building, complies with 9.2.3, as shown in Figure 9.2.6g.

(h) An *external wall* of the Class 1 and 10a building, which is less than 1.8 m from the *external wall* of the other building, complies with 9.2.3, as shown in Figure 9.2.6h.

Figure 9.2.6a: Class 10a building 1.8 m from other building on allotment

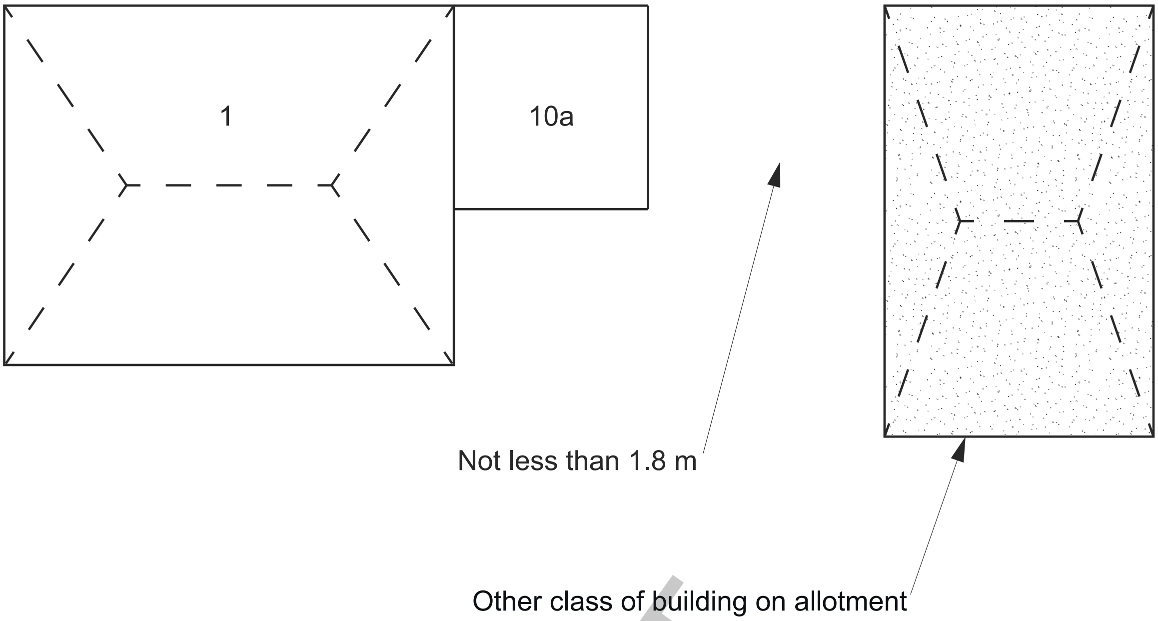


Figure 9.2.6b: External wall to Class 10a building with FRL (method 1)

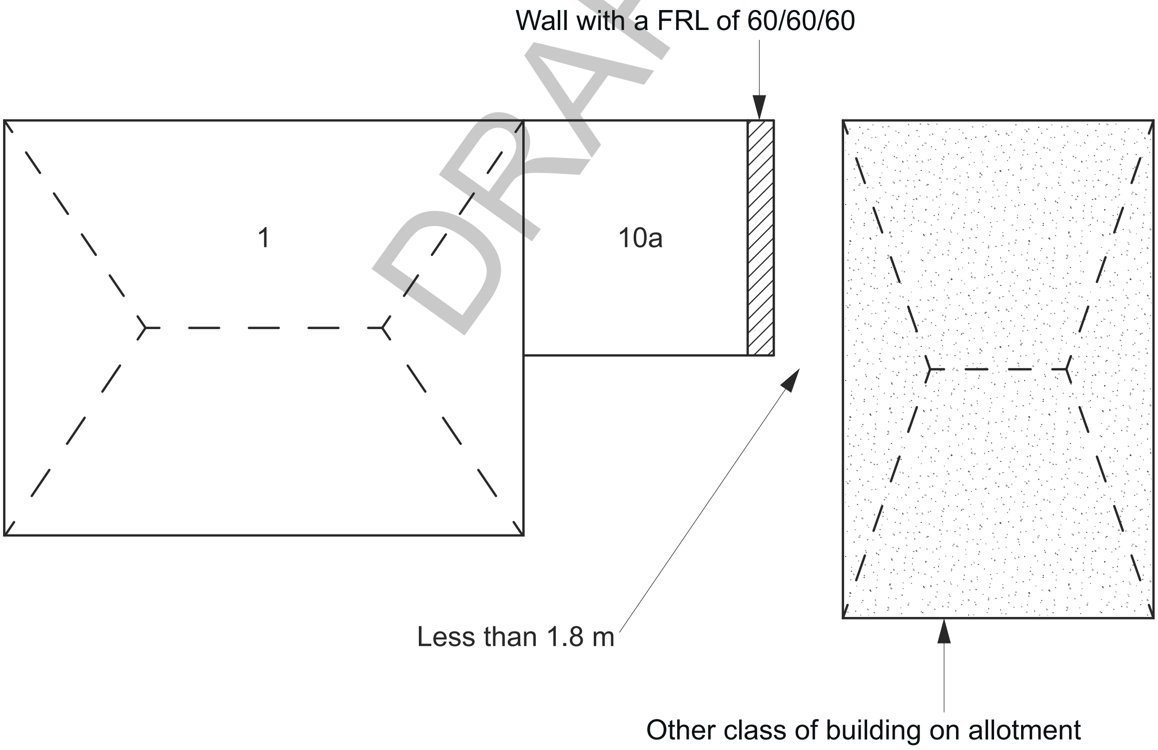


Figure 9.2.6c: **External wall to Class 10a building with FRL (method 2)**

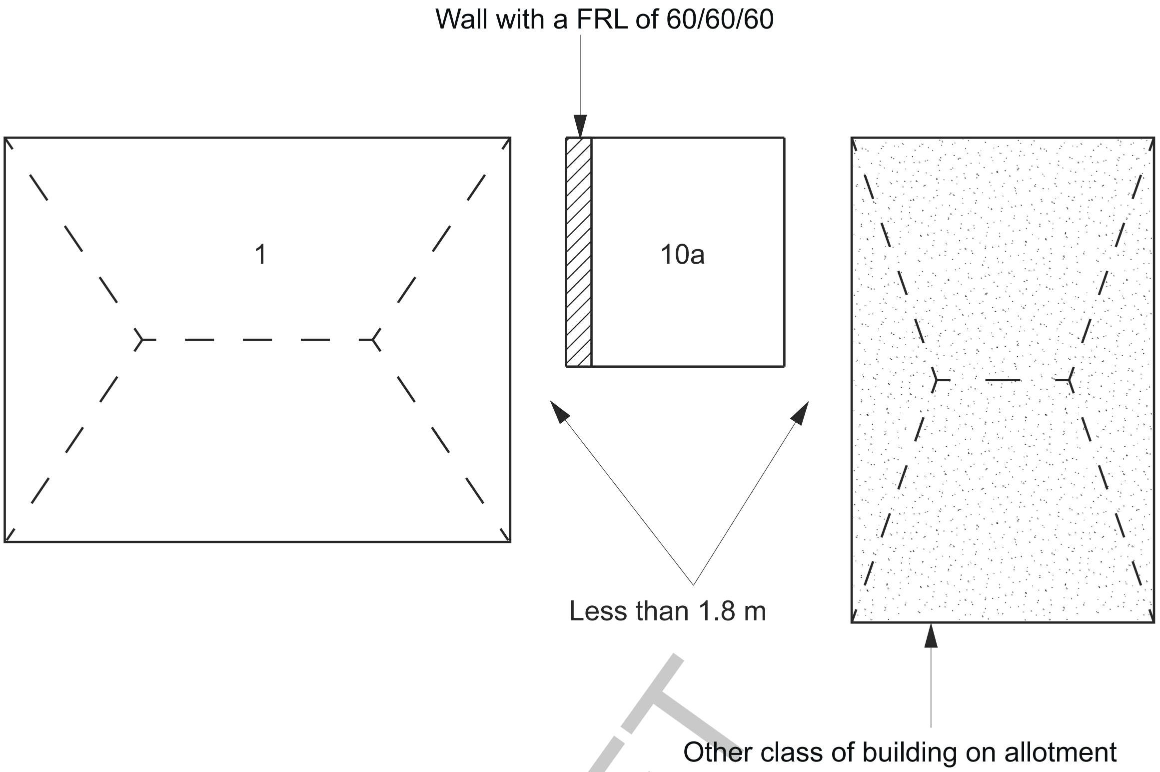


Figure 9.2.6d: **1.8 m separation between Class 1 and 10a**

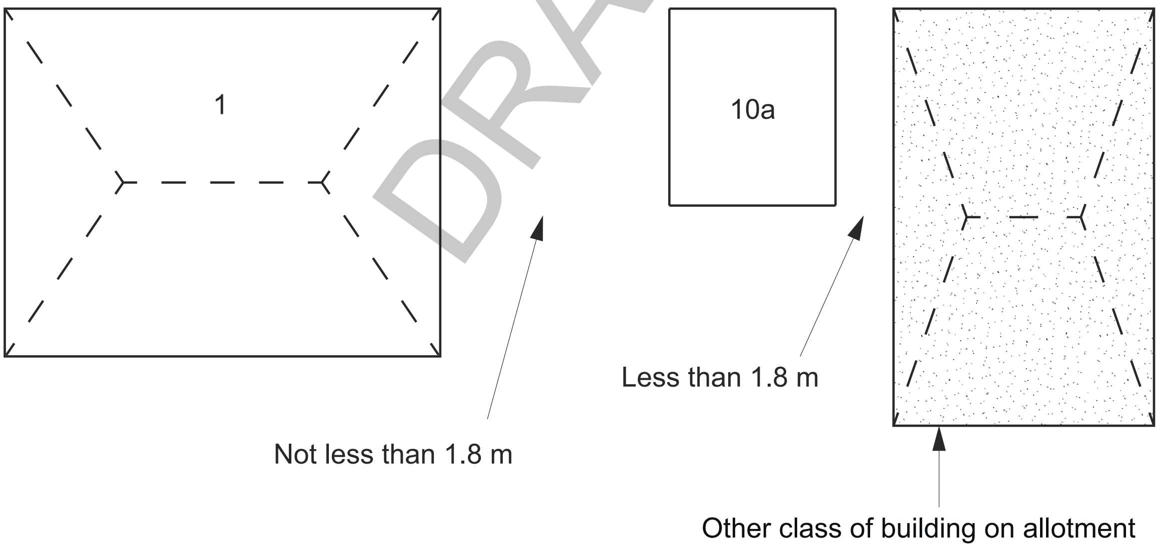


Figure 9.2.6e: **Class 1 building with FRL to external wall**

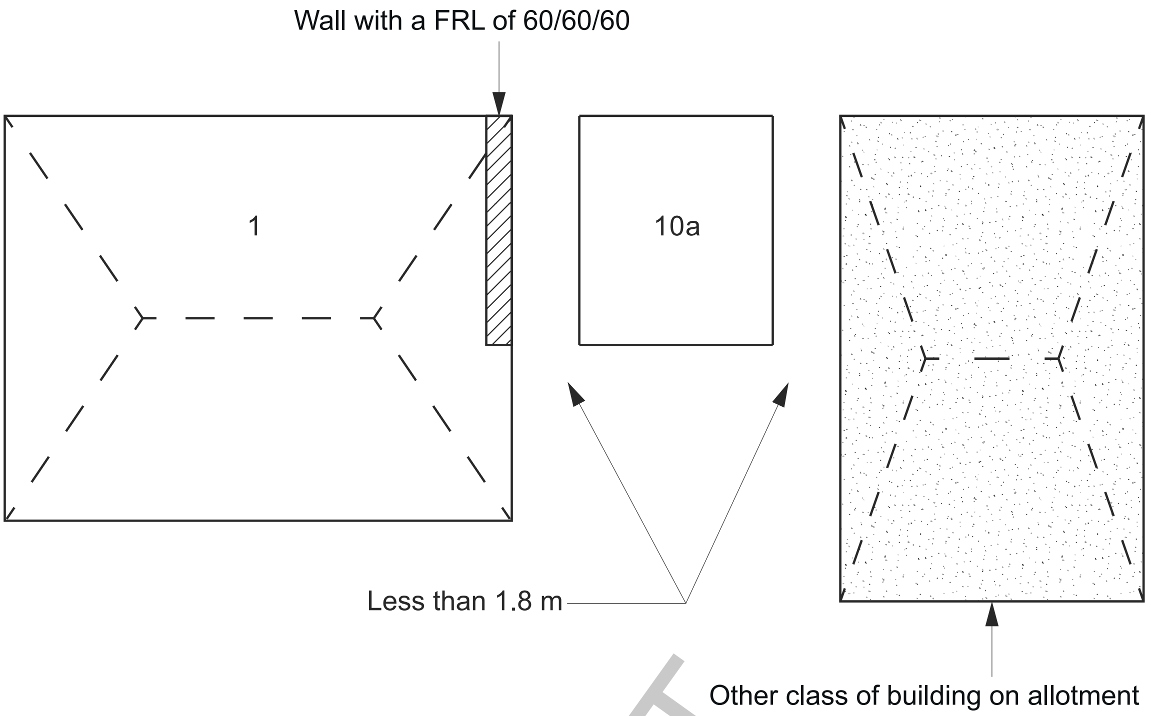


Figure 9.2.6f: **External wall of adjacent Class 10a building with FRL (method 1)**

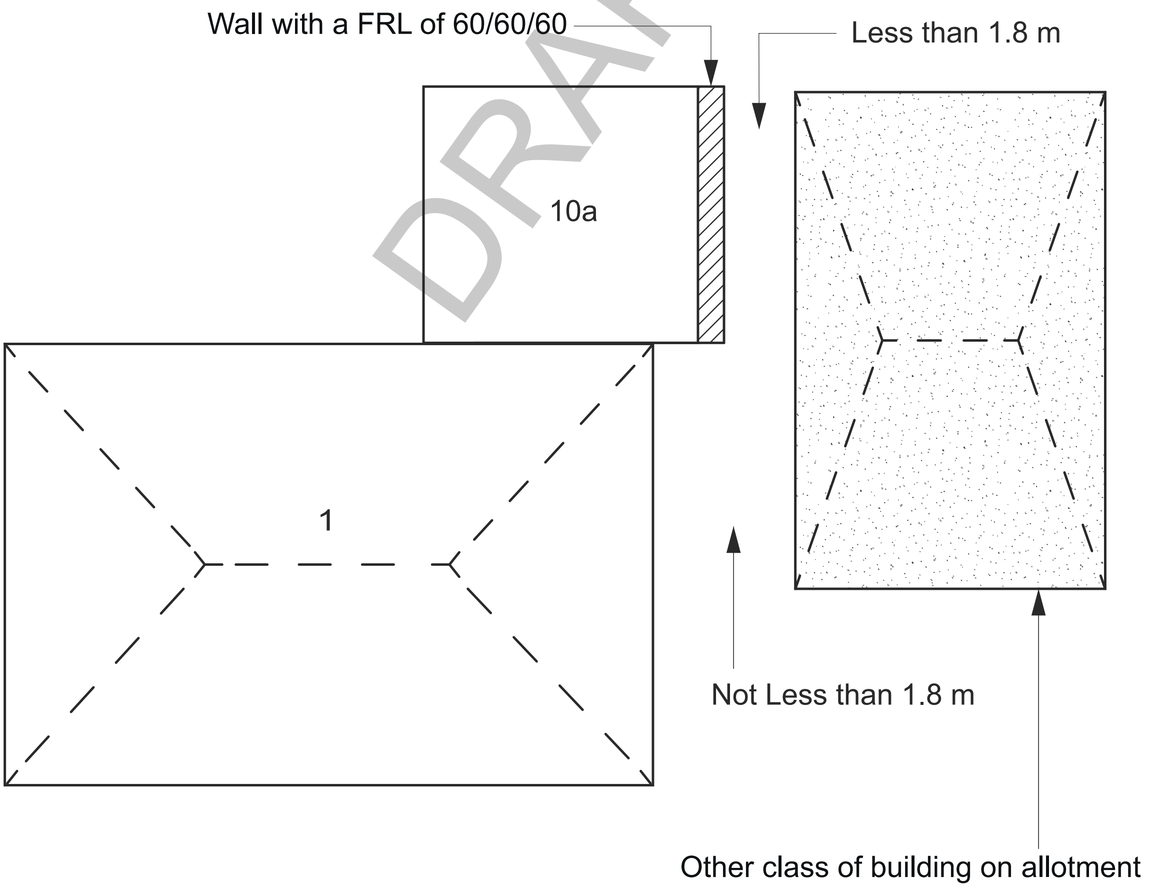


Figure 9.2.6g: External wall of adjacent Class 10a building with FRL (method 2)

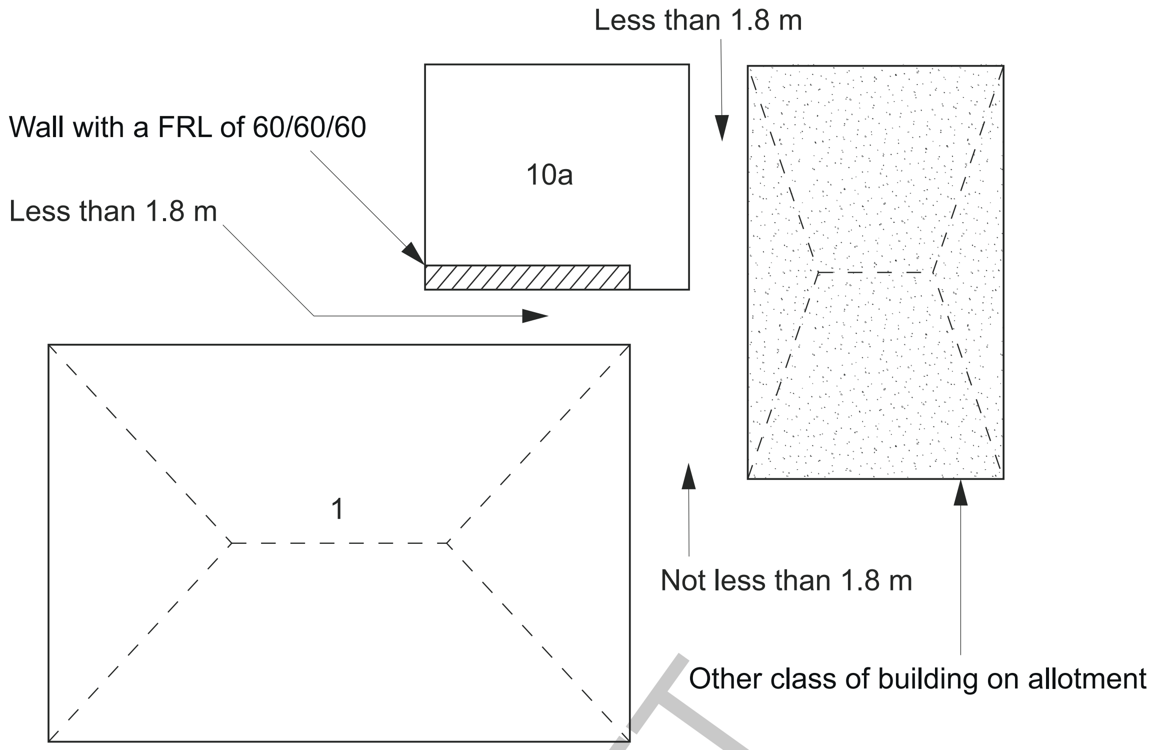
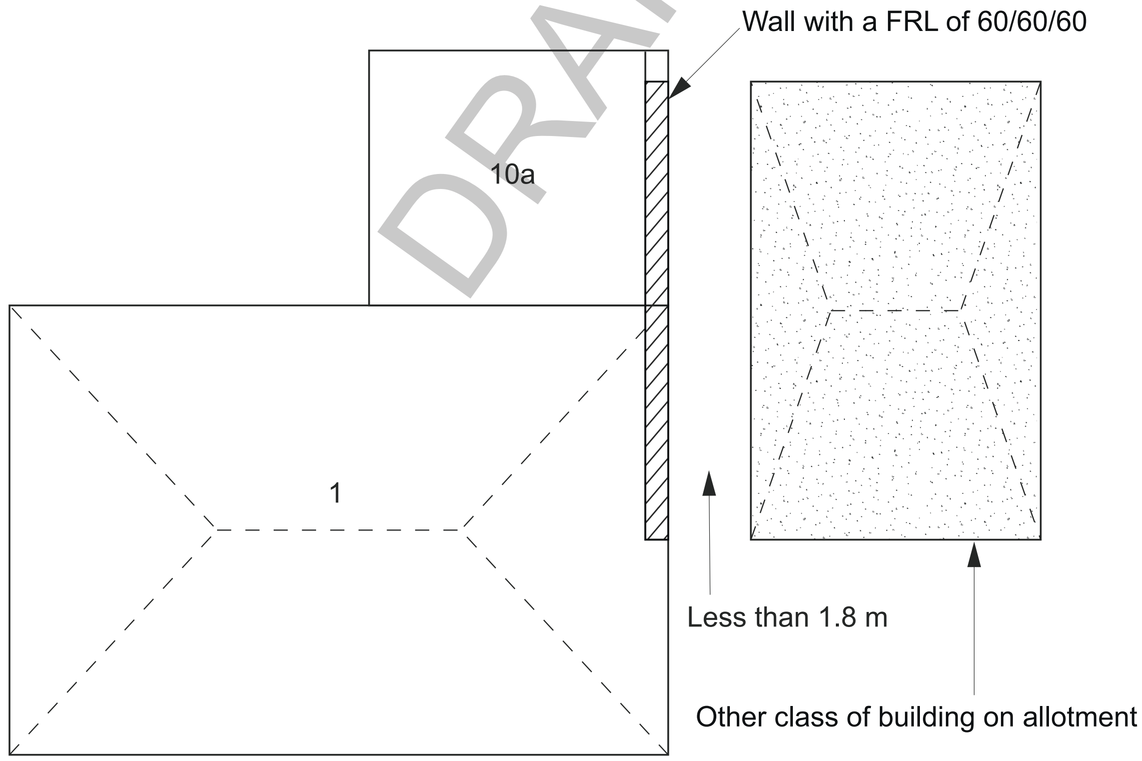


Figure 9.2.6h: Class 1 and 10 building with FRL to external wall



9.2.7 Protection of Class 1 buildings—separation of Class 10a buildings on an allotment

[2019: Figure 3.7.2.5]

The following methods are acceptable for the protection of a Class 1 building where two or more Class 10a buildings on the same allotment are located between and are associated with different Class 1 buildings:

(a) Each Class 10a building must be separated from each other by a distance of not less than 1.8 m, as shown in Figure 9.2.7a.

(b) Each Class 10a building must be separated from each other by *external walls* complying with 9.2.3, as shown in Figure 9.2.7b.

(c) Each Class 10a building must be separated from each Class 1 building by a distance of not less than 900 mm, as shown in Figure 9.2.7c.

(d) Each Class 10a building must be separated from each Class 1 building by *external walls* complying with 9.2.3, as shown in Figure 9.2.7d.

(e) Each Class 10a building must be separated by a wall complying with 9.3.1, as shown in Figure 9.2.7e.

(f) Each Class 10a building must be separated from each other by *external walls* complying with 9.2.3, as shown Figure 9.2.7f.

(g) Each Class 10a building must be separated from each Class 1 building by *external walls* complying with 9.2.3, as shown in Figure 9.2.7g.

(h) Each Class 10a building must be separated by a wall complying with 9.3.1.

Figure 9.2.7a: 1.8m separation between Class 10a buildings

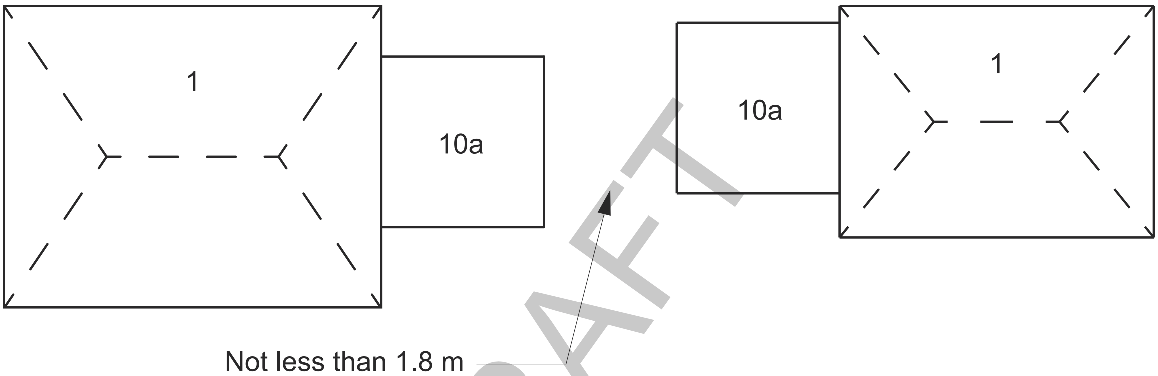


Figure 9.2.7b: External wall to Class 10a building with FRL (method 1)

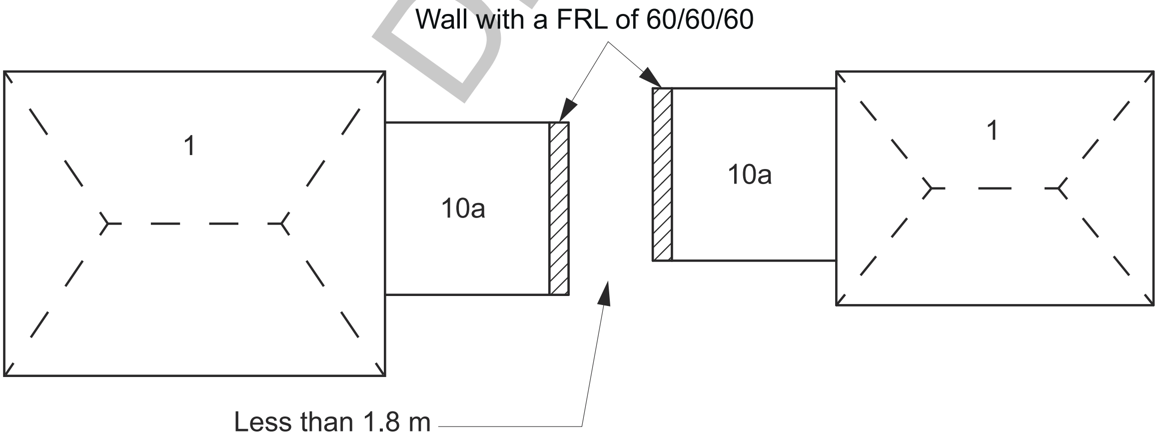


Figure 9.2.7c: **900 mm separation between Class 10a and Class 1 buildings**

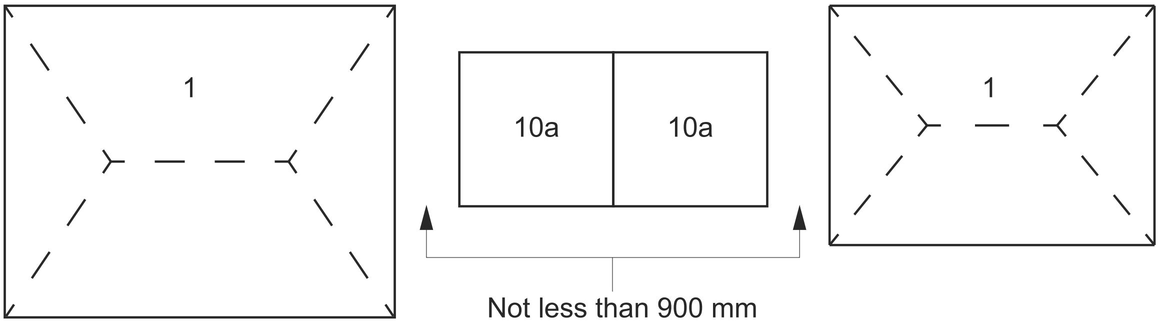


Figure 9.2.7d: **External wall to a Class 10a buildings with FRL (method 2)**

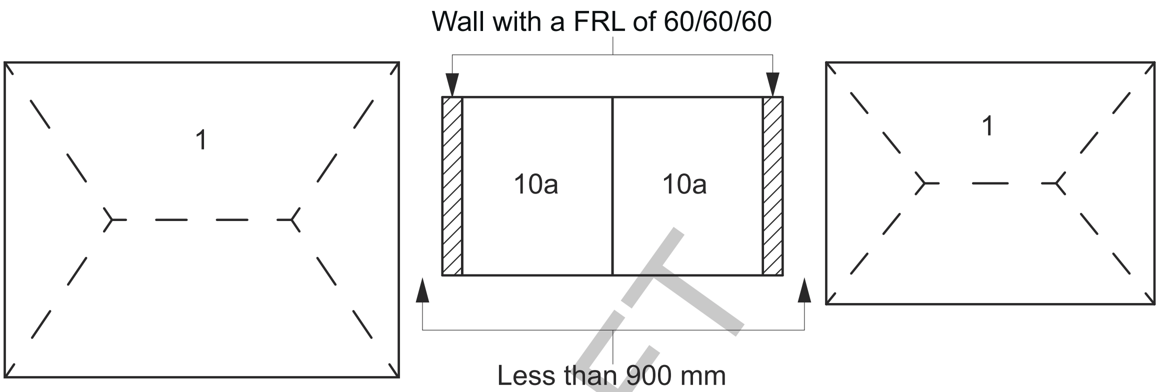


Figure 9.2.7e: **Class 10a buildings with FRL to separating wall (method 1)**

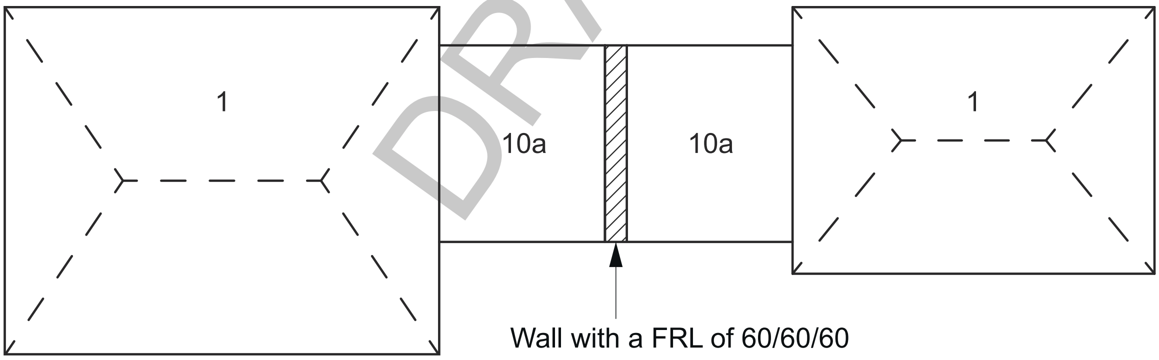


Figure 9.2.7f: External wall to adjacent Class 10a buildings with FRL (method 1)

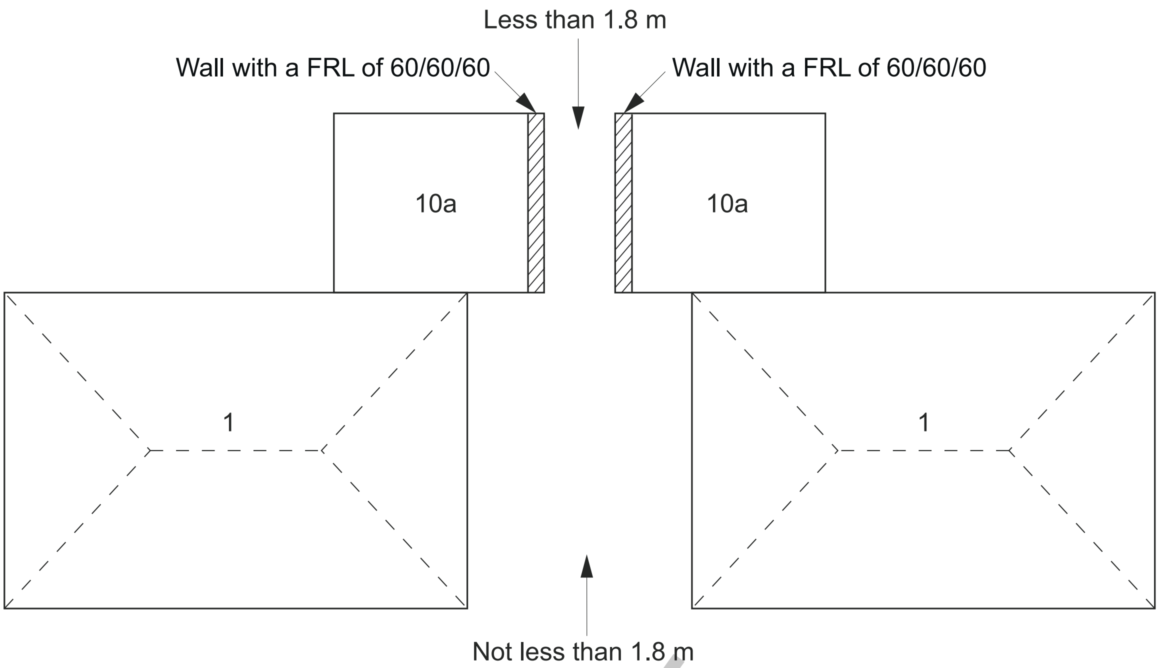


Figure 9.2.7g: External wall to adjacent Class 10a buildings with FRL (method 2)

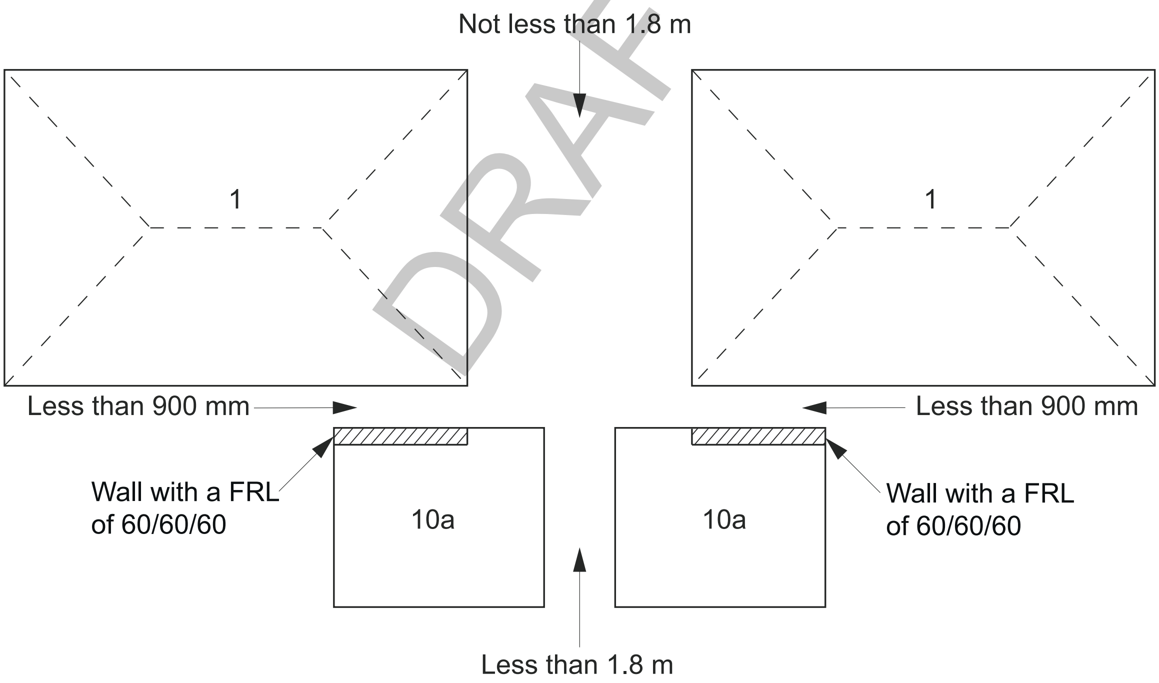
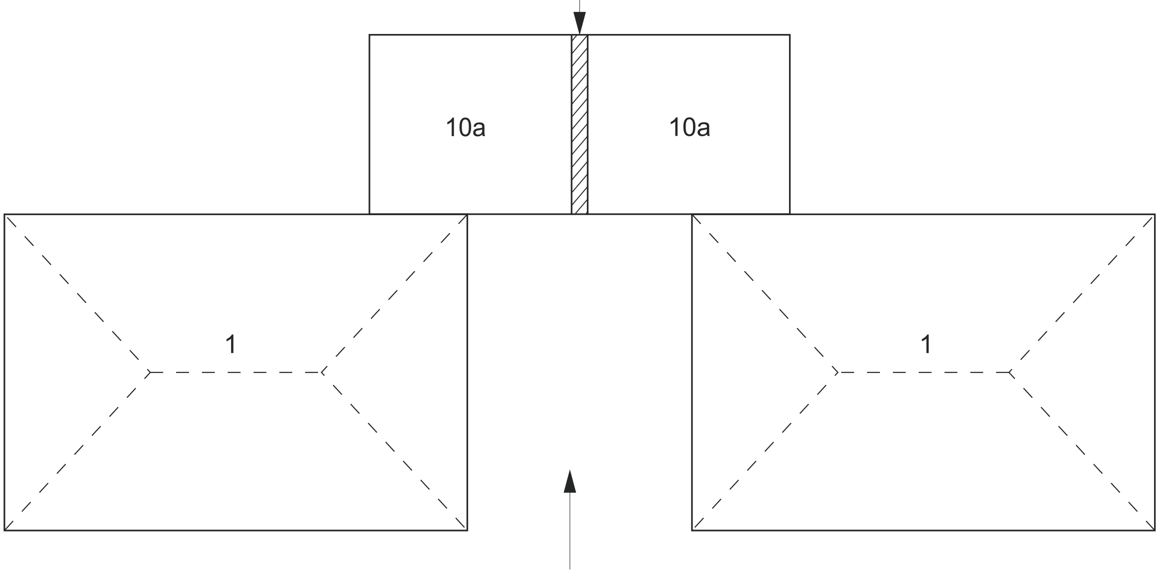


Figure 9.2.7h: Class 10a buildings with FRL to separating wall (method 2)



SA 9.2.8

9.2.8 Open carports

[2019: 3.7.2.6]

A Class 10a carport is exempt from complying with 9.2.4(1) if—

(a) it has two or more sides open and not less than one third of its perimeter open; and

(b) for the purposes of (a), a side is considered to be open if the roof covering adjacent to that side is not less than 500 mm from another building or allotment boundary; and

(c) it has a polycarbonate or *non-combustible* roof covering; and

(d) any ceiling lining and wall cladding, including gables, is *non-combustible* (see Figure 9.2.8a); and

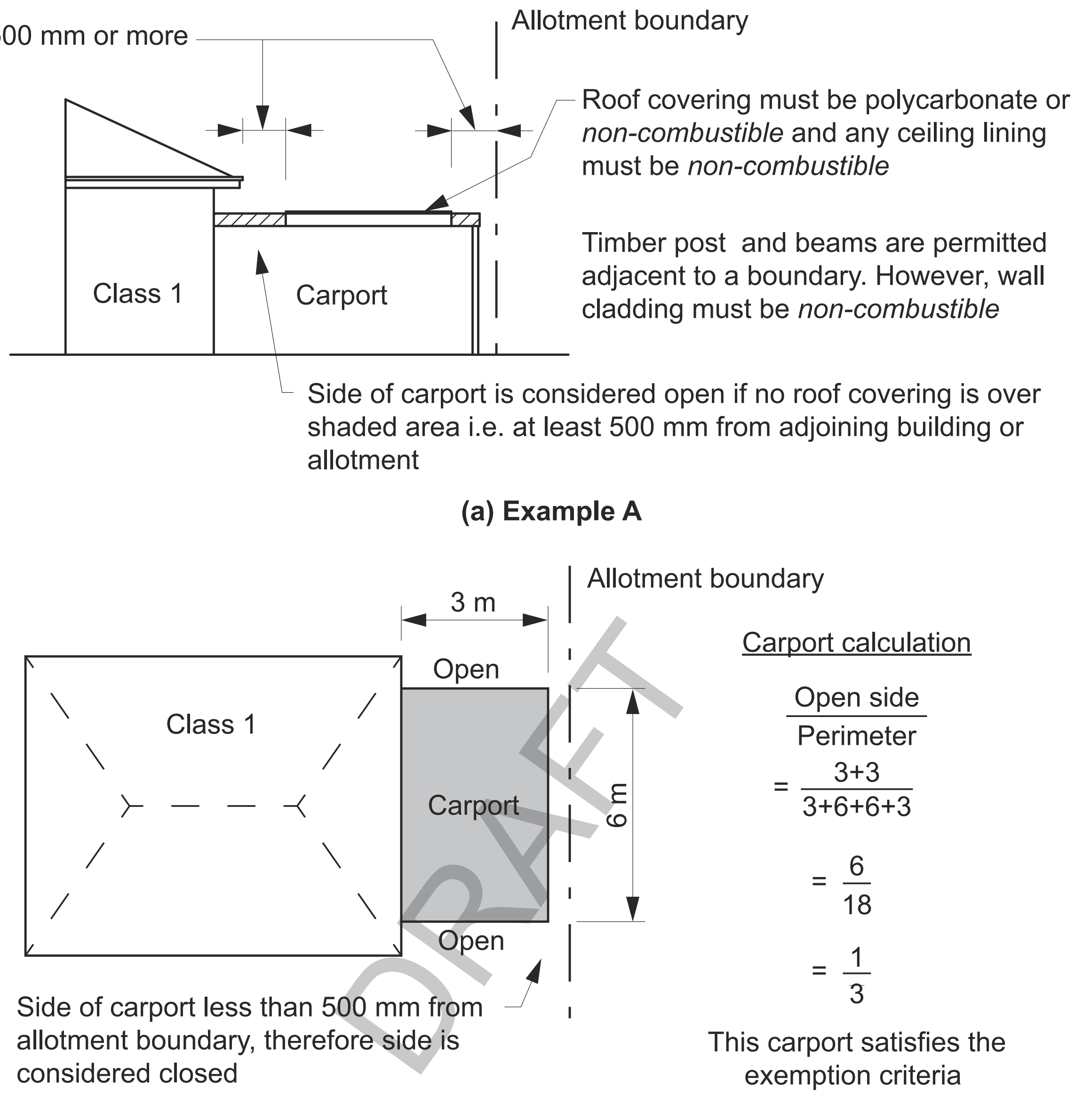
(e) it does not provide direct vertical support to any part of the Class 1 building; and

(f) in the case where it has a common roof structure with the Class 1 building and the carport does not have a ceiling (See Figure 9.2.8b), the opening between the top of the wall of the Class 1 building and the underside of the roof covering is infilled with—

  (i) a *non-combustible* material; or

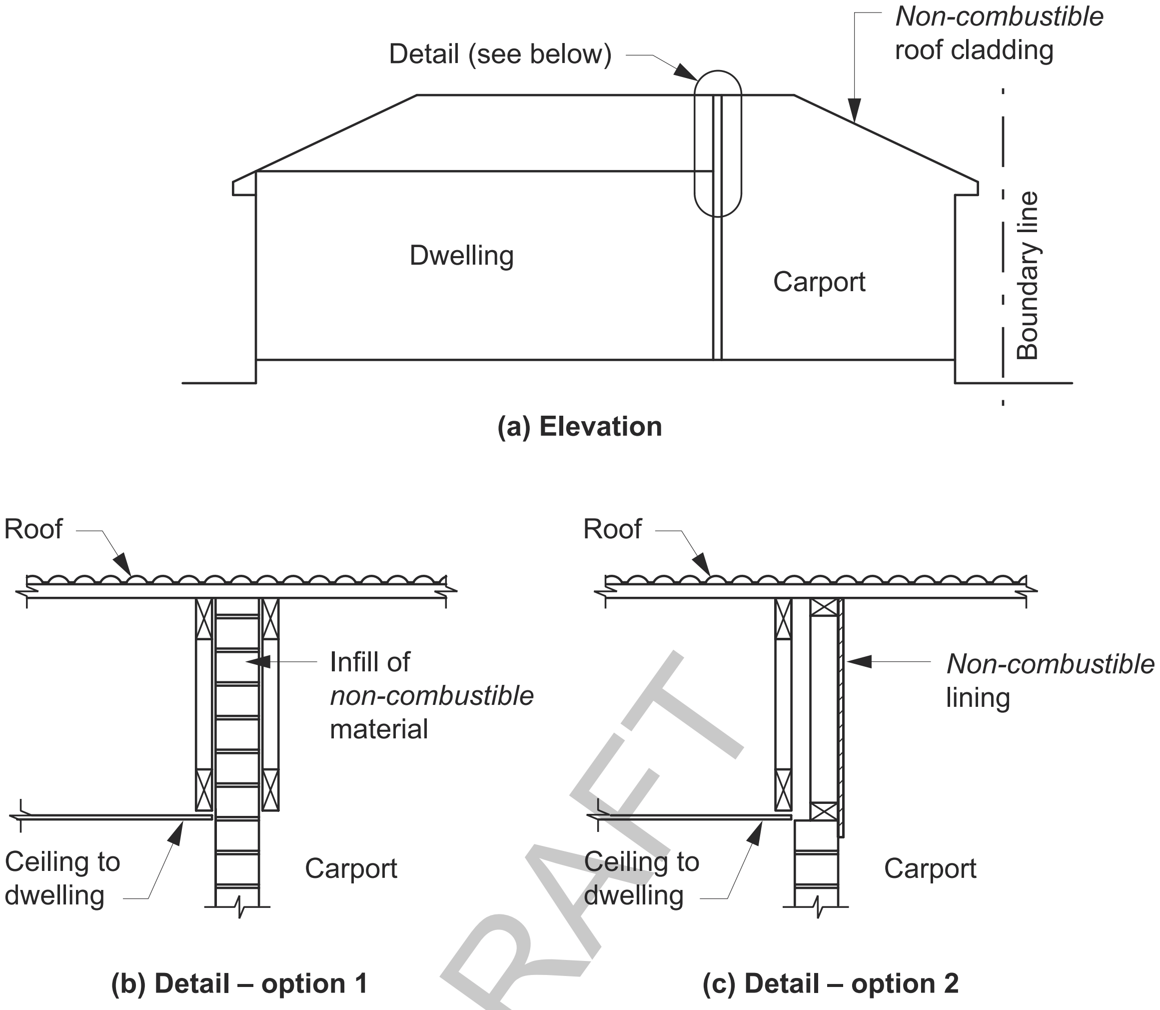
  (ii) construction clad with *non-combustible* material on the carport side.

Figure 9.2.8a: **Identifying an open carport**



(b) Example B

Figure 9.2.8b: Requirements for non-combustible infill panels to carport



Explanatory Information:

A side of a carport enclosed by a vehicle access door is not considered to be an open side.

SA 9.2.9

9.2.9 Allowable encroachments

[2019: 3.7.2.7]

(1) An encroachment is any construction~~between~~—

(a) between the *external wall* of the building and the allotment boundary other than a boundary adjoining a road or other public space; or

(b) between the *external walls* of two buildings on the same allotment; or

(c) between the *external wall* of the building and the vertical projection of the *external wall* of another ~~an adjoining~~ building on the same allotment~~.~~; or

(d) that extends beyond the vertical projection of another building on the same allotment other than a building it is associated with.

(2) For the purposes of (1), an encroachment relates to any *external wall* of—

(a) a Class 10a building *required* to comply with 9.2.4; or

(b) a Class 1 building.

(3) Encroachments allowed within 900 mm of an allotment boundary or within 1.8 m of another building, or its vertical

projection, on the same allotment are—

(a) *non-combustible* fascias, gutters and downpipes; and

(b) light fittings, electricity or gas meters, aerials or antennas; and

(c) pergolas, sun blinds or water tanks (see Figure 9.2.9a); and

(d) unroofed terraces, landings, steps and ramps, not more than 1 m in height.

(4) Encroachments allowed up to but not closer than 450 mm from an allotment boundary or up to but not closer than 900 mm from another building, or its vertical projection, on the same allotment or associated encroachments of another building on the same allotment are—

(a) *combustible* fascias, gutters and downpipes (see Figure 9.2.9a, Figure 9.2.9b and Figure 9.2.9c); and

(b) eaves with *non-combustible* roof cladding and *non-combustible* lining; and

(c) flues, chimneys, pipes, domestic fuel tanks, cooling or heating appliances or other services.

(5) Encroachments allowed to project beyond ~~between an external wall of a building and~~ the vertical projection of another building ~~an adjoining building~~ on the same allotment are *non-combustible* fascias, gutters and downpipes (see Figure 9.2.3e).

Figure 9.2.9a: Allowable encroachments for non-combustible construction — Combustible fascia up to but not closer than 450 mm to an allotment boundary

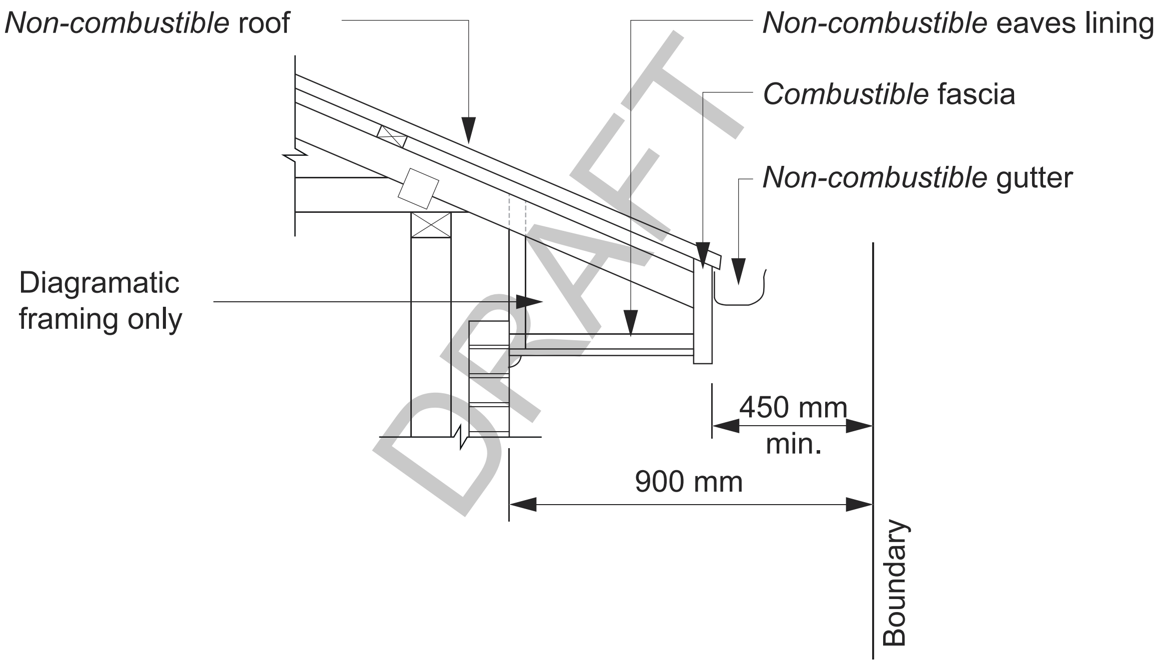


Figure 9.2.9b: **Allowable encroachments for non-combustible construction — Non-combustible fascia and gutter within 900 mm of an allotment boundary**

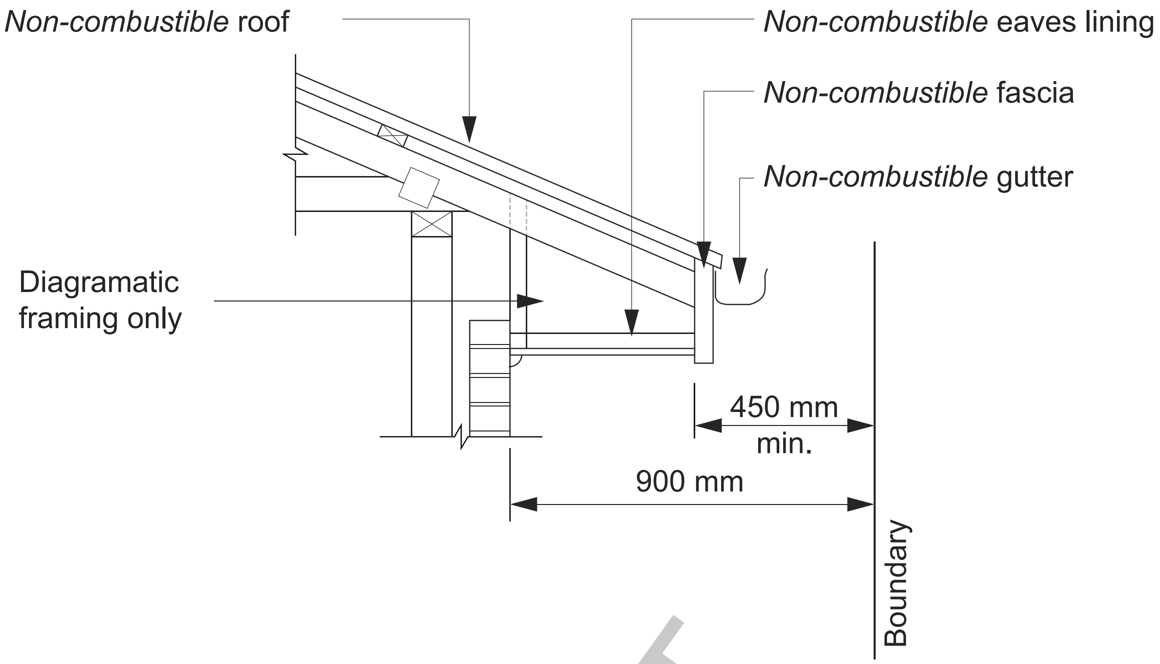
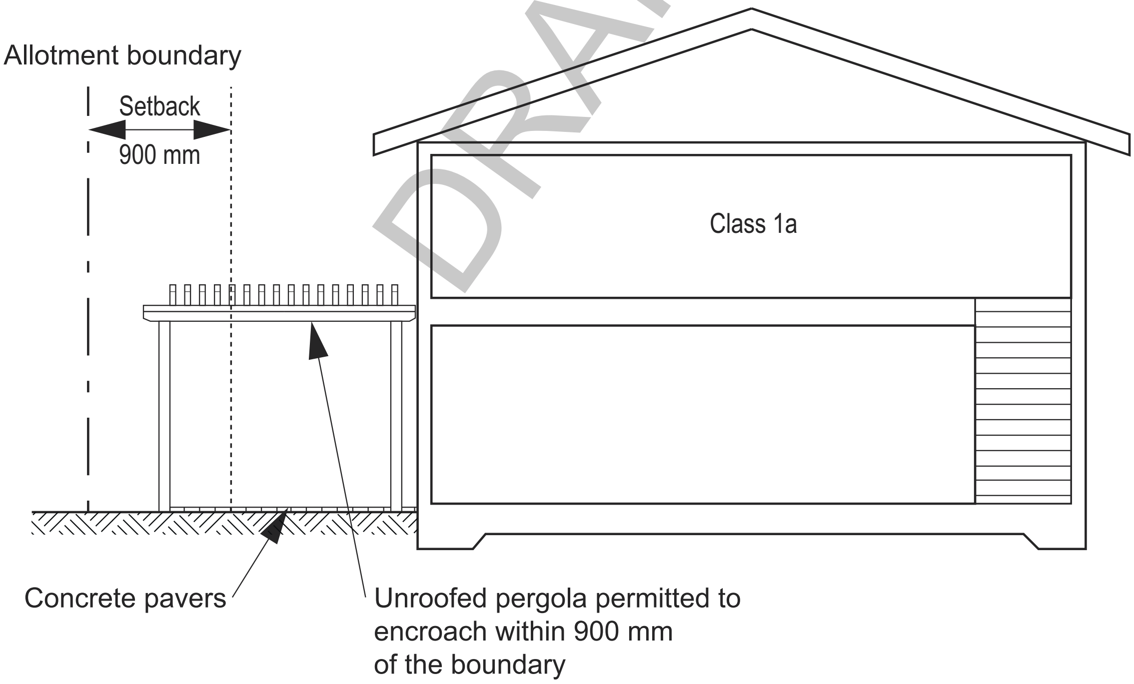


Figure 9.2.9c: **Allowable encroachments for non-combustible construction — Unroofed pergola within 900 mm of an allotment boundary**



Explanatory Information:

A deck is not considered an unroofed terrace and is therefore not permitted as an allowable encroachment under 9.2.9 whether *combustible* or not.

The term 'pergola' is a reference to an unroofed structure.

9.2.10 Roof lights

[2019: 3.7.2.8]

Combustible roof lights, skylights or the like installed in a roof or part of a roof *required* to have a *non-combustible* covering must—

(a) have an aggregate area not more than 20% of the roof or part of the roof; and

(b) not less than—

(i) 900 mm from the allotment boundary other than the boundary adjoining a road alignment or other public space; and

(ii) 1.8 m from any roof light or the like in another building on the allotment other than an associated building or a detached part of the same building. (See Figure 9.2.10).

Figure 9.2.10: Location of combustible roof lights

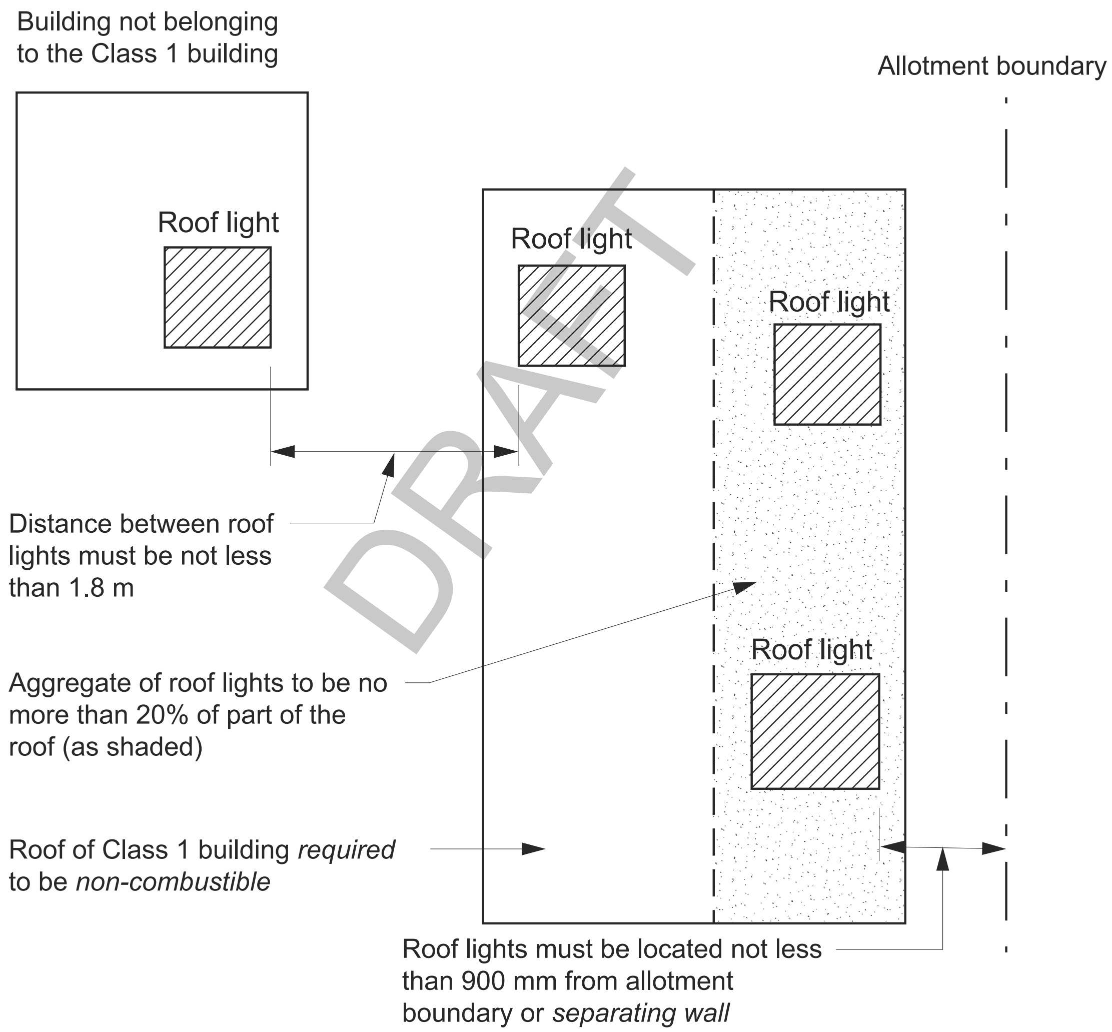


Figure Notes:

Roof lights depicted in Figure 9.2.10 are *combustible*.

Part 9.3 Fire protection of separating walls and floors

9.3.1 Separating walls

[2019: 3.7.3.2]

(1) A *separating wall* between Class 1 buildings, or a wall that separates a Class 1 building from a Class 10a building which is not associated with the Class 1 building must—

(a) be constructed—

(i) having an FRL of not less than 60/60/60; or

(ii) of masonry not less than 90 mm thick; and

(b) commence at the footings or ground slab (see Figure 9.3.1a), except for horizontal projections to which 9.3.4 applies (see Figure 9.3.4); and

(c) extend—

(i) if the building has a *non-combustible* roof covering, to the underside of the roof covering (see Figure 9.3.1a and Figure 9.3.1b); or

(ii) if the building has a *combustible* roof covering, to not less than 450 mm above the roof covering (see Figure 9.3.1a); and

(d) comply with (2) to (5) and 9.3.2 as applicable.

(2) A *separating wall* of *lightweight construction* must be tested in accordance with Specification 6.

(3) A *separating wall* complying with (1)(c)(i)—

(a) must not be crossed by timber or other *combustible* building elements except for roof battens with dimensions of 75 x 50 mm or less, or roof sarking; and

(b) must have any gap between the top of the wall and the underside of the roof covering packed with mineral fibre or other suitable material.

(4) Where a building has a masonry veneer *external wall*, any gap between the *separating wall* and the external masonry veneer must be—

(a) not more than 50 mm; and

(b) packed with a mineral fibre or other suitable fire resistant material with the packing arranged to maintain any weatherproofing requirements of H2D4.

(5) Eaves, verandahs and similar spaces that are open to the roof space and are common to more than one Class 1 dwelling must be separated by a *non-combustible* vertical lining (see Figure 9.3.1c).

Figure 9.3.1a: Separating wall construction

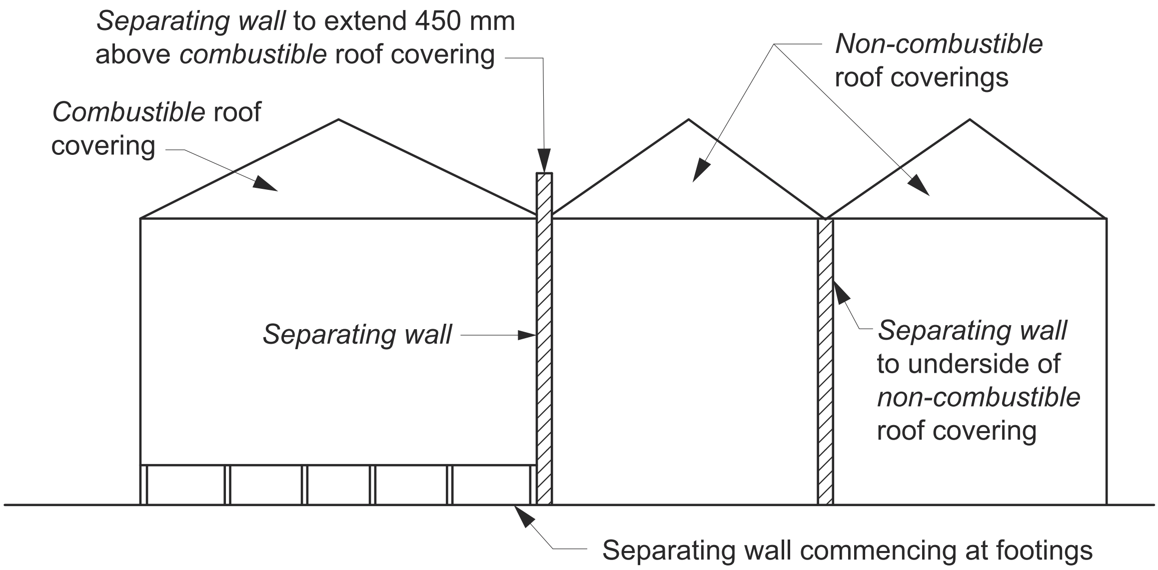
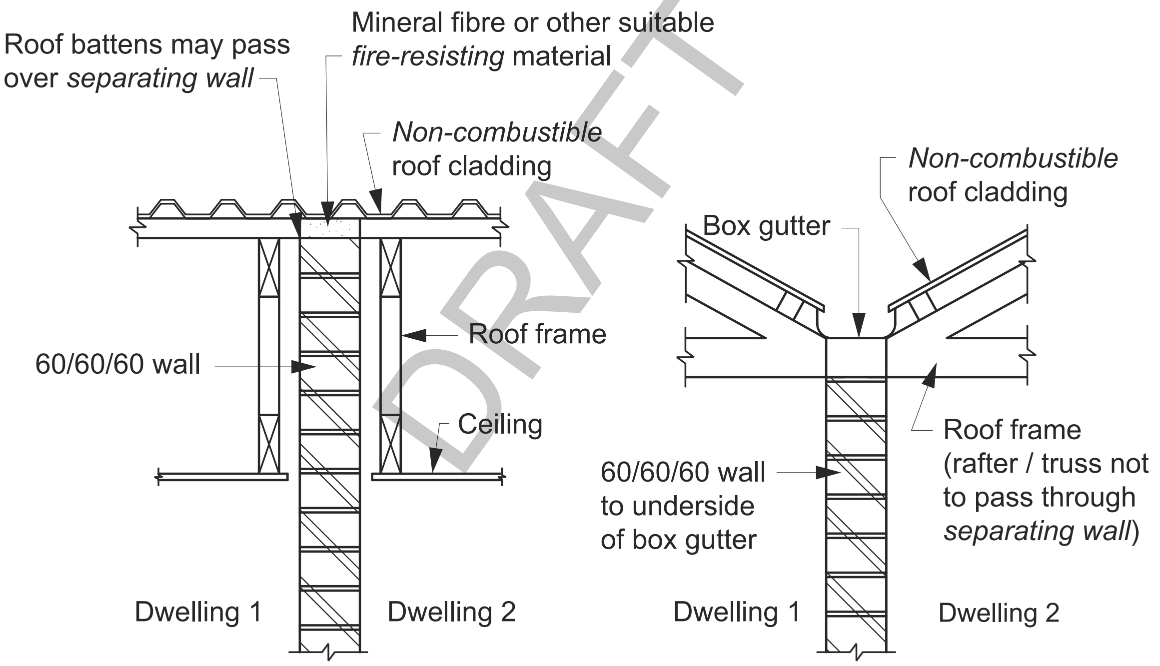


Figure 9.3.1b: Separating wall construction — Underside of non-combustible roof cladding (diagram 1)



(a) Wall parallel to roof frame **(b) Wall at right-angles to roof frame**

Figure 9.3.1c: Separating wall construction — Underside of non-combustible roof cladding (diagram 2)

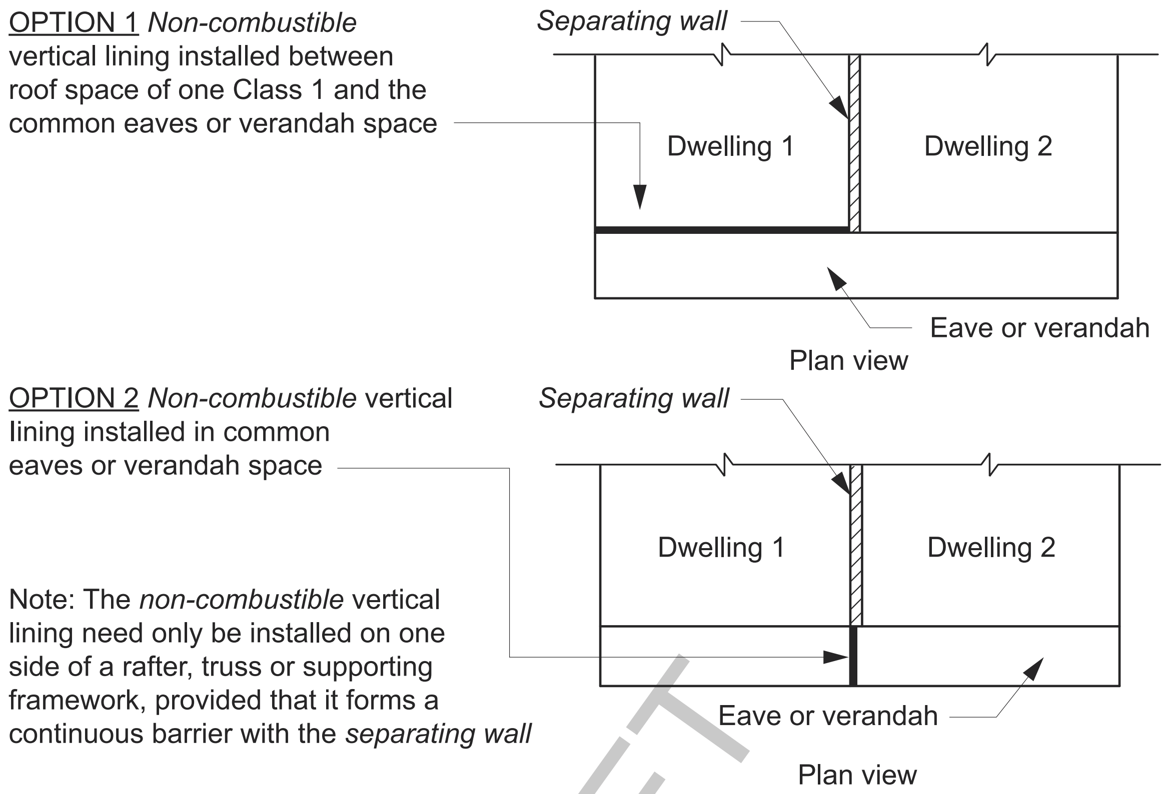


Figure Notes:

Elements crossing the *non-combustible* vertical lining must comply with 9.3.1(3).

9.3.2 Services in separating walls

[2019: 3.7.3.3]

(1) Any service opening, other than those listed in (2), (3) and (4), in a *separating wall* must have construction with an FRL of not less than -/60/60.

(2) If an electrical wire or cable penetrates a *separating wall*—

(a) the service and building element at the penetration must—

(i) be identical with a prototype assembly that has been tested in accordance with AS 4072.1 and AS 1530.4 and achieve an FRL of not less than -/60/60; or

(ii) differ from a prototype assembly of the service and building element in accordance with AS 4072.1; or

(b) the service must be installed so that—

(i) the opening is neatly formed, cut or drilled and no closer than 50 mm to any other service; and

(ii) the opening is no larger in cross-section than—

(A) 2000 mm^2 if only a single cable is accommodated and the gap between the cable and the wall is no wider than 15 mm; or

(B) 500 mm^2 in any other case; and

(iii) any gap between the service and the wall is packed with mineral fibre or other suitable fire resistant material.

(3) If an electrical switch, outlet, socket or the like is accommodated in a *separating wall*—

(a) the service and building element at the penetration must—

(i) be identical with a prototype assembly which has been tested in accordance with AS 4072.1 and AS 1530.4 and achieve an FRL of not less than -/60/60; or

(ii) differ from a prototype assembly of the service and building element in accordance with AS 4072.1; or

(b) the service must be installed so that—

(i) the opening or recess—

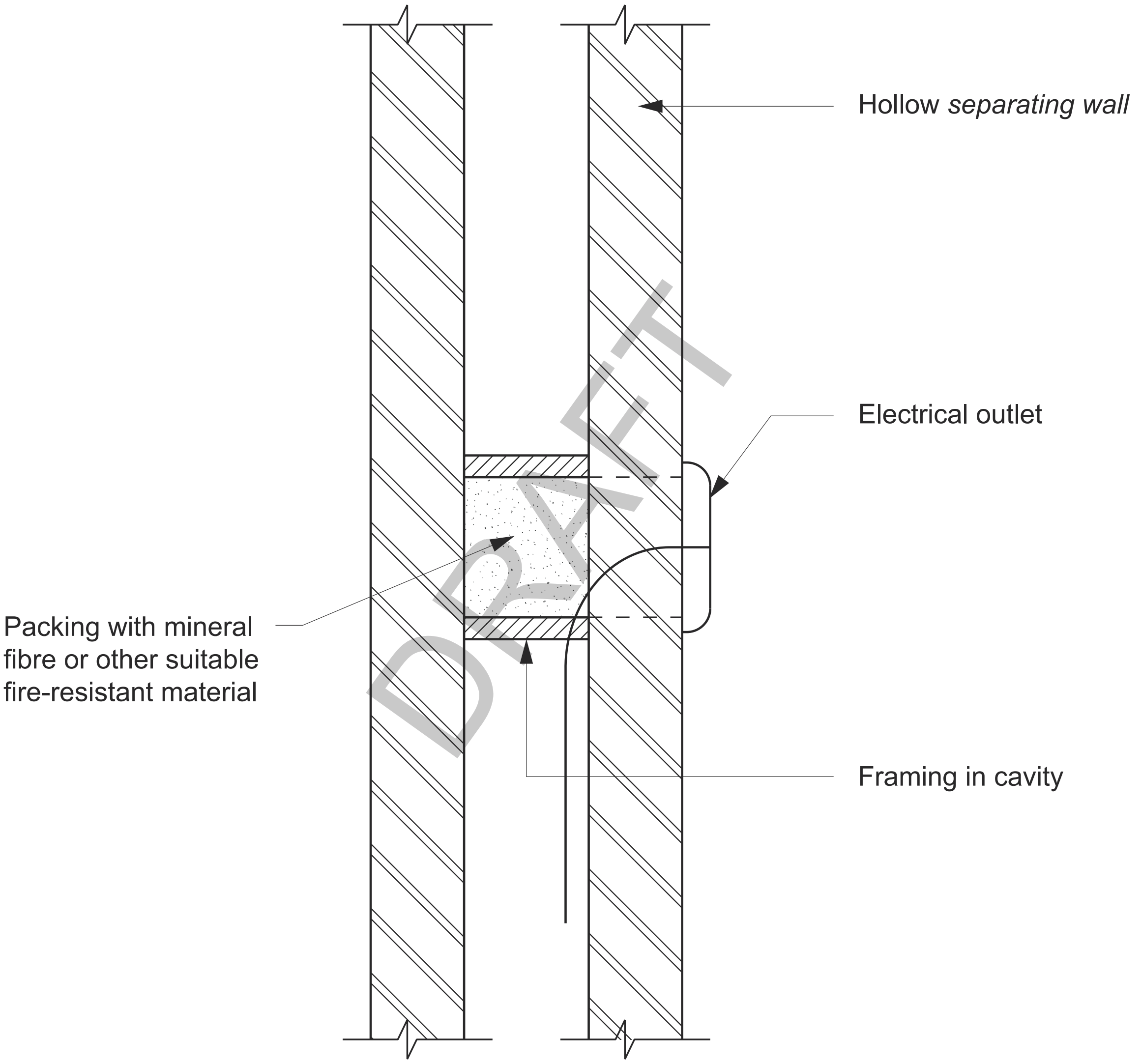
(A) is not located opposite any point within 300 mm horizontally or 600 mm vertically of any opening or recess on the opposite side of the wall; or

(B) does not extend beyond half the thickness of the wall; and

(ii) any gap between the service and the wall is packed with mineral fibre or other suitable fire resistant material.

(4) Other than where a tested system is used in accordance with (3)(a), if an electrical switch, socket, outlet or the like is accommodated in a hollow *separating wall*, the cavity immediately behind the service must be framed and packed with mineral fibre or other suitable fire resistant material (see Figure 9.3.2).

Figure 9.3.2: Separating wall construction — Services in cavity construction



Explanatory Information:

For the purposes of 9.3.2 and 10.7.2, a reference to a *separating wall* includes a wall that separates a Class 1 building from a Class 10a building that is not associated with the Class 1 building.

It is important that any opening in a *separating wall* between Class 1 buildings does not allow the free passage of fire between buildings. Many designs would require the installation of openings for electrical cables and outlets in these walls. 9.3.2 therefore allows such openings provided they comply with the requirements of that provision.

A reference to a hollow *separating wall* in 9.3.2(4) may include a stud wall, masonry *cavity* wall or a wall of hollow blockwork.

Part 10.7 (sound insulation) also contains requirements relevant to *separating walls*, in addition to the provisions of this Part. This includes installation requirements for walls and services to achieve appropriate levels of sound insulation.

9.3.3 Roof lights

[2019: 3.7.3.4]

Combustible roof lights, skylights or the like installed in a roof or part of a roof *required* to have a *non-combustible* covering must—

(a) have an aggregate area not more than 20% of the roof or part of the roof; and

(b) be not less than 900 mm from the vertical projection of a *separating wall* extending to the underside of the roof covering.

9.3.4 Horizontal projections

[2019: 3.7.3.5]

(1) Where a horizontal projection forms part of a *separating wall* complying with 9.3.1, any horizontal projection within 1.8 m on each side of the *separating wall* (see Figure 9.3.4) must—

(a) be a floor/ceiling or floor/soffit system incorporating a ceiling or soffit which has a *resistance to the incipient spread of fire* to the space above itself of not less than 60 minutes; or

(b) have an FRL not less than 30/30/30 when tested from the underside; or

(c) have a fire-protective covering on the underside of the floor, including beams incorporated in it, if the floor is *combustible* or of metal.

(2) The part of the *separating wall* that projects outwards horizontally must—

(a) extend to the underside of the floor/ceiling or floor/soffit system complying with (1); and

(b) not be crossed by timber or other *combustible* building elements except for framing members with dimensions of 75 x 50 mm or less, or sarking; and

(c) have any gap between the bottom of the wall and the underside of the floor/ceiling or floor/soffit system packed with mineral fibre or other suitable material.

(3) Where a floor subject to (1)(b) depends on direct vertical or lateral support from another part to maintain its FRL, that supporting part must have an FRL of not less than 30/-/-.

(4) Where a service passes through a floor referred to in (1), the penetration must not reduce the fire performance of the floor or covering.

Figure 9.3.4: **Horizontal projection forming part of a separating wall**

Class 1 buildings on same allotment

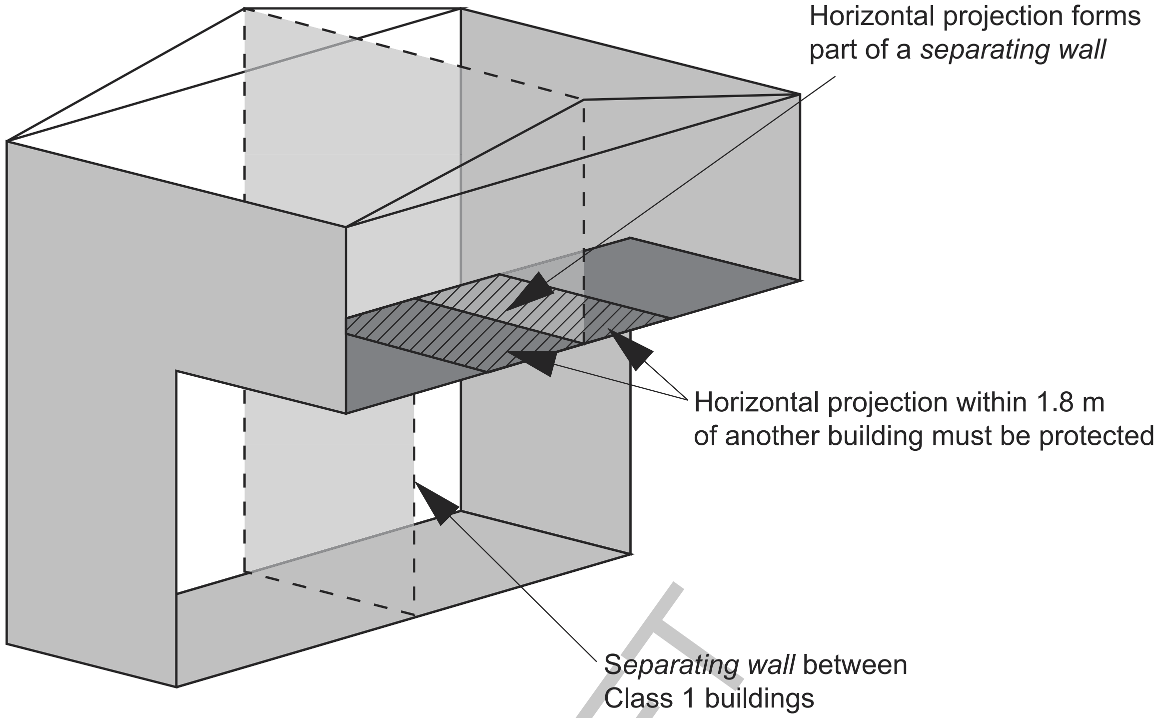


Figure Notes:

Horizontal projections within 1.8 m of another building must be protected in accordance with 9.3.4(1).

Part 9.4 Fire protection of garage top dwellings

NSW Part 9.4

9.4.1 Walls requiring protection

[2019: 3.7.4.2]

(1) Where parts of a Class 1a dwelling are located above a Class 10a *private garage* that is not associated with the Class 1a dwelling—

(a) any wall separating parts of the Class 1a dwelling from the *private garage* not associated with the dwelling must comply with (2); and

(b) any *private garage* associated with and located below the Class 1a dwelling must be separated from the *private garage* not associated with the dwelling by a wall complying with (2).

(2) A wall *required* by (1) must—

(a) have either—

(i) an FRL of not less than 60/60/60 when tested from the *private garage* associated with another dwelling side; or

(ii) be of masonry construction not less than 90 mm thick; and

(b) commence at the footings or ground slab; and

(c) extend to the underside of a separating floor complying with 9.4.2; and

(d) comply with 9.3.1(2) to (5) and 9.3.2 as applicable.

9.4.2 Separating floors

[2019: 3.7.4.3]

(1) Where parts of a Class 1a dwelling are located above or below a Class 10a *private garage* that is not associated with the Class 1a dwelling, any floor separating the Class 1a dwelling from the Class 10a *private garage* not associated with the dwelling must—

(a) be a floor/ceiling or floor/soffit system incorporating a ceiling or soffit which has a *resistance to the incipient spread of fire* to the space above itself of not less than 60 minutes; or

(b) have an FRL not less than 30/30/30 when tested from the underside; or

(c) have a *fire-protective covering* on the underside of the floor, including beams incorporated in it, if the floor is *combustible* or of metal.

(2) Where a floor subject to (1)(b) depends on direct vertical or lateral support from another part to maintain its FRL, that supporting part must have an FRL of not less than 30/-/-.

(3) Where a service passes through a floor referred to in (1), the penetration must not reduce the fire performance of the floor or covering.

(4) See Figure 9.4.2.

Figure 9.4.2: **Separating wall and floor construction**

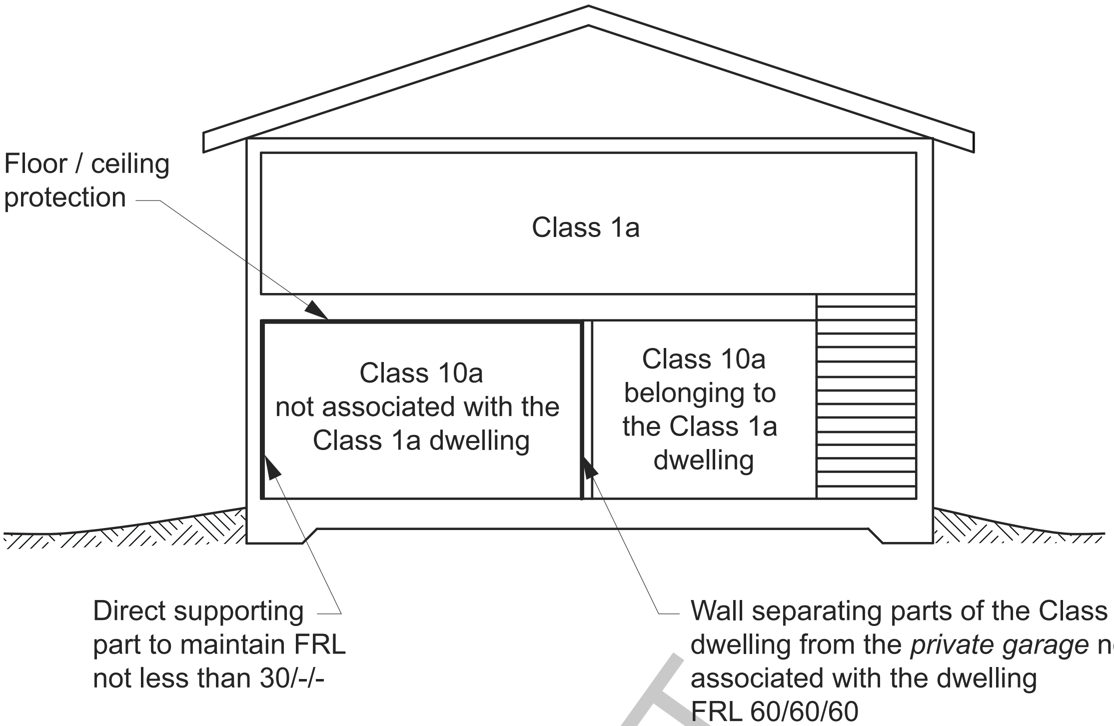


Figure Notes:

1. For floor/ceiling protection, see 9.4.1(2)(c) and 9.4.2.
2. For FRL for direct supporting part, 9.4.2(2).
3. For FRL for wall separating parts of the Class 1a dwelling from the non-associated *private garage*, see 9.4.1(1).

Part 9.5 Smoke alarms and evacuation lighting

NSW 9.5.1

9.5.1 Smoke alarm requirements

[2019: 3.7.5.2]

Smoke alarms must—

(a) be located in—

(i) Class 1a buildings in accordance with 9.5.2 and 9.5.4; and

(ii) Class 1b buildings in accordance with 9.5.3 and 9.5.4; and

(b) comply with AS 3786, except that in a Class 10a *private garage* where the use of the area is likely to result in smoke alarms causing spurious signals, any other alarm deemed suitable in accordance with AS 1670.1 may be installed provided that smoke alarms complying with AS 3786 are installed elsewhere in the Class 1 building; and

(c) be powered from the consumer mains source where a consumer mains source is supplied to the building; and

(d) be interconnected where there is more than one alarm.

Explanatory Information:

A smoke alarm can give spurious alarms if the atmosphere contains particles which obscure vision, such as could occur in a Class 10a *private garage* part of a building. 9.5.1(b) therefore allows the use of a more suitable alarm, such as a heat alarm, in these locations.

9.5.1(d) requires alarms to be interconnected where there is more than one alarm. This only applies within a single dwelling. Therefore, alarms in a Class 1a dwelling need not be interconnected with alarms in another dwelling or a *private garage* which does not belong to the Class 1a dwelling.

9.5.2 Location – Class 1a buildings

[2019: 3.7.5.3]

(1) In a Class 1a building, smoke alarms must be located in—

(a) any storey containing bedrooms, every corridor or hallway associated with a bedroom, or if there is no corridor or hallway, in an area between the bedrooms and the remainder of the building; and

(b) each other storey not containing bedrooms.

(2) See Figure 9.5.2a and Figure 9.5.2b.

Figure 9.5.2a: Class 1a building where all bedrooms are grouped together and served by a hallway

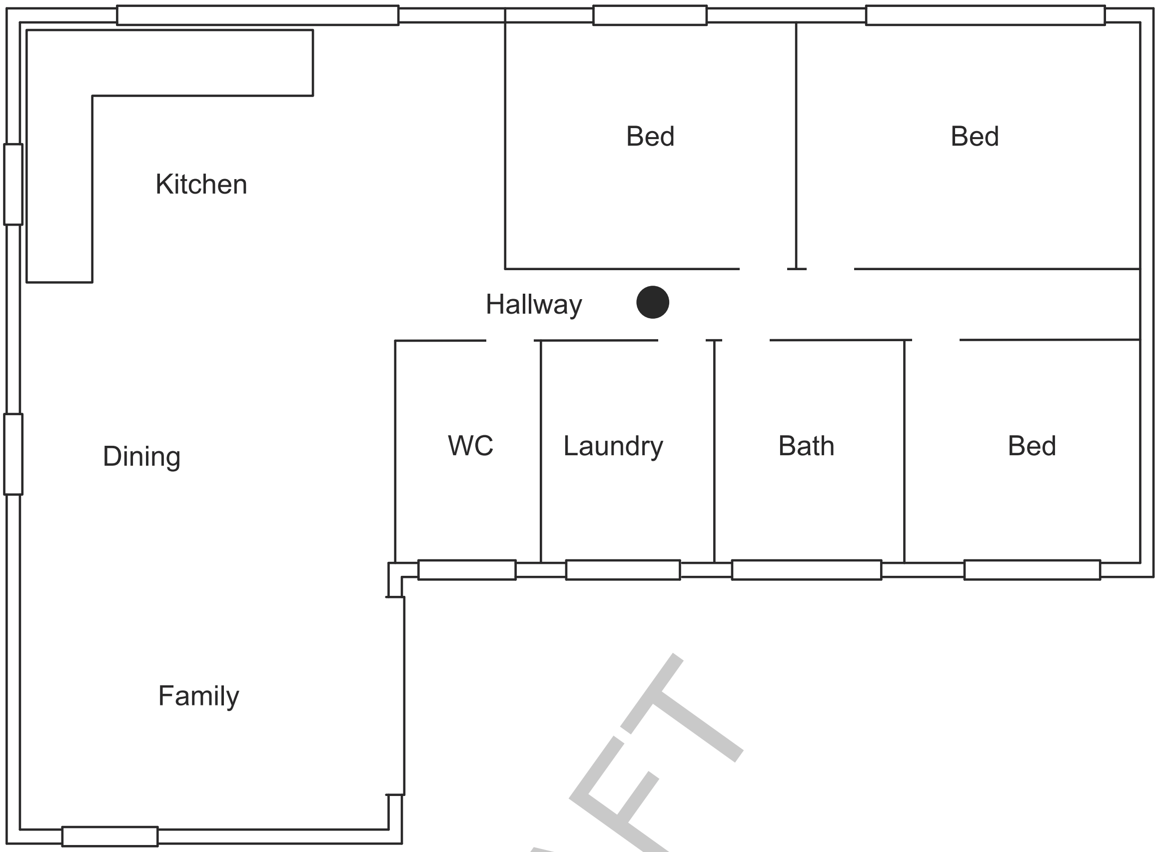


Figure Notes:

In this diagram, the location of the smoke alarm is indicated by a black dot.

Figure 9.5.2b: Class 1a building where bedrooms are located in separate areas

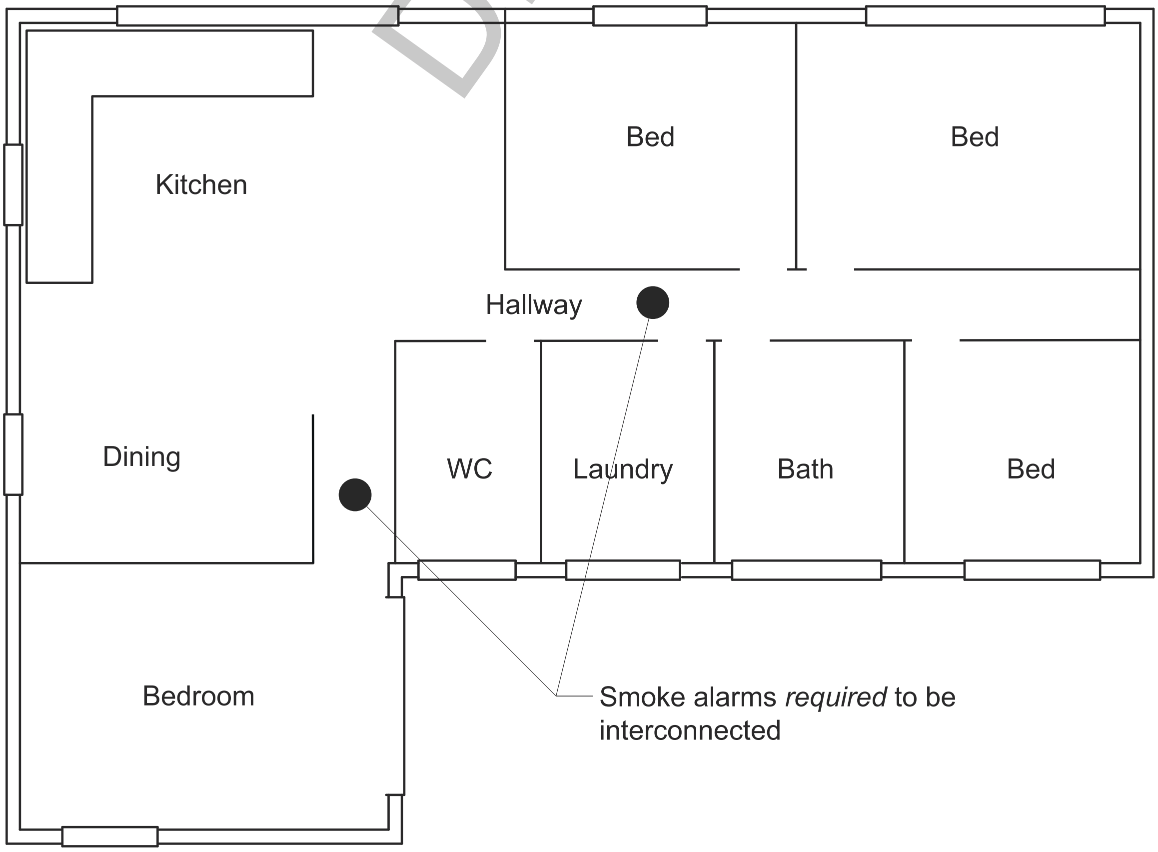


Figure Notes:

1. In this diagram, the location of each smoke alarm is indicated by a black dot.
2. Smoke alarms are *required* to be interconnected by 9.5.1(d).

9.5.3 Location – Class 1b buildings

[2019: 3.7.5.4]

(1) In a Class 1b building, smoke alarms must be located in—

(a) every bedroom; and

(b) every corridor or hallway associated with a bedroom, or if there is no corridor or hallway, in an area between the bedrooms and the remainder of the building; and

(c) each other storey.

(2) See Figure 9.5.3.

Figure 9.5.3: Class 1b building where multiple bedrooms are served by a hallway

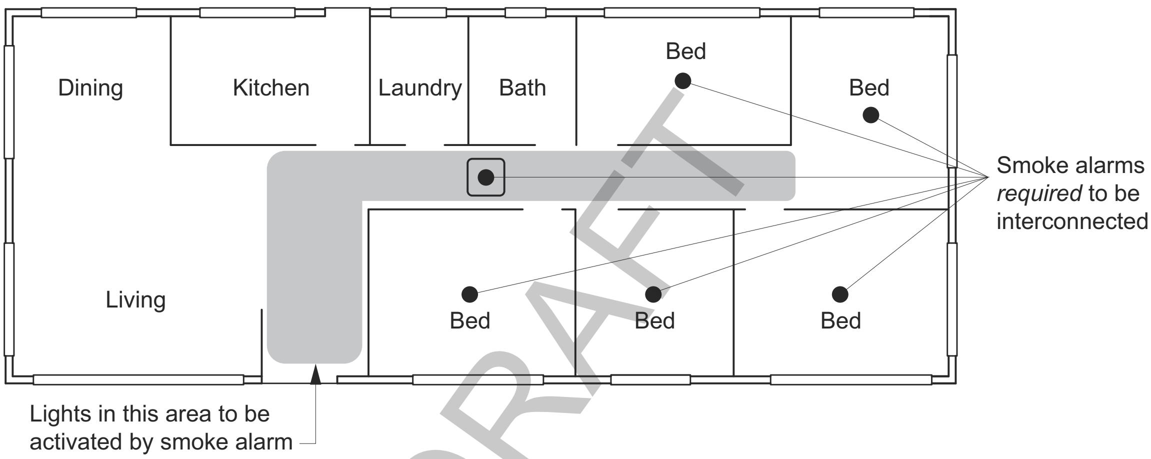


Figure Notes:

1. In this diagram—
   a. the location of each smoke alarm is indicated by a black dot; and
   b. the location of a smoke alarm with evacuation lighting is indicated by a block within a square; and
   c. the area served by evacuation lighting is indicated by grey shading.
2. Smoke alarms are *required* to be interconnected by 9.4.1(d).
3. Lighting in the grey shaded area is to be activated by a smoke alarm if using 9.5.5(b)(ii).

9.5.4 Installation of smoke alarms

[2019: 3.7.5.5]

Smoke alarms *required* by 9.5.2 and 9.5.3 must be installed on or near the ceiling, in accordance with the following:

(a) Where a smoke alarm is located on the ceiling it must be—

(i) a minimum of 300 mm away from the corner junction of the wall and ceiling; and

(ii) between 500 mm and 1500 mm away from the high point and apexes of the ceiling, if the room has a sloping ceiling.

(b) Where (a) is not possible, the smoke alarm may be installed on the wall, and located a minimum of 300 mm and a maximum of 500 mm off the ceiling at the junction with the wall.

Explanatory Information:

Smoke alarms need to be located on (or near) the ceiling for optimum detection of smoke in a fire situation with special care taken to avoid dead air spaces. A dead air space is an area in which trapped hot air will prevent smoke from reaching the alarm. This space generally occurs at the apex of cathedral ceilings, the corner junction of walls and ceilings and between exposed joists etc. (see explanatory Figure 9.5.4).

Smoke alarms may be located on the wall in accordance with 9.5.4(b). Explanatory Figure 9.5.4 provides location criteria and the dimensional relationship to building elements and the associated dead air spaces.

Figure 9.5.4 (explanatory): Installation of smoke alarms to avoid dead air space

9.5.5 Lighting to assist evacuation – Class 1b buildings

[2019: 3.7.5.6]

In a Class 1b building, a system of lighting must be installed to assist evacuation of occupants in the event of a fire, and—

(a) be activated by the smoke alarm *required* by 9.5.3(1)(b); and

(b) consist of—

(i) a light incorporated within the smoke alarm; or

(ii) the lighting located in the corridor, hallway or area served by the smoke alarm.

Explanatory Information:

The lighting *required* by 9.5.5 may consist of artificial lighting which may already be installed in a corridor, hallway or area, provided that the lighting is activated by the smoke alarm. However consideration should be given to ensure that the lighting is not controlled by a dimmer or timer controlled switch which may dim the level of light to an ineffective level, or switch the light off before occupants have time to evacuate.

10 Health and amenity

Part 10.1 Scope and application of Section 10

10.1.1 Scope

[New for 2022]

This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for—

(a) *wet areas* and external *waterproofing* (see Part 10.2); and
(b) room heights (see Part 10.3); and
(c) facilities (see Part 10.4); and
(d) light (see Part 10.5); and
(e) ventilation (see Part 10.6); and
(f) sound insulation (see Part 10.7); and
(g) condensation management (see Part 10.8).

10.1.2 Application

[New for 2022]

The application of Section 10 of the ABCB Housing Provisions is subject to the following:

(a) The Governing Requirements of NCC 2022 Volume Two.
(b) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 10 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practices for Parts 3.8.1 to 3.8.7 of NCC 2019 Volume Two.

Part 10.2 Wet areas and external waterproofing

SA 10.2.1

10.2.1 Wet areas

[2019: 3.8.1.2]

(1) Building elements in *wet areas* within a building must be protected with a *waterproofing system*.~~—~~

(a) ~~be *waterproof* or *water resistant* in accordance with 10.2.2 to 10.2.7; and~~

(b) ~~comply with AS 3740.~~

(2) The *waterproofing system* in (1) must be either *waterproof* or *water resistant* in accordance with 10.2.2 to 10.2.6.

10.2.2 Shower area (enclosed and unenclosed)

[2019: Table 3.8.1.1]

(1) For a *shower area* with a hob, step-down or without a hob or step-down, the following applies:

(a) The floor of the *shower area* must be *waterproof*, including any hob or step-down (see Figure 10.2.2); and

(b) The walls of the *shower area* must be (see Figure 10.2.2)—

(i) *waterproof* for all walls in *shower area* to a height the greater of—

(A) not less than 150 mm above floor substrate; or

(B) not less than 25 mm above maximum retained water level; and

(ii) *water resistant* for walls to not less than 1800 mm above finished floor level of the shower.

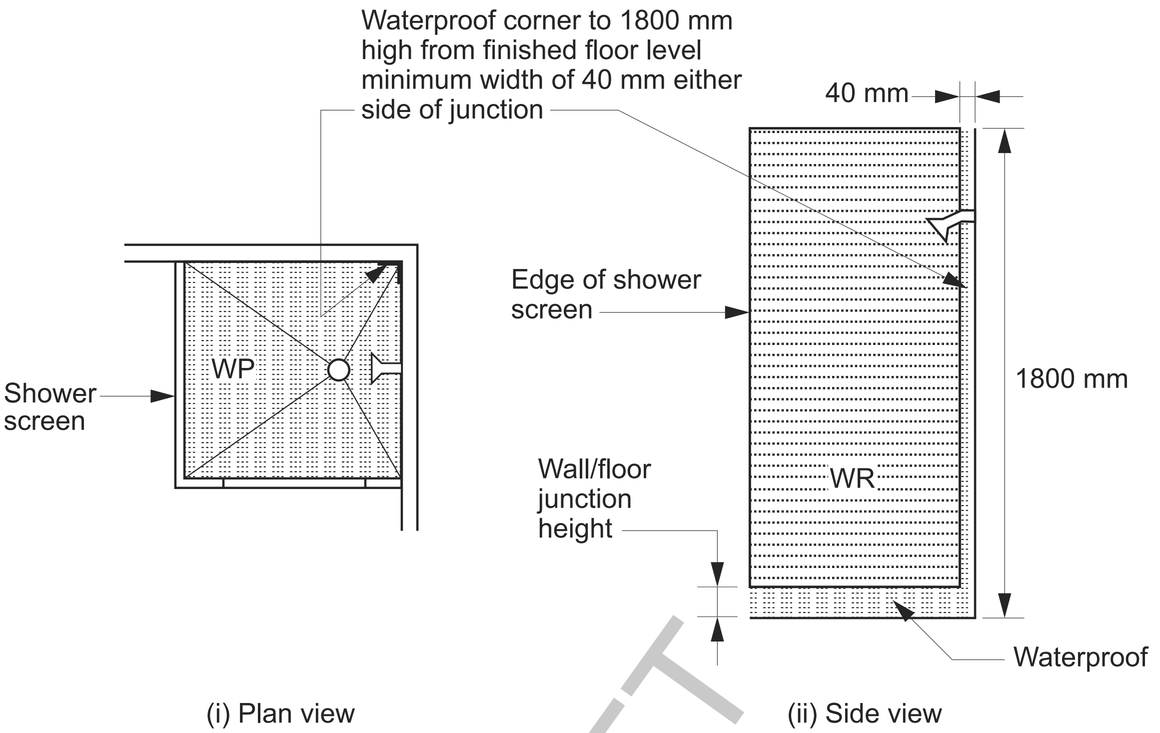
(c) Wall junctions and joints within the *shower area* must be *waterproof* not less than 40 mm either side of the junction (see Figure 10.2.2).

(d) Wall/floor junctions within the *shower area* must be *waterproof* (see Figure 10.2.2).

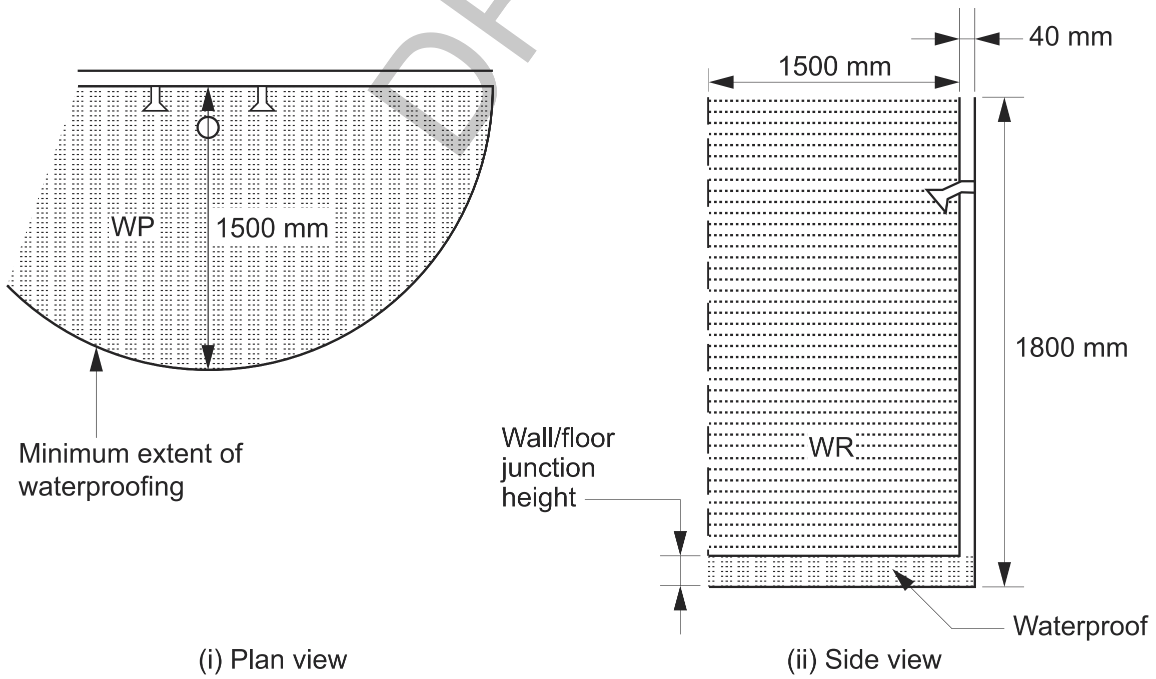
(e) Penetrations within the *shower area* must be *waterproof*.

(2) A shower with a preformed shower base must also comply with the requirements of (1), except for (a) and (b)(i) which are not applicable.

Figure 10.2.2: Extent of treatment for shower areas —concrete and compressed fibre-cement sheet floors



(a) Enclosed shower



(b) Unenclosed shower - Concrete and compressed fibre cement sheet floors

Figure Notes:

Wall/floor junction heights are to be as per 10.2.2 to 10.2.6 (as applicable).

Notes:

Where a shower is above a bath or spa, use requirements for shower.

10.2.3 Area outside shower area

[2019: Table 3.8.1.1]

(1) For concrete, ~~and~~ compressed fibre-cement and fibre-cement sheet flooring, the floor of the room must be *water resistant*.

(2) For timber floors including particleboard, plywood and other timber based flooring materials, the floor of the room must be *waterproof*.

(3) Wall/floor junctions must be— ~~waterproof.~~

(a) *waterproof*; and

(b) where a *flashing* is used, the horizontal leg must be not less than 40 mm.

10.2.4 Areas adjacent to baths and spas (other than inserted baths and spas)

[2019: Table 3.8.1.1]

(1) Freestanding baths and spas — For concrete, ~~and~~ compressed fibre-cement and fibre-cement sheet flooring, the floor of the room must be *water resistant*.

(2) Freestanding baths and spas — For timber floors including particleboard, plywood and other timber based flooring materials, the floor of the room must be *waterproof*.

(3) Walls must be *water resistant* (see Figure 10.2.4a and Figure 10.2.4b)—

(a) to a height of not less than 150 mm above the *vessel*, for the extent of the *vessel*, where the *vessel* is within 75 mm of a wall; and

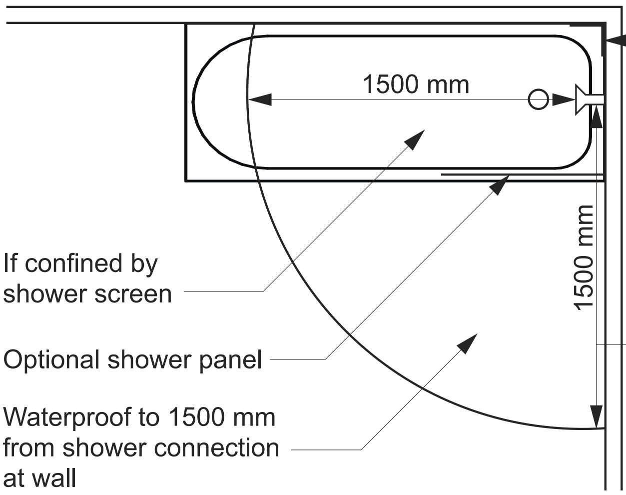
(b) for all exposed surfaces below *vessel* lip.

(4) Wall junctions and joints must be *water resistant* junctions within 150 mm above a *vessel* for the extent of the *vessel* (see Figure 10.2.4a and 10.2.4b).

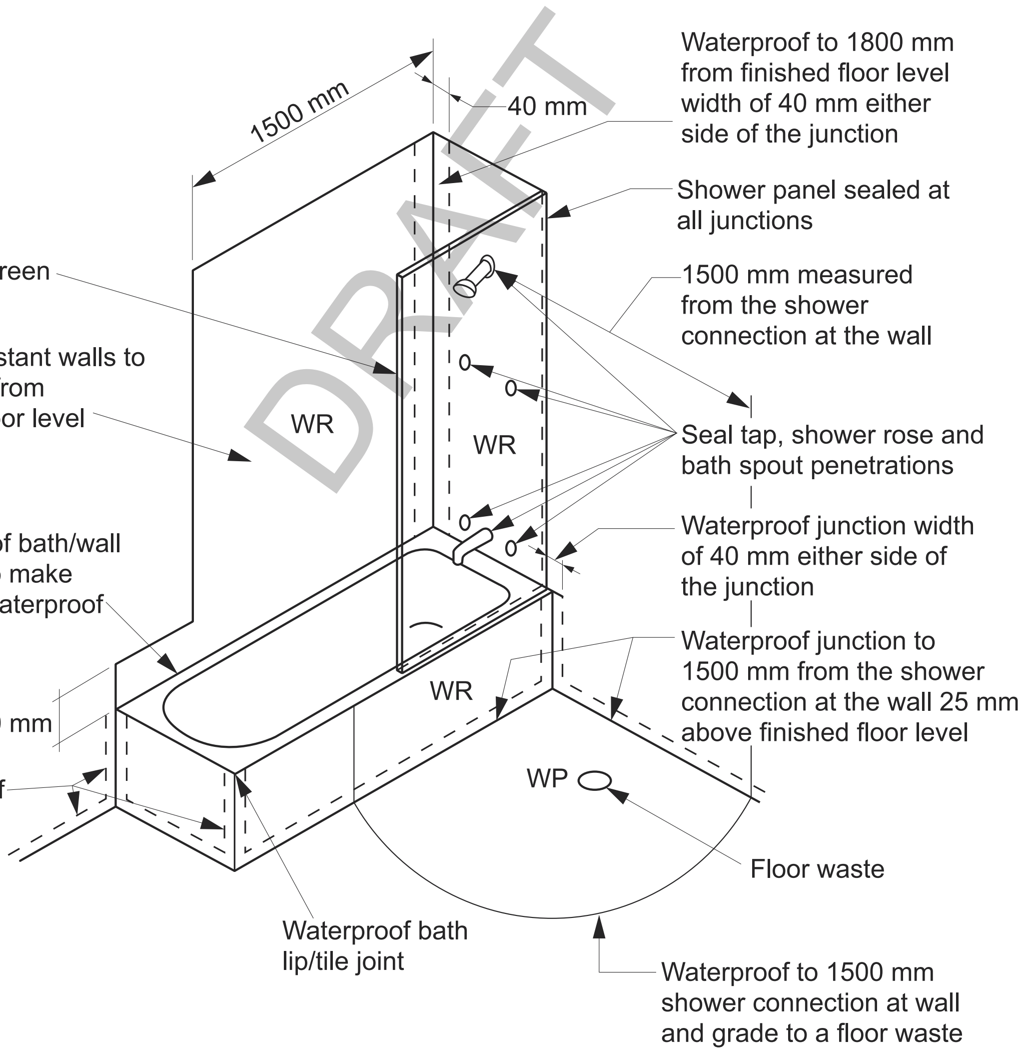
(5) Wall/floor junctions must be *water resistant* for the extent of the *vessel* (see Figure 10.2.4a and Figure 10.2.4b).

(6) Tap and spout penetrations must be *waterproof* where they occur in horizontal surfaces.

Figure 10.2.4a: Unenclosed showers above baths — area protected for concrete, compressed fibre-cement and fibre-cement sheet flooring

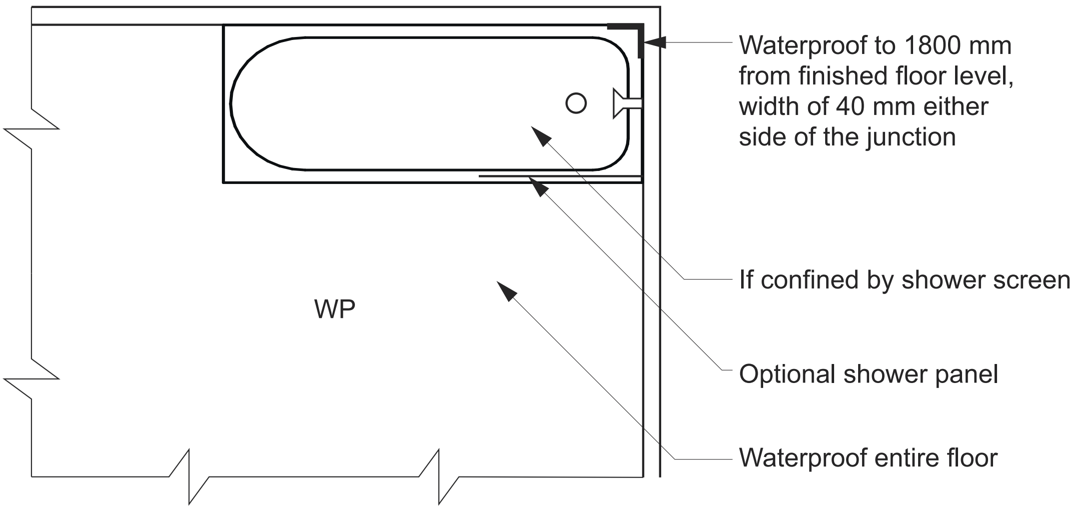


(a) Plan view

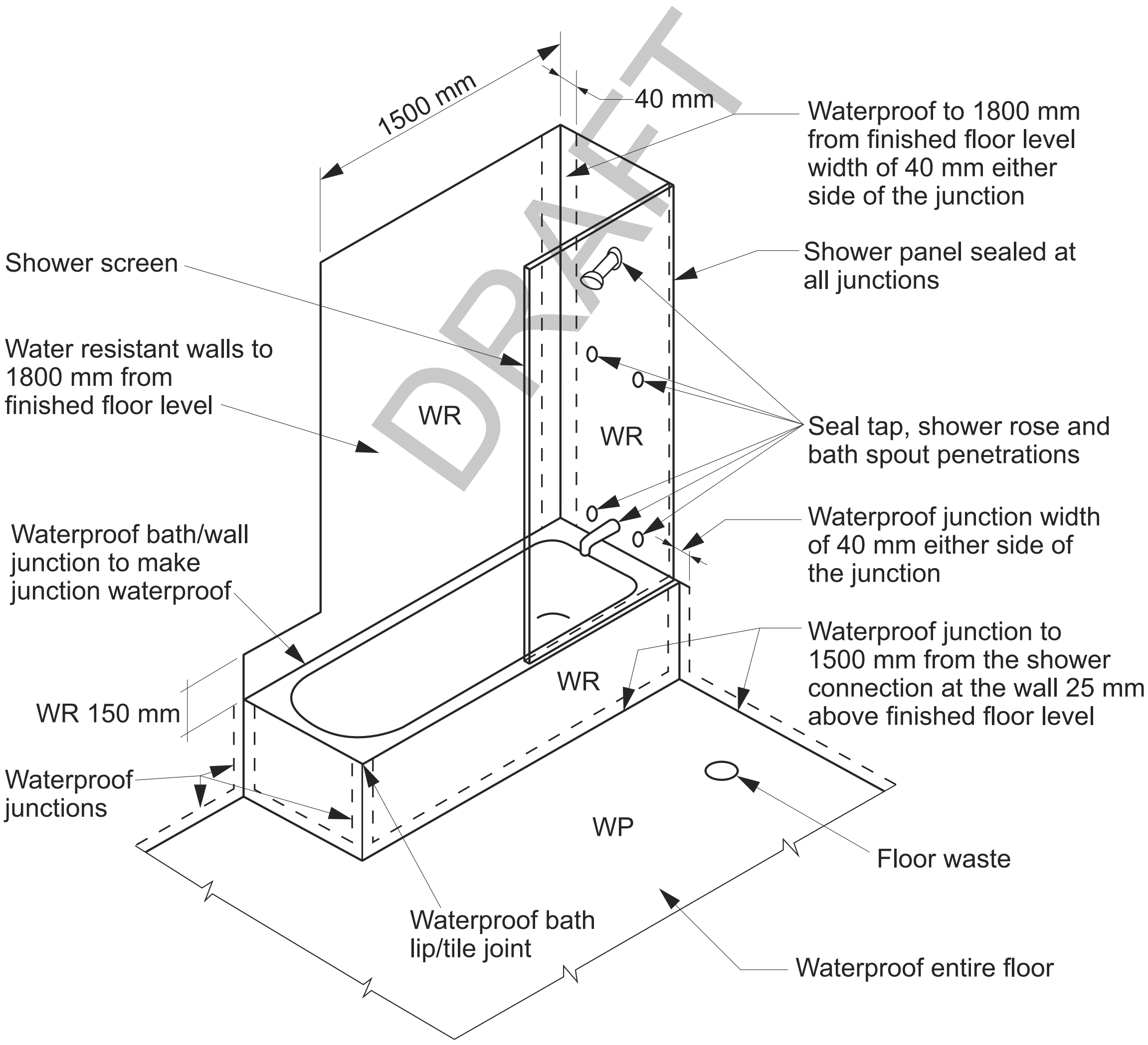


(b) Isometric view

Figure 10.2.4b: Unenclosed showers above baths— areas protected for timber floors including particle-board, plywood and other floor materials



(a) Plan view



(b) Isometric view

10.2.5 Areas adjacent to inserted baths and spas

[2019: Table 3.8.1.1]

(1) Floors and horizontal surfaces:

(a) *Waterproof* shelf area, incorporating waterstop under bath lip.

(b) No requirement under bath.

(2) Walls:

(a) *Waterproof* to not less than 150 mm above lip of bath or spa.

(b) No requirement under bath.

(3) Wall junctions and joints:

(a) *Waterproof* junctions within 150 mm above bath or spa.

(b) No requirement under bath.

(4) Tap and spout penetrations must be *waterproof* where they occur in horizontal surfaces.

10.2.6 Other areas

[2019: Table 3.8.1.1]

(1) For walls adjoining other types of *vessel* (e.g. sink, basin or laundry tub), the following applies:

(a) Walls must be *water resistant* to a height of not less than 150 mm above the *vessel*, for the extent of the *vessel*, where the *vessel* is within 75 mm of a wall (see Figure 10.2.6).

(b) *Waterproof* wall junctions where a *vessel* is fixed to a wall.

(c) *Waterproof* tap and spout penetrations where they occur in surfaces required to be *waterproof* or *water resistant*.

(2) For laundries and WCs, the following applies:

(a) The floor of the room must be *water resistant*.

(b) Wall/floor junctions must be *water resistant*, and where a *flashing* is used, the horizontal leg must not be less than 40 mm.

(3) For WCs with handheld bidet spray installations, the following applies:

(a) The floor of the room must be *waterproof*.

(b) Walls must be—

(i) *waterproof* in WC area within a 1500 mm radius from the wall connection of the handheld bidet spray device to a height of not less than 150 mm above substrate; and

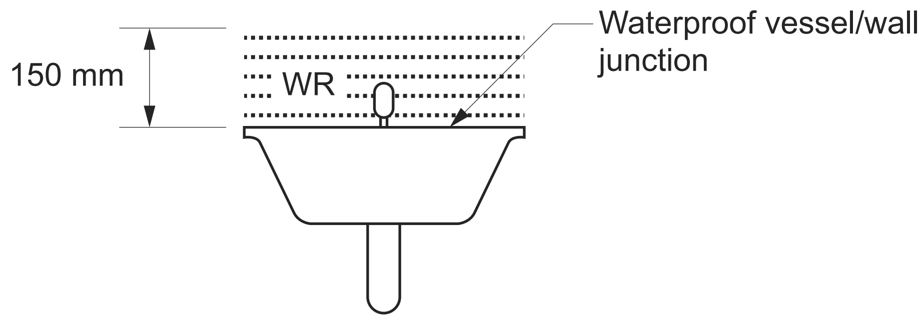
(ii) *water resistant* in WC area within a 1500 mm radius from the wall connection of the handheld bidet device to not less than 1800 mm above the finished floor level of the WC.

(c) Wall junctions within WC area within 150 mm radius from the wall connection of the handheld bidet spray device must be *waterproof*.

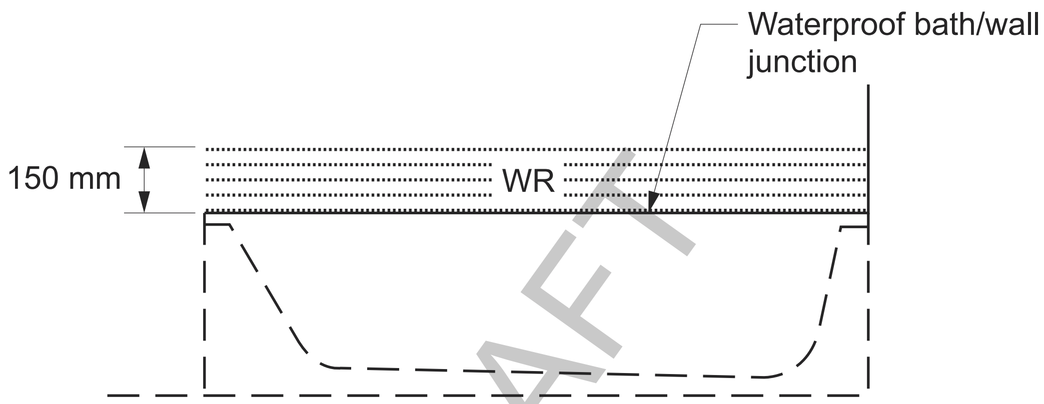
(d) Wall/floor junctions within WC area within 150 mm radius from the wall connection of the handheld bidet spray device must be *waterproof*.

(e) Penetrations in WC area must be *waterproof*.

Figure 10.2.6: Bath and vessel abutting wall — areas to be protected



(a) Vessel abutting wall



(b) Wall/bath junction

~~10.2.7 External above ground membranes~~

[~~2019: 3.8.1.3~~]

~~Waterproofing membranes for external above ground use must comply with AS 4654.1 and AS 4654.2.~~

10.2.7 Waterproofing systems

[New for 2022]

(1) For 10.2 of the ABCB Housing Provisions, a *waterproofing system* is deemed—

(a) *waterproof*, if it complies with (2);or

(b) *water resistant*, if it complies with (3).

(2) For a *waterproofing system* required to be *waterproof* in accordance with 10.2.2 to 10.2.6, the materials nominated in 10.2.9 must be used in conjunction with the—

(a) *water resistant* substrate materials in 10.2.10; and

(b) *water resistant* surface materials in 10.2.11.

(3) For a *waterproofing system* required to be *water resistant* in accordance with 10.2.2 to 10.2.6, the materials nominated in 10.2.10 must be used in conjunction with the materials in 10.2.11.

10.2.8 Materials

[New for 2022]

Materials used in *wet areas* forming *waterproofing system* must be either *waterproof* or *water resistant* in accordance with 10.2.2 to 10.2.6.

10.2.9 Materials — waterproof

[New for 2022]

The following materials used in *waterproofing systems* are deemed to be *waterproof*—

(a) Stainless steel.

(b) Flexible waterproof sheet flooring material with sealed joints.

(c) Membranes complying with AS 3740.

10.2.10 Materials — water resistant substrates

[New for 2022]

The following materials are deemed to be *water resistant*:

(a) For walls:

  (i) Concrete complying with AS 3600, treated to resist moisture.

  (ii) Cement render, treated to resist moisture movement.

  (iii) Compressed fibre-cement sheeting manufactured in accordance with AS/NZS 2908.2.

  (iv) *Water resistant* plasterboard sheeting.

  (v) Masonry in accordance with AS 3700, treated to resist moisture movement.

(b) For floors:

  (i) Concrete complying with AS 3600.

  (ii) Concrete slabs complying with AS 2870.

  (iii) Compressed fibre-cement sheeting manufactured in accordance with AS/NZS 2908.2 and supported on a structural floor.

10.2.11 Materials — water resistant surface materials

[New for 2022]

The following surface materials are deemed to be *water resistant*:

(a) For walls:

  (i) Thermosetting laminate.

  (ii) Pre-decorated compressed fibre-cement sheeting manufactured in accordance with AS 2908.2.

  (iii) Tiles when used in conjunction with a substrate listed in 10.2.10.

  (iv) *Water resistant* flexible sheet wall material with sealed joints when used in conjunction with a substrate listed in 10.2.10.

  (v) Sanitary grade acrylic linings.

(b) For floors, when used in conjunction with a substrate listed in 10.2.10:

  (i) Tiles.

  (ii) *Water resistant* flexible sheet flooring material with welded joints.

Explanatory Information:

Sheet vinyl or linoleum would satisfy the requirement of 10.2.11.

10.2.12 Construction of wet areas — wall and floor substrate materials

[New for 2022]

For compliance with 10.2 of the ABCB Housing Provisions, floor wall and floor lining materials used in substrates must comply with 10.2.10.

10.2.13 Construction of wet areas — wall and floor surface materials

[New for 2022]

For compliance with 10.2 of the ABCB Housing Provisions, floor wall and floor lining materials used in surface must comply with 10.2.11.

10.2.14 Construction of wet area floors — falls

[New for 2022]

Where a *floor waste* is installed—

(a) the minimum continuous fall to the waste must be 1:80; and

(b) the maximum continuous fall to the waste must be 1:50.

10.2.15 Acceptable shower area

[New for 2022]

Shower areas must be designed—

(a) as either *enclosed* or *unenclosed*; and

(b) to include a *floor waste* with falls complying with 10.2.14; and

(c) with a—

  (i) stepdown complying with 10.2.16; or

  (ii) hob complying with 10.2.17; or

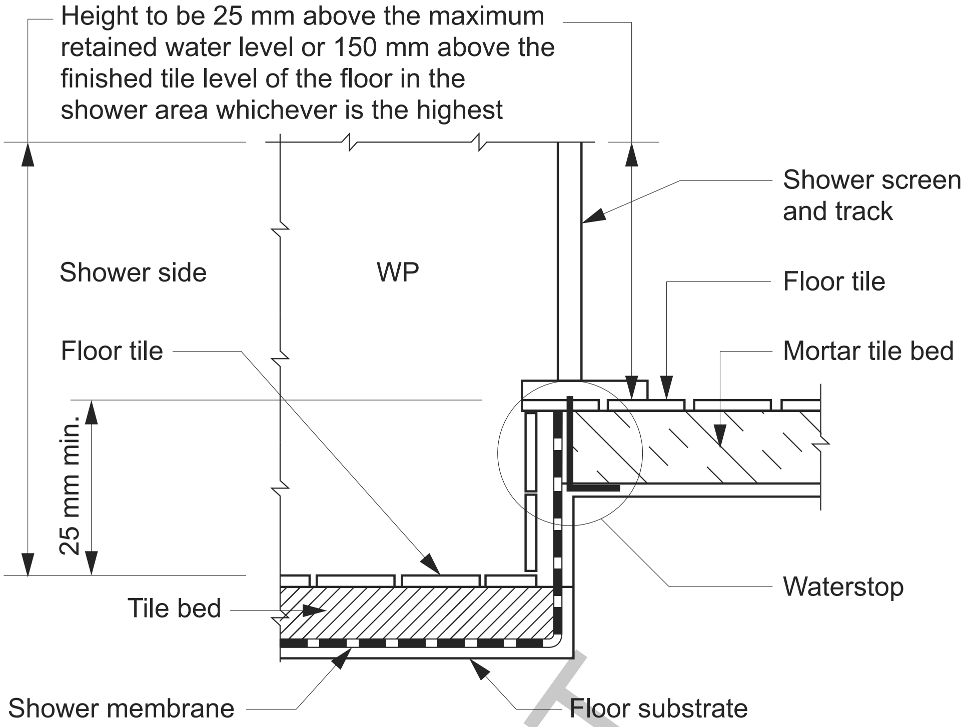
  (iii) level threshold complying with 10.2.18.

10.2.16 Stepdown showers

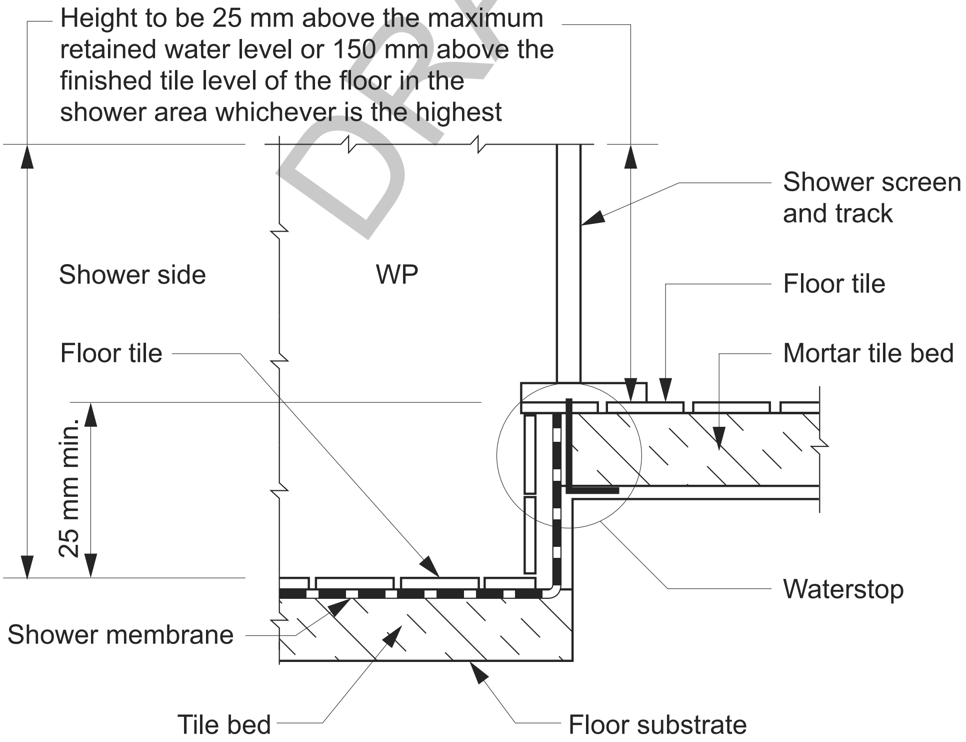
[New for 2022]

The highest finished floor level of the *shower area* must be stepped down a minimum of 25 mm lower than the finished floor level outside the shower (see Figures 10.2.16a and 10.2.16b).

Figure 10.2.16a: Typical stepped down shower construction (diagrams (a) and (b))

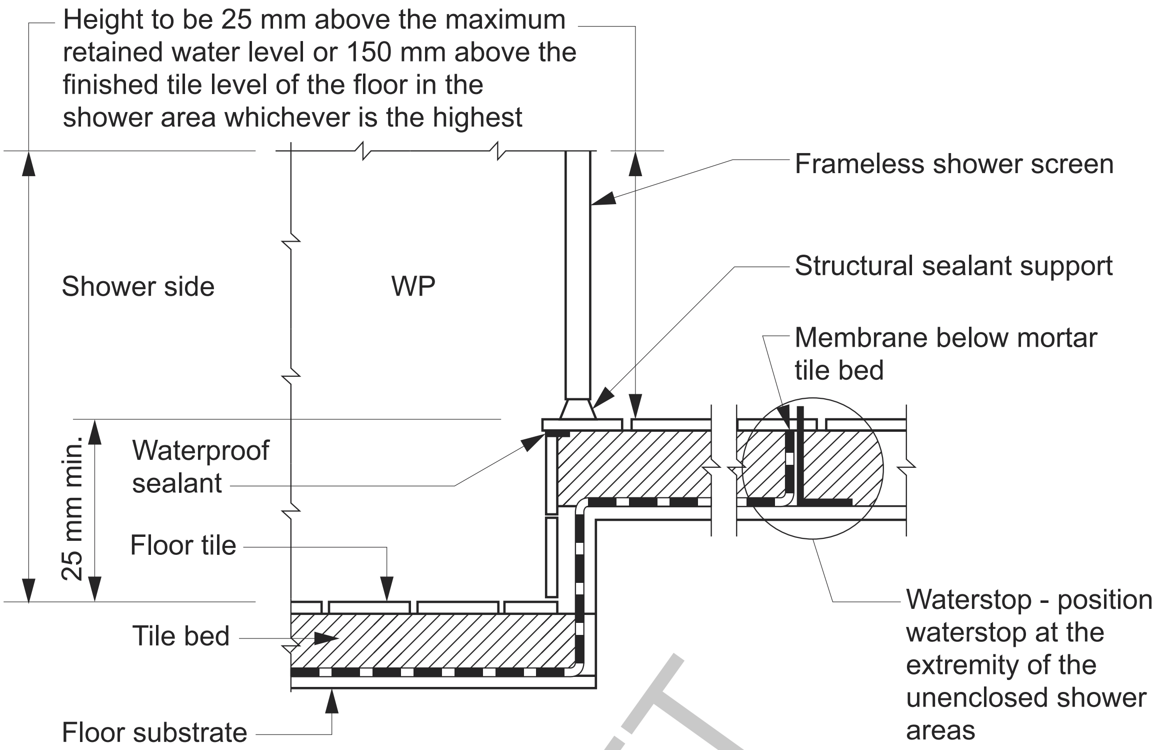


(a) Enclosed shower-Membrane below tile bed

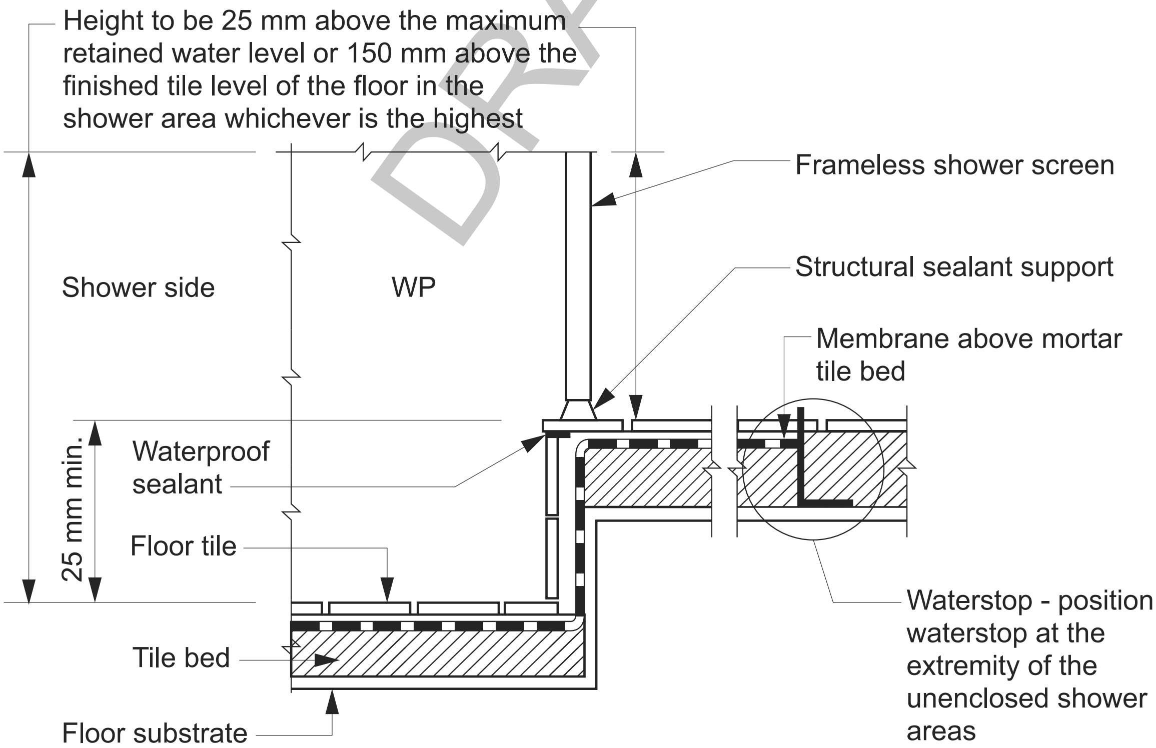


(b) Enclosed shower-Membrane above tile bed

Figure 10.2.16b: Typical stepped-down shower construction (diagrams (c) and (d))



(c) Unenclosed shower-Membrane below tile bed



(d) Unenclosed shower-Membrane above tile bed

10.2.17 Hob construction

[New for 2022]

(1) *Hobs* must be constructed of—

(a) masonry; or

(b) concrete; or

(c) primed autoclaved aerated concrete; or

(d) extruded polyurethane foam,

in accordance with Figure 10.2.17.

(2) All gaps, joints and intersections of the *hob* substrate must be made flush before application of the *membrane*.

(3) *Hobs* must be adequately secured to the floor and sealed against the wall prior to applying an internal *membrane*.

(4) Timber must not be used for *hob* construction.

Figure 10.2.17: Typical hob construction — internal membrane

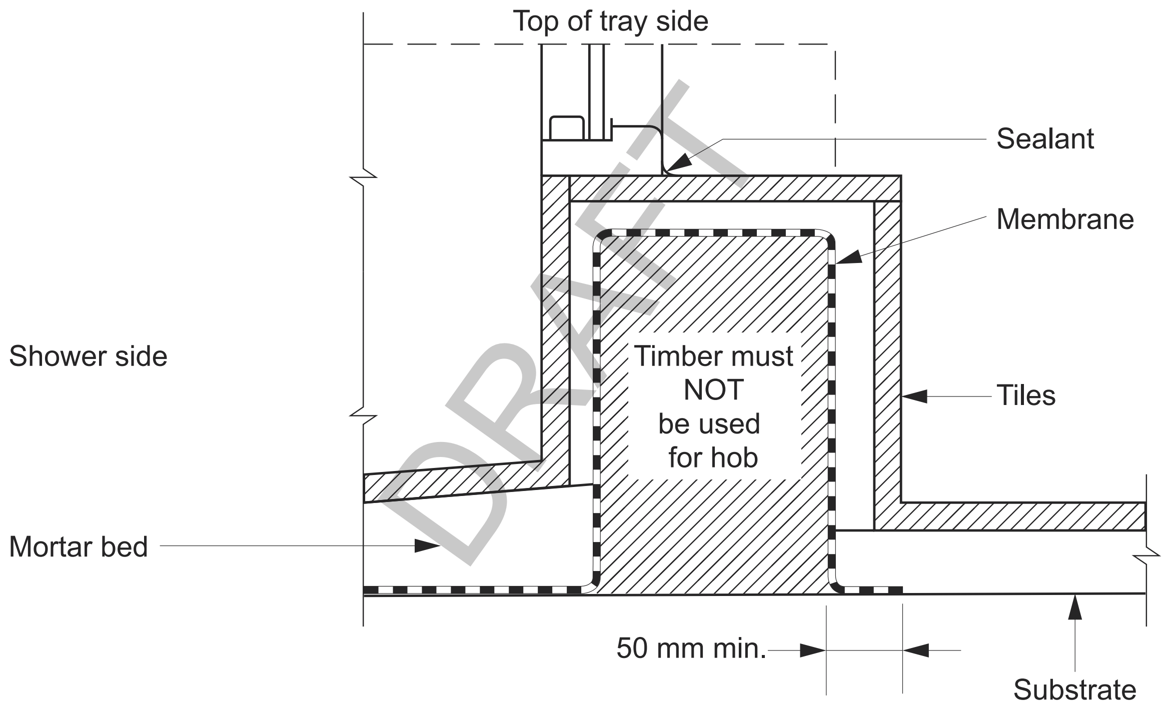


Figure Notes:

For shower screen positioning, see 10.2.31.

10.2.18 Enclosed showers with level threshold (without hob or set down)

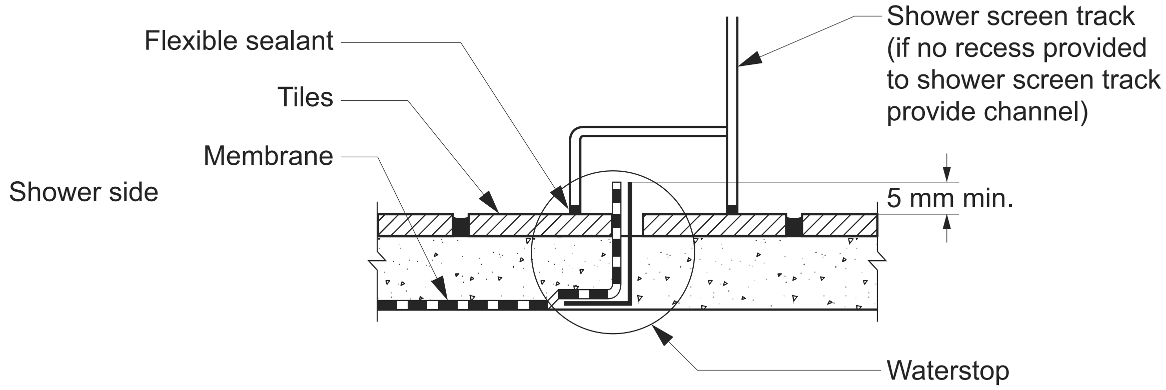
[New for 2022]

At the extremity of the *shower area*, a *waterstop* must be positioned so that its vertical leg finishes where—

(a) a *shower screen* is to be installed, not less than 5 mm above the finished floor level (see Figure 10.2.18); and

(b) the *waterstop* intersects with a wall or is joined, the junction must be waterproof.

Figure 10.2.18: Typical hobless construction



10.2.19 Unenclosed showers

[New for 2022]

(1) Unenclosed showers must be constructed as follows:

(a) A *waterstop* must be installed a minimum horizontal distance of 1500 mm from the shower rose; and

(b) The vertical leg of the *waterstop* must finish—

(i) flush with the top surface of the floor (see Figure 10.2.19); and

(ii) where the *waterstop* intersects with a wall or is joined—

(A) the junction must be waterproof; or

(B) the whole *wet area* floor must be waterproofed and drained to a floor waste as for the *shower area*.

(2) In the case of (1)(b)(iii), at doorways, where the height of the tiling angle needs to be adjusted for tiling purposes, the angle must be fixed with a sealant compatible with the waterproofing *membrane* without damaging the *waterproofing system*.

Figure 10.2.19: Typical termination of membrane at extent of shower area

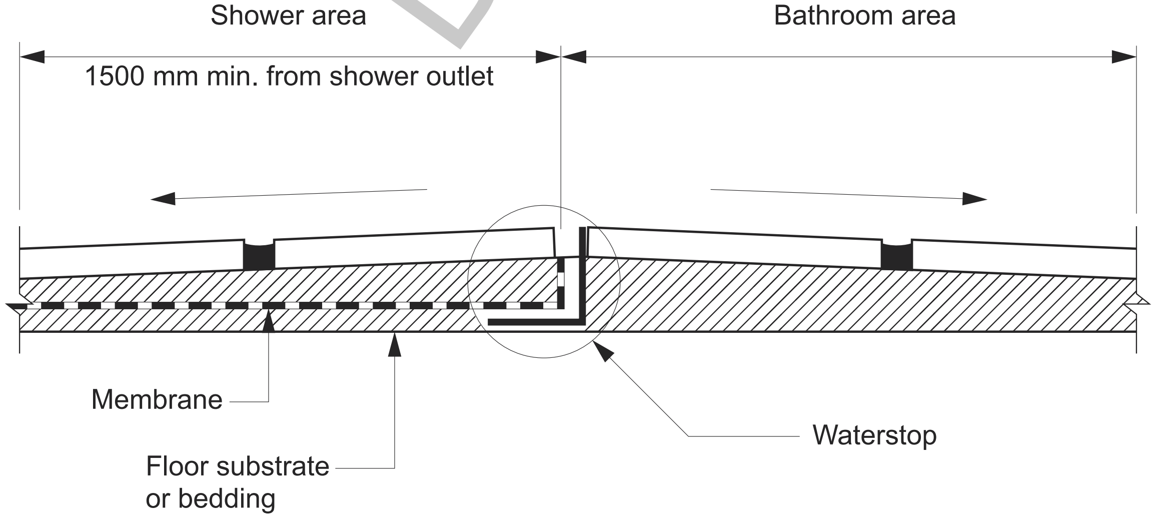


Figure Notes:

Fall is to be provided in accordance with 10.2.14.

10.2.20 Preformed shower bases

[New for 2022]

Shower bases must—

(a) have an upturn lip (see Figure 10.2.20a and Figure 10.2.20b); and

(b) be recessed into the wall to allow the *water resistant* surface materials to pass down inside the perimeter upturn lip of the shower base (see Figure 10.2.20a and Figure 10.2.20b); and

(c) be supported to prevent distortion or cracking.

Figure 10.2.20a: Typical preformed shower base wall/floor junction

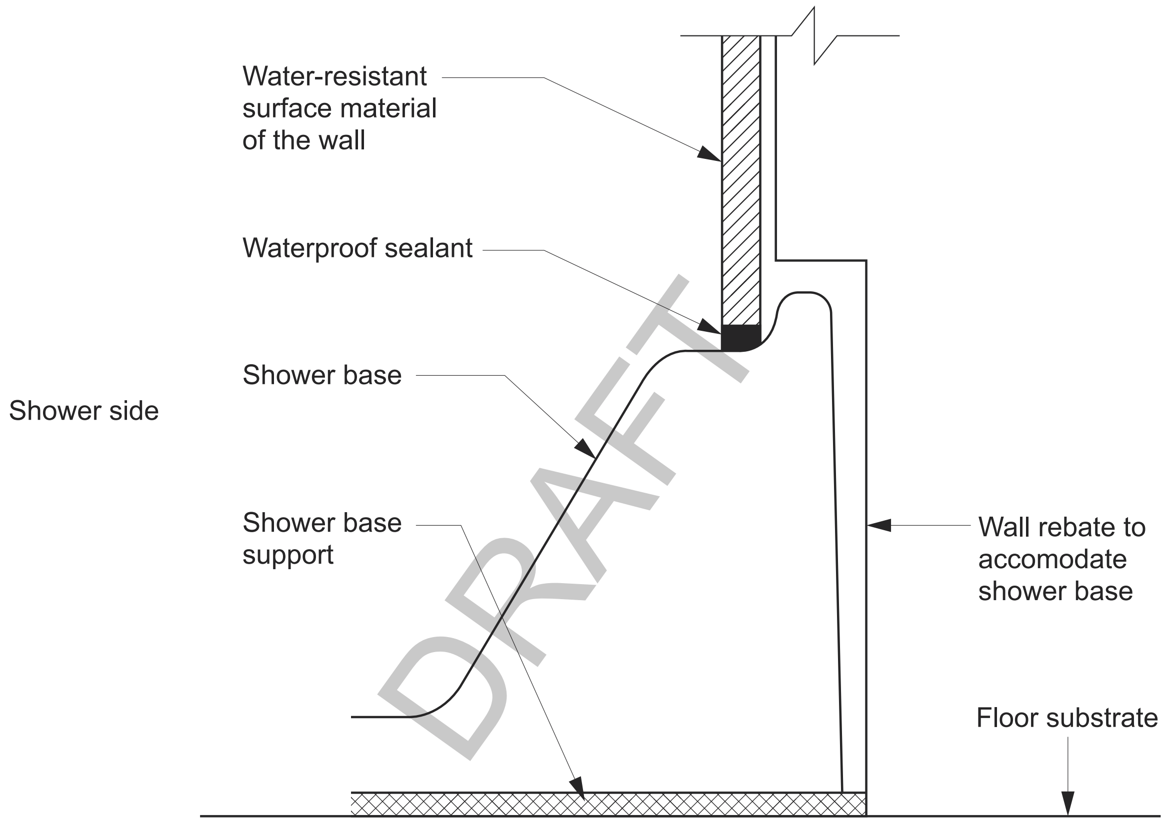
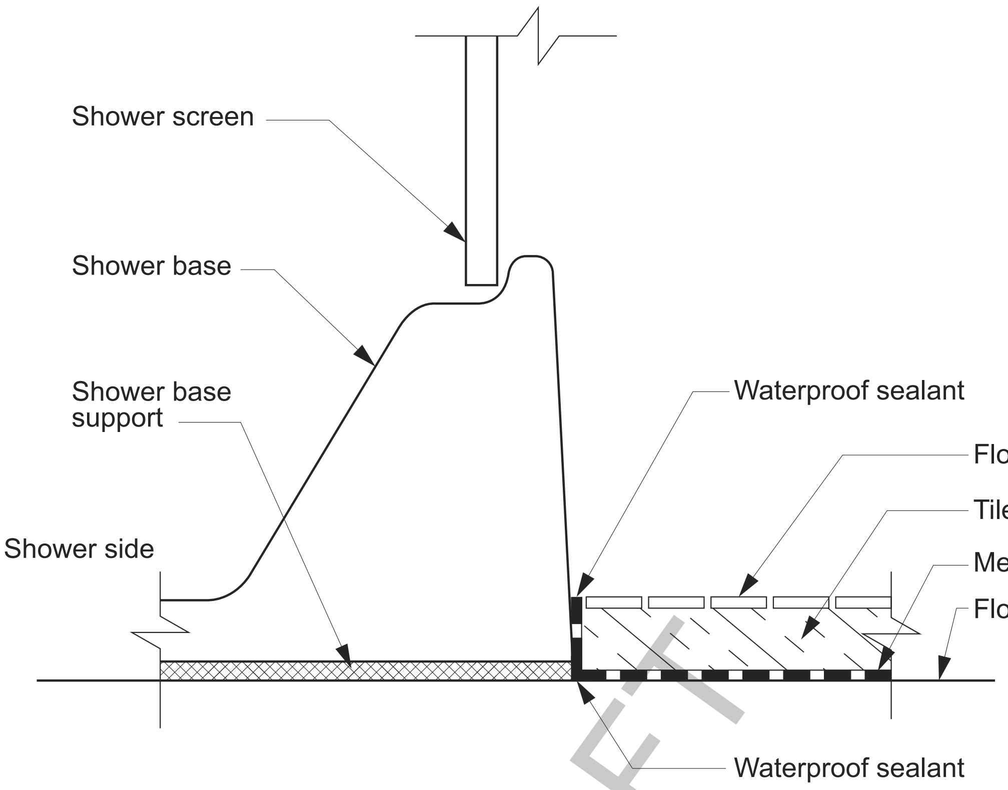


Figure 10.2.20b: Typical preformed shower base/floor junction on timber floors, including particleboard, plywood and other timber materials



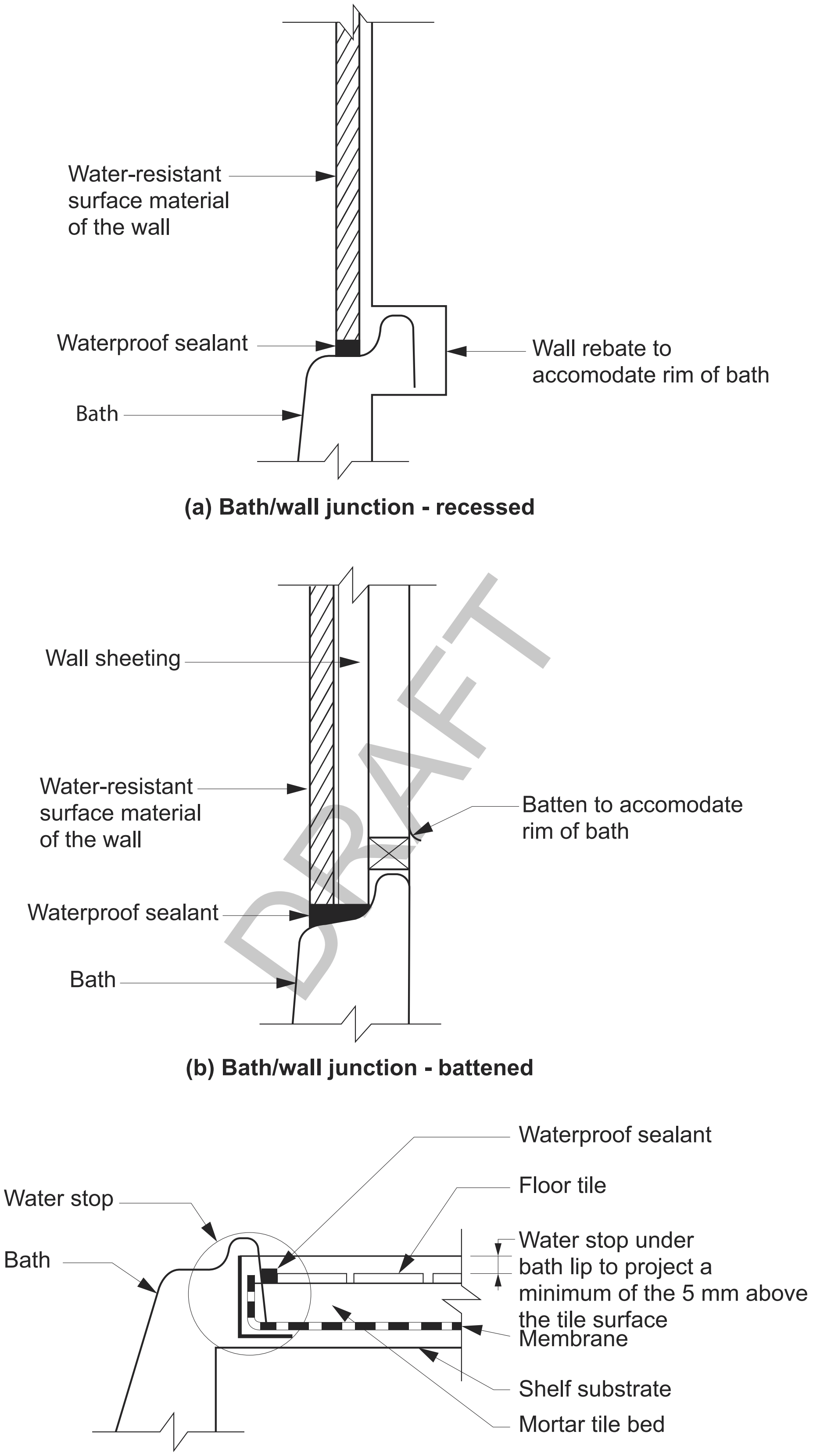
10.2.21 Baths and spas

[New for 2022]

Baths and spas must—

(a) have an upturn lip; and
(b) be recessed into the wall (see Figure 10.2.21); and
(c) have the *water resistant* surface materials of the wall pass down inside the upturn lip (see Figure 10.2.21); and
(d) be supported to prevent distortion and cracking.

Figure 10.2.21: Typical bath junctions



(a) Bath/wall junction - recessed

(b) Bath/wall junction - battened

(c) Bath/shelf junction

10.2.22 Membrane installation for screed

[New for 2022]

Where a screed is used in conjunction with a *waterproof* membrane, the *waterproof* membrane must be installed above the tile bed or screed.

10.2.23 Substrate surface preparation for application of membrane

[New for 2022]

The substrate surface area where a membrane is to be applied must—

(a) be clean and dust free; and

(b) free of indentations and imperfections.

10.2.24 Penetrations

[New for 2022]

Penetrations within *shower areas* must comply with the following:

(a) Penetrations for taps, shower nozzles and the like must be waterproofed by sealing with—
   (i) sealants; or
   (ii) proprietary flange systems.

(b) The spindle housing of the tap body must be able to be removed to enable replacement of the washer without damaging the seal.

(c) The following must be waterproofed:
   (i) All penetrations due to mechanical fixings or fastenings of substrate materials.
   (ii) Any penetration of the surface materials due to mechanical fixings or fastenings.
   (iii) Recessed soap holders (niches) and the like.

(d) Tap and spout penetrations on horizontal surfaces surrounding baths and spas must be waterproofed by—
   (i) sealing the tap body to the substrate with sealants; or
   (ii) proprietary flange systems.

10.2.25 Flashings/junctions

[New for 2022]

Flashings must be installed in accordance with 10.2.2 to 10.2.6 and the following:

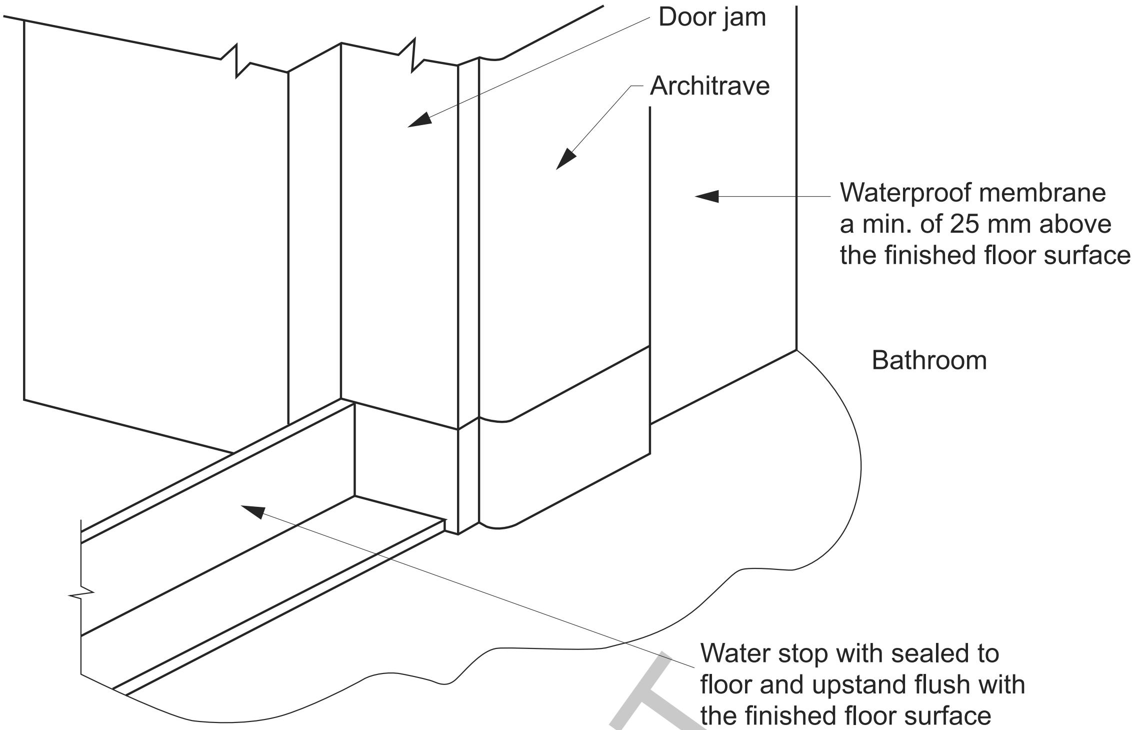
(a) Perimeter *flashing* to wall/floor junctions must have a vertical leg of not less than 25 mm above the finished floor level, except across doorways, and the horizontal leg must have a width of not less than 50 mm.

(b) Where a *water resistant* substrate is used in conjunction with a *water resistant* surface material, a waterproof sealant must be installed after the finishes have been applied at the wall/floor junction.

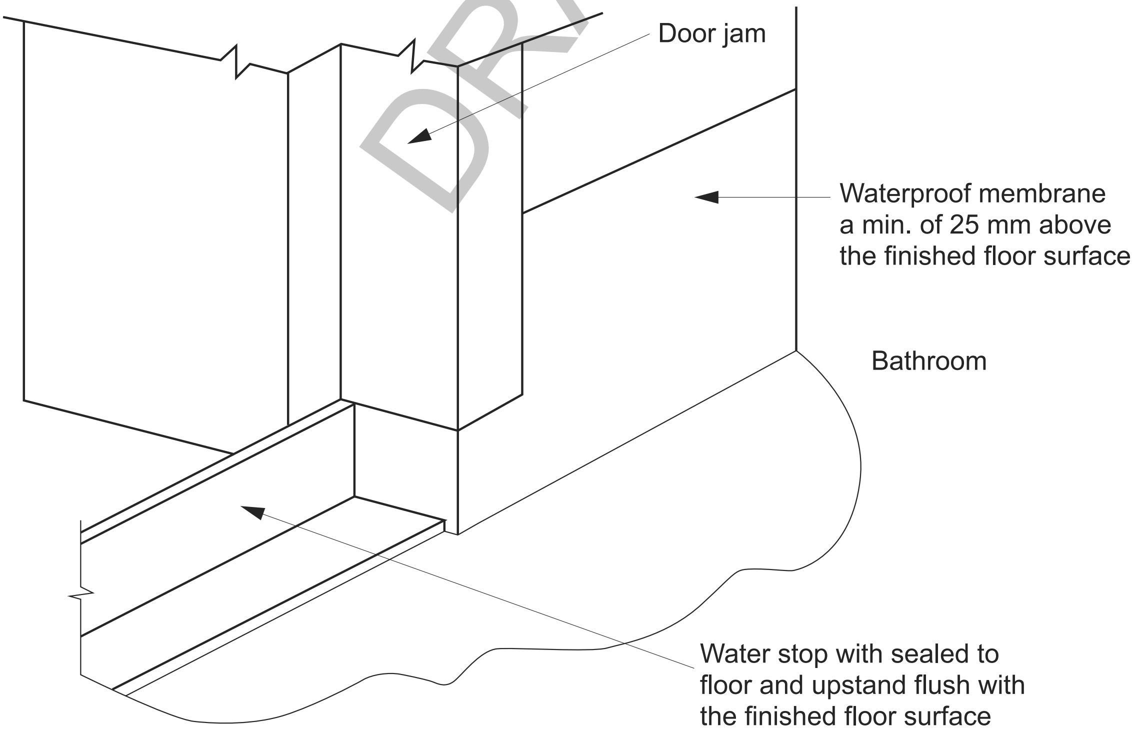
(c) Perimeter *flashings* at floor level opening must comply with the following:
   (i) Where the whole *wet area* floor is waterproof, at floor level openings, a *waterstop* must be installed that has a vertical leg finishing flush with the top of the finished floor level with the floor *membrane* being terminated to create a waterproof seal to the *waterstop* and to the perimeter *flashing* (see Figure 10.2.25).
   (ii) In any other case, at floor level openings a *waterstop* must be installed that has a vertical leg finishing flush with the top of the finished floor level and waterproofed to the perimeter *flashing*.

(d) Vertical *flashing*, either external to the *wet area* or internal, must terminate not less than 1800 mm above the finished floor level.

Figure 10.2.25: Typical bathroom door details for whole bathroom waterproofing



(a) After installation of architrave



(b) Prior to installation of architrave

Explanatory Information:

Vertical *flashing* may be used as follows:

(a) External vertical *flashing* may be used with external *membrane* systems and installed behind the wall sheeting or render. They must have legs of sufficient width to allow the wall sheeting or render to overlap by not less than 32 mm.

(b) Internal vertical *flashing* may be used with both external and internal *membrane* systems provided each leg has a minimum overlap of 40 mm to the wall sheeting or render and where used with—

(i) internal membranes, must extend vertically from the shower tray; and

(ii) external membranes, must overlap the top edge of the floor *waterproofing system* by not less than 20 mm; and

(iii) preformed shower bases or baths, must extend to the bottom edge of the wall sheeting or render.

10.2.26 Shower area floor membrane application

[New for 2022]

The *membrane* must be applied over the floor and up the vertical face of the wall substrate material as follows:

(a) For showers with *hobs* or stepdowns, to a height the greater of—

(i) not less than a height of 150 mm above the finished tile level of the floor; or

(ii) 25 mm above the maximum retained water level.

(b) For hobless showers, not less than a height of 150 mm above the finished tile level of the floor.

10.2.27 Membrane requirements for wall sheeting or render substrates

[New for 2022]

(1) Where wall sheeting or render is used with an external *membrane* system in a shower area it must be waterproof to prevent moisture movement by capillary action.

(2) Where *water resistant* plasterboard is used all cut edges that have the potential to be affected by moisture must be waterproofed, including the bottom edge over a preformed shower base.

10.2.28 Bond breaker installation for bonded membranes

[New for 2022]

(1) *Bond breakers* must be installed at all wall/floor, *hob*/wall junctions and at movement joints where the membrane is bonded to the substrate.

(2) *Bond breakers* must be of the type compatible with the flexibility class of the membrane to be used.

Explanatory Information:

Typical details for *bond breaker* types are given in Figure 10.2.28.

Figure 10.2.28 (explanatory): Typical bond breaker details

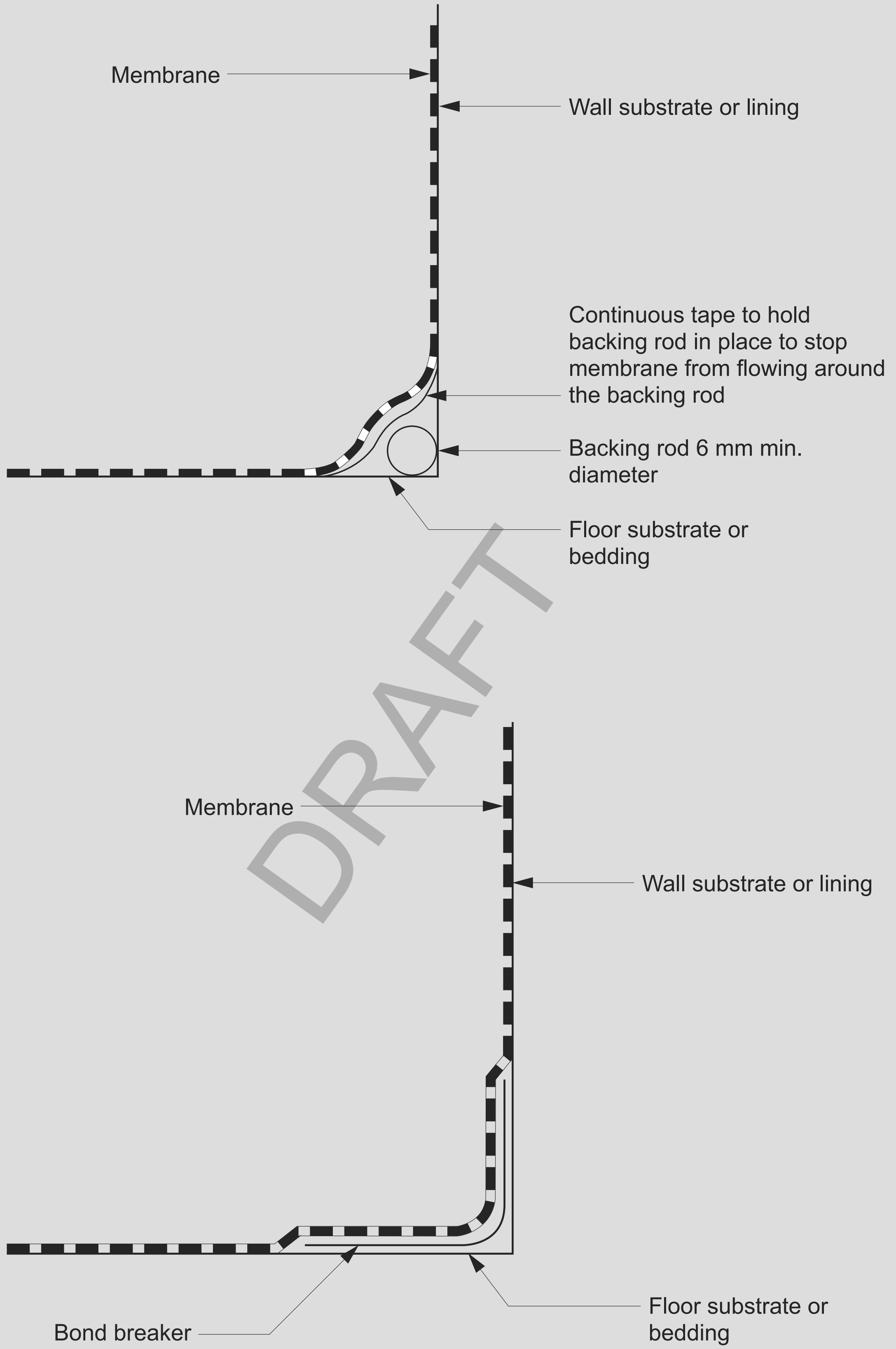


Figure Notes:

1. *Bond breakers* for Class I membranes (low extensibility) allow the *membrane* to flex rather than stretch.
2. *Bond breakers* for Class II membranes (medium extensibility) allow the *membrane* to stretch. If a tape is used as a bond breaker, either the *membrane* must not bond to the tape or the tape must have elastic properties similar to

the *membrane*.

3. *Bond breakers* for Class III membranes (high extensibility) allow the *membrane* to have an even thickness.

10.2.29 Installation of internal membranes

[New for 2022]

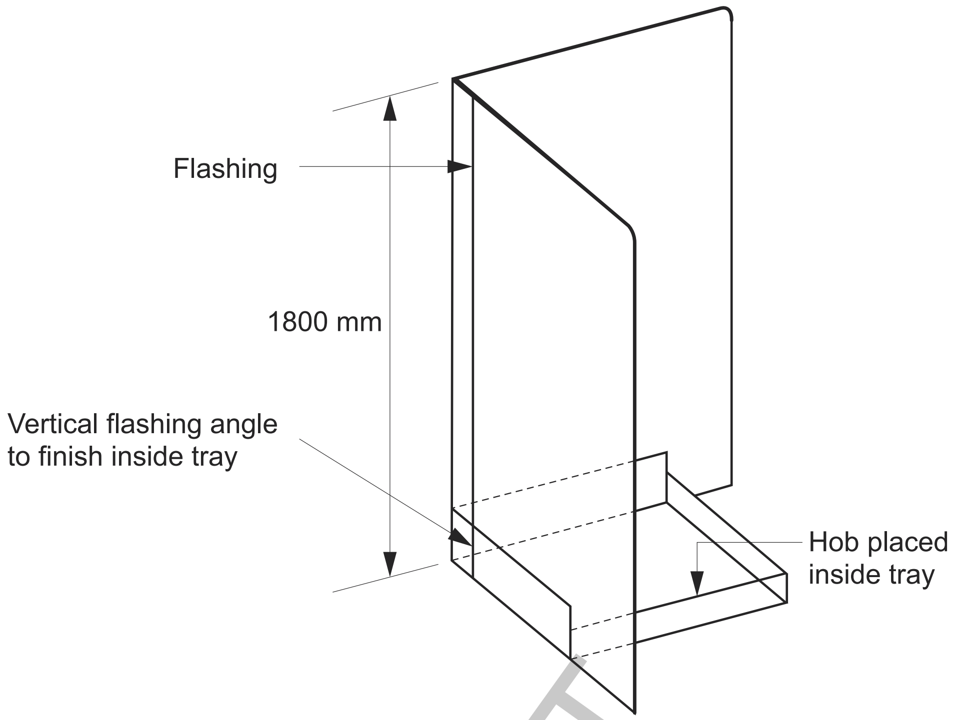
(1) Where a shower has a hob—

(a) the *membrane* must be brought over the top of the *hob*, down the outside face and terminate not less than 50 mm onto the floor (see Figure 10.2.17); and

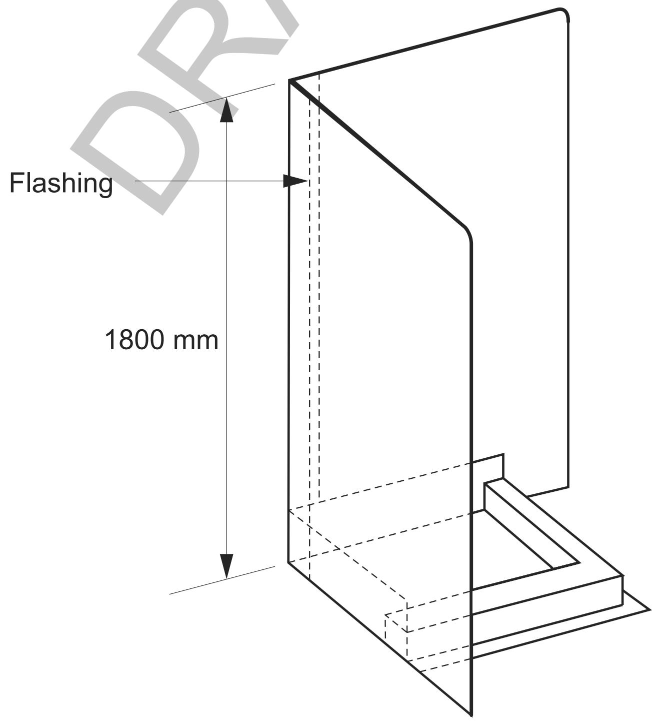
(b) the membrane must comply with Figure 10.2.29 for an internal shower tray.

(2) Where the shower has a *waterstop*, the *membrane* must be brought to the top of the finished floor, except where it is under a *shower screen* where it must terminate not less than 5 mm above the finished tile surface (see Figure 10.2.18 and Figure 10.2.19).

Figure 10.2.29: Typical shower construction



(a) External system-Shower membrane installed before wall sheeting



(b) Internal system-Shower membrane installed after wall sheeting

10.2.30 Membrane to drainage connection

[New for 2022]

(1) *Membrane* drainage connections in concrete floors must comply with one of the following:

(a) The *drainage riser* must be trimmed to the floor level of the concrete substrate or screed with all internal burrs removed and the waterproofing *membrane* terminated not less than 20 mm into the riser.

(b) A *drainage flange* must be installed with the waterproofing *membrane* terminated at or in the *drainage flange* to provide a waterproof connection (see Figure 10.2.30).

(c) Where a prefabricated shower tray is used, provision must be made to drain the tile bed and provide a waterproof connection to the drain.

(2) Membrane drainage connections in other floors must comply with one of the following:

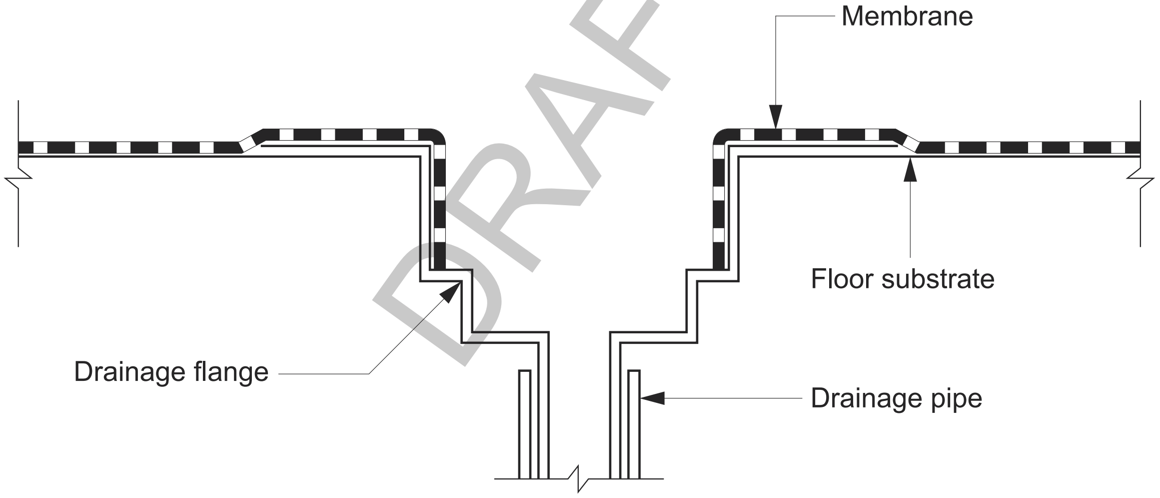
(a) The drainage riser must be fixed to the floor substrate and the waterproofing membrane terminated not less than 20 mm into the riser.

(b) A drainage flange must be installed with the waterproofing membrane terminated at or in the drainage flange to provide a waterproof connection (see Figure 10.2.30).

(3) Where a prefabricated shower tray is used, provision must be made to drain the tile bed and provide a waterproof connection to the drain.

(4) *Floor wastes* must be of sufficient height to suit the thickness of the tile and tile bed at the outlet position.

Figure 10.2.30: Typical membrane termination at drainage outlet



Explanatory Information: Drainage flanges

1. For *membrane* drainage connections in concrete floors: *drainage flanges* may be either cast into the concrete slab or fixed to the top surface of the concrete slab or the tile bed.
2. For *membrane* drainage connections in other floors: *drainage flanges* may be either set into the floor or fixed to the top surface of the floor substrate or the tile bed.

10.2.31 Drainage riser connection

[New for 2022]

(1) Where a preformed shower tray is used, the *drainage riser* must be connected to the tray with a waterproof joint.

(2) Where an in situ shower tray is used, the *membrane* must—

(a) extend not less than 20 mm into the *drainage riser* or *drainage flange*; and

(b) be able to form a permanent waterproof seal to the *drainage riser* or *drainage flange* (see Figure 10.2.30).

10.2.32 Door jambs and architraves on tiled floors

[New for 2022]

Where the bottom of door jambs do not finish above the floor tiling, the portion of the door frame and architrave below the floor tiling must be waterproofed to provide a continuous seal between the perimeter *flashing* and the *waterstop*.

10.2.33 Shower screens

[New for 2022]

(1) For an enclosed shower, the *shower screen* must be designed and installed to prevent water escaping from the shower enclosure.

(2) For a shower with a *hob*, the *shower screen* must be installed flush with the *shower area* side of the *hob* or overhang into the shower area.

(3) For a shower with a stepdown, the *shower screen* must be installed flush with the finished vertical surface of the stepdown of the shower area.

(4) For a shower without a *hob* or stepdown, the *shower screen* must incorporate or be mounted on an inverted channel, positioned over the top of the *waterstop*, that defines the shower area.

(5) For bath end walls and dividing walls abutting a shower, the *shower screen* must be positioned so that the bottom edge within the *shower area* is either flush with the outside edge of the bath or overhanging into the *shower area* .

Explanatory Information:

A self-draining sub-sill is considered to be part of the *shower screen*.

10.2.34 Bath end walls abutting a shower

[New for 2022]

Where a bath end wall is within a *shower area*, it must be treated as a *shower area* wall.

Part 10.3 Room heights

10.3.1 Height of rooms and other spaces

[2019: 3.8.2.2]

(1) Heights of rooms and other spaces (see Figure 10.3.1) must be not less than—

- (a) in a *habitable room* excluding a kitchen — 2.4 m; and
- (b) in a kitchen — 2.1 m; and
- (c) in a corridor, passageway or the like — 2.1 m; and
- (d) in a bathroom, shower room, laundry, *sanitary compartment*, airlock, pantry, storeroom, garage, car parking area or the like — 2.1 m; and
- (e) in a room or space with a sloping ceiling or projections below the ceiling line within—
  - (i) a *habitable room*—
    - (A) in an attic — a height of not less than 2.2 m for at least two-thirds of the *floor area* of the room or space; and
    - (B) in other rooms — a height of not less than 2.4 m over two-thirds of the *floor area* of the room or space; and
  - (ii) a non-*habitable room* — a height of not less than 2.1 m for at least two-thirds of the *floor area* of the room or space; and
- (f) in a stairway, ramp, *landing*, or the like — 2.0 m measured vertically above the nosing line of stairway treads or the floor surface of a ramp, *landing* or the like.

(2) For the purposes of (1)(e), when calculating the *floor area* of a room or space, any part that has a ceiling height of less than 1.5 m is not included.

Figure 10.3.1: Measurement of heights of rooms and other spaces

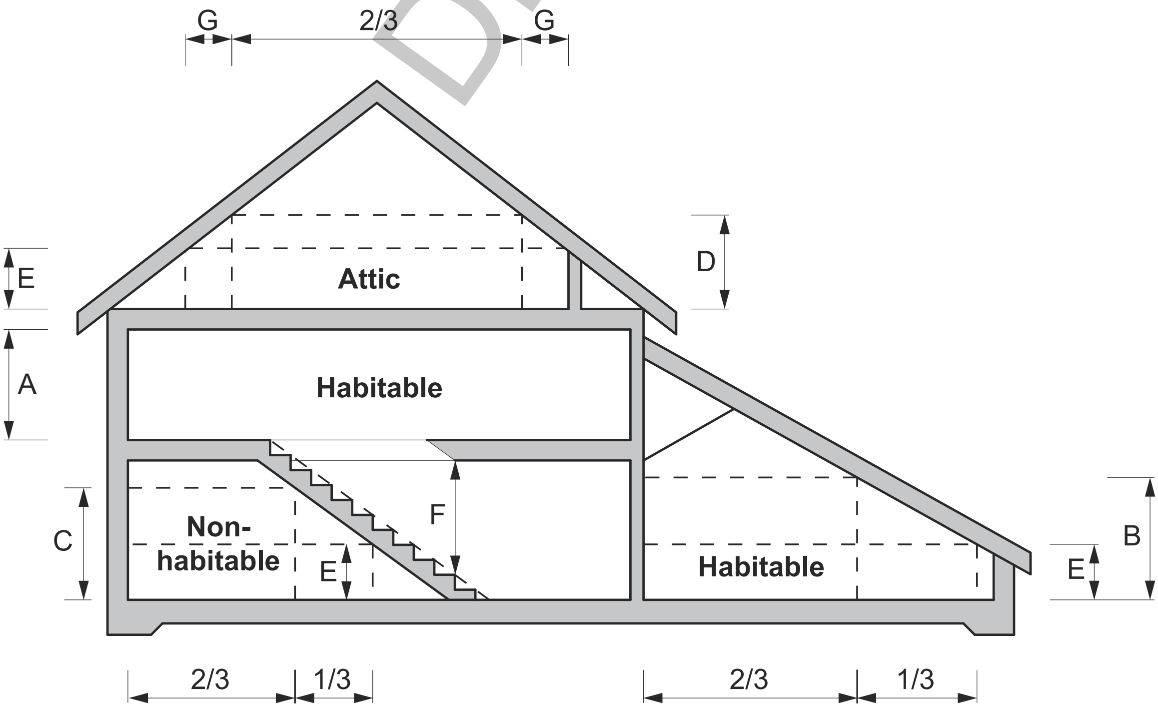


Figure Notes:

The letters in the diagram represent the following minimum dimensions:

A = 2.4 m In a *habitable room* (excluding a kitchen).

B = 2.4 m In a *habitable room* with a sloping ceiling for at least two-thirds of the *floor area* of the room or space.

C = 2.1 m In a non-*habitable room* with a sloping ceiling for at least two-thirds of the *floor area* of the room or space.

D = 2.2 m In an attic with a sloping ceiling for at least two-thirds of the *floor area* of the room or space.

E = 1.5 m For the purpose of calculating the *floor area* of a room or space, any ceiling height of less than 1.5 m is excluded.

F = 2.0 m In a stairway (measured vertically above the nosing line).

The combined dimensions of G must not exceed one-third of the *floor area* (See E above) of the room or space.

Explanatory Information:

1. Where a room or space has no ceiling lining, the measurement is taken from the floor to the underside of the floor or roof above.
2. In areas unlikely to be occupied for long periods, such as non-*habitable rooms*, a reduced height of 2.1 m is permitted.
3. 10.3.1(1)(f) permits a reduced height of 2.0 m above stairways, ramps and landings, as these are used for transient purposes and therefore a reduction from the *required* height in corridors and rooms (2.1 and 2.4 m generally) will not adversely affect occupant safety, health or amenity.

Part 10.4 Facilities

10.4.1 Required facilities

[2019: 3.8.3.2]

(1) A Class 1 building must be provided with—

(a) a kitchen sink and facilities for the preparation and cooking of food; and

(b) a bath or shower; and

(c) clothes washing facilities, comprising at least one washtub and space in the same room for a washing machine; and

(d) a closet pan; and

(e) a washbasin.

(2) If any of the facilities in (1) are detached from the main building, they must be set aside for the exclusive use of the occupants of the building.

Explanatory Information:

1. A kitchen sink or washbasin must not be counted as a laundry washtub. A laundry washtub is considered to provide the necessary means to dispose of waste water as *required* by H4P3(2).
2. Installation requirements for certain electrical or gas cooking appliances may influence the selection of surrounding materials or the clearance to those materials.

10.4.2 Construction of sanitary compartments

[2019: 3.8.3.3]

The door to a fully enclosed *sanitary compartment* must—

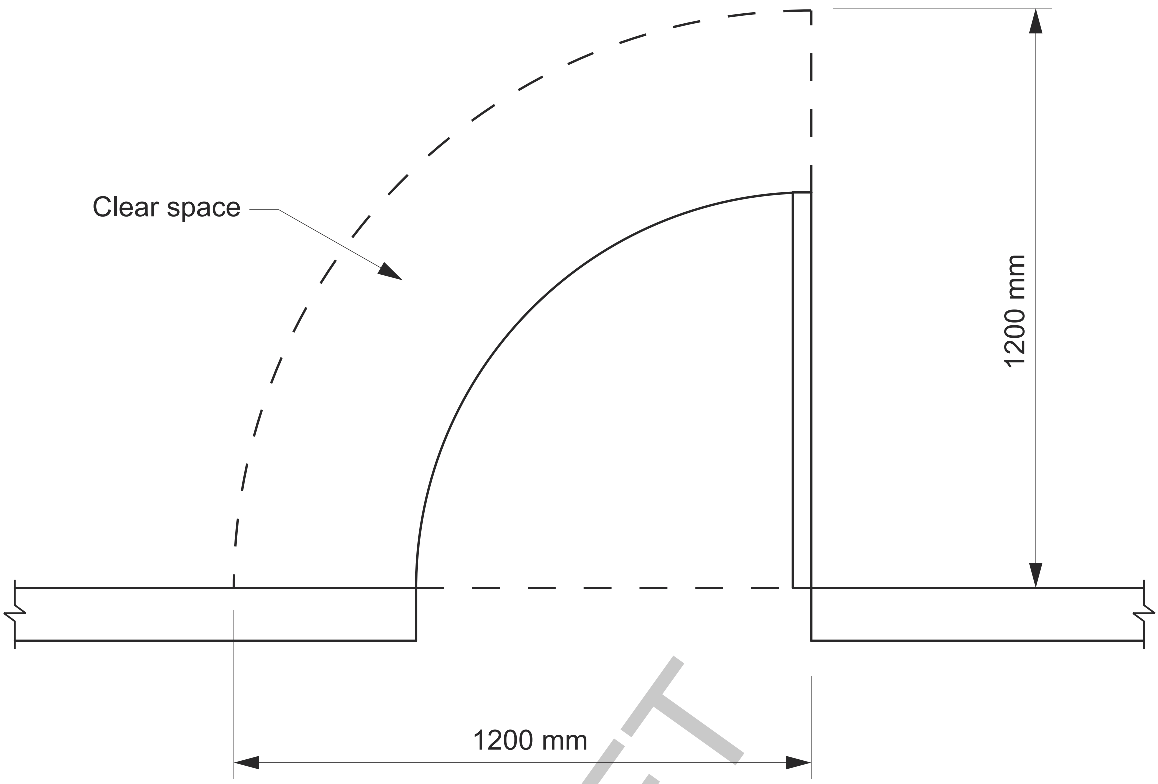
(a) open outwards; or

(b) slide; or

(c) be readily removable from the outside of the compartment,

unless there is a clear space of at least 1.2 m, measured in accordance with Figure 10.4.2, between the closet pan within the *sanitary compartment* and the doorway.

Figure 10.4.2: **Construction of sanitary compartments**



Explanatory Information:

10.4.2 requires means of removing an unconscious occupant from a fully enclosed *sanitary compartment*. If the enclosure has gaps that are large enough to allow access for a person into the *sanitary compartment*, the compartment is not considered enclosed for the purpose of this clause.

TAS 10.4.3

Part 10.5 Light

10.5.1 Natural light

[2019: 3.8.4.2]

(1) Natural light must be provided to all *habitable rooms*, in accordance with the requirements of (2) to (4).

(2) Natural light must be provided by—

(a) *windows*, excluding *roof lights* that—

(i) have an aggregate light transmitting area measured exclusive of framing members, glazing bars or other obstructions of not less than 10% of the *floor area* of the room; and

(ii) are open to the sky or face a court or other space open to the sky or an open verandah, carport or the like; or

(b) *roof lights* that—

(i) have an aggregate light transmitting area measured exclusive of framing members, glazing bars or other obstructions of not less than 3% of the *floor area* of the room; and

(ii) are open to the sky; or

(c) a proportional combination of *windows* and *roof lights required* by (a) and (b).

(3) A *window required* to provide natural light that faces a boundary of an adjoining allotment must not be less than a horizontal distance of 900 mm from that boundary.

(4) Natural light to a room may come through one or more glazed panels or openings from an adjoining room (including an enclosed verandah) if—

(a) the glazed panels or openings have an aggregate light transmitting area of not less than 10% of the *floor area* of the room to which it provides light; and

(b) the adjoining room has—

(i) *windows*, excluding *roof lights* that—

(A) have an aggregate light transmitting area of not less than 10% of the combined *floor area* of both rooms; and

(B) are open to the sky or face a court or other space open to the sky or an open verandah, carport or the like; or

(ii) *roof lights* that—

(A) have an aggregate light transmitting area of not less than 3% of the combined *floor area* of both rooms; and

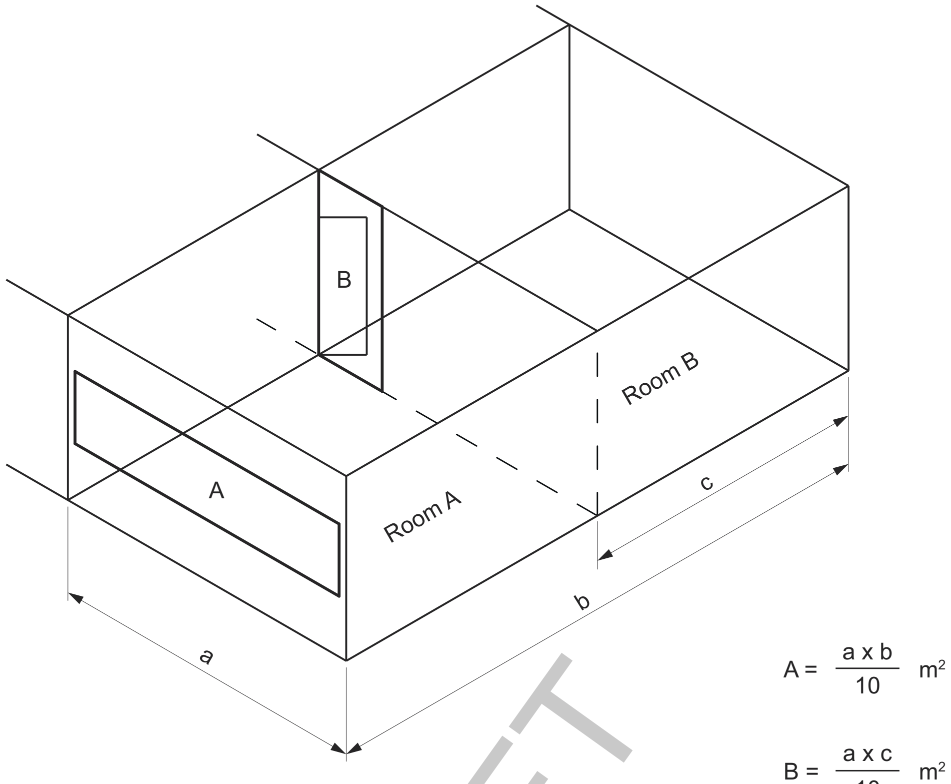
(B) are open to the sky; or

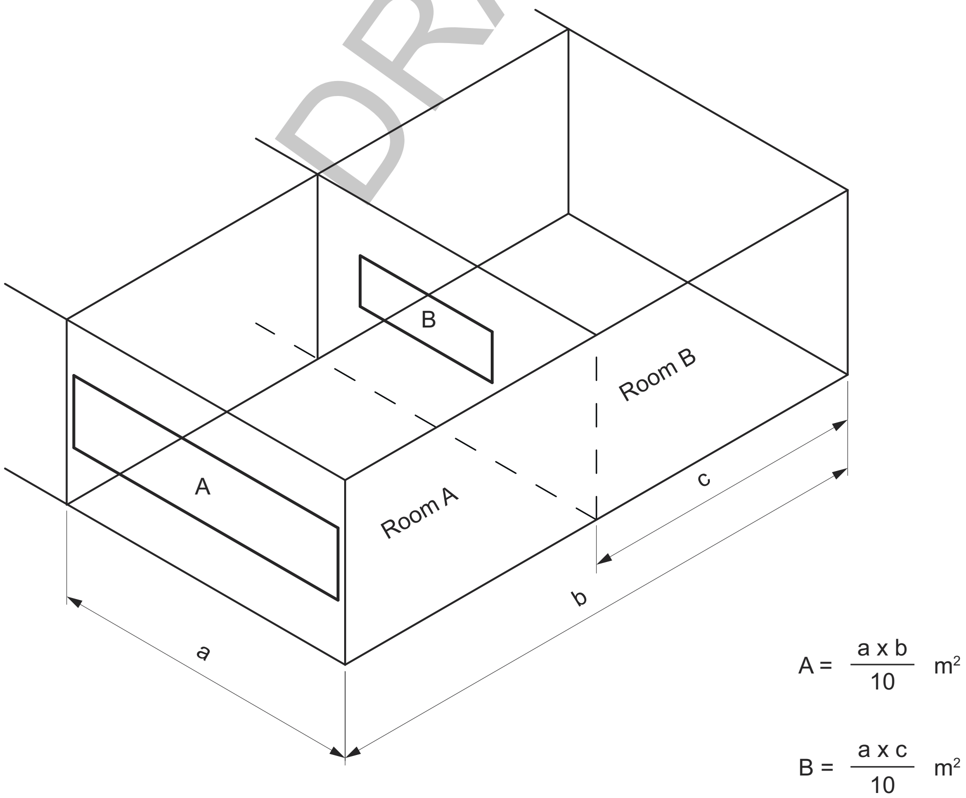
(iii) a proportional combination of *windows* and *roof lights required* by (i) and (ii).

(5) The areas specified in (4)(a) and (b) may be reduced as appropriate if direct natural light is provided from another source.

(6) See Figure 10.5.1.

Figure 10.5.1: Method of determining areas of openings for borrowed light





Explanatory Information: Explanatory Figure 10.5.1

A *roof light* generally receives greater exposure to sunlight than a *window* because of its orientation to the sky and consequently, the size of a *roof light* as a percentage of the *floor area* served is permitted to be smaller than for a *window* serving the same *floor area*. This is explained in Explanatory Figure 10.5.1, below.

Figure 10.5.1 (explanatory): Method for determining proportional combination of windows and roof lights

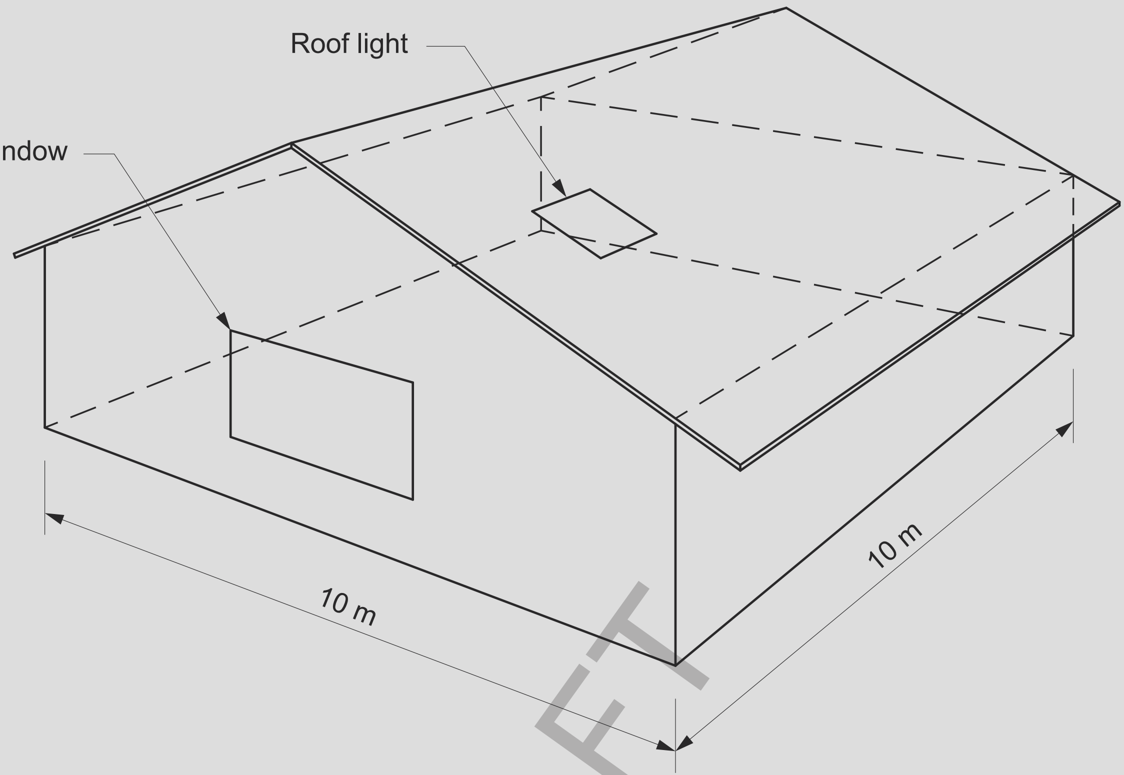


Figure Notes:

1. Area of the room which *requires* natural light is 100 m^2.
2. No natural light is borrowed from adjoining rooms.

Explanatory Information: General requirements for Explanatory Figure 10.5.1

Required window(s) to provide natural light must have a light transmitting area of at least 10% of the *floor area*.

10% of 100 m^2 = 10 m^2

Or, *roof light(s)* to provide natural light must have a light transmitting area of at least 3% of the *floor area*.

3% of 100 m^2 = 3 m^2

In the formula shown in the next Explanatory Information box, 3% of the *floor area* is expressed as the fraction 0.03 and 10% of the *floor area* is expressed as the fraction 0.1.

Explanatory Information: Calculations for Explanatory Figure 10.5.1

Formula — for the area of *window(s) required* to compensate for *roof light(s)* short fall:

- Area of room covered by the *roof light(s)* = (Area of *roof light(s)*) / 0.03
- *Required window(s)* area = [(*floor area*) – (Area covered by the *roof light(s)*)] / 10

Area of *window(s) required* to compensate for *roof light(s)* short fall:

If the *roof light(s)* = 1 m^2

- Area of room covered by the *roof light(s)* = (1 m^2 / 0.03) = 33.33 m^2.
- *Required window(s)* area = (100 m^2 – 33.33 m^2) / 10 = 6.67 m^2.

Formula — for the area of *roof light(s) required* to compensate for *window(s)* short fall:

- Area of room covered by the *window(s)* = (Area of *window(s)*) / 0.1.
- *Required roof light(s)* area = [(*floor area*) – (Area covered by the *window(s)*)] / 33.33.

Area of *roof light(s) required* to compensate for *window(s)* short fall:

If the *window(s)* = 5 m^2.

- Area of room covered by the *window(s)* = (5 m^2 / 0.1) = 50 m^2.
- *Required roof light(s)* area = (100 m^2 – 50 m^2) / 33.33 m^2 = 1.5 m^2.

Notes:

1. For the purposes of this example a *window* excludes a *roof light*.
2. The same proportional calculation principle applies if—
   a. two or more *windows* are used; or
   b. two or more *roof lights* are used.

Explanatory Information: Natural light borrowed from another source

1. Direct natural light provided from another source is intended to mean light from a *window* or *roof light* in the subject room. As the provision relates to natural light obtained from an adjoining room, "another source" refers to direct natural light provided to the subject room which does not meet the *required* allowance of either 10% or 3% of the *floor area* of that room. By not meeting the *required* amount of natural light, the "direct natural light from another source" can be used as a supplement to the natural light *required* from an adjoining room.
2. To borrow natural light from another room, 10.5.1(4)(a) allows light to pass through a glazed panel(s) or opening(s) from an adjoining room, which under 10.5.1(4)(b), must have *windows*, *roof lights* or a combination of windows and *roof lights* of a minimum size in proportion to the combined floor areas of both rooms. The minimum size of the glazed panel(s) or opening(s), and the minimum size of the *window* to the adjoining room are illustrated in Figure 10.5.1.
3. If a doorway is used as an opening to obtain natural light, it must do so when in the closed position (see Figure 10.5.1).

10.5.2 Artificial lighting

[2019: 3.8.4.3]

Sanitary compartments, bathrooms, shower rooms, airlocks and laundries must be provided with artificial lighting if natural light in accordance with the relevant provisions of 10.5.1 is not available—

(a) at a rate of not less than one light fitting per 16 m^2 of *floor area*; or

(b) in accordance with AS/NZS 1680.0.

Part 10.6 Ventilation

10.6.1 Application of Part 10.6

[New for 2022]

(1) Part 10.6 applies subject to the limitations set out at H4D6.

(2) Part 10.6 need not be complied with if H4D6(1) is complied with.

Explanatory Information:

The requirements of this Part are to be read in conjunction with the condensation management requirements in Part 10.8 and the air movement requirements in Part 13.5. However, it should be noted that Part 13.5 does not apply in all States and Territories.

10.6.2 Ventilation requirements

[2019: 3.8.5.2]

Ventilation must be provided to a *habitable room*, *sanitary compartment*, bathroom, shower room, laundry and any other room occupied by a person for any purpose by any of the following means:

(a) Openings, *windows*, doors or other devices which can be opened—
   (i) with a ventilating area not less than 5% of the *floor area* of the room *required* to be ventilated; and
   (ii) open to—
      (A) a suitably sized court, or space open to the sky; or
      (B) an open verandah, carport, or the like; or
      (C) an adjoining room in accordance with (b).

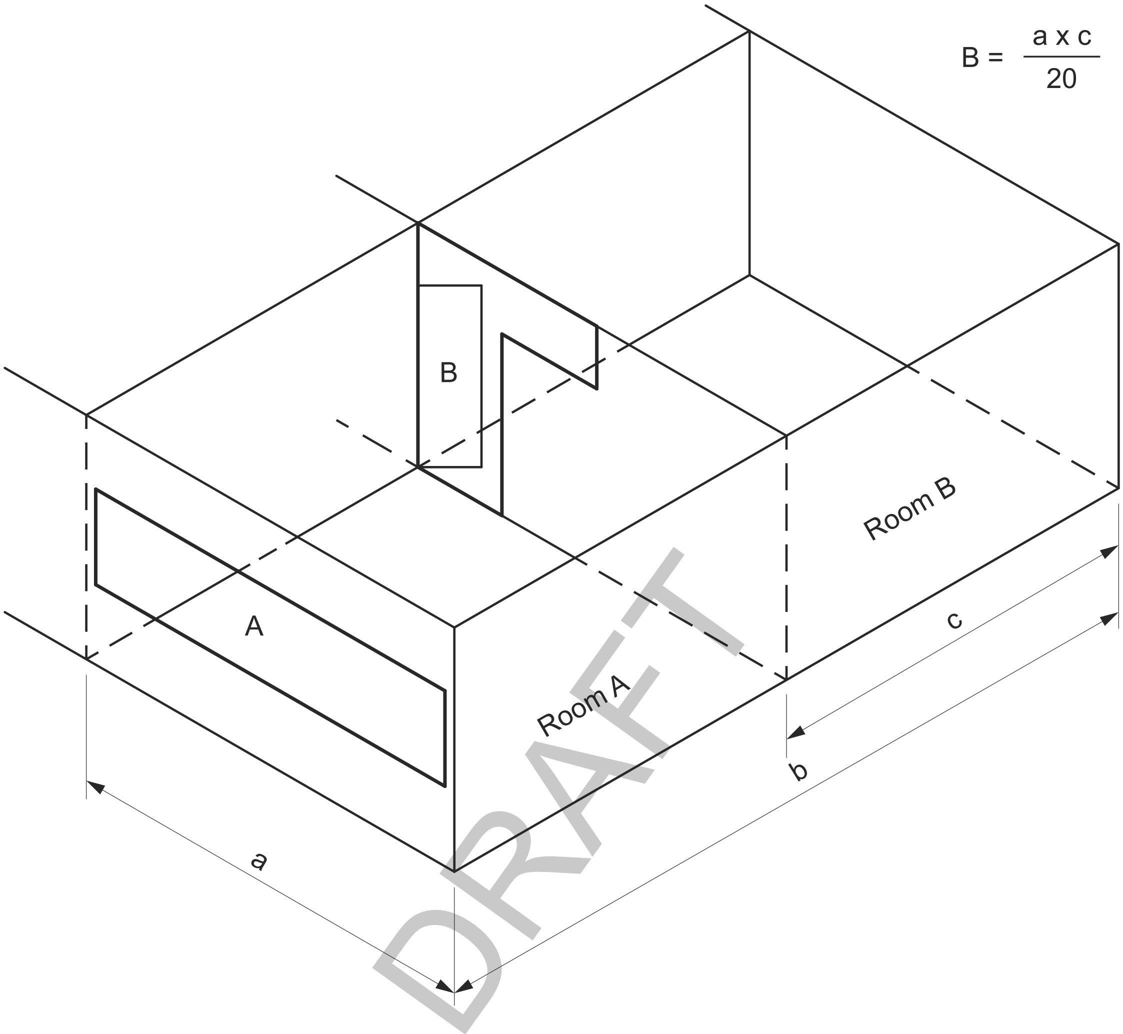
(b) Natural ventilation to a room may come through a *window*, opening, door or other device from an adjoining room (including an enclosed verandah) if—
   (i) the room to be ventilated or the adjoining room is not a *sanitary compartment*; and
   (ii) the *window*, opening, door or other device has a ventilating area of not less than 5% of the *floor area* of the room to be ventilated; and
   (iii) the adjoining room has a *window*, opening, door or other device with a ventilating area of not less than 5% of the combined *floor areas* of both rooms; and
   (iv) the ventilating areas specified may be reduced as appropriate if direct natural ventilation is provided from another source (See Figure 10.6.2).

(c) An exhaust fan or other means of mechanical ventilation may be used to ventilate a *sanitary compartment*, laundry, kitchen or bathroom, or where mechanical ventilation is provided in accordance with 10.6.3(b), provided contaminated air exhausts comply with 10.8.2.

Figure 10.6.2: **Method of determining areas of openings for borrowed ventilation**

$$A = \frac{a \times b}{20} \quad m^2$$

$$B = \frac{a \times c}{20} \quad m^2$$



Explanatory Information:

The ventilating area of a *window* is measured as the size of the openable sash of the *window*. This is the case regardless of the type of *window*, i.e. whether it is an awning, casement or sliding *window* and irrespective of the restrictions on the openable sash.

10.6.2(b) permits a room's *required* ventilation to be "borrowed" from an adjoining room, i.e. an adjoining room's ventilation can be used to help make up the total amount of ventilation *required*.

The use of borrowed ventilation is acceptable if the provisions of 10.6.2(b) are applied to the subject room and to the total area of each relevant room.

10.6.3 Location of sanitary compartments

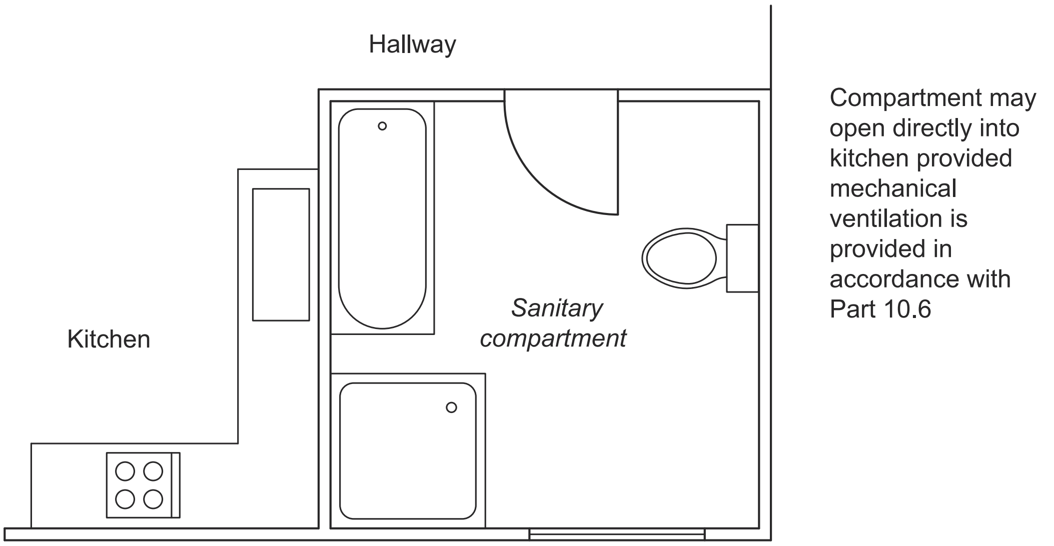
[2019: 3.8.5.3]

Sanitary compartments must not open directly into a kitchen or pantry unless—

(a) access is by an airlock, hallway or other room, (see Figure 10.6.3); or

(b) the *sanitary compartment* is provided with an exhaust fan or other means of mechanical exhaust ventilation.

Figure 10.6.3: **Acceptable location of non mechanically ventilated sanitary compartment**



Part 10.7 Sound insulation

10.7.1 Sound insulation requirements

[2019: 3.8.6.2]

(1) A *separating wall* between Class 1 buildings, or a wall that separates a Class 1 building from a Class 10a building which is not associated with the Class 1 building must—

(a) have an $R_w + C_{tr}$ (airborne) not less than 50; and

(b) be of *discontinuous construction* if it separates a bathroom, *sanitary compartment*, laundry or kitchen in one Class 1 building from a *habitable room* (other than a kitchen) in an adjoining Class 1 building (see Figure 10.7.1).

(2) For the purposes of (1)(b), *discontinuous construction* means a wall system that has two separate leaves and that is not a staggered stud wall, that complies with the following:

(a) The wall has a minimum 20 mm cavity between leaves.

(b) For masonry walls, where wall ties are *required* to connect leaves, the ties are of the resilient type.

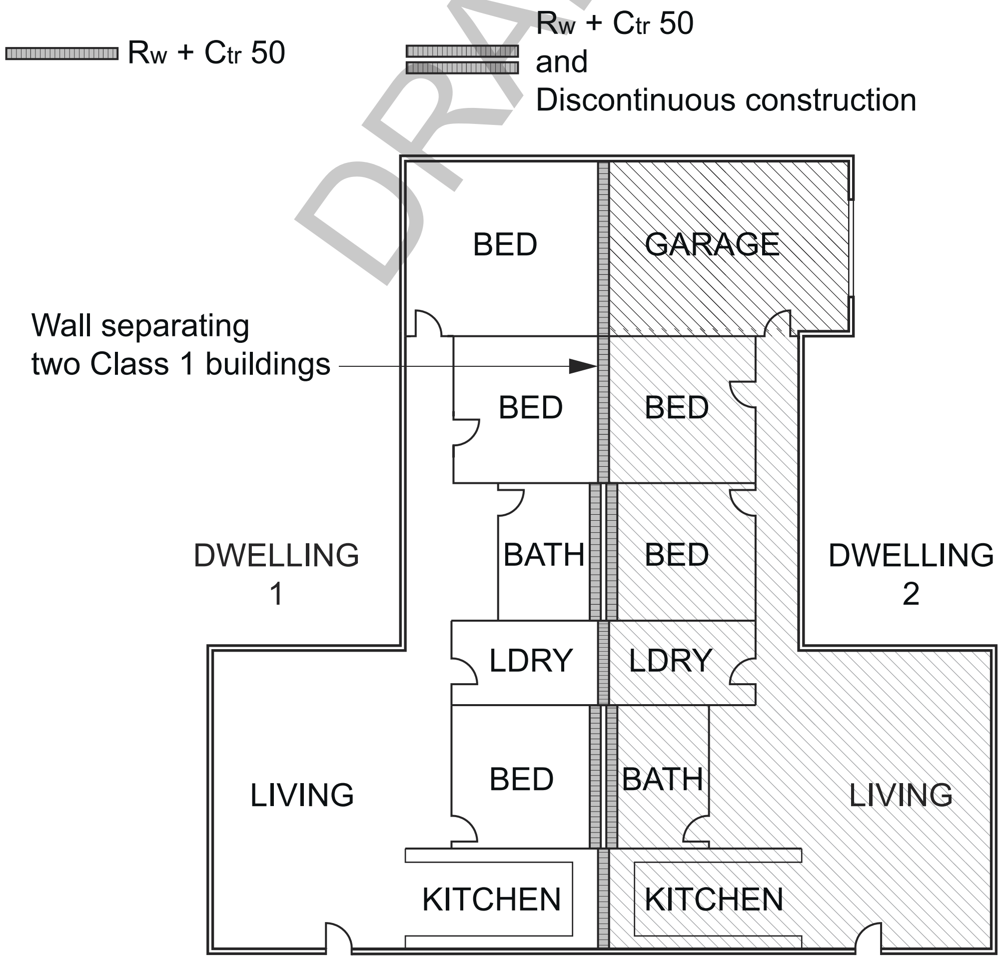
(c) For walls other than masonry, there is no mechanical linkage between leaves except at the periphery.

(3) A wall *required* to have sound insulation must continue to—

(a) the underside of the roof above; or

(b) a ceiling that provides the sound insulation *required* for the wall.

Figure 10.7.1: Required airborne and impact sound insulation — Plan view



Explanatory Information:

Insulation to reduce both airborne and impact noise transmission is *required* for parts of a wall that are common to adjoining Class 1 buildings but not parts of a wall located in the subfloor.

10.7.2 Determination of airborne sound insulation ratings

[2019: 3.8.6.3]

The Rw + Ctr sound insulation rating *required* by 10.7.1(1)(a) must—

(a) be determined in accordance with AS/NZS ISO 717.1, using results from laboratory measurements; or

(b) comply with 10.7.5 to 10.7.8 and the relevant provisions of 10.7.3.

Explanatory Information:

R_w is a measure of airborne sound insulation. C_{tr} is a spectrum adjustment factor that adjusts for low frequency sound levels. C_{tr} has been chosen in recognition of the problems caused by the high bass frequency outputs of modern home theatre systems and music reproduction equipment used by occupants of Class 1 buildings.

The wall configurations described in 10.7.5 to 10.7.8 are typical examples. Other proprietary methods are available via testing to AS/NZS ISO 717.1 for meeting the R_w + C_{tr} requirements of 10.7.1.

10.7.3 Construction of sound insulated walls

[2019: 3.8.6.4]

To achieve the appropriate level of sound insulation, walls must be constructed as follows:

(a) Stud wall junction — junctions of sound insulated walls with any perimeter walls and roof cladding must be sealed in accordance with Figure 10.7.3a.

(b) Masonry — units must be laid with all joints filled solid, except for articulation joints complying with 5.6.8~~5.2.13~~, including those between the masonry and any adjoining construction.

(c) Concrete panels — must have joints between panels and any adjoining construction filled solid.

(d) Plasterboard sheeting —

(i) If two layers are *required*, the second layer joints must not coincide with those of the first layer (see Figure 10.7.3b).

(ii) Joints between sheets including the outer layer or between sheets and any adjoining construction must be taped and filled solid.

(e) Steel framed construction — steel framing and perimeter members must be installed as follows:

(i) Steel framing members must be not less than 0.6 mm thick.

(ii) Studs must be not less than 63 mm in depth unless another depth is specified in 10.7.5 to 10.7.8.

(iii) All steel members at the perimeter of the wall must be securely fixed to the adjoining structure and the joints must be caulked so that there are no voids between the steel members and the wall.

(f) Timber-framed construction — timber studs and perimeter members must be installed as follows:

(i) Noggings and like members must not bridge between studs supporting different wall leaves.

(ii) All timber members at the perimeter of the wall must be securely fixed to the adjoining structure and the joints must be caulked so there are no voids between the timber members and the wall.

Figure 10.7.3a: **Sound insulation between buildings — Stud wall junctions**

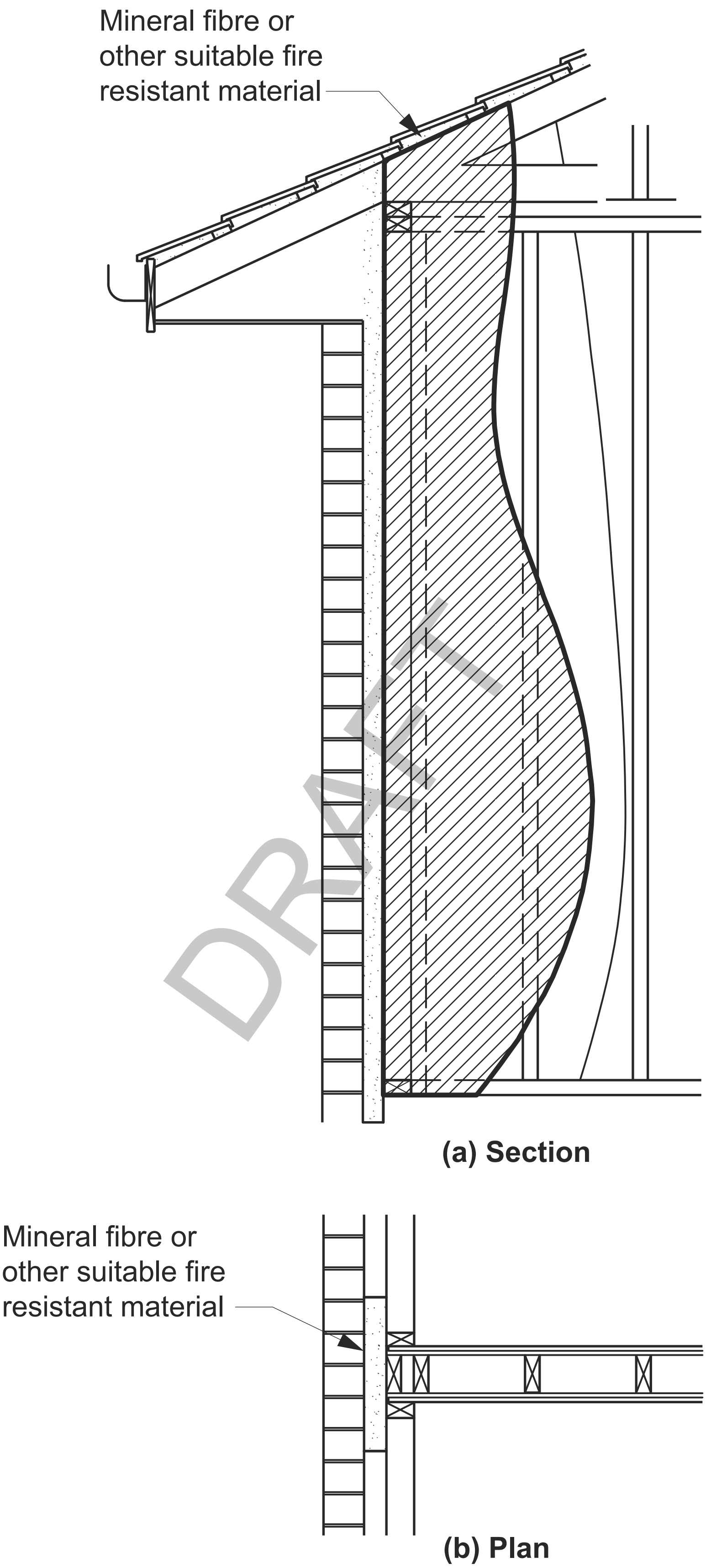
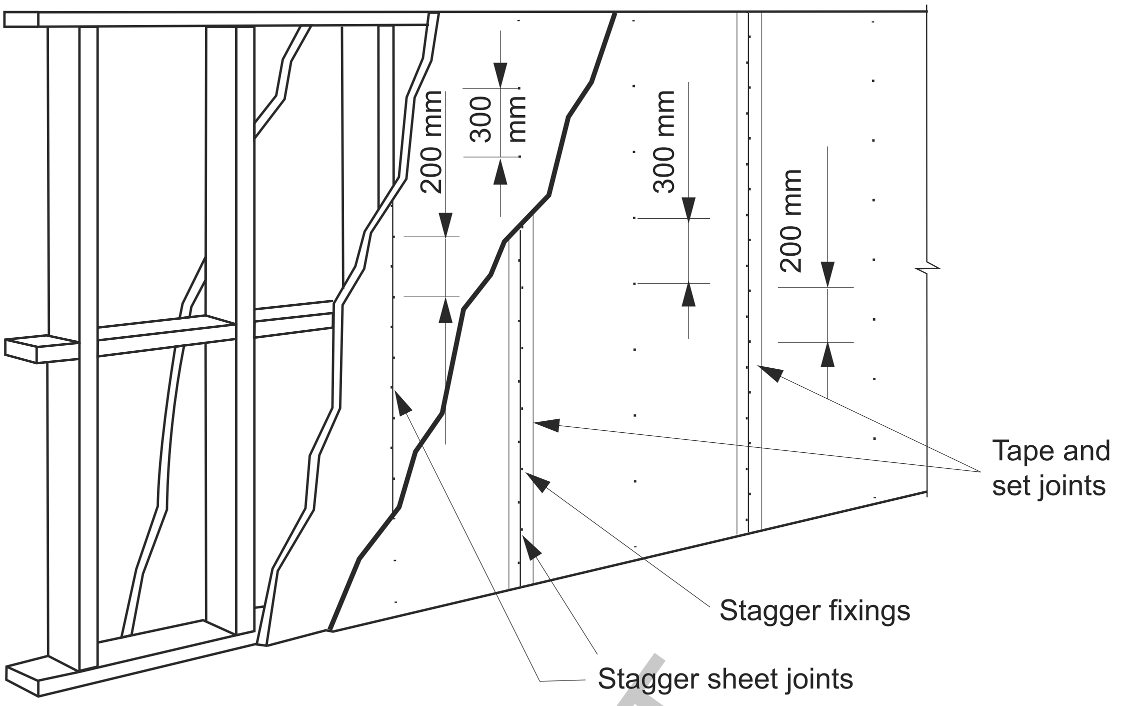
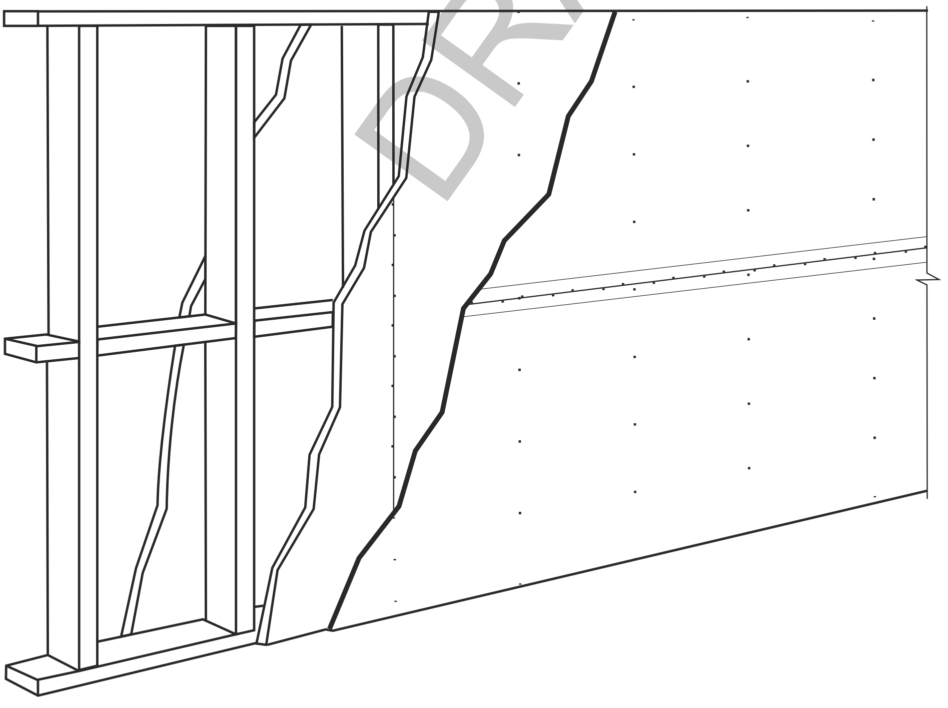


Figure 10.7.3b: **Typical installation of plaster sheets for sound insulation**



(a) Second layer positioned vertically



(b) Second layer positioned horizontally

10.7.4 Services

[2019: 3.8.6.5]

(1) Services must not be chased into concrete or masonry *separating walls*.

(2) If a duct, soil, waste, water supply or storm water pipe is located in a *separating wall*—

(a) a door or panel providing access to a duct or pipe *required* to be separated must—

(i) not open into any *habitable room*, other than a kitchen; and

(ii) in any other part must be firmly fixed so as to overlap the frame or rebate of the frame by not less than 10 mm and be constructed of—

(A) wood, plasterboard or blockboard not less than 33 mm thick; or

(B) compressed fibre reinforced cement sheeting not less than 9 mm thick; or

(C) other suitable material with a mass per unit area not less than 24.4 kg/m^2; and

(b) in the case of a water supply pipe, it must—

(i) only be installed in *discontinuous construction*; and

(ii) in the case of a water supply pipe that serves one dwelling, not be fixed to the wall leaf on the side of any other dwelling and have a clearance not less than 10 mm to the other wall leaf.

(3) Electrical outlets must be offset from each other—

(a) in masonry walling, not less than 100 mm; and

(b) in timber or steel-framed walling, not less than 300 mm.

10.7.5 Acceptable forms of construction for masonry walls

[2019: Table 3.8.6.1a]

(1) Acceptable forms of construction for masonry walls are set out in (2) to (6).

(2) Two leaves of 110 mm clay brick masonry with—

(a) *cavity* not less than 50 mm between leaves; and

(b) 50 mm thick glass wool insulation with a density of 11 kg/m^3 or 50 mm thick polyester insulation with a density of 20 kg/m^3 in the *cavity*,

with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.5a.

(3) Two leaves of 110 mm clay brick masonry with—

(a) *cavity* not less than 50 mm between leaves; and

(b) 13 mm cement render on each outside face,

with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.5b.

(4) Single leaf of 110 mm clay brick masonry with—

(a) a row of 70 mm x 35 mm timber studs or 64 mm steel studs at 600 mm centres, spaced 20 mm from the masonry wall; and

(b) 50 mm thick mineral insulation or glass wool insulation with a density of 11 kg/m^3 positioned between studs; and

(c) one layer of 13 mm plasterboard fixed to outside face of studs and outside face of masonry,

with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.5c.

(5) Single leaf of 90 mm clay brick masonry with—

(a) a row of 70 mm x 35 mm timber studs or 64 mm steels studs at 600 mm centres, spaced 20 mm from each face of the masonry wall; and

(b) 50 mm thick mineral insulation or glass wool insulation with a density of 11 kg/m^3 positioned between studs in each row; and

(c) one layer of 13 mm plasterboard fixed to studs on each outside face, with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.5d.

(6) Single leaf of 220 mm brick masonry with 13 mm cement render on each face with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.5e.

Figure 10.7.5a: Two leaves of 110 mm clay brick masonry (method 1)

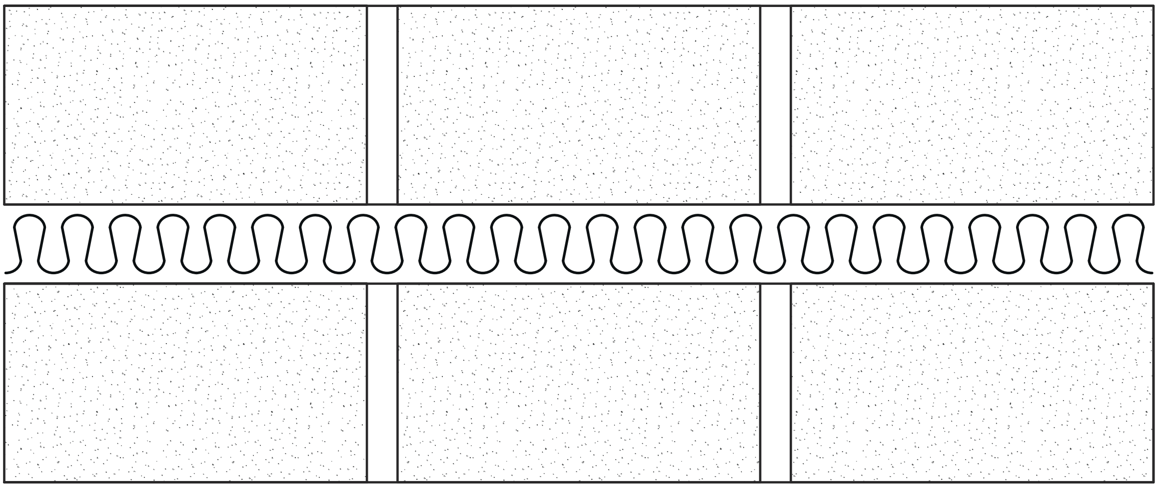


Figure 10.7.5b: Two leaves of 110 mm clay brick masonry (method 2)

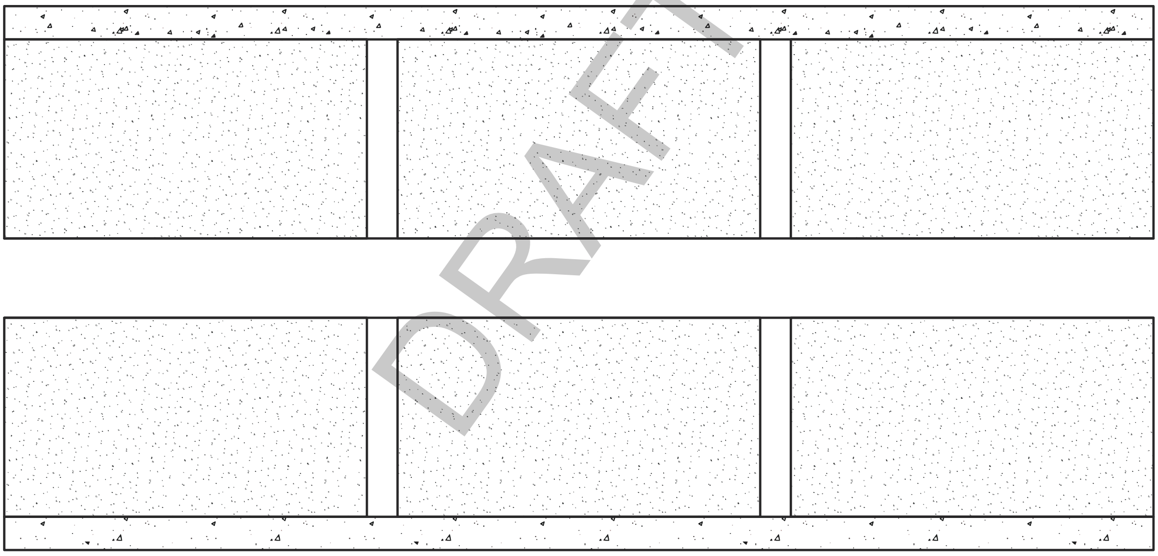


Figure 10.7.5c: Single leaf of 110 mm clay brick masonry

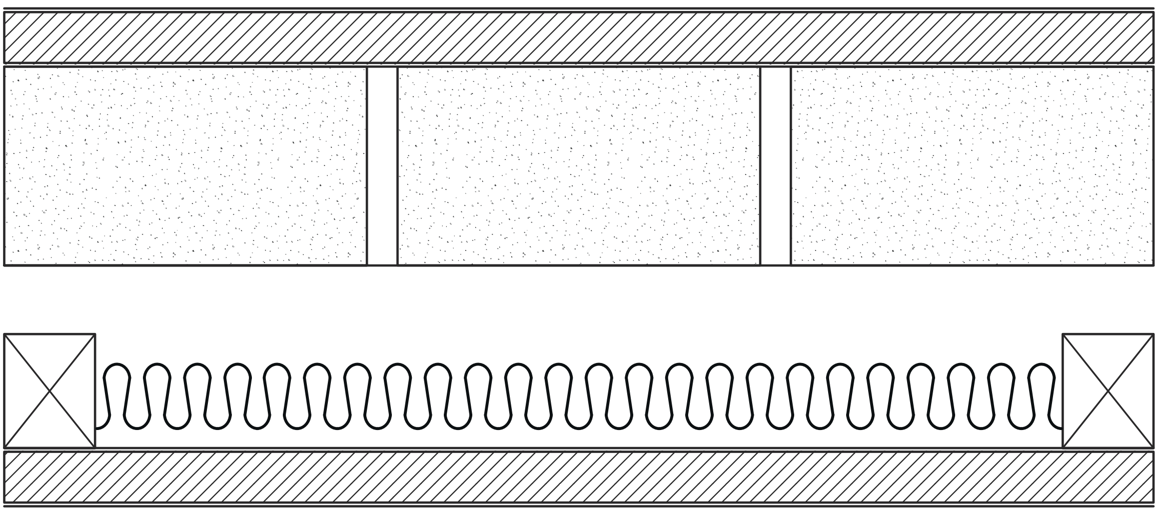


Figure 10.7.5d: Single leaf of 90 mm clay brick masonry

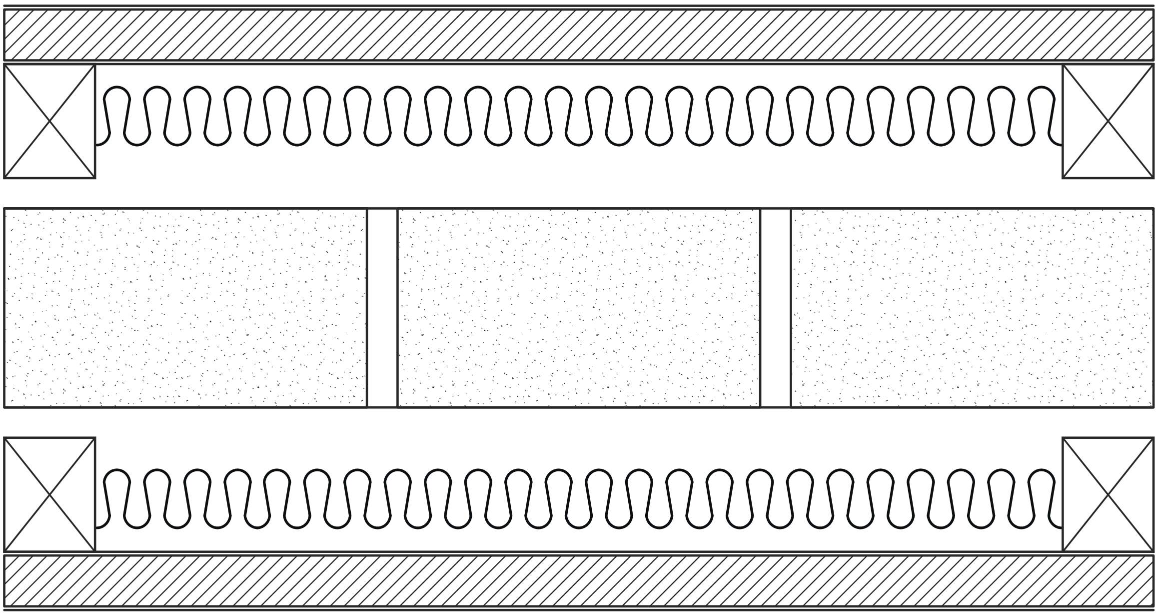
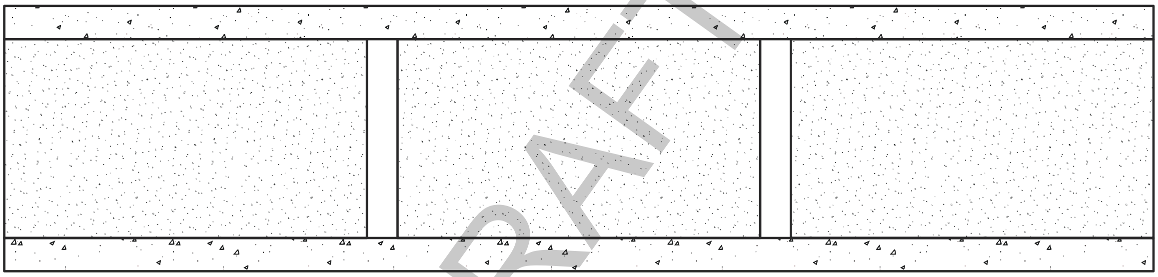


Figure 10.7.5e: Single leaf of 220 mm brick masonry with 13 mm cement render on each face



10.7.6 Acceptable forms of construction for concrete walls

[2019: Table 3.8.6.1b]

(1) Acceptable forms of construction for concrete walls are set out in (2) to (5).

(2) 150 mm thick plain off form concrete, with an with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.6a.

(3) 200 mm thick concrete panel with one layer of 13 mm plasterboard or 13 mm cement render on each face, with an with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.6b.

(4) 100 mm thick concrete panel with—

(a) a row of 64 mm steel studs at 600 mm centres, spaced 25 mm from the concrete panel; and

(b) 80 mm thick polyester insulation or 50 mm thick glass wool insulation with a density of 11 kg/m^3, positioned between studs; and

(c) two layers of 13 mm plasterboard fixed to outside face of studs and one layer of 13 mm plasterboard fixed to outside face of concrete panel,

with an with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.6c.

(5) 125 mm thick concrete panel with—

(a) a row of 64 mm steel studs at 600 mm centres, spaced 20 mm from the concrete panel; and

(b) 70 mm polyester insulation with a density of 9 kg/m^3, positioned between studs; and

(c) one layer of 13 mm plasterboard fixed to the outside face of the studs,

with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.6d.

Figure 10.7.6a: 150 mm thick plain off form concrete

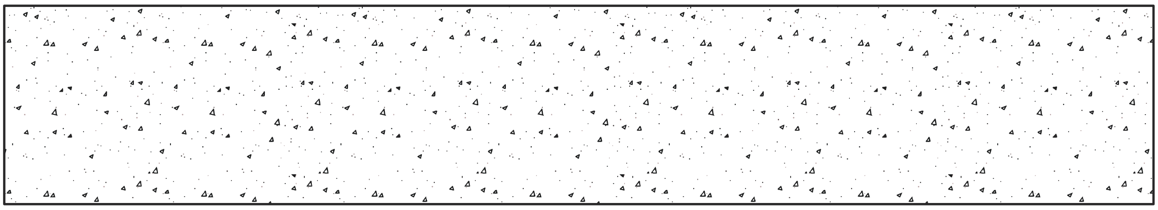


Figure 10.7.6b: 200 mm thick concrete panel

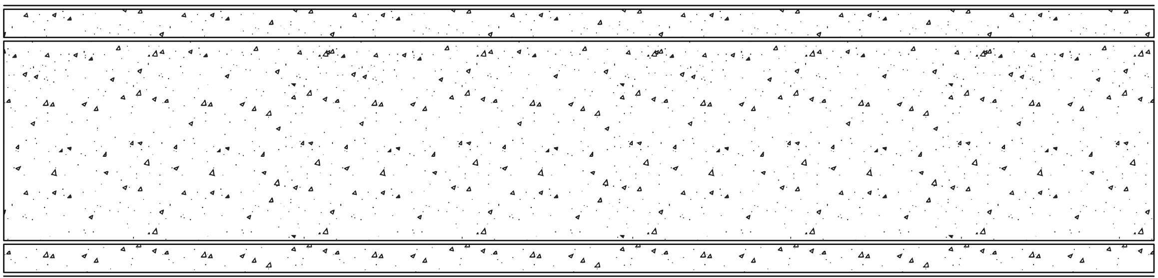


Figure 10.7.6c: 100 mm thick concrete panel

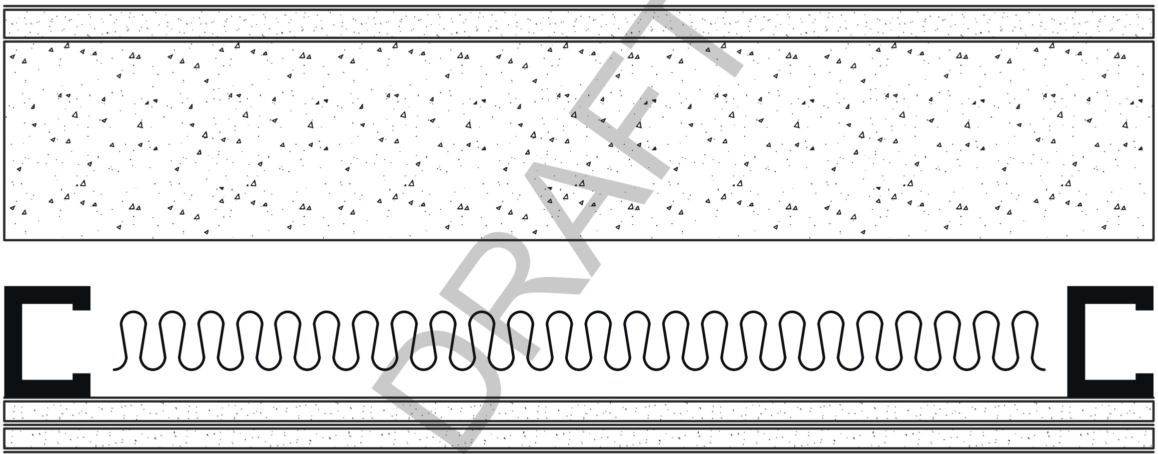
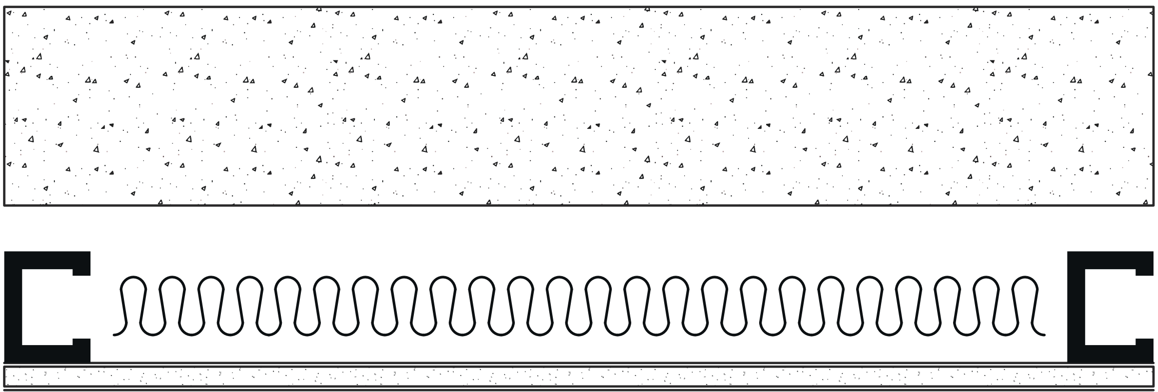


Figure 10.7.6d: 125 mm thick concrete panel



10.7.7 Acceptable forms of construction for autoclaved aerated concrete walls

[2019: Table 3.8.6.1c]

(1) Acceptable forms of construction for autoclaved aerated concrete walls are set out in (2) to (4).

(2) 75 mm thick autoclaved aerated concrete wall panel with—

(a) a row of 64 mm steel studs at 600 mm centres, spaced 20 mm from the autoclaved aerated concrete wall panel; and

(b) 75 mm thick glass wool insulation with a density of 11 kg/m^3 positioned between studs; and

(c) one layer of 10 mm moisture resistant plasterboard or 13 mm fire protective grade plasterboard fixed to outside face of studs and outside face of autoclaved aerated concrete wall panel,

with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.7a.

(3) 75 mm thick autoclaved aerated concrete wall panel with—

(a) a row of 64 mm steel studs at 600 mm centres, spaced 35 mm from the autoclaved aerated concrete panel wall; and

(b) 28 mm metal furring channels fixed to the outside face of the autoclaved aerated concrete wall panel, with 50 mm thick polyester insulation with a density of 9 kg/m^3 positioned between furring channels and one layer of 13 mm fire protective grade plasterboard fixed to furring channels; and

(c) 105 mm thick glass wool insulation with a density of 7 kg/m^3 positioned between studs; and

(d) one layer of 13 mm fire protective grade plasterboard fixed to the outside face of the studs,

with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.7b.

(4) Two leaves of 75 mm autoclaved aerated concrete wall panel with—

(a) a *cavity* not less than 30 mm between panels containing 50 mm glass wool insulation with a density of 11 kg/m^3; and

(b) one layer of 10 mm plasterboard fixed to outside face of each panel,

with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.7c.

Figure 10.7.7a: 75 mm thick autoclaved aerated concrete wall panel (method 1)

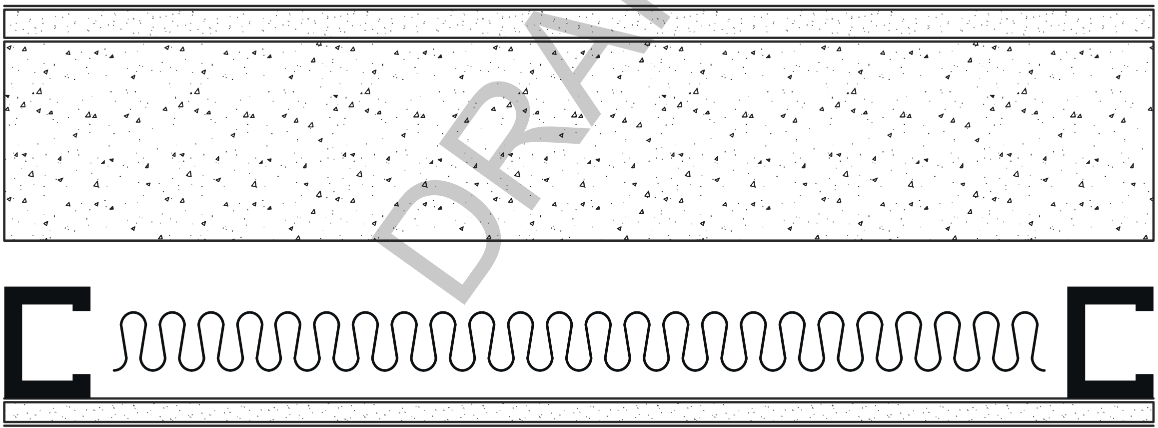


Figure 10.7.7b: 75 mm thick autoclaved aerated concrete wall panel (method 2)

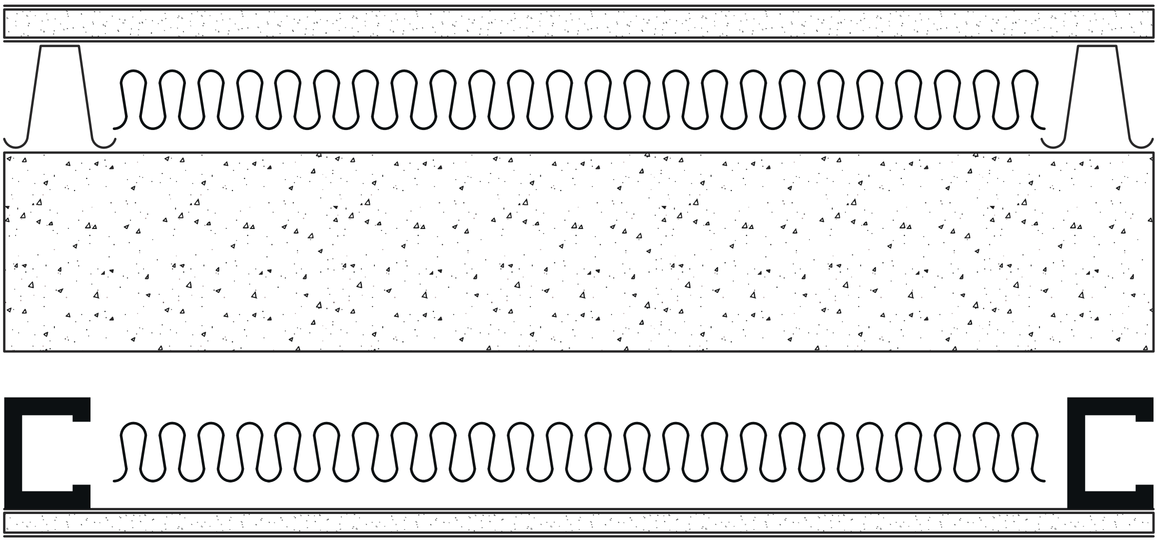
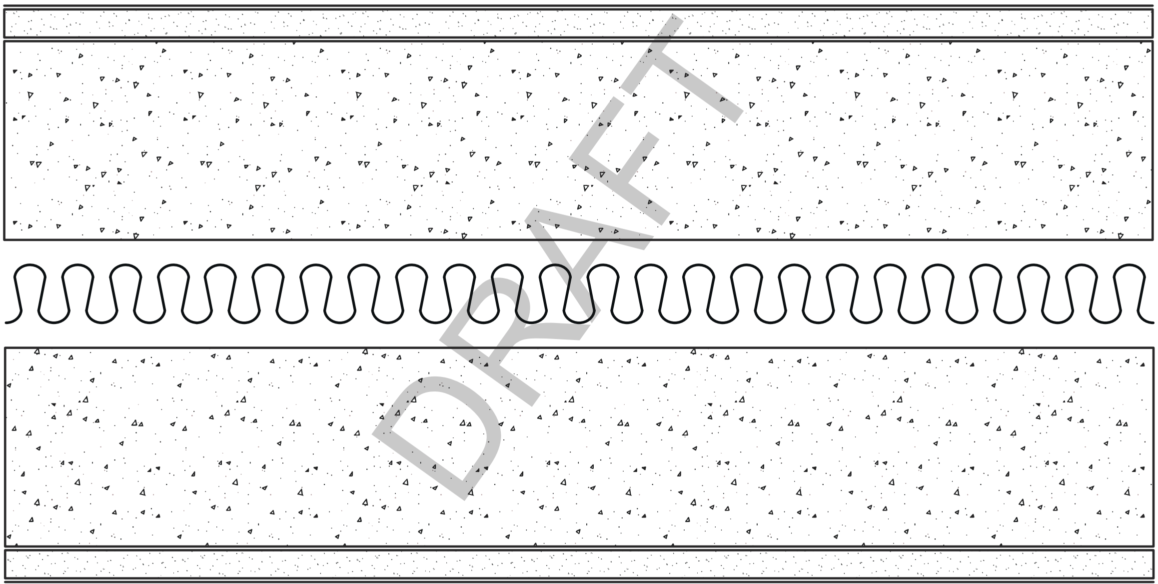


Figure 10.7.7c: Two leaves of 75 mm autoclaved aerated concrete wall panel



10.7.8 Acceptable forms of construction for timber and steel framed walls

[2019: Table 3.8.6.1d]

(1) Acceptable forms of construction for timber and steel framed walls are set out in (2) and (3).

(2) Two rows of 90 x 35 mm timber studs or two rows of 64 mm steels studs at 600 mm centres with—

(a) an air gap not less than 20 mm between the rows of studs; and

(b) 50 mm thick glass wool insulation or 60 mm thick polyester insulation with a density of 11 kg/m³; positioned between one row of studs, and

(c) two layers of 13 mm fire protective grade plasterboard or one layer of 6 mm fibre cement sheet and one layer of 13 mm fire protective grade plasterboard, fixed to outside face of studs,

with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.8a.

(3) Two rows of 64 mm steel studs at 600 mm centres with—

(a) an air gap not less than 80 mm between the rows of studs; and

(b) 200 mm thick polyester insulation with a density of 14 kg/m^3 positioned between studs; and

(c) one layer of 13 mm fire-protective grade plasterboard and one layer 13 mm plasterboard on one outside face and one layer of 13 mm fire-protective grade plasterboard on the other outside face,

with an $R_w + C_{tr}$ of not less than 50, constructed in accordance with Figure 10.7.8b.

Figure 10.7.8a: Two rows of 90 mm x 35 mm timber studs or two rows of 64 mm steels studs at 600 mm centres

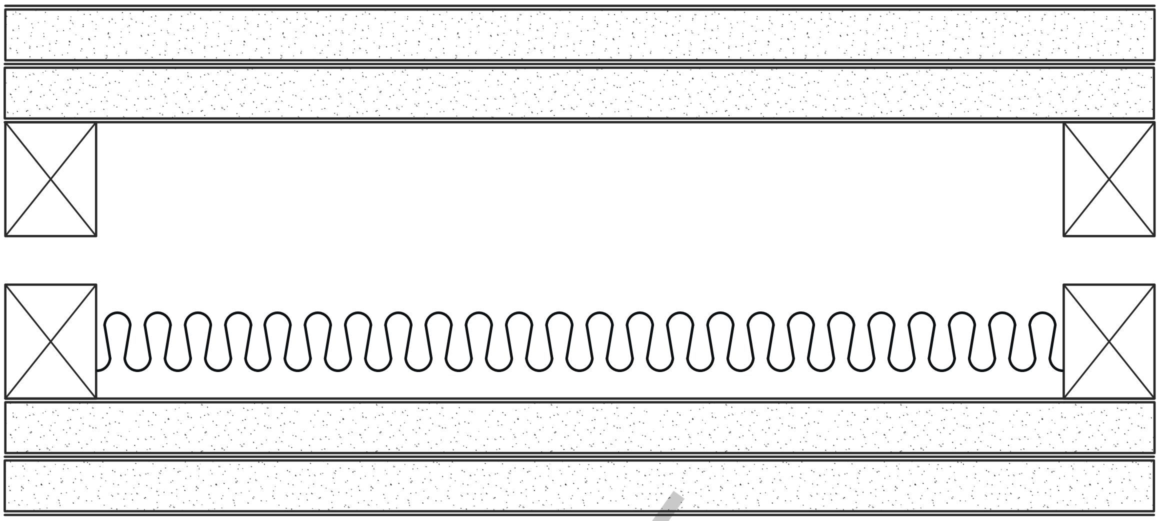
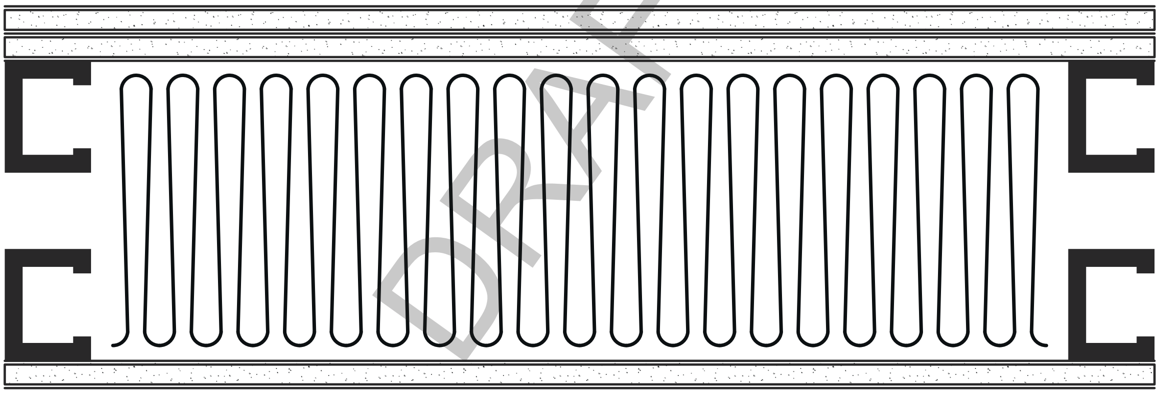


Figure 10.7.8b: Two rows of 64 mm steel studs at 600 mm centres



Part 10.8 Condensation management

10.8.1 Pliable building membrane

[2019: 3.8.7.2]

(1) Where a *pliable building membrane* is installed in an *external wall*, it must—

(a) comply with AS/NZS 4200.1; and

(b) be installed in accordance with AS 4200.2; and

(c) be a vapour permeable membrane for *climate zones* 6, 7 and 8; and

(d) be located on the exterior side of the primary insulation layer of wall assemblies that form the external envelope of a building.

(2) Except for single skin masonry or single skin concrete, where a *pliable building membrane* is not installed in an *external wall*, the primary *water control layer* must be separated from *water sensitive materials* by a drained cavity.

10.8.2 Flow rate and discharge of exhaust systems

[2019: 3.8.7.3]

(1) An exhaust system installed in a kitchen, bathroom, *sanitary compartment* or laundry must have a minimum flow rate of—

(a) 25 L/s for a bathroom or *sanitary compartment*; and

(b) 40 L/s for a kitchen or laundry.

(2) Exhaust from a bathroom, *sanitary compartment*, or laundry must be discharged—

(a) directly or via a shaft or duct to *outdoor air*; or

(b) to a roof space that is ventilated in accordance with 10.8.3.

10.8.3 Ventilation of roof spaces

[2019: 3.8.7.4]

(1) Where an exhaust system covered by 10.8.2 discharges into a roof space, the roof space must be ventilated to *outdoor air* through evenly distributed openings.

(2) Openings *required* by (1) must have a total unobstructed area of 1/300 of the respective ceiling area if the roof pitch is more than 22°, or 1/150 of the respective ceiling area if the roof pitch is not more than 22°.

(3) 30% of the total unobstructed area *required* by (2) must be located not more than 900 mm below the ridge or highest point of the roof space, measured vertically, with the remaining *required* area provided by eave vents.

11 Safe movement and access

Part 11.1 Scope and application of Section 11

11.1.1 Scope

[New for 2022]

This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for—

(a) stairway and ramp construction (see Part 11.2); and

(b) barriers and handrails (see Part 11.3).

11.1.2 Application

[New for 2022]

The application of Section 11 of the ABCB Housing Provisions is subject to the following:

(a) The Governing Requirements of NCC 2022 Volume Two.

(b) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 11 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practices for Parts 3.9.1 and 3.9.2 of NCC 2019 Volume Two.

Part 11.2 Stairway and ramp construction

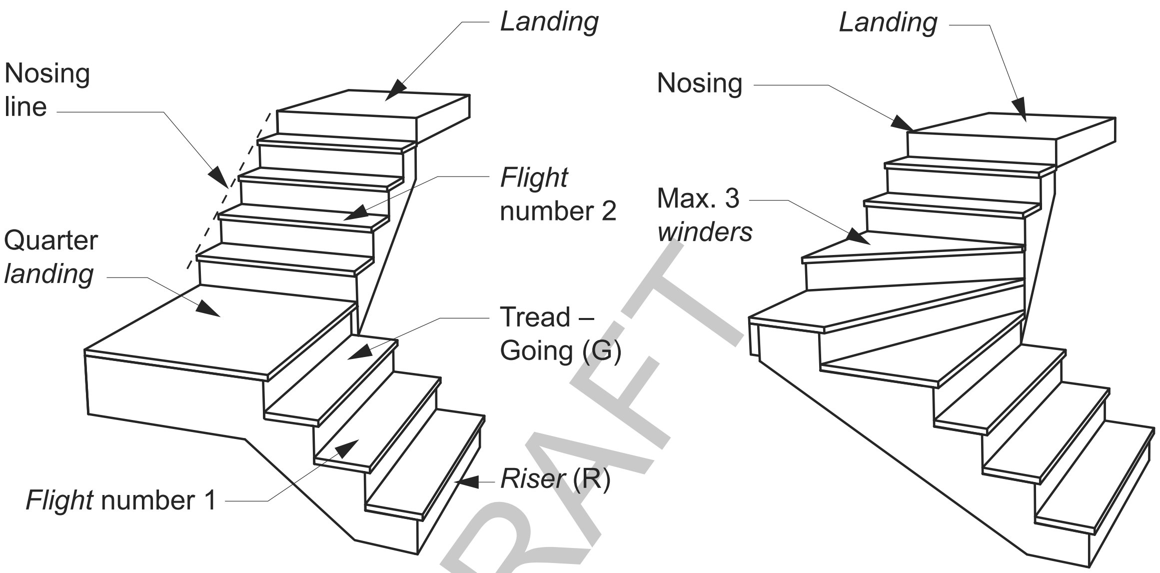
11.2.1 Explanation of terms

[2019: 3.9.1.0]

(1) Figure 11.2.1 depicts stairway members and associated terminology used to describe them in the ABCB Housing Provisions.

(2) Some items such as barriers and handrails have been omitted for clarity.

Figure 11.2.1: Stairway terms



(a) Quarter landing stairway – 2 flights

(b) Continuous stairway – 1 flight (90° change in direction)

Explanatory Information: Alpine areas

The requirements of this Part are to be read in conjunction with Part 12.2 where a building is located in an *alpine area* and contains an external stairway or ramp.

Explanatory Information: Room heights

Part 10.3 contains the *required* height for a ceiling above a stairway, ramp or *landing*, measured vertically above the nosing line of stairway treads or the floor surface of a ramp or *landing*.

11.2.2 Stairway construction

[2019: 3.9.1.2]

(1) A stairway must be designed to take loading forces in accordance with AS/NZS 1170.1 and must have—

(a) not more than 18 and not less than 2 *risers* in each *flight*; and

(b) *Goings* (G), *risers* (R) and a slope relationship quantity (2R + G) in accordance with Table 11.2.2a, except as permitted by (2) and (3); and

(c) constant *goings* and *risers* throughout each *flight*, except as permitted by (3) and (4), and the dimensions of *goings*(G) and *risers* (R) in accordance with (1), (2) and (3) are considered constant if the variation between—

(i) adjacent *risers*, or between adjacent *goings*, is no greater than 5 mm; and

(ii) the largest and smallest *riser* within a *flight*, or the largest and smallest going within a *flight*, does not exceed 10 mm; and

(d) *risers* which do not have any openings that would allow a 125 mm sphere to pass through between the treads; and

(e) treads of solid construction (not mesh or other perforated material) if the stairway is more than 10 m high or connects more than 3 storeys.

(2) In the case of a stairway serving only non-*habitable rooms*, such as attics, storerooms and the like that are not used on a regular or daily basis—

(a) the *going*(G), *riser* (R) and slope relationship quantity (2R + G) in accordance with Table 11.2.2a may be substituted with those in Table 11.2.2b; and

(b) need not comply with (1)(d).

(3) In the case of a stairway with *winders*—

(a) a maximum of 3 consecutive *winders* in lieu of a quarter *landing* in a *flight* and a maximum of 6 consecutive *winders* in lieu of a half *landing* in a *flight*; and

(b) the *going* (G) of all *winders* in lieu of a quarter or half *landing* may vary from the *going* of the straight treads within the same *flight* provided that the *going* (G) of such *winders* is constant.

(4) The point of measurement of the *going* (G) in the slope relationship quantity (2R + G) for *tapered treads* and treads in *spiral stairways* as described in Table 11.2.2a (see Figure 11.2.2a to Figure 11.2.2c) must be—

(a) for *tapered treads*, other than treads in a *spiral stairway*—

(i) not more than 1 m in width, the middle of the unobstructed width of the stairway (see Figure 11.2.2b); and

(ii) more than 1 m in width, 400 mm from the unobstructed width of each side of the stairway (see Figure 11.2.2c); and

(b) for treads in *spiral stairways*, the point seven tenths of the unobstructed width from the face of the centre pole or support towards the handrail side (see Figure 11.2.2d and Figure 11.2.2e).

(5) *Riser* and *going* dimensions must be measured in accordance with Figure 11.2.2f.

Table 11.2.2a: Riser and going dimensions (mm)

Stair type	Riser (R) (see Figure 11.2.2f)		Going (G) (see Figure 11.2.2f)		Slope relationship (2R+G)	
	Max	Min	Max	Min	Max	Min
Stairs (other than spiral)	190	115	355	240	700	550
Spiral	220	140	370	210	680	590

Table Notes:

Riser and *going* dimensions must be measured in accordance with Figure 11.2.2f

Table 11.2.2b: Riser and going dimensions (mm) — stairways serving non-habitable rooms used infrequently

Riser (R)		Going (G)		Slope relationship (2R+G)	
Max	Min	Max	Min	Max	Min
225	130	355	215	700	540

Table Notes:

The *going* (G) must be not more than the tread depth plus a maximum gap of 30 mm between the rear edge of one tread and the nosing of the tread above.

Figure 11.2.2a: **Measurement of slope relationship — Plan view — Stair with 2 flights**

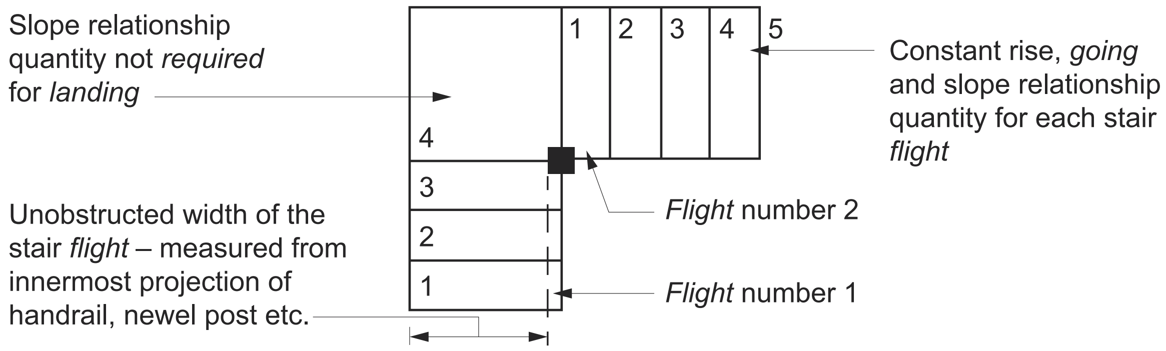


Figure 11.2.2b: **Measurement of slope relationship — Plan view — Tapered treads not more than 1 m wide**

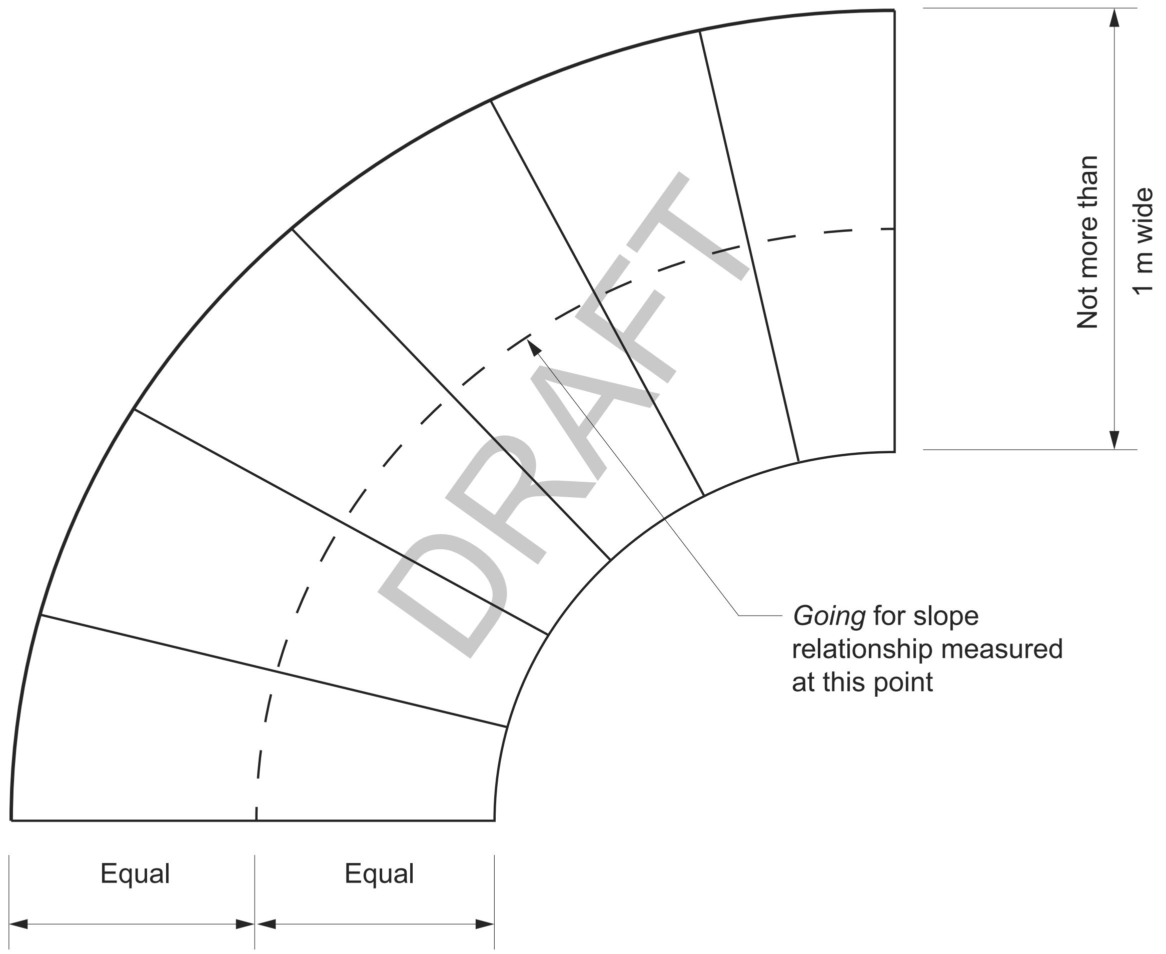


Figure 11.2.2c: Measurement of slope relationship — Plan view —Tapered treads more than 1 m wide

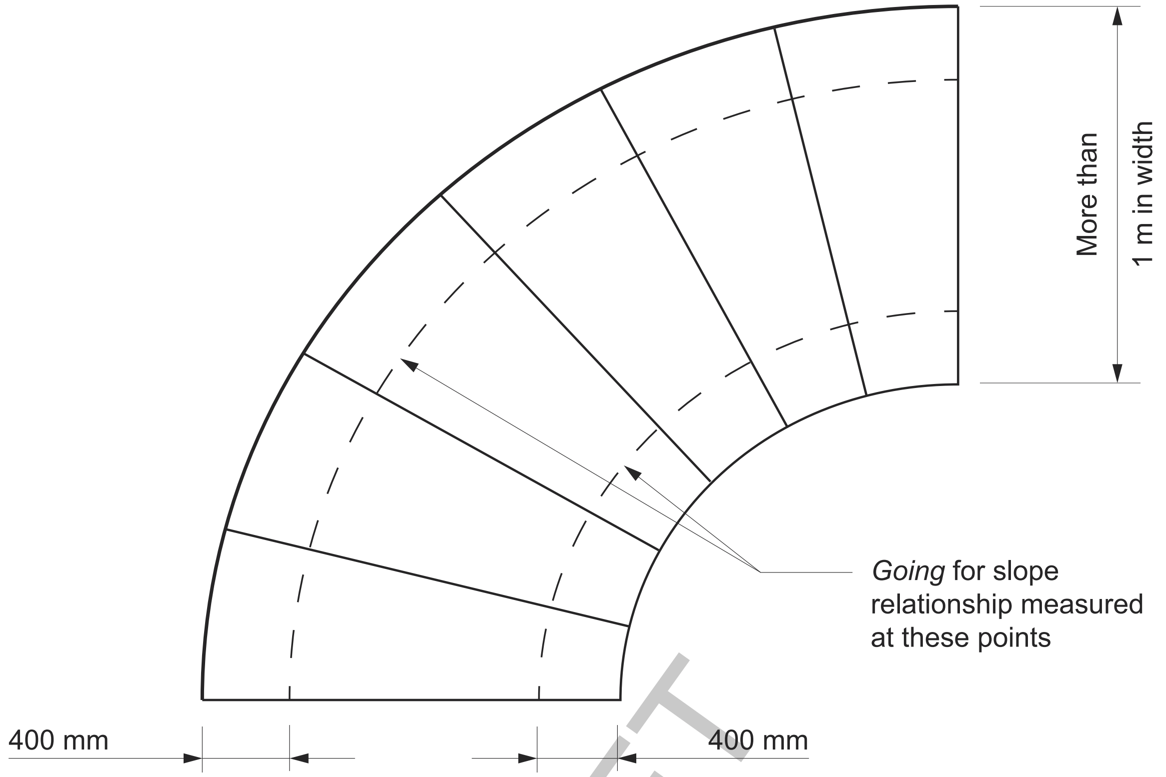


Figure 11.2.2d: Spiral stairs — Measurement for slope relationship

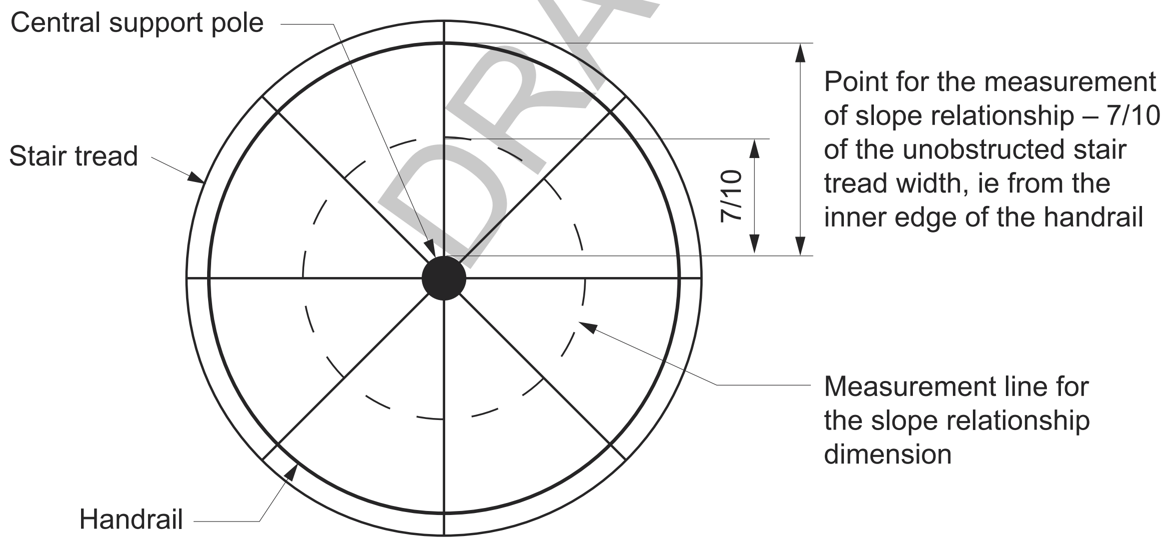


Figure 11.2.2e: Spiral stairs — Measurement of openings in stairs

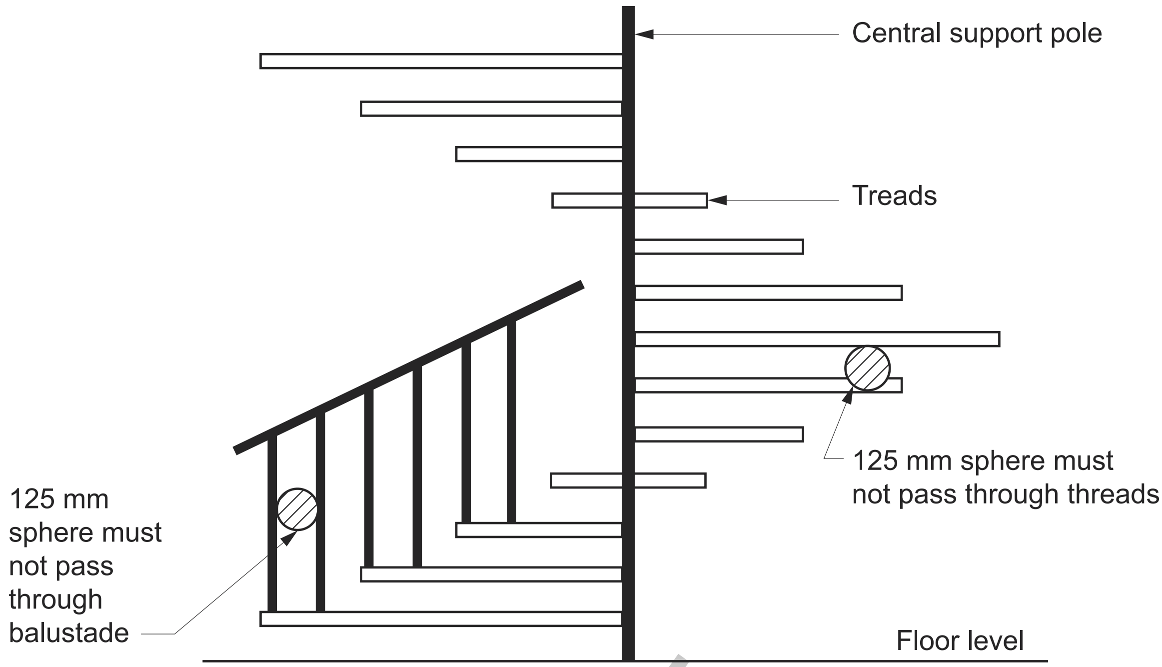
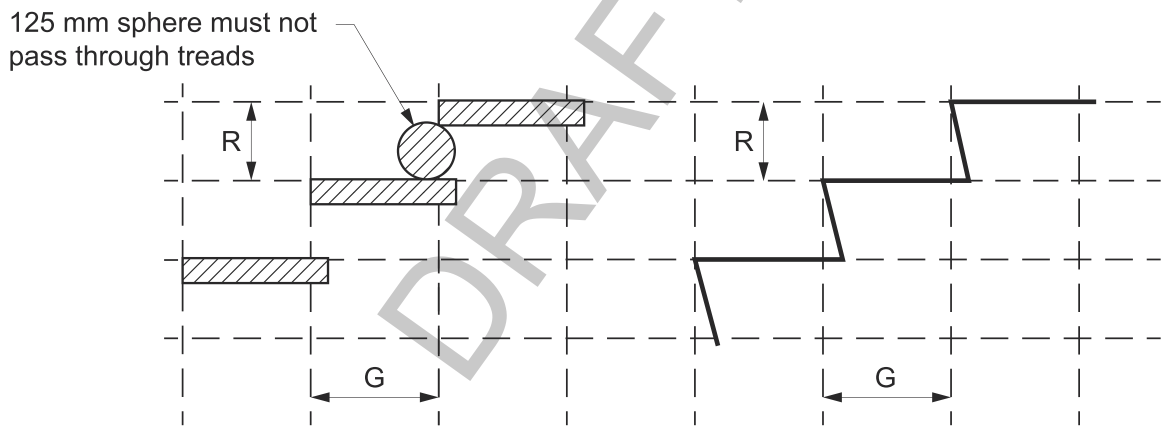


Figure 11.2.2f: Riser and going dimensions — Measurement



Explanatory Information: Not more than 18 and not less than 2 risers

11.2.2(1)(a) states that a stairway must have not more than 18 and not less than 2 *risers* in each *flight*. Where there are less than 2 *risers* in a *flight*, it does not comprise a stairway for the purpose of the NCC. 18 risers is considered to be the maximum reasonable number that an average person can negotiate before requiring a rest. Winders are counted as part of the maximum number of 18 *risers*. More than 1 *riser* is considered necessary for a person to observe and adjust to a change in level.

Explanatory Information: Going and riser dimensions

The purpose of 11.2.2 is to achieve constant *going* and *riser* dimensions deemed safe for people to walk up and down. This minimises the risk of people overstepping during descent on uneven stairs (due to short *goings*) and tripping on ascent (due to high *risers*). Table 11.2.2a and Table 11.2.2b express ratios between *going* and *riser* dimensions which are considered safe for use. 11.2.2(1)(c) accounts for conditions such as movement of materials due to atmospheric moisture changes or minor deviations related to variations in materials which affect finished stair dimensions.

Explanatory Figure 11.2.2a illustrates adjacent *risers* within a *flight* with minor deviations in the materials affecting the finished stair dimensions. The nominated *riser* height is exceeded by *riser* A. As a consequence *riser* height B is less than the nominated *riser* height. The difference between *riser* A and *riser* B cannot exceed 5 mm.

Explanatory Figure 11.2.2b illustrates an entire *flight* with minor deviations in the materials affecting the finished *riser* dimensions. In addition to the 5 mm difference permitted between adjacent *goings* or *risers*, the maximum difference between the smallest and largest *going* or *riser* within a *flight* must not exceed 10 mm. Despite the deviations shown in both diagrams, the stairs in the *flight* are deemed constant. Irrespective of any minor deviations permitted by 11.2.2(1)(c), finished *going* and *riser* dimensions must not exceed the limitations stipulated in Table 11.2.2a.

Figure 11.2.2a (explanatory): Minor deviations in a stairway — deviation in adjacent risers

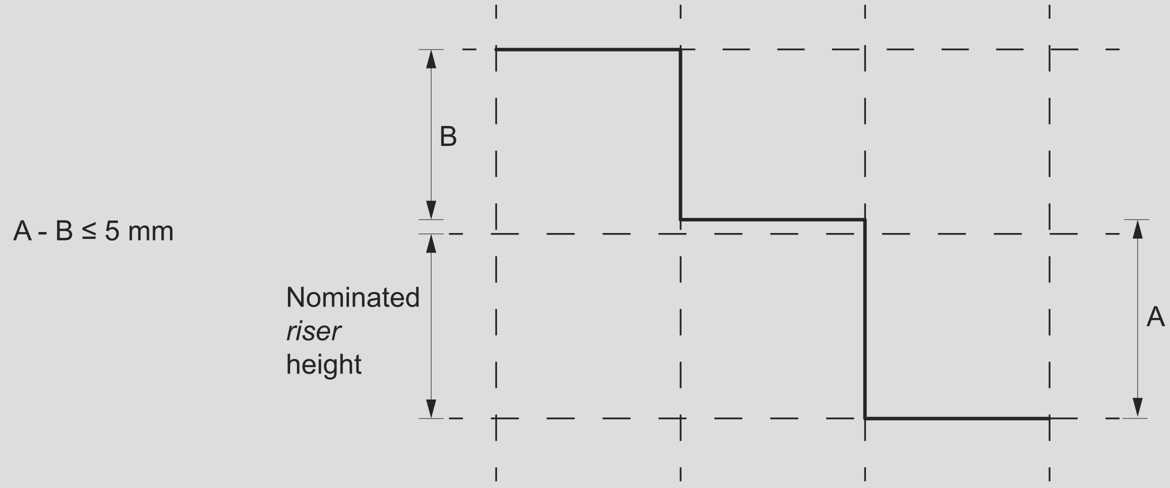


Figure Notes:

1. A = larger *riser* of two adjacent *riser*.
2. B = smaller *riser* of two adjacent *riser*.
3. This diagram only shows deviations in *risers*, however the same principle can apply for *goings*.

Figure 11.2.2b (explanatory): Minor deviations in a stairway – deviations over a flight

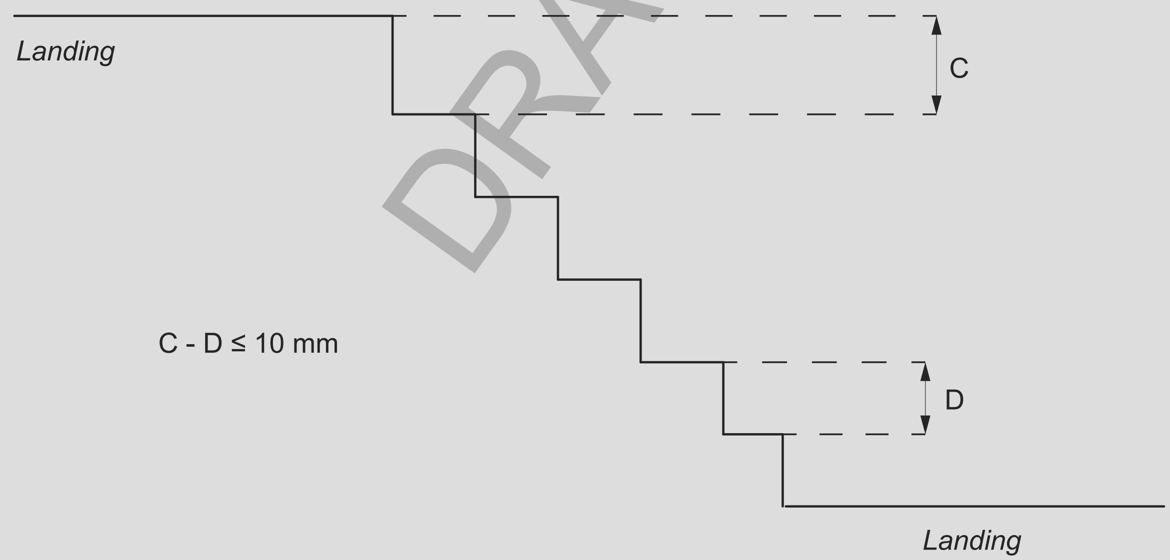


Figure Notes:

1. C = largest *riser* of the *flight*.
2. D = smallest *riser* of the *flight*.
3. This diagram only shows deviations in *risers*, however the same principle can apply for *goings*.

Explanatory Information: Openings in stair risers

11.2.2(1)(d) allows the use of open *riser* stairs. However, it limits the openings to 125 mm to minimise the risk of a person (especially a young child) falling through the opening created by the open *riser*.

Explanatory Information: Solid treads

11.2.2(1)(e) specifies a height where solid treads must be used so that people cannot see through them. This minimises the risk of people being affected by vertigo.

Explanatory Information: Stairways with winders

1. 11.2.2(3) allows the use of *winders* in stairways. However, 11.2.2(3) places a restriction on the number of allowable *winders* in a stairway *flight*, this restriction would apply equally to not permit a stairway incorporating a consecutive series of *winders* in a *flight*.
2. This also means the maximum number of consecutive *winders* in any stairway *flight* is 6.

11.2.3 Ramps

[2019: 3.9.1.3]

An external ramp serving an external doorway or a ramp within a building must—

- (a) be designed to take loading forces in accordance with AS/NZS 1170.1; and
- (b) have a gradient not steeper than 1:8; and
- (c) be provided with *landings* complying with 11.2.5 at the top and bottom of the ramp and at intervals not greater than 15 m.

Notes: Livable housing design

Where an external ramp is provided for the purposes of compliance with the ABCB Standard for Livable Housing Design, the requirements of that Standard override the requirements of 11.2.3.

Explanatory Information:

In relation to external ramps, 11.2.3 applies to a ramp serving an external door. For the purpose of 11.2.3 a driveway is not considered to be a ramp.

11.2.4 Slip resistance

[2019: 3.9.1.4]

(1) The requirements for slip-resistance treatment to stair treads, ramps and *landings* are as set out in (2), (3) and (4).

(2) Treads must have—

- (a) a surface with a slip-resistance classification not less than that listed in Table 11.2.4 when tested in accordance with AS 4586; or
- (b) a nosing strip with a slip-resistance classification not less than that listed in Table 11.2.4 when tested in accordance with AS 4586.

(3) The floor surface of a ramp must have a slip-resistance classification not less than that listed in Table 11.2.4 when tested in accordance with AS 4586.

(4) *Landings*, where the edge leads to the *flight* below, must have—

- (a) a surface with a slip-resistance classification not less than that listed in Table 11.2.4 when tested in accordance with AS 4586, for not less than 190 mm from the stair nosing; or
- (b) a nosing strip with a slip-resistance classification not less than that listed in Table 11.2.4 when tested in accordance with AS 4586.

Explanatory Information:

1. To determine the appropriate surface of a tread or the floor surface of a ramp, it is necessary to determine the likely conditions the tread or ramp will be subject to over the life of the building. This can be either dry, wet or both. A dry surface is one that is not normally wet or likely to be made wet other than by an accidental spill. A wet surface is

one that is normally wet or likely to be made wet, including areas exposed to the weather.

2. Under 11.2.4(2) stair treads must have a surface or nosing strip which minimises the risk of people slipping and injuring themselves. In each case the surface or nosing must have a slip-resistance classification when tested in accordance with AS 4586. There are two tests (the Wet Pendulum Test or the Oil-Wet Inclining Platform Test) and two conditions (dry or wet) to be considered.
3. Under 11.2.4(3) the floor surface of a ramp must be slip-resistant to minimise the risk of people slipping and injuring themselves. The surface must have a slip-resistance classification when tested in accordance with AS 4586.

Table 11.2.4: Slip-resistance classification

Application	Dry surface conditions	Wet surface conditions
Ramp not steeper than 1:8	P4 or R10	P5 or R12
Tread surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

11.2.5 Landings

[2019: 3.9.1.5]

(1) *Landings* must—

(a) be not less than 750 mm long and where this involves a change in direction, the length is measured 500 mm from the inside edge of the *landing* (see Figure 11.2.5a); and

(b) have a gradient not steeper than 1:50; and

(c) be provided where the sill of a threshold of a doorway opens onto a stairway or ramp that provides a change in floor level or floor to ground level greater than 3 risers or 570 mm (see Figure 11.2.5b); and

(d) extend across the full width of a doorway.

(2) In the case of a stairway serving only non-*habitable rooms*, such as attics, storerooms and the like that are not used on a regular or daily basis, the requirements of (1)(a) may be substituted with a minimum length of *landing* being not less than 600 mm long.

Figure 11.2.5a: Landings

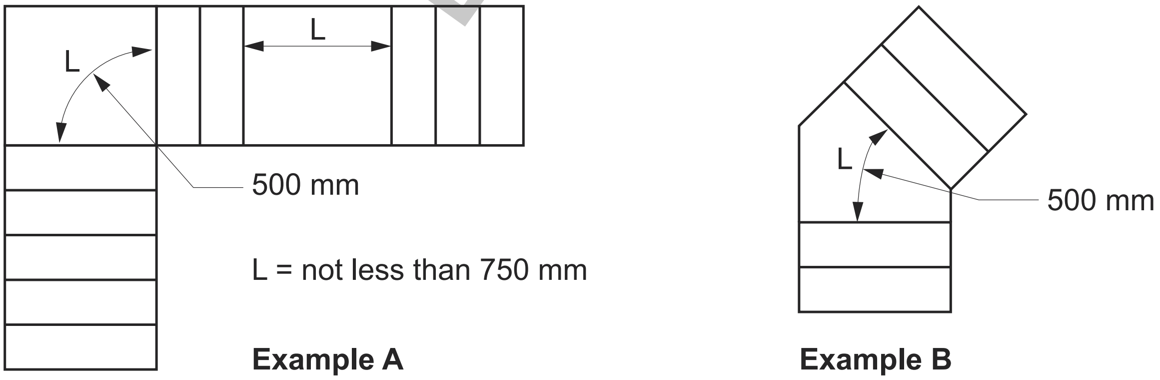
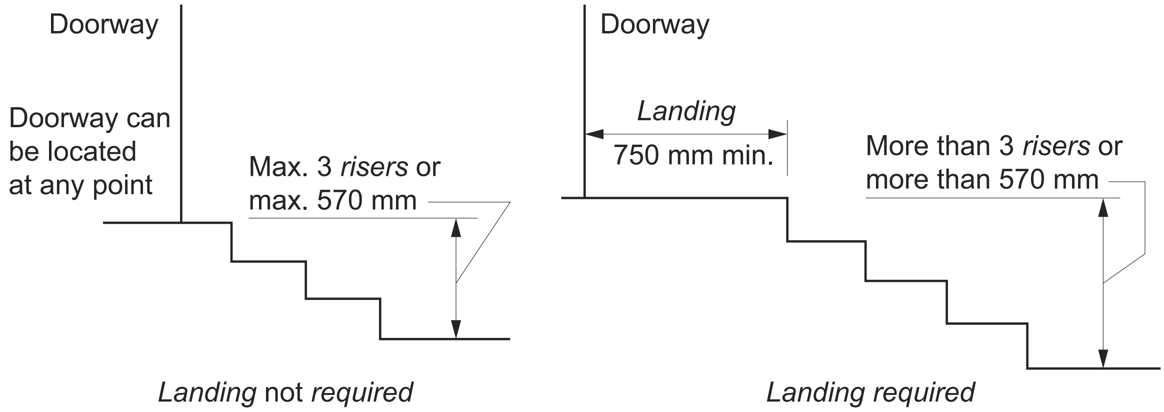


Figure 11.2.5b: **Threshold landing**



Explanatory Information: Purpose of a landing

The purpose of a *landing* is to provide a rest area for people using the stairway or ramp, and to allow the stairway or ramp to change direction if needed.

Explanatory Information: Minimum landing length

The minimum length of a *landing* allows people using a stairway or ramp to rest, and reduces the risk of people falling more than one *flight* of stairs.

Explanatory Information: Maximum grade of 1:50

The maximum grade of 1 in 50 *required* under 11.2.5(1)(b) makes sure that the *landing* is as level as possible, but still allows a slight slope for drainage if necessary.

11.2.6 Thresholds

[2019: 3.9.1.6]

Where the threshold of a doorway is more than 230 mm above the adjoining surface it must incorporate steps having *riser* (R) and *going* (G) dimensions in accordance with 11.2.2.

Part 11.3 Barriers and handrails

11.3.1 Application of Part 11.3

[2019: 3.9.2.1]

Compliance with Part 11.3 is achieved by complying with—

(a) 11.3.2, 11.3.3 and 11.3.5 for barriers to prevent falls; and

(b) 11.3.4 for handrails; and

(c) 11.3.6 and 11.3.7 for protection of openable windows.

Explanatory Information: External trafficable structures

For a *required* barrier to an external trafficable structure in an *alpine area*, the requirements of this Part need to be read in conjunction with the requirements of Part 12.2.

Explanatory Information: Swimming pools

Safety barrier requirements for *swimming pools* are contained in H7D2.

Explanatory Information: Additional requirements

In addition to the requirements of this Part, a barrier and handrail must comply with the structural requirements of Part 2.2. The structural requirements refer to the barrier and/or handrail being designed and constructed to withstand any combinations of loads and other actions to which it may reasonably be subjected and the structural resistance of the materials and forms of construction used for the barrier or handrail.

A window forming a part of a barrier must comply with the glazing assembly provisions of Section 8, and therefore is not *required* to comply with AS/NZS 1170.1 (structural design actions - referenced in Part 2.2) as it is exempted by Section 8. The Section 8 provisions consider the wind loading on the glazing and human impact requirements.

11.3.2 Explanation of terms

[2019: 3.9.2.0]

(1) Figure 11.3.2 depicts typical stairway and barrier members and associated terminology.

(2) Some items have been omitted for clarity.

Figure 11.3.2: **Typical stairway and barrier members**

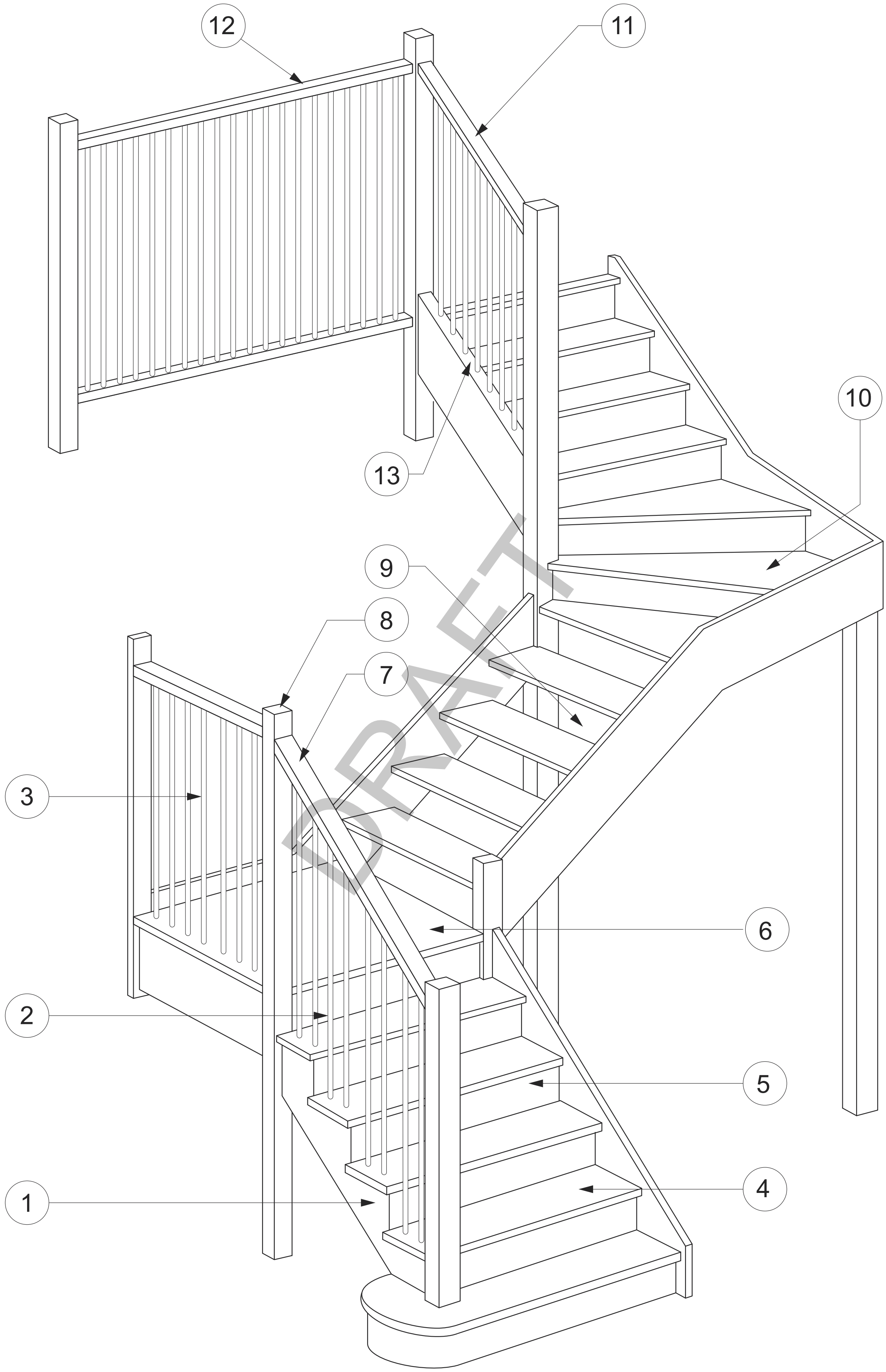


Figure Notes:

Legend:

1. Stringer

2. Baluster
3. Barrier
4. Tread
5. Riser
6. Landing
7. Handrail
8. Newel post
9. Winders (tapered treads)
10. Handrail
11. Landing barrier
12. Barrier

11.3.3 Barriers to prevent falls

[2019: 3.9.2.2]

(1) A continuous barrier must be provided along the side of a trafficable surface, such as—

(a) a stairway, ramp or the like; and

(b) a floor, corridor, hallway, balcony, deck, verandah, mezzanine, access bridge or the like; and

(c) a roof top space or the like to which general access is provided; and

(d) any delineated path of access to a building,

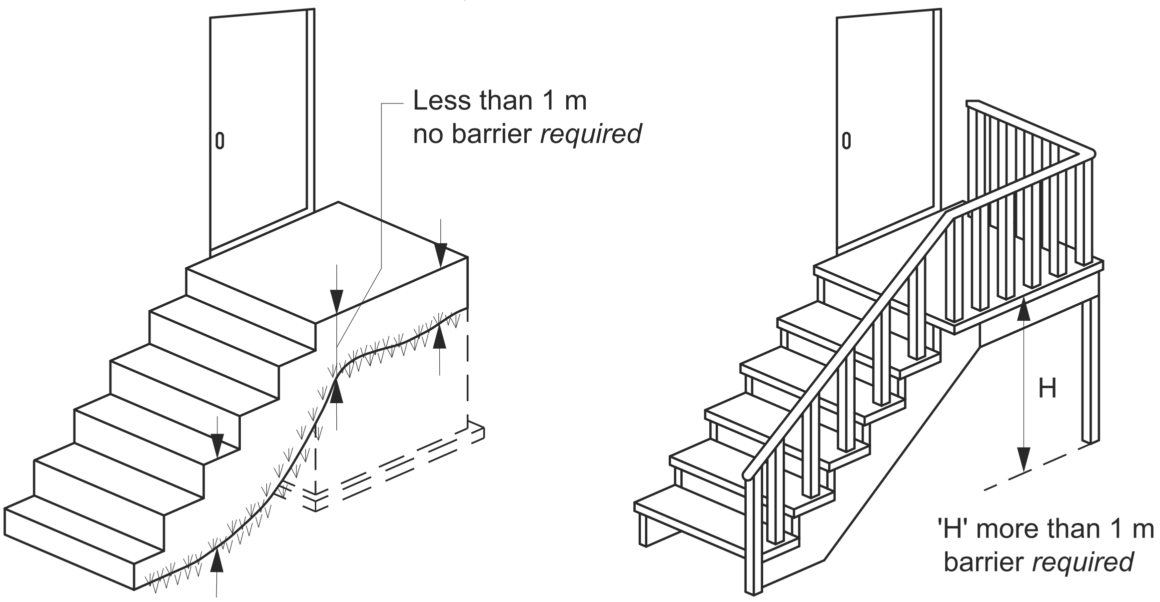
where it is possible to fall 1 m or more measured from the level of the trafficable surface to the surface beneath (see Figure 11.3.3a).

(2) The requirements of (1) do not apply to—

(a) a retaining wall unless the retaining wall forms part of, or is directly associated with, a delineated path of access to a building from the road, or a delineated path of access between buildings (see Figure 11.3.3b); or

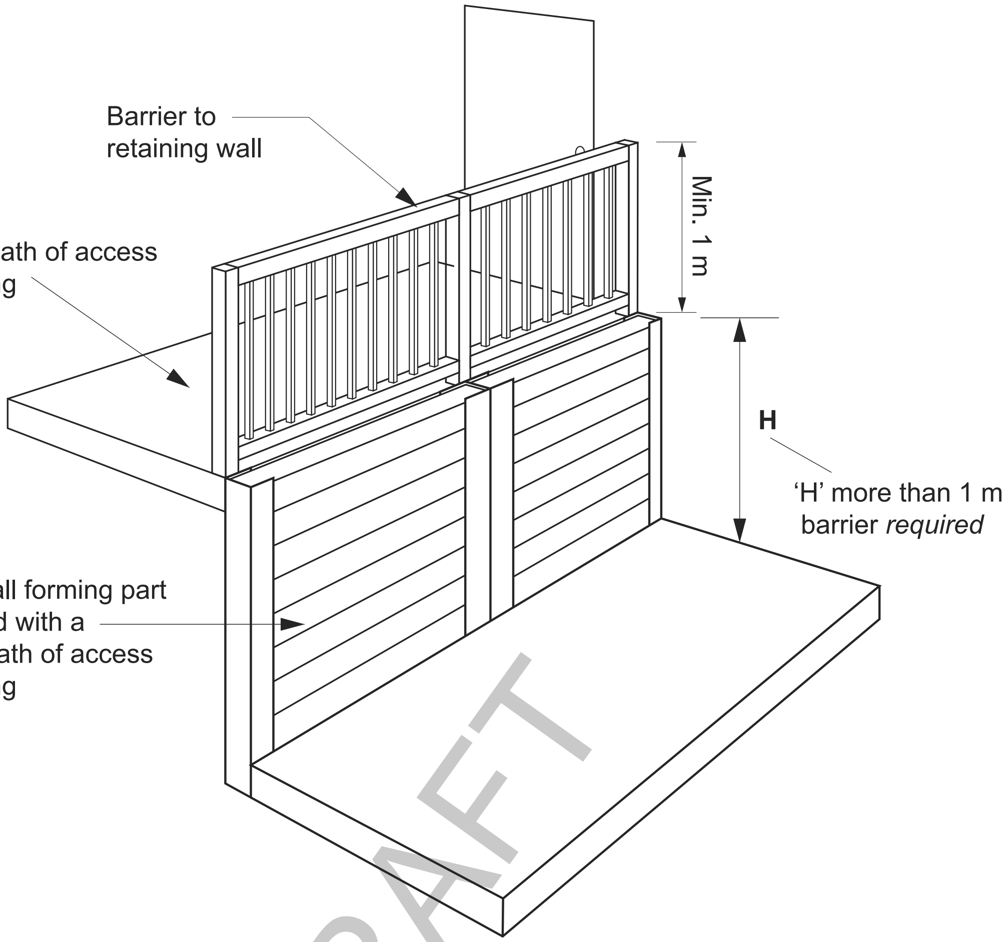
(b) a barrier provided to an openable window covered by 11.3.7 and 11.3.8.

Figure 11.3.3a: Barriers — when required



(a) Barrier not required **(b) Barrier required**

Figure 11.3.3b: Barriers — when required for retaining walls



Explanatory Information: Intent

The intent of the barrier requirements is to prescribe provisions to minimise the risk of a person falling from a stairway, raised floor level (such as a balcony) or the like. 11.3.3 sets out when barriers are *required* to be provided and 11.3.4 contains the requirements for the construction of barriers.

Explanatory Information: Barriers and children

Children are at particular risk of falling off, over or through ineffectively designed or constructed barriers. Accordingly the requirements of this Part aim to ensure that a barrier reduces the likelihood of children being able to climb over a barrier or fall through a barrier.

11.3.4 Construction of barriers to prevent falls

[2019: 3.9.2.3]

(1) A barrier *required* by 11.3.3 must comply with (2) to (10~~9~~).

(2) The height of a barrier must be in accordance with the following:

(a) The height must not be less than 865 mm above the nosings of the stair treads, the floor of a ramp or the like (see Figure 11.3.4a).

(b) The height must not be less than—

(i) 1 m above the floor of any *landing*, corridor, hallway, balcony, deck, verandah, access path, mezzanine, access bridge, roof top space or the like to which general access is provided (see Figure 11.3.3b and Figure 11.3.4a); or

(ii) 865 mm above the floor of a *landing* to a stairway or ramp where the barrier is provided along the inside edge of the *landing* and does not exceed a length of 500 mm.

(3) A transition zone may be incorporated where the barrier height changes from 865 mm on the stairway *flight* or ramp to 1 m at the *landing* (see Figure 11.3.4b).

(4) Openings in barriers (including decorative balustrades) must be constructed so that they do not permit a 125 mm sphere to pass through it and for stairways, the opening is measured above the nosing line of the stair treads (see Figure 11.3.4b).

(5) Where a barrier is fixed to the face of a *landing*, balcony, deck or the like, the opening between the barrier and the face must not permit a 40 mm sphere to pass through.

(6~~5~~) A barrier to a stairway serving a non-*habitable room*, such as an attic, storeroom or the like that is not used on a regular or daily basis, need not comply with (4) if—

(a) openings are constructed so that they do not permit a 300 mm sphere to pass through; or

(b) where rails are used, the barrier consists of a top rail and an intermediate rail, with the openings between rails not more than 460 mm.

(7~~6~~) Restriction on horizontal elements:

(a) Where it is possible to fall more than 4 m, any horizontal elements within the barrier between 150 mm and 760 mm above the floor must not facilitate climbing.

(b) For the purpose of (a), the 4 m is measured from the floor level of the trafficable surface to the surface beneath.

(8~~7~~) A barrier constructed of wire is deemed to meet the requirements of (4) if it is constructed in accordance with 11.3.6.

(9~~8~~) A glass barrier or *window* serving as a barrier must comply with H1D8 and the relevant provisions of this Part.

(10~~9~~) A barrier, except a *window* serving as a barrier, must be designed to take loading forces in accordance with AS/NZS 1170.1.

Figure 11.3.4a: Barrier construction

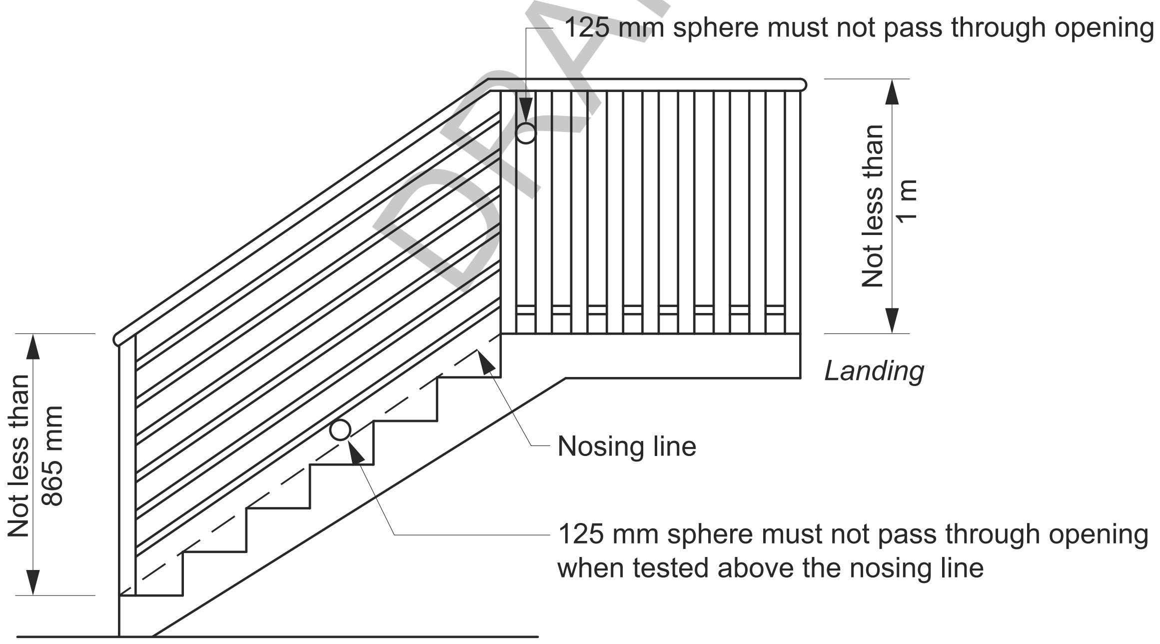
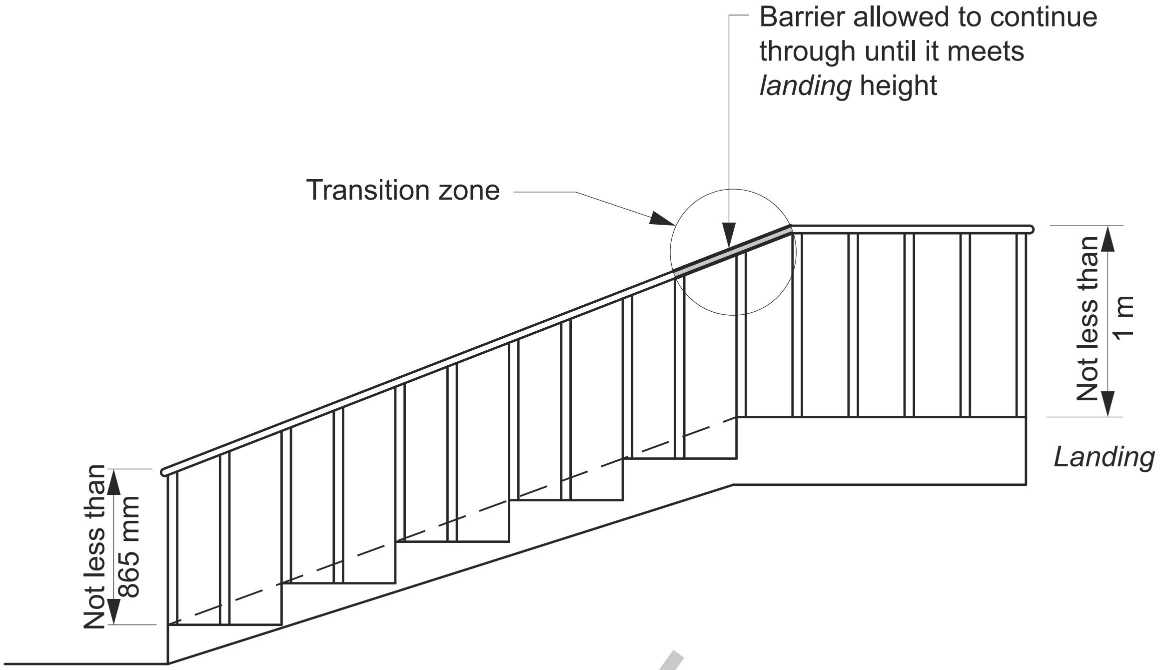


Figure 11.3.4b: **Measuring heights for barriers and handrails and where transition zones are allowed**



Explanatory Information:

For a *window* forming part of a barrier, any horizontal elements such as a *window* sill, transom or rail between 150 mm and 760 mm above the floor is deemed to facilitate climbing.

Section 8 contains the glazing assembly provisions for glass barriers and *windows* forming part of the barrier, however, the barrier would still need to comply with the relevant requirements of this Part for *required* height, allowable openings, etc.

11.3.5 Handrails

[2019: 3.9.2.4]

(1) Handrails to a stairway or ramp must—

(a) be located along at least one side of the stairway *flight* or ramp; and

(b) be located along the full length of the stairway *flight* or ramp, except in the case where a handrail is associated with a barrier the handrail may terminate where the barrier terminates; and

(c) have the top surface of the handrail not less than 865 mm vertically above the nosings of the stair treads or the floor surface of the ramp (see Figure 11.3.4b); and

(d) be continuous and have no obstruction on or above them that will tend to break a handhold, except for newel posts, ball type stanchions, or the like.

(2) The requirements of (1) do not apply to—

(a) a stairway or ramp providing a change in elevation of less than 1 m; or

(b) a *landing*; or

(c) a *winder* where a newel post is installed to provide a handhold.

Explanatory Information:

1. 11.3.5 addresses requirements regarding location, height and extent of handrails. Where a barrier and handrail are installed together, 11.3.5 is to be read in conjunction with 11.3.3, 11.3.4 and 11.3.6.
2. A handrail is *required* on at least one side of the stairway *flight* or ramp. The top rail of a barrier may be suitable as a handrail if it meets 11.3.5 and is able to be grasped by hand to provide support to the person using the stairway

or ramp.

3. 11.3.5(1)(b) requires a continuous handrail which must extend the full length of the stairway *flight* or ramp except where the handrail is associated with the barrier, in which case the handrail can terminate where the barrier is allowed to terminate. This allows for the barriers to geometric stairways such as elliptical, spiral, circular or curved stairways to finish a few treads from the bottom of the stairway.
4. 11.3.5(1)(c) requires a minimum handrail height of 865 mm. This height provides comfort, stability, support and assistance for most users.
5. 11.3.5(2) outlines where a handrail need not be provided, this includes—
   a. where a stairway or ramp is providing a change in elevation less than 1 m; or
   b. a *landing* for a stairway or ramp; or
   c. *winder* in a stairway if a newel post is installed to provide a handhold.

11.3.6 Construction of wire barriers

[2019: 3.9.2.5]

(1) A wire barrier is deemed to meet the requirements of 11.3.4(4) if it is constructed in accordance with (2) to (4).

(2) For a horizontal or near horizontal wire system—

(a) when measured with a strain indicator, it must be in accordance with the tension values in Table 11.3.6a; or

(b) when measured for a maximum permissible deflection, it must not exceed the maximum deflections in Table 11.3.6b.

(3) For a non-continuous vertical wire system—

(a) when measured with a strain indicator, it must be in accordance with the tension values in Table 11.3.6a (see Note 4); or

(b) when measured for maximum permissible deflection, it must not exceed the maximum deflections in Table 11.3.6b.

(4) For a continuous vertical or continuous near vertical sloped wire system—

(a) it must have wires of no more than 2.5 mm diameter with a lay of 7 x 7 or 7 x 19 construction; and

(b) changes in direction at support rails must pass around a pulley block without causing permanent deformation to the wire; and

(c) supporting rails must be spaced of not more than 900 mm apart and be of a material that does not allow deflection that would decrease the tension of the wire under load; and

(d) when the wire tension is measured with a strain indicator, it must be in accordance with the tension values in Table 11.3.6c when measured in the furthermost span from the tensioning device.

Table 11.3.6a: Wire barrier construction – Minimum required tension (N) for stainless steel horizontal wire

Wire dia. (mm)	Lay	Wire spacing (mm)	Clear distance between posts (mm)								
			600	800	900	1000	1200	1500	1800	2000	2500
2.5	7x7	60	55	190	263	415	478	823	1080	1139	x
		80	382	630	730	824	1025	1288	x	x	x
		100	869	1218	1368	x	x	x	x	x	x
2.5	1x19	60	35	218	310	402	585	810	1125	1325	x
		80	420	630	735	840	1050	1400	1750	x	x
		100	1140	1565	x	x	x	x	x	x	x
3.0	7x7	60	15	178	270	314	506	660	965	1168	1491
		80	250	413	500	741	818	1083	1370	1565	x

Wire dia. (mm)	Lay	Wire spacing (mm)	Clear distance between posts (mm)								
			600	800	900	1000	1200	1500	1800	2000	2500
		100	865	1278	1390	1639	x	x	x	x	x
3.0	1x19	60	25	183	261	340	520	790	1025	1180	x
		80	325	555	670	785	1025	1330	1725	1980	x
		100	1090	1500	1705	1910	x	x	x	x	x
4.0	7x7	60	196	422	480	524	760	1100	1358	1530	2130
		80	30	192	300	415	593	1105	1303	1435	1844
		100	853	1308	1487	1610	2048	2608	3094	3418	3849
4.0	1x19	60	5	5	10	15	20	147	593	890	1280
		80	30	192	300	415	93	1105	1303	1435	1844
		100	853	1308	1487	1610	2048	2608	3094	3418	3849
4.0	7x19	60	155	290	58	425	599	860	1080	1285	1540
		80	394	654	785	915	1143	1485	1860	2105	2615
		100	1038	1412	1598	1785	2165	2735	x	x	x

Table Notes:

1. Lay = number of strands by the individual wires in each strand. For example a lay of 7 x 19 consists of 7 strands with 19 individual wires in each strand.
2. Where a change of direction is made in a run of wire, the tensioning device is to be placed at the end of the longest span.
3. If a 3.2 mm diameter wire is used, the tension figures for 3.0 mm wire are applied.
4. This table may also be used for a set of non-continuous (single) vertical wires forming a barrier using the appropriate clear distance between posts as the vertical clear distance between the rails.
5. X = not allowed because the *required* tension would exceed the safe load of the wire.
6. Tension measured with a strain indicator.

Table 11.3.6b: Continuous wire barrier construction – Maximum permissible deflection of each wire in mm when a 2 kg mass is suspended at mid-span for stainless steel wires

Wire dia. (mm)	Wire spacing (mm)	Clear distance between posts (mm)					
		600	900	1200	1500	1800	2000
2.5	60	17	11	9	8	8	8
	80	7	5	5	5	x	x
3.0	60	19	13	8	7	7	7
	80	8	6	6	5	5	5
4.0	60	18	12	8	8	7	7
	80	8	6	4	4	4	4

Table Notes:

1. Where a change of direction is made in a run of wire, the 2 kg mass must be placed at the middle of the longest span.
2. If a 3.2 mm diameter wire is used, the deflection figures for a 3.0 mm wire are applied.
3. This table may also be used for a set of non-continuous (single) vertical wires forming a barrier using the appropriate clear distance between posts as the vertical clear distance between the rails.
4. The deflection (offset) is measured by hooking a standard spring scale to the mid span of each wire and pulling it horizontally until a force of 19.6 N is applied.
5. X = not allowed because the *required* tension would exceed the safe load of the wire.

6. This table has been limited to 60 mm and 80 mm spaces for 2.5 mm, 3 mm and 4 mm diameter wires because the required wire tensions at greater spacings would require the tension to be beyond the wire safe load limit, or the allowed deflection would be impractical to measure.

Table 11.3.6c: Continuous wire barrier construction—Minimum required tension (N) for vertical or near-vertical stainless steel wires where the maximum clear spacing between the rails is 900mm

Wire dia. (mm)	Lay	Wire spacing (mm)	Required tension in Newtons (N)
2.5	7 x 19	80	145
		100	310
		110	610
2.5	7 x 7	80	130
		100	280
		110	500

Table Notes:

1. Lay = number of strands by the number of individual wires in each strand. For example a lay of 7 x 19 consists of 7 strands with 19 individual wires in each strand.
2. Vertical wires must have two pulley blocks to each 180 degree change of direction in the wire.
3. Near vertical wires may only *require* one pulley block for each change of direction.
4. Wire tension measured with a strain indicator.
5. The table only includes 7 x 7 and 7 x 19 wires due to other wires not having sufficient flexibility to make the necessary turns.

Explanatory Information:

1. For the purpose of 11.3.6, a wire barrier consists of a series of tensioned wire rope connected to either vertical or horizontal supports serving as a guard to reduce the risk of a person falling from a roof, stairway, raised floor level or the like.
2. To assist in the application of 11.3.6, the following terms are explained:
   a. Continuous - where the wire spans three or more supports.
   b. Non-continuous - where the wire only spans between two supports.
   c. Pulley block - a device consisting of a wheel in which a wire runs around to change its direction.
   d. Permissible deflection - is the allowable bending of the wire.
   e. Support rails - are horizontal components of the barrier system that span across the top and bottom to provide structural support.
3. Tables 11.3.6a and 11.3.6c contain tension requirements for wires in vertical and horizontal wire barrier systems with varying post spacings, wire spacings and wire types, whereas Table 11.3.6b contains deflection requirements for use in horizontal and vertical barrier systems. The figures contained in the tables were derived from testing the spacing combinations in order to prevent the passage of a 125 mm diameter solid cone penetrating between the wires at a predetermined force.
4. It is important to read the notes to the Tables as they provide additional information on their application to horizontal, vertical and near vertical wire barriers.
5. Wire barriers deflect under loading conditions, even when tightly tensioned. This is particularly relevant over the service life of the barrier as the wire tends to lose its tension. Therefore, care needs to be taken to ensure that wire tension will be maintained during the life of the barrier. In some situations, it may be necessary to incorporate “lock-off” devices to prevent loosening of the wire. Likewise, if a threaded anchor bears against a soft wood post or rail, the anchor may indent the post or rail, thus loosening the wire.
6. Temperature effects on the tension of the wire may be significant but there is little that can be done to allow for temperature variation in service. The shorter the wire span, the lesser the effect will be.

7. Stainless steel wire with a lay of 1 x 19 has the greatest elastic modulus and will take up the same load with less extension than equivalent wires with other lays.
8. A wire barrier excludes wire mesh fences and the like.
9. Sharp ends of wires at terminations and swages need to be removed for the safety of children and other people. No wire end should protrude more than half the diameter of the wire from the swage or termination fitting.
10. It should be noted that 11.3.6 is only one form of compliance solution which can be used to demonstrate compliance with H5P2(2)(c) and (d). The following means of verification are available:
    a. H5V1.
    b. The *Deemed-to-Satisfy Provisions* in 11.3.6.
    c. A *Performance Solution* that uses one of the other NCC *Assessment Methods* which verifies that H4P2(2)(c) and (d) will be achieved.

11.3.7 Protection of openable windows – bedrooms

[2019: 3.9.2.6]

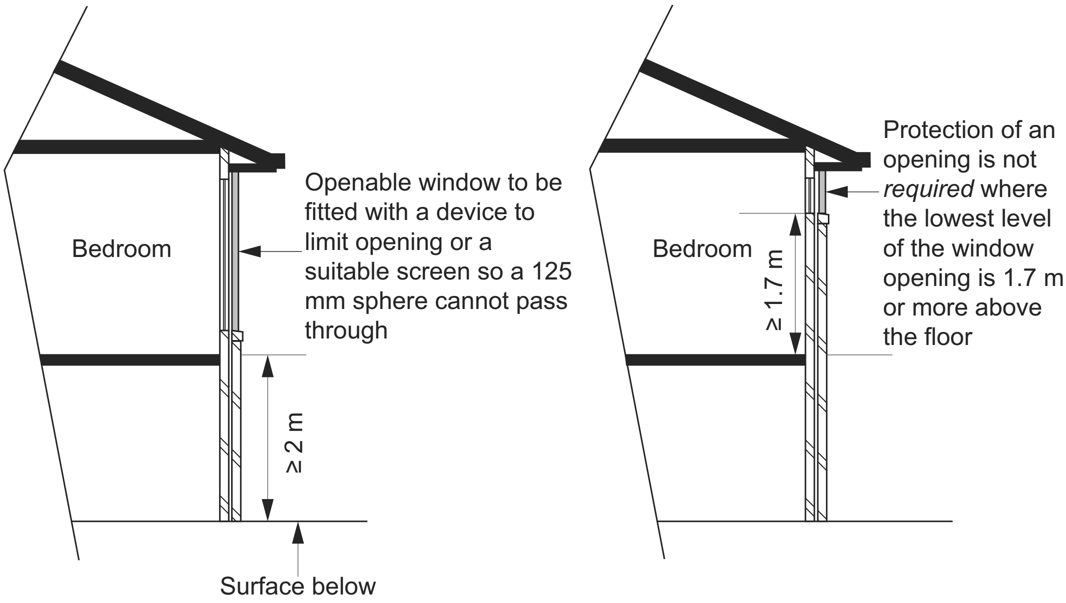
(1) A window opening in a bedroom must be provided with protection, where the floor below the window is 2 m or more above the surface beneath.

(2) Where the lowest level of the window opening covered by (1) is less than 1.7 m above the floor, the window opening must comply with the following:
- (a) The openable portion of the window must be protected with—
  - (i) a device capable of restricting the window opening; or
  - (ii) a screen with secure fittings.
- (b) A device or screen *required* by (a) must—
  - (i) not permit a 125 mm sphere to pass through the window opening or screen; and
  - (ii) resist an outward horizontal action of 250 N against the—
    - (A) window restrained by a device; or
    - (B) screen protecting the opening; and
  - (iii) have a child resistant release mechanism if the screen or device is able to be removed, unlocked or overridden.

(3) Where a device or screen provided in accordance with (2)(a) is able to be removed, unlocked or overridden, a barrier with a height not less than 865 mm above the floor is *required* to an openable window in addition to window protection.

(4) A barrier covered by (3) must not—
- (a) permit a 125 mm sphere to pass through it; and
- (b) have any horizontal or near horizontal elements between 150 mm and 760 mm above the floor that facilitate climbing (see Figure 11.3.7).

Figure 11.3.7: Protection of openable windows — bedrooms



Explanatory Information: Intent

The intent of 11.3.7 is to reduce the risk of a person (especially a young child) falling through an openable window.

Explanatory Information: Protection of openable windows – bedrooms

Where the floor level below an openable window in a bedroom is less than 2 m there are no specific requirements. For an openable window 2 m or more above the surface beneath, openable windows are *required* to restrict passage of a 125 mm sphere using any one of the following design solutions:

(a) The window be designed such that any opening does not allow a 125 mm sphere to pass through (e.g. louvres) and be capable of resisting a 250 N force when directed against the window.

(b) The window be fitted with a fixed or dynamic device that is capable of restricting the window opening so it does not allow a 125 mm sphere to pass through and is difficult for a young child to operate. The restricting device must be capable of resisting a 250 N force when directed against the window such as a casement window or in attempting to push a sliding window open. An internal screen with similar parameters may be installed.

(c) The window be fitted with an internal or external screen that does not allow a 125 mm sphere to pass through and which must resist a horizontal outward force of 250 N.

If the openable part of the window is at least 1.7 m above the floor, no further protection is *required*.

Explanatory Information: Restricting devices

Where a device or screen is securely fixed in position (e.g. a screen pop riveted to the window frame) so it cannot be unlocked, overridden, or is very difficult to remove without for example a drill, the 865 mm barrier would not be *required* as the securing method is considered a fixture and not a child resistant release mechanism. 11.3.7(2)(b)(iii) relates to a screen or window restricting device protecting an openable window in a bedroom. The screen or opening restricting device may be installed in a manner that allows it to be removed, unlocked or overridden in the event of a fire or other emergency to allow safe egress. In these situations the unlocking device must be child resistant.

Child resistance could be achieved by the need to use a tool, key or two hands.

There are a number of hardware options available. Short chain winders and barrier screens will allow windows to comply with this requirement. Sliding window locks may lock a sash so a 125 mm sphere cannot pass through. Where provision is made to fully open the window beyond 125 mm then the child resistant release mechanism is required in addition to the device resisting a 250 N force as *required* by 11.3.7(2)(b)(ii).

11.3.7 in addition prescribes that an 865 mm barrier (sill) would be *required*. A wall beneath an openable window or fixed glazing under the openable part of a window which meets the height requirements (e.g. transom at least 865 mm above the floor) can be considered as the barrier if the criteria in 11.3.7 are met.

Explanatory Information: Use of the term 'window'

The term "window" is not italicised in 11.3.7 and as such, is not restricted to the definition of "window" in the NCC. The reason for this is to also capture windows that may let in air but not light, e.g. metal louvres. A metal louvre or openable panel would not fit in the NCC definition of window but is subject to the window barrier provisions.

11.3.8 Protection of openable windows – rooms other than bedrooms

[2019: 3.9.2.7]

(1) A window opening in a room other than a bedroom must be provided with protection where the floor below the window is 4 m or more above the surface beneath.

(2) The openable part of the window covered by (1) must be protected with a barrier with a height of not less than 865 mm above the floor.

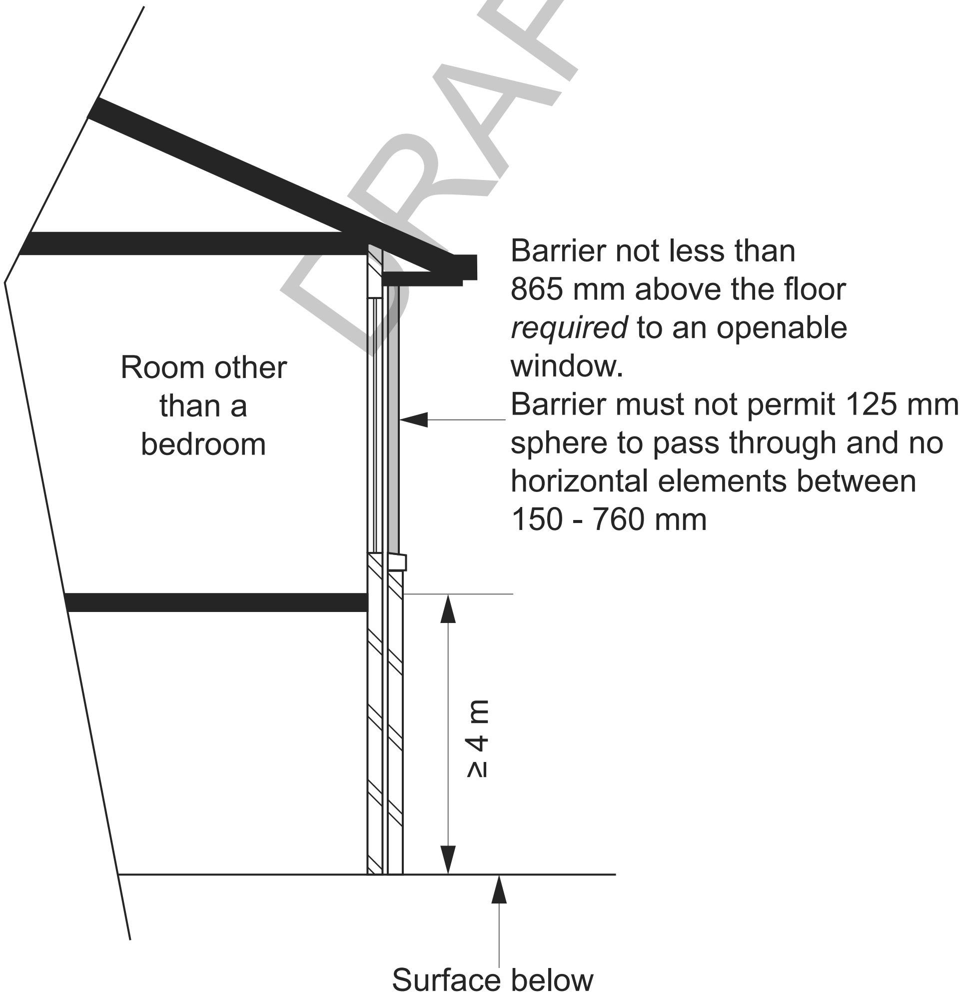
(3) A barrier *required* by (2) must not—

(a) permit a 125 mm sphere to pass through it; and

(b) have any horizontal or near horizontal elements between 150 mm and 760 mm above the floor that facilitate climbing.

(4) See Figure 11.3.8.

Figure 11.3.8: **Protection of openable windows — rooms other than bedrooms**



Explanatory Information: Intent

The intent of 11.3.8 is to reduce the risk of a person (especially a young child) falling through an openable window.

Explanatory Information: Protection of openable windows – rooms other than bedrooms

A wall beneath an openable window or fixed glazing under the openable part of a window which meets the height requirements (e.g. transom at least 865 mm above the floor) can be considered as the barrier if the criteria in 11.3.8(2) are met.

Explanatory Information: Use of the term 'window'

The term "window" is not italicised in 11.3.8 and as such, is not restricted to the definition of "window" in the NCC. The reason for this is to also capture windows that may let in air but not light, e.g. metal louvres. A metal louvre or openable panel would not fit in the NCC definition of window but is subject to the window barrier provisions.

12 Ancillary provisions

Part 12.1 Scope and application of Section 12

12.1.1 Scope

[New for 2022]

(1) This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for—

(a) construction in *alpine areas* (see Part 12.2); and

(b) attachment of decks and balconies to external walls (see Part 12.3); and

(c) ~~boilers, pressure vessels,~~ heating appliances, fire places, chimneys and flues (see Part 12.4).

(2) For other ancillary provisions and additional construction requirements not included in this Section of the ABCB Housing Provisions, refer to the following *Deemed-to-Satisfy Provisions* in NCC Volume Two:

(a) *swimming pools* (see H7D2).

(b) earthquake areas (see H1D9).

(c) *flood hazard areas* (see H1D10).

(d) construction in bushfire-prone areas (see H7D4).

12.1.2 Application

[New for 2022]

The application of Section 12 of the ABCB Housing Provisions is subject to the following:

(a) The Governing Requirements of NCC 2022 Volume Two.

(b) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 12 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practices for Parts 3.10.4, 3.10.6 and 3.10.7 of NCC 2019 Volume Two.

In NCC 2019 Volume Two, Parts 3.10.1, 3.10.2, 3.10.3 and 3.10.5 did not include an acceptable construction practice.

Part 12.2 Construction in alpine areas

12.2.1 Application of Part 12.2

[New for 2022]

Part 12.2 applies subject to the provisions at H7D3(2) and (3).

Explanatory Information:

Buildings constructed in alpine areas need special consideration because of sub-zero temperatures which can create elements which restrict free movement to and from the building. The additional measures in this Part include—

- having external doorways open in a way that is not impeded by snow and ice outside; and
- for external trafficable structures forming part of the means of egress, being constructed so that they remain useable under snow conditions, and
- minimising the impact of snow build up between and around buildings.

Part 2.2 (structural provisions) and Section 13 (energy efficiency) also contain specific additional requirements for a building located in an alpine area.

12.2.2 External doors

[2019: 3.10.4.2]

External doors that may be subject to a build-up of snow must—

(a) open inwards or slide; and

(b) be constructed so that the threshold is not less than 900 mm above the adjoining surface; and

(c) in a Class 1b building, be marked “OPEN INWARDS” on the inside face of the door in letters not less than 75 mm high and in a colour contrasting with that of the background.

12.2.3 External trafficable structures

[2019: 3.10.4.3]

External stairways, ramps, access bridges or other trafficable structures serving the building must have—

(a) a floor surface that consists of expanded mesh if it is used as a means of egress; and

(b) any *required* barrier designed so that its sides are not less than 75% open; and

(c) for a stairway, *goings* (G), *risers* (R) and slope relationship quantity (2R + G) in accordance with—

  (i) Table 11.2.2a; or

  (ii) Table 12.2.3; and

(d) for a ramp serving an external doorway, a gradient not steeper than 1:12.

Table 12.2.3: Alternative stair riser and going dimensions

Maximum *risers* (R) (mm)	Minimum *risers* (R) (mm)	Maximum *going* (G) (mm)	Minimum *going* (G) (mm)	Maximum slope relationship (2R + G) (mm)	Minimum slope relationship (2R + G) (mm)
150	115	375	355	675	605

12.2.4 Clear spaces around buildings

[2019: 3.10.4.4]]

A building must be constructed so that—

(a) for any *external walls* more than 3.6 m above the natural ground level, the distance of that part of the building from the allotment boundary (other than a road alignment) must be not less than 2.5 m plus an additional 100 mm for each 300 mm or part by which that part of the *external wall* exceeds a height of 3.6 m (see Figure 12.2.4a); and

(b) if an external doorway discharges into a court between wings of a building and that area may be used for vehicle access to the building, the clear distance between wings must be not less than 4 m (see Figure 12.2.4b); and

(c) where an external doorway discharges opposite a feature that could trap snow or an embankment that is more than 900 mm above the threshold of that doorway, a minimum clear distance of not less than 4 m must be provided between the door and the feature (see Figure 12.2.4c and Figure 12.2.4d).

Figure 12.2.4a: Clear spaces around buildings — Set-back from allotment boundary where wall exceeds 3.6 m

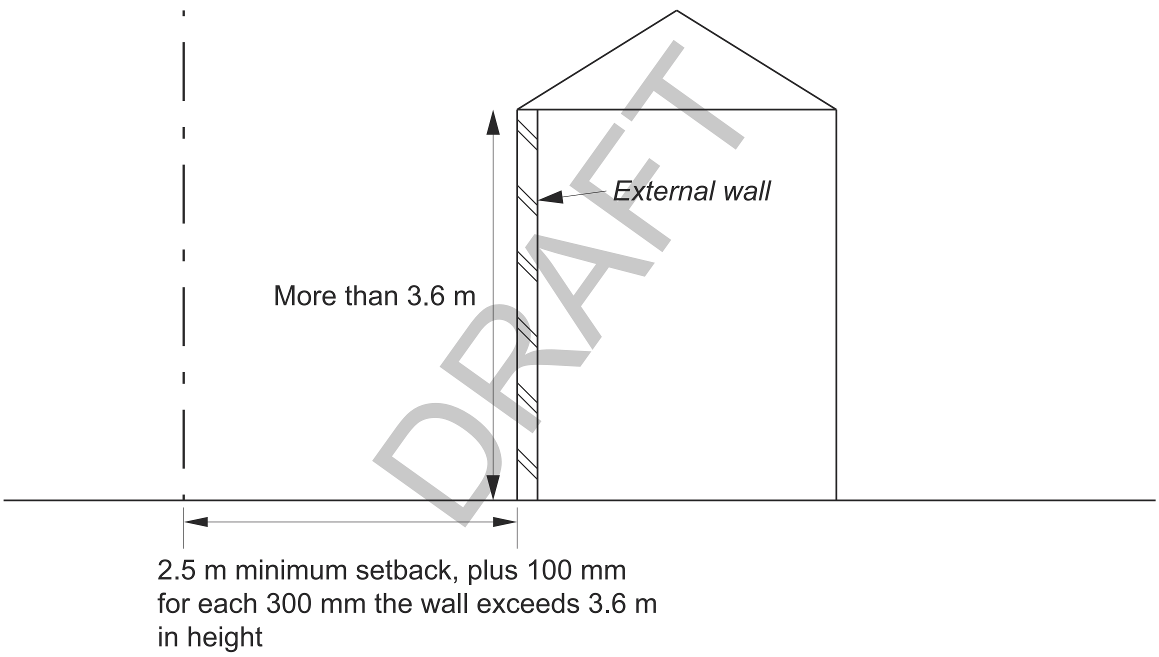


Figure 12.2.4b: **Clear spaces around buildings — External doorway discharging into a court between wings of a building**

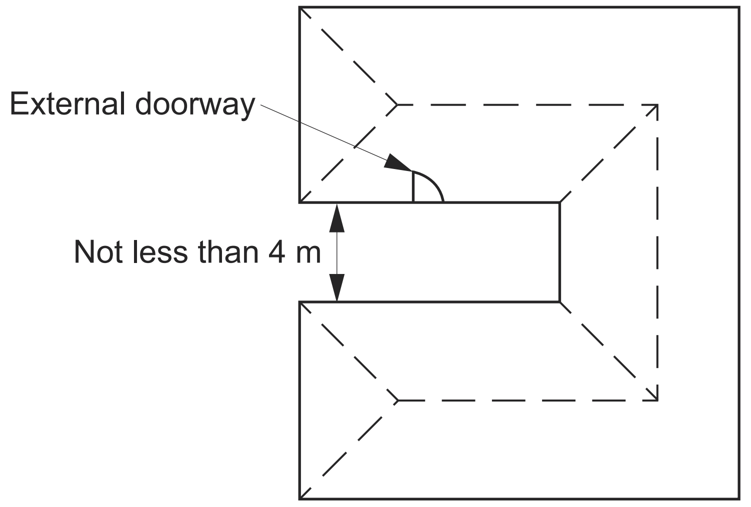


Figure 12.2.4c: **Clear spaces around buildings — Embankments adjoining buildings**

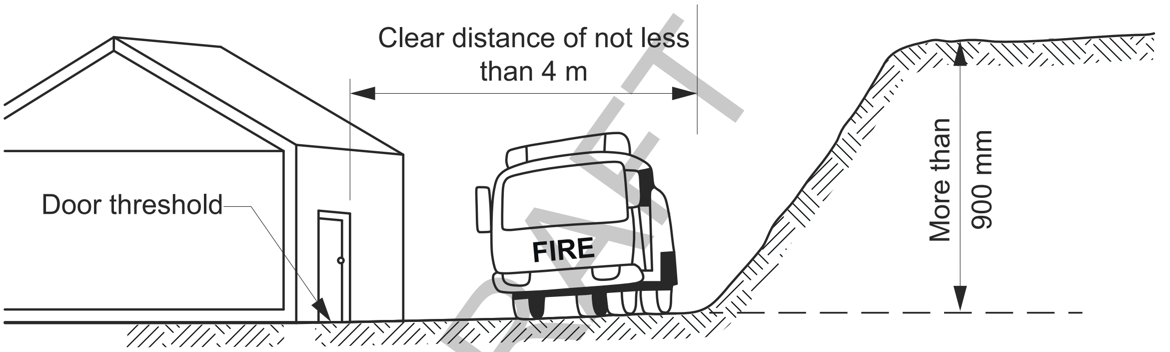
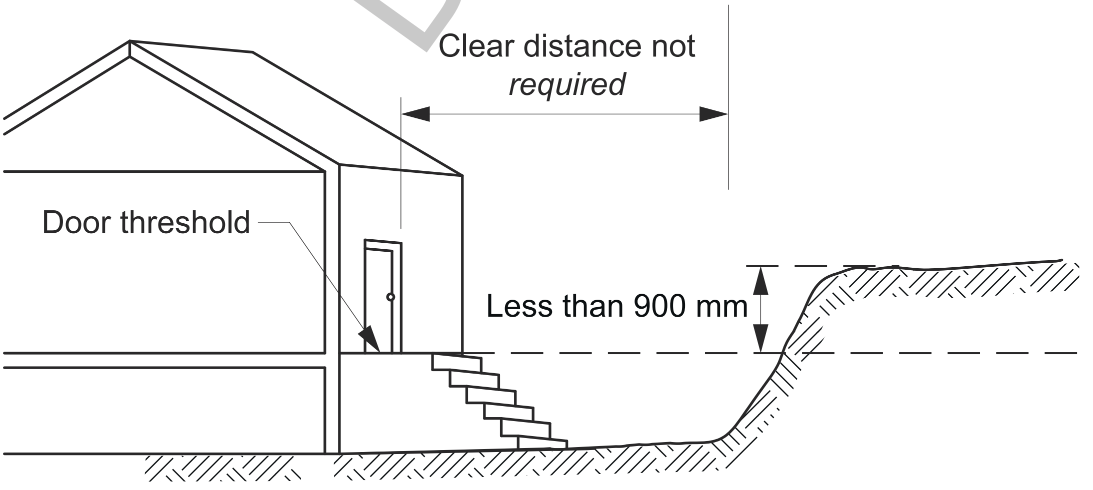


Figure 12.2.4d: **Clear spaces around buildings — Use of a threshold where clear space is not available**



Explanatory Information: Snow build-up around buildings

The design and construction of a building in an *alpine area* must not aid dangerous levels of snow build-up between and around buildings. This control—

- assists with egress in an emergency; and
- helps vehicle access around the buildings, both for snow clearing and emergency situations; and
- minimises the risk of snow or ice falling from the roof onto adjoining lots or egress routes.

Explanatory Information: Set-back distances

12.2.4(a) prescribes set-back requirements for *external walls* from the boundary of adjoining allotments. The aim is to ensure that a reasonable distance is created between buildings to reduce the amount of snow build-up between properties. 12.2.4(a) applies only to the area adjacent to that part of the wall that is more than 3.6 m in height.

Explanatory Information: Distance between wings of buildings

12.2.4(b) prescribes a minimum distance between wings of a building or attached buildings where external doorways may discharge into this area. This requirement only applies where the court or wings are able to be accessed by vehicles.

Explanatory Information: Embankments adjoining buildings

12.2.4(c) applies where features adjacent to an external doorway could trap snow and complicate access and egress to and from the building.

Part 12.3 Attachment of framed decks and balconies to external walls

12.3.1 Application of Part 12.3

[New for 2022]

Part 12.3 applies subject to the limitations set out at H1D11.

12.3.2 Fixing decks and balconies to external walls

[2019: 3.10.6.2]

Where a deck or balcony relies on the *external wall* of a building or structure for support, the method of attachment, including any fixings, to the *external wall* must comply with the following:

(a) The deck or balcony's joist framing members must be supported at the wall by a waling plate.

(b) The joist span nearest the *external wall* must not be more than 3 m (single or continuous span).

(c) The size of a waling plate *required* by (a) must be not less than—

  (i) for a timber waling plate— ~~190 x 45 mm with a minimum stress grade of F5 or MGP10; or~~

    (A) 140 x 35 mm with a minimum stress grade of F5 or MGP10 when fixed to concrete core-filled masonry using M12 bolts chemical or expanding/mechanical anchors; or

    (B) 90 x 35 mm with a minimum stress grade of F5 or MGP10 when fixed to timber frames using No. 14 partial threaded self-drilling screws; or

  (ii) for a steel waling plate — C15015 (minimum Grade G550) with the web located against the *external wall*.

(d) A waling plate must be attached so that—

  (i) for core-filled reinforced concrete masonry *external walls*, fixings are staggered along the waling plate at not more than 300 mm centres measured along the waling plate; and

  (ii) for timber *external wall*~~s~~ frames, two No. 14 Type screws ~~fixings~~ are provided— ~~into a solid joist or bearer framing member that is not less than 190 x 100 mm with a minimum stress grade of F5 or MGP10, at not more than 300 mm centres measured along the waling plate; and~~

    (A) into a solid joist or bearer framing member that is not less than 90 x 45 mm with a minimum stress grade of F5 or MGP10; and

    (B) for deck construction— at not more than 450 mm centres measured along the waling plate; and

    (C) for tiled balcony construction— at not more than 400 mm centres measured along the waling plate; and

  (iii) for steel framed *external walls*, two fixings are provided into a joist or bearer framing member not less than C20015 (Grade G550) at not more than 300 mm centres measured along the waling plate; and

  (iv) fixings are~~—~~ installed within 300 mm of each end of the waling plate, and in accordance with the following (as applicable):

    (A) ~~installed within 300 mm of each end of the waling plate; and~~

    (B) ~~f~~For a timber waling plate — deck construction: two No. 14 partial threaded self-drilling screws at not more than 450 mm centres and not located within 65 mm from the ends or within 30 mm from the top and bottom edges.~~; or~~ ~~not located within 120 mm from the ends or within 60 mm from the top and bottom edges; and~~

    (C) ~~f~~For a timber waling plate — deck construction: M12 bolts chemical or expanding/mechanical anchors at not more than 400 mm centres and not located within 120 mm from the ends or within 60 mm from the top and bottom edges.

    (D) ~~f~~For a timber waling plate — tiled balcony construction: two No. 14 partial threaded self-drilling screws at not more than 400 mm centres and not located within 65 mm from the ends or within 30 mm from the top and bottom edges.

(E) ~~f~~For a timber waling plate — tiled balcony construction: M12 bolts chemical or expanding/mechanical anchors at not more than 300 mm centres and not located within 120 mm from the ends or within 60 mm from the top and bottom edges.

(F) ~~f~~For a steel waling plate — not located within 50 mm from the ends or within 30 mm from the top and bottom edges.

(e) Fixings for attaching a waling plate to an *external wall* must be—

(i) for timber *external wall* frames with a minimum stress grade of F5 or MGP 10, No. 14 partial threaded self-drilling screws so that each screw is embedded not less than 44 mm into the joist or bearer member (see Figure 12.3.2a);and~~—~~

(A) ~~M12 coach screws with not less than 3 mm thick 55 mm diameter washers fixed so that the coach screw is embedded not less than 96 mm into the joist or bearer framing member (see Figure 12.3.2a); or~~

(B) ~~4.6/S M12 bolts with not less than 3 mm thick 55 mm diameter washers placed on the waling plate under the bolt head; and~~

(ii) for steel *external wall* frames, 8.8/S M12 bolts with not less than 3 mm thick 55 mm diameter washers; and

(iii) for a core-filled masonry *external wall*, 4.6/S M12 chemical or expanding/mechanical anchors with—

(A) a minimum 2 kN working load capacity in shear and 1.5 kN in tension; and

(B) not less than 3 mm thick 55 mm diameter washers placed on the waling plate under the anchor head (see Figure 12.3.2b).

(f) Fixings used for attaching waling plates to *external walls* must be—

(i) stainless steel where the building is located within 200 m of *breaking surf*; or

(ii) hot-dipped galvanised, stainless steel or monel metal for all other areas.

Figure 12.3.2a: Methods of attachment — ~~M12 coach screws~~ No. 14 partial threaded self-drilling screws into a timber framed external wall

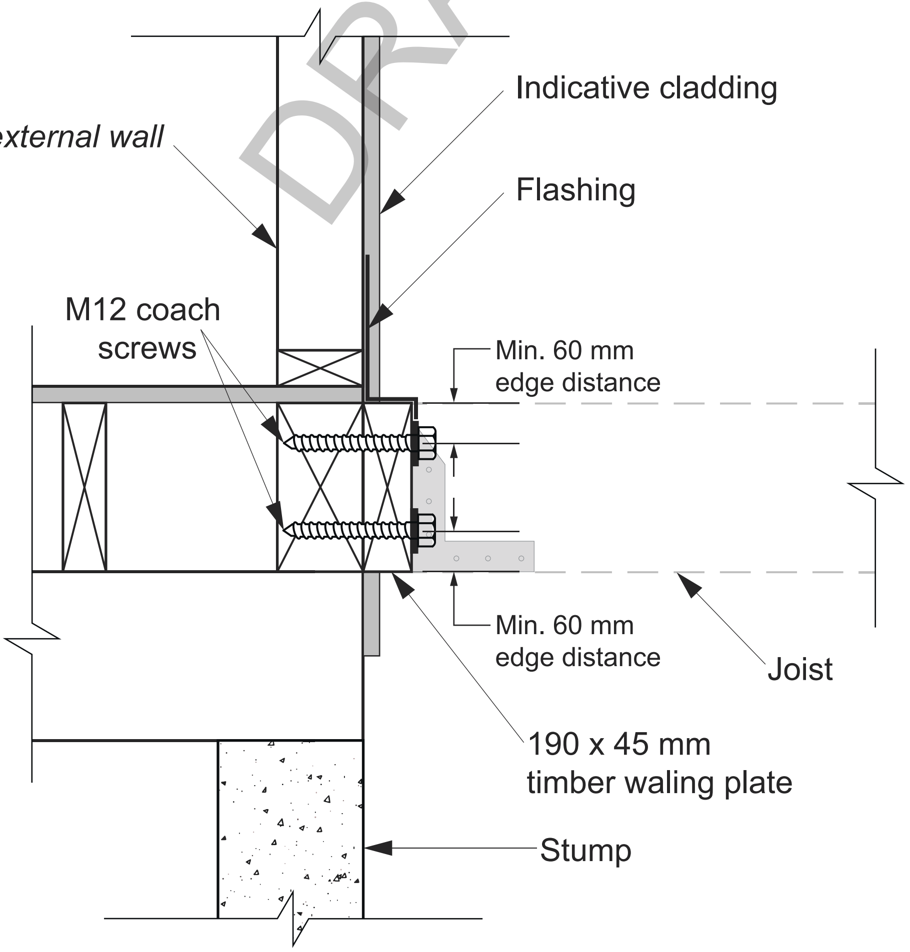
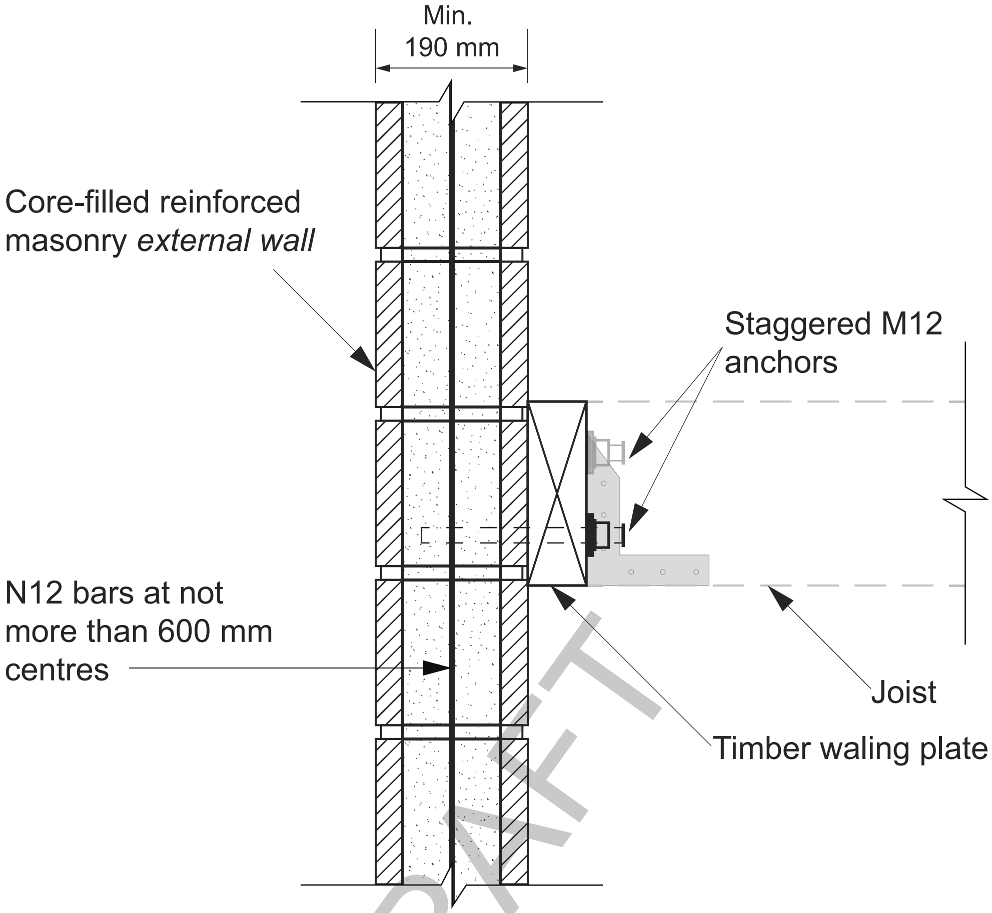


Figure 12.3.2b: **Methods of attachment - 4.6/S M12 chemical or masonry anchors into a core-filled reinforced masonry external wall**



Explanatory Information:

When using fixings 12.3.2(1)(d), care must be taken if chemical anchors are selected. The use of chemical anchors in horizontal applications is limited. Attention should be paid to selecting only chemical anchors that are specifically designed and manufactured for use in horizontal or overhead applications.

Consideration needs to be given to offsetting the waling plate fastener spacing to avoid interference with joist attachment. To ensure fasteners are positively anchored to the building or structure they need to be located so that they are not fixed into mortar beds between masonry units or fixed into blocking or the end grains of timbers.

An I-beam is not considered a solid joist or bearer framing member under 12.3.2(d)(ii) and is therefore not permitted as an appropriate method of support for attachment of a deck or balcony to an *external wall*.

The working load capacity of an anchor *required* by 12.3.2(e)(iii)(A) may be available in technical data provided by the manufacturer of the anchor.

The bolt category 4.6/S refers to a commercial bolt of a strength grade of 4.6 using a snug tight method of tensioning. AS 4100 contains information on tensioning techniques and the methods of determining the strength of an anchor.

Where the waling plate is fixed to the *external wall* through wall cladding, fixing length must be increased to compensate for the additional width of the cladding to ensure the connection to the *external wall* is structurally adequate.

All coach screwed joints should be pre-drilled with a pilot hole whose diameter is not greater than that of the threaded portion of the screw.

12.3.3 Flashings to the junction of the waling plate and external wall

[2019: 3.10.6.3]

Where the wall cladding is removed to attach a waling plate, openings in *external wall* cladding exposed to the weather must be flashed with materials complying with AS/NZS 2904 and in accordance with the following:

(a) *Flashings* must be provided to bottom, tops and the sides of the junction of the waling plate and the *external wall*, and must be installed so that the *flashing*—
  (i) extends not less than 150 mm beyond each side of the waling plate where practicable; and
  (ii) is attached to the waling plate and wall framing; and
  (iii) at the top and bottom of the waling plate, drains to the outside face of the wall or cladding.

(b) Joins in the *flashing* must—
  (i) overlap by not less than 75 mm in the direction of flow; and
  (ii) be securely fastened at intervals of not more than 40 mm; and
  (iii) have sealant installed between laps.

(c) The method of *flashing* must be suitable for the framing and cladding used.

(d) *Flashings* must be securely fixed at least 25 mm under the cladding at ends and edges of the framing of the opening.

Explanatory Information:

Consideration needs to be given to the method of fixing the waling plate to the *external wall* so that deterioration of the *external wall* as a result of water entry will not occur. Such cases would include where the wall cladding is removed to attach a waling plate. This may be achieved by installing flashing between the *external wall* and the waling plate.

12.3.4 Bracing

[2019: 3.10.6.4]

Where a deck or balcony is more than 1 m off the ground when measured from the upper most surface of the deck or balcony at any point to the top of any supporting footing, bracing must be installed as follows:

(a) Two diagonally opposed 30 x 0.8 mm galvanized steel straps must be installed across the top or underside of the joists and be attached using one fixing at—
  (i) each joist or equivalent framing member; and
  (ii) the waling plate.

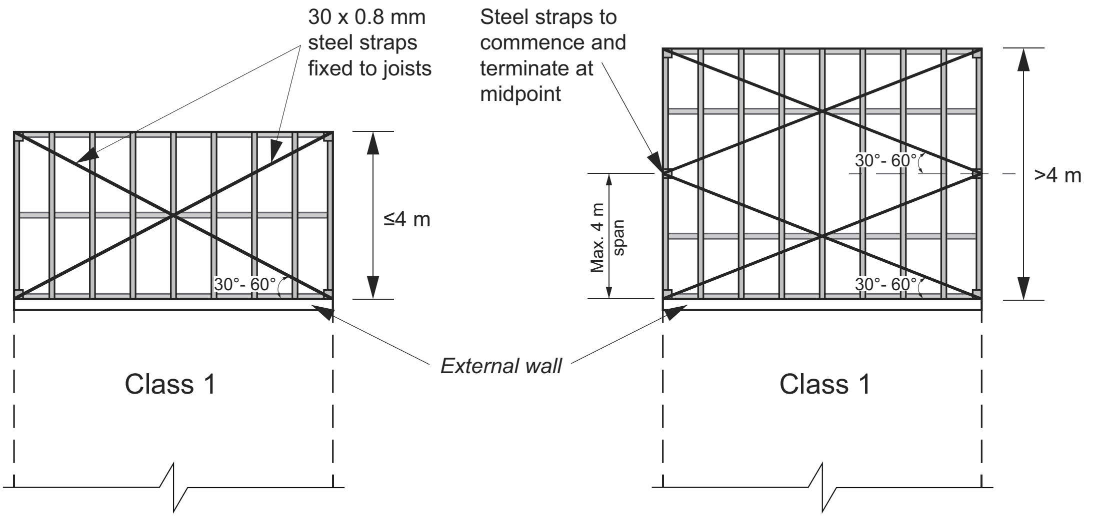
(b) A secondary set of 30 x 0.8 mm steel straps must be installed using one fixing at each joist or equivalent framing member in accordance with Figure 12.3.4 where the deck or balcony extends more than 4 m from the *external wall*.

(c) The steel straps must—
  (i) be continuous and extend diagonally at an angle between 30° to 60°; and
  (ii) span not more than 4 m when measured along a line at a right angle from the *external wall*.

(d) Fixings for the steel straps must be—
  (i) for timber framing, 50 x 3.15 hot-dipped galvanized flat head ring shank or flat head deformed nail; or
  (ii) for steel framing, 8-18 self embedding head or wafer head screws.

(e) Where the deck or balcony is located within a severe corrosion environment the bracing and fixings must comply with~~Table 6.3.4~~Table 6.3.9a, 6.3.9b and 6.3.9c.

Figure 12.3.4: **Bracing of decks and balconies**



a) Decks or balconies extending up to 4 m from the *external wall*

b) Decks or balconies extending more than 4 m from the *external wall*

Part 12.4 ~~Boilers, pressure vessels, h~~Heating appliances, fireplaces, chimneys and flues

12.4.1 Application of Part 12.4

[New for 2022]]

For the installation of a domestic solid fuel burning appliance, Part 12.4 need not be complied with if H7D5(a) is complied with.

12.4.2 Open fireplace construction

[2019: 3.10.7.2]

An open fireplace, or solid-fuel burning appliance in which the fuel-burning compartment is not enclosed must have—

(a) all masonry constructed in accordance with H1D5; and

(b) a hearth constructed of stone, concrete, masonry or similar *non-combustible* material so that—

  (i) it extends not less than 300 mm beyond the front of the fireplace opening and not less than 150 mm beyond each side of that opening; and

  (ii) its upper surface does not slope away from the back hearth (see Figure 12.4.2(b)); and

  (iii) *combustible* material, such as flooring or framing members below or around the external edge of the hearth, is situated not less than 150 mm from the upper surface of the hearth (see Figure 12.4.2); and

(c) walls forming the sides and back of the fireplace up to a height of 300 mm above the underside of the arch or lintel which—

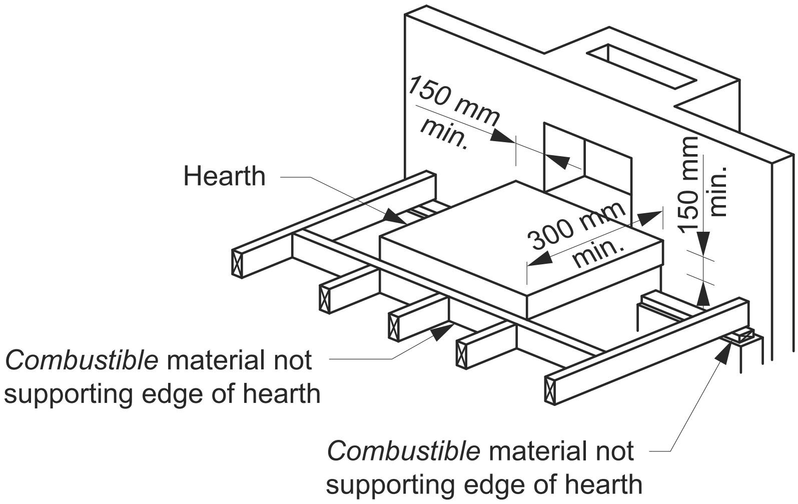
  (i) are constructed in 2 separate leaves of solid masonry with a total combined thickness not less than 180 mm ~~thick~~, excluding any *cavity*; and

  (ii) do not consist of concrete block masonry in the construction of the inner leaf; and

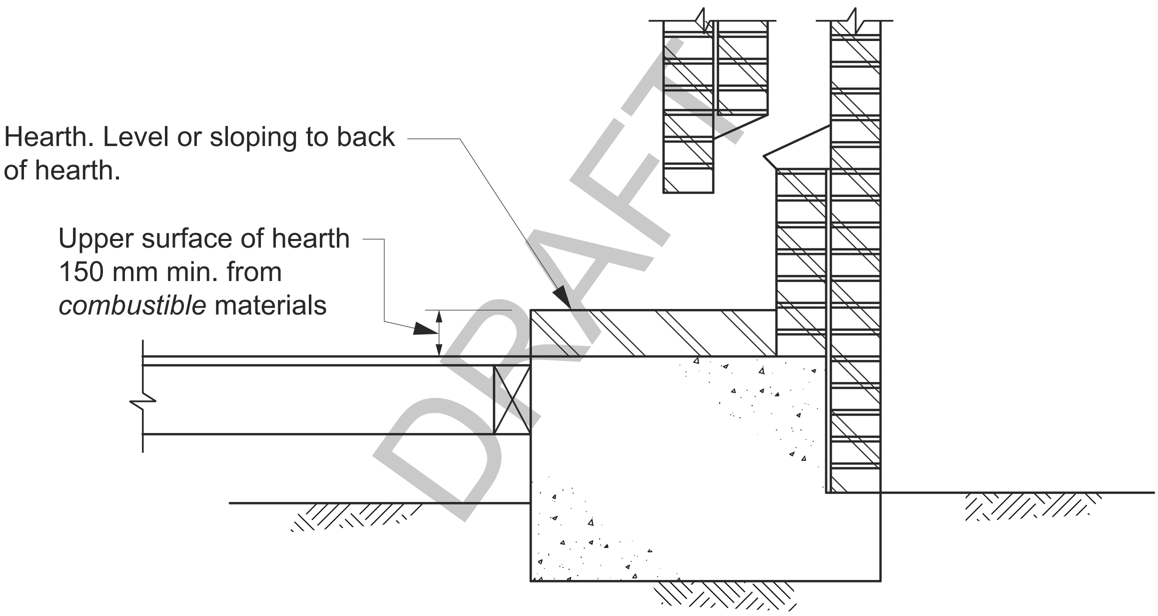
  (iii) are constructed of masonry units with a net volume, excluding cored and similar holes, not less than 75% of their gross volume, measured on the overall rectangular shape of the units, and with an actual thickness of not less than 100 mm; and

(d) the fireplace must be constructed on footings complying with 4.2.18.

Figure 12.4.2: **Fireplace clearance from combustible materials**



(a) View A



(b) View B

12.4.3 Chimney construction

[2019: 3.10.7.3]

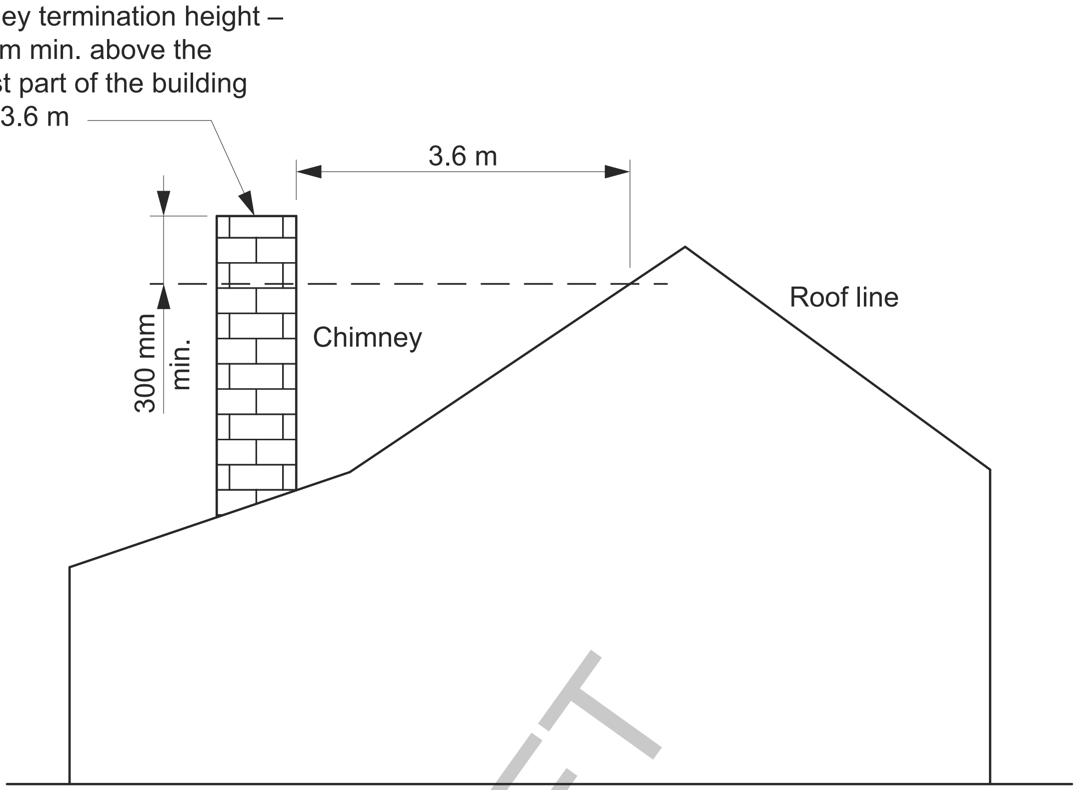
The construction of a chimney must comply with H1D5 and the following:

(a) The walls of the chimney above the level referred to in 12.4.2(c) must be lined internally to a thickness of not less than 10 mm with composition mortar parging.

(b) The composition mortar in (a) must comply with AS 3700 or AS 4773 except that the mortar must be mixed by volume in the proportions of 1 part cement : 1 part lime : 5 parts sand.

(c) The chimney or flue must terminate not less than 300 mm above the highest part of the building within a horizontal distance of 3.6 m of the chimney or flue (see Figure 12.4.3).

Figure 12.4.3: Section showing height and position of chimney



Explanatory Information:

1. The requirements of this Part are to be read in conjunction with the building sealing requirements in Part 13.4. However, it should be noted that Part 13.4 does not apply in all States and Territories.
2. 12.4.3(a) requires the internal faces of masonry chimneys to be parged with a mortar to protect masonry elements and mortar beds from the corrosive by-products of combustion.

12.4.4 Installation of insert fireplaces and flues

[2019: 3.10.7.4]

An insert fireplace and flue must comply with the following:

(a) The insert fireplace and flue must be— ~~tested and passed the tests required by AS/NZS 2918.~~
  (i) tested and passed the tests required by AS/NZS 2918; and
  (ii) fitted into a masonry fireplace (including chimney) constructed in accordance with H1D5 and Figure 12.4.4.

(b) ~~The insert fireplace must be fitted into a masonry fireplace (including chimney) constructed in accordance with H1D5.~~

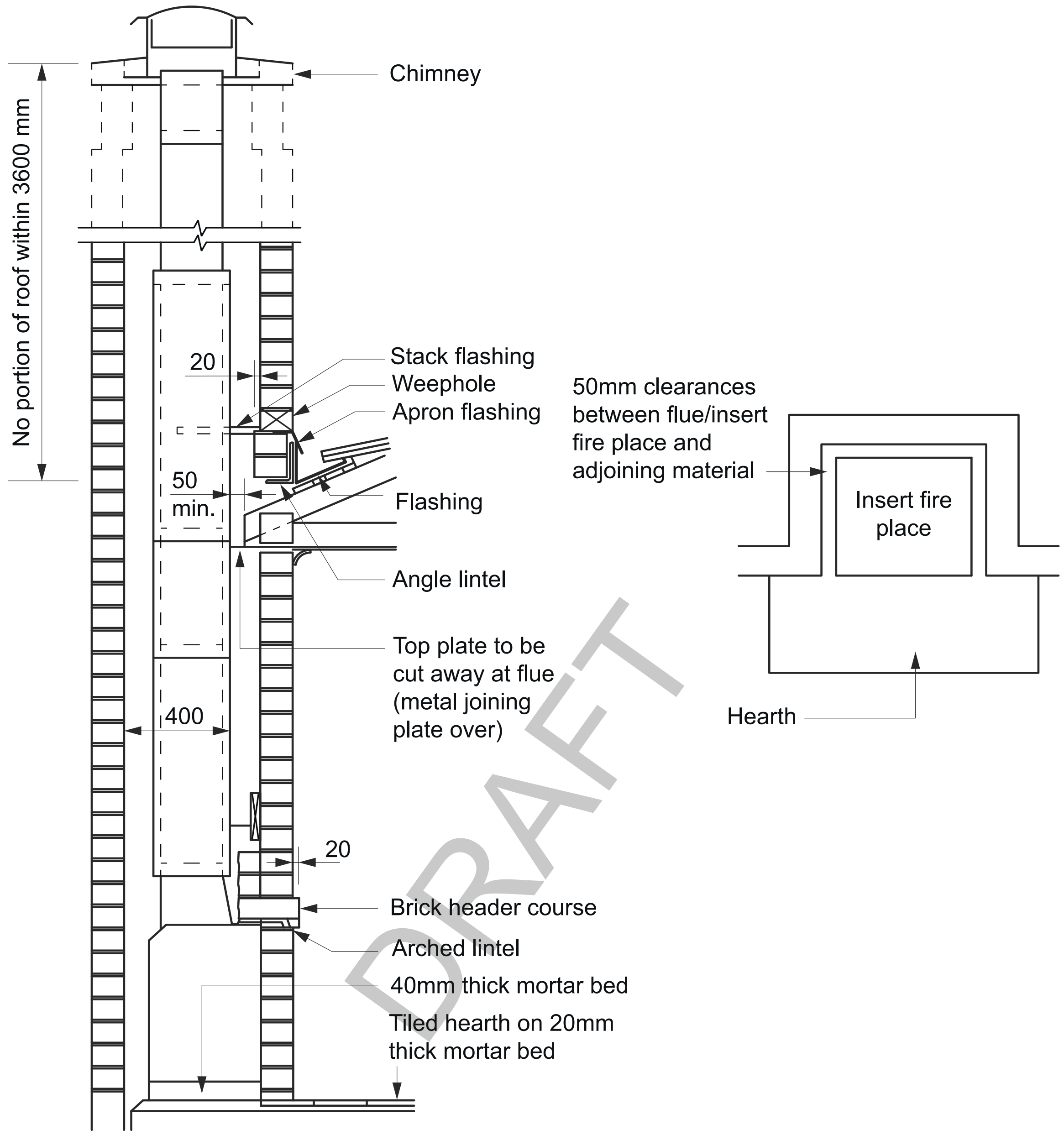
(c) The flue must be double skin and have been tested and pass the tests required by AS/NZS 2918.

(d) There must be a clearance of 50 mm between the outer flue and adjacent materials.

(e) The flue must terminate in accordance with Figure 12.4.3.

(f) The hearth must be constructed in accordance with 12.4.2(b) and (d).

Figure 12.4.4: Typical installation of fireplace flue inserts



12.4.5 Installation of free standing heating appliances

[2019: 3.10.7.5]

The installation of a free standing heating appliance must comply with the following:

(a) The appliance must—

(i) be installed with safety clearances determined by testing in accordance with AS/NZS 2918; or

(ii) be located not less than 1.2 m from adjoining walls (other than a masonry wall); or

(iii) have a heat shield between the adjoining wall (other than a masonry wall) and the heating appliance in accordance with Figure 12.4.5a and Figure 12.4.5b.

(b) Where a heat shield is used, it must be installed in accordance with Figure 12.4.5a and Figure 12.4.5b~~; and Figure 12.4.5b and it must be not less than 90 mm thick masonry constructed in accordance with H1D5.~~, and—

(i) have an FRL of 60/60/60; or

(ii) be not less than 90 mm thick masonry constructed in accordance with H1D5.

(c) The heating appliance must be installed on a hearth—

(i) complying with 12.4.2(b), except that the hearth must extend 400 mm from the front and sides of the appliance in accordance with Figure 12.4.5a and Figure 12.4.5b; or

(ii) where a heat shield is installed, in accordance with Figure 12.4.5a and Figure 12.4.5b.

(d) The flue must—

(i) have been tested and passed the tests required by AS/NZS 2918; and

(ii) be installed in accordance with Figure 12.4.5c; and

(iii) terminate in accordance with Figure 12.4.3; and~~.~~

(iv) be flashed in accordance with H1D7.

(e) Flue types or installation of flues in areas not specifically covered by Figure 12.4.5a and Figure 12.4.5b and Figure 12.4.5c must be installed in accordance with AS/NZS 2918.

Figure 12.4.5a: Acceptable location of free standing heating appliances — Elevation

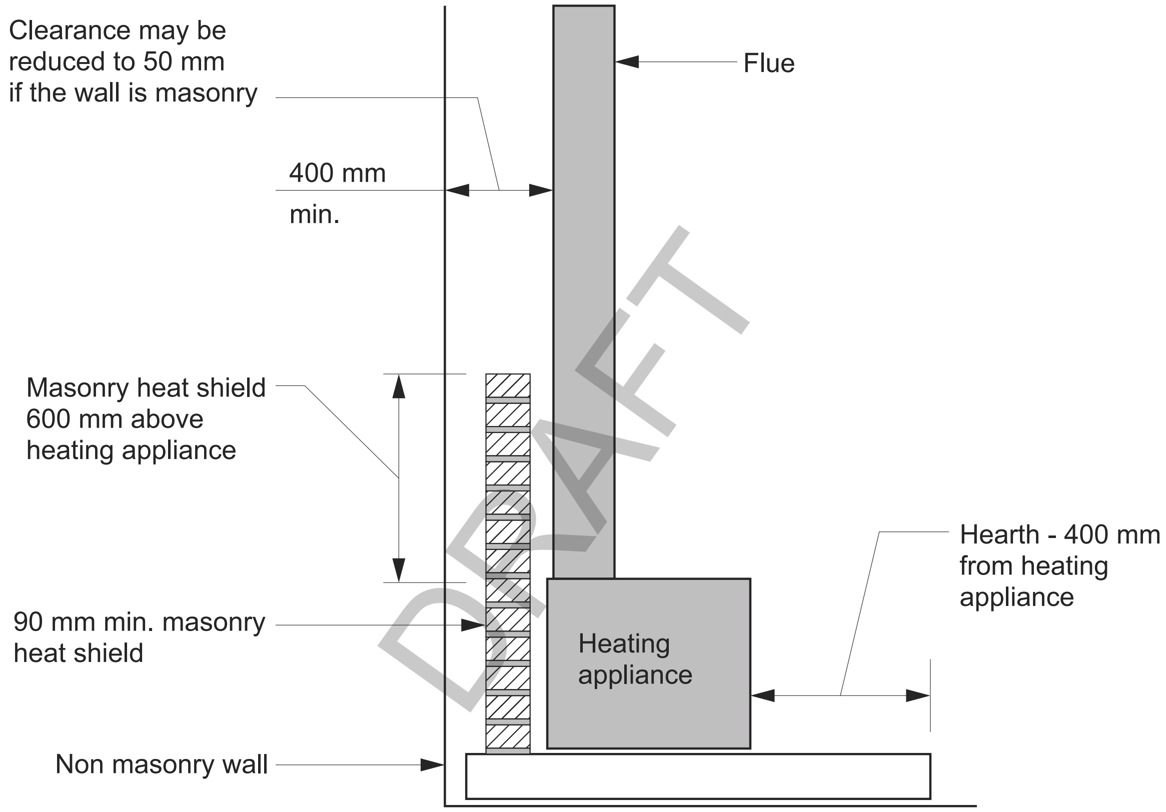


Figure 12.4.5b: Acceptable location of free standing heating appliances — Plan view

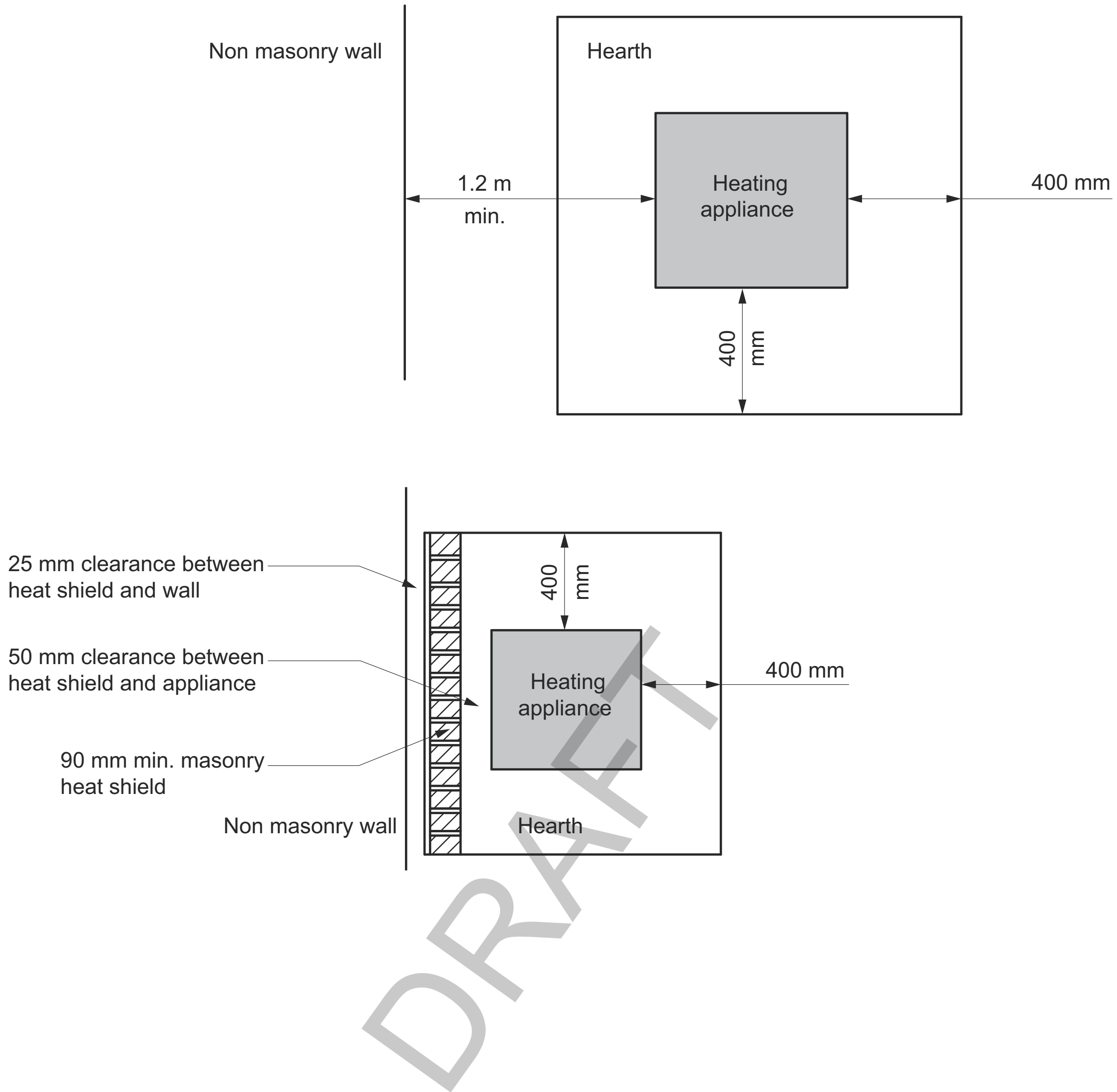


Figure 12.4.5c: Acceptable flue installation details

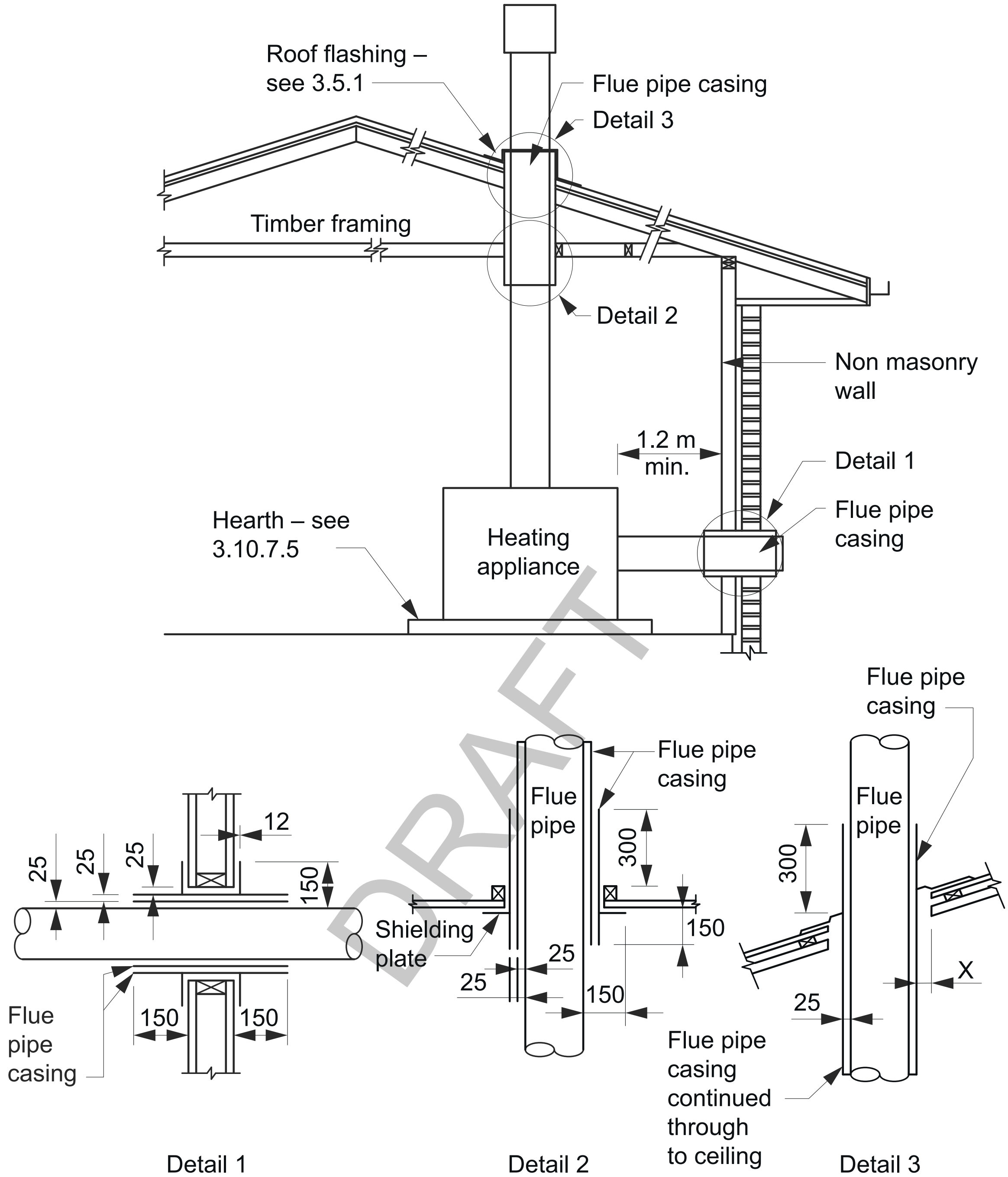


Figure Notes:

Flue pipe size — 150 mm maximum (for other sizes see AS/NZS 2918).

Explanatory Information:

References to AS/NZS 2918 in 12.4.5(a)(i) and (d)(i) is only applicable in the context in which it is referred to in accordance with A4G1(2). 12.4.5(a) provides three options for the installation of free standing heating appliances. Where 12.4.5(a)(i) is chosen as a solution the free standing heating appliance must be installed with safety clearances determined by testing in accordance with AS/NZS 2918. 12.4.5(d)(i), in addition to (d)(ii) and (d)(iii), require the flue to be tested and have passed the tests required by AS/NZS 2918.

~~12.4.6 Installation of boilers and pressure vessels~~

[~~2019: 3.10.7.6~~]

~~The installation of a boiler or pressure vessel heating appliance within a building, must comply with the following:~~

(a) ~~The distance between the vent of any explosion relief device and any adjacent wall, roof, ceiling or other solid construction must be calculated in accordance with Table 12.4.6.~~

(b) ~~Floor surfaces beneath a *boiler* or *pressure vessel* must be *water resistant* and formed to drain away from supports and structural building elements.~~

(c) ~~Where a safe tray is provided to trap liquids, it must be manufactured from a material resistant to corrosion from the contents of the *boiler* or *pressure vessel*.~~

(d) ~~Building elements surrounding a *boiler* must be protected from any furnace heat by refractory material or effective air spaces so that —~~

(i) ~~steel elements do not exceed a temperature of more than 300°C; and~~

(ii) ~~concrete elements do not exceed a temperature of more than 200°C; and~~

(iii) ~~timber elements do not exceed a temperature of more than 150°C.~~

Table 12.4.6: ~~**Minimum clearances for explosion relief**~~

~~Clearance from~~	~~Minimum clearance (metres)~~
~~Adjacent wall or ceiling/roof~~	~~0.4(V/3)$^{1/3}$ or 0.4 m, whichever is the greater~~
~~Two walls at right angles; or one wall and a ceiling/roof~~	~~0.6(V/3)$^{1/3}$ or 0.6 m, whichever is the greater~~

Table Notes:

~~V is the internal volume of the boiler or pressure vessel being vented, up to the connection of the flue.~~

Explanatory Information:

~~The requirements of 12.4.6 are limited to a *boiler* or *pressure vessel* heating appliance within a building. Therefore, the provision does not apply to a *boiler* or *pressure vessel* outside of these limitations, such as a portable gas appliance.~~

~~Table 12.4.6 provides the minimum clearance *required* which is based on the volume of the space being vented. The minimum clearance is determined by a formula which includes the volume of the space being vented.~~

~~The intention of the explosion relief provisions is that, in the event of an explosion, the extent of damage is limited.~~

~~The minimum clearance determined in the first row is 0.4 m from an adjacent wall or ceiling/roof.~~

~~The minimum clearance determined in the second row is 0.6 m from two walls at right angles, or one wall and a ceiling/roof. This scenario poses a higher risk of damage from over pressure experienced during a deflagration and therefore both the ventilation and clearances are increased.~~

13 Energy efficiency

13.6.9 Spa pool heating and pumping

Part 13.1 Scope and application of Section 13

NSW Part 13.1

NT Part 13.1

13.1.1 Scope

[New for 2022]

This Section of the ABCB Housing Provisions sets out the *Deemed-to-Satisfy Provisions* for energy efficiency:

(a) Building fabric (see Part 13.2).

(b) External glazing (see Part 13.3).

(c) Building sealing (see Part 13.4).

(d) Air movement (see Part 13.5).

(e) Services (see Part 13.6).

SA 13.1.2

13.1.2 Application

[New for 2022]

The application of Section 13 of the ABCB Housing Provisions is subject to the following:

(a) The Governing Requirements of NCC 2022 Volume Two.

(b) The State and Territory variations, additions and deletions contained in the Schedules to the ABCB Housing Provisions and NCC Volume Two.

Explanatory Information:

In NCC 2019, the content of Section 13 of the ABCB Housing Provisions (other than content added in NCC 2022 or later) was contained in the acceptable construction practices for Part 3.12 of NCC 2019 Volume Two.

Part 13.2 Building fabric

13.2.1 Application of Part 13.2

[2019: 3.12.1]

(1) The provisions of 13.2.2 to 13.2.6 apply to—
   (a) a Class 1 building; and
   (b) a Class 10a building with a *conditioned space*.

(2) The provisions of 13.2.7 apply to a Class 1 building with an attached Class 10a building.

(3) Part 13.2 must be applied as directed in H6D2(1)(a) or (b).

13.2.2 Building fabric thermal insulation

[2019: 3.12.1.1]

(1) Where *required*, insulation must comply with AS/NZS 4859.1 and be installed so that it—
   (a) abuts or overlaps adjoining insulation other than at supporting members such as columns, studs, noggings, joists, furring channels and the like where the insulation must butt against the member; and
   (b) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
   (c) does not affect the safe or effective operation of a *domestic service* or fitting.

(2) Where *required*, *reflective insulation* must be installed with—
   (a) the necessary airspace, to achieve the required *R-Value* between a reflective side of the reflective insulation and a building lining or cladding; and
   (b) the *reflective insulation* closely fitted against any penetration, door or *window* opening; and
   (c) the reflective insulation adequately supported by framing members; and
   (d) each adjoining sheet of roll membrane being—
      (i) overlapped greater than or equal to 150 mm; or
      (ii) taped together.

(3) Where *required*, bulk insulation must be installed so that—
   (a) it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
   (b) in a ceiling, where there is no bulk insulation or *reflective insulation* in the *external wall* beneath, it overlaps the *external wall* by greater than or equal to 50 mm.

Explanatory Information: Example

1. For example, in a two storey house with the second storey set back, the insulation in the first storey wall, the second storey wall and the roof over the set-back must be continuous. Therefore if the roof over the set-back has insulation on a horizontal ceiling, then insulation is also needed on the vertical in any ceiling space in order to connect the ceiling insulation to the second storey wall.
2. To form a continuous barrier, insulation should be placed in gaps between window and door jambs, heads and sills, and the adjoining wall framing unless a gap is otherwise *required*. This may need to be compressible to allow for movement between members.

Explanatory Information: Safety of domestic services

Care should be taken when installing insulation to ensure that it does not interfere with the safety or performance of *domestic services* and fittings such as heating flues, recessed light fittings, light transformers, gas appliances and general plumbing and electrical components. This includes providing appropriate clearance as detailed in relevant legislation and referenced standards such as for electrical, gas and fuel oil installations.

Explanatory Information: Airspace adjoining reflective insulation

For *reflective insulation* and the adjoining airspace to achieve its tested *R-Value*, the airspace needs to be a certain width. This width varies depending on the particular type of *reflective insulation* and the *R-Value* to be achieved.

Explanatory Information: Adjoining sheets of roll membrane

Where *reflective insulation* also acts as a vapour barrier or sarking, both the minimum overlap and taping may be necessary.

Explanatory Information: Compression of bulk insulation

The *R-Value* of bulk insulation is reduced if it is compressed. The allocated space for bulk insulation must therefore allow the insulation to be installed so that it maintains its correct thickness when using the product's stated *R-Value*, otherwise the *R-Value* needs to be reduced to account for any compression. This is particularly relevant to wall and cathedral ceiling framing whose members can only accommodate a limited thickness of insulation. In some instances, larger framing members or thinner insulation material, such as polystyrene boards, may be necessary to ensure that the insulation achieves its *required R-Value*.

Explanatory Information: Airspaces

The *R-Value* of *reflective insulation* and its adjoining airspace is affected by the width of the airspace between a reflective side of the *reflective insulation* and the building lining or cladding. For further information on *reflective insulation*, refer to the explanatory information accompanying 13.2.2.

Explanatory Information: Condensation

Artificial cooling of buildings in some climates can cause *condensation* to form inside the layers of the building *envelope*. Such *condensation* can cause significant structural or cosmetic damage to the *envelope* before it is detected. Associated mould growth may also create health risks to the occupants. Effective control of *condensation* is a complex issue. In some locations a fully sealed vapour barrier may need to be installed on the more humid, or generally warmer, side of the insulation. Note that Part 10.8 contains specific provisions for *condensation*.

13.2.3 Roofs

[2019: 3.12.1.2]

(1) Subject to (2) and (5), a roof must—
   (a) achieve the specified in Tables 13.2.3a to 13.2.3g as appropriate, for the direction of heat flow; and
   (b) where a pitched roof has a flat ceiling, have greater than or equal to 50% of the added insulation laid on the ceiling.

(2) In *Climate zones* 1, 2, 3, 4 and 5 the specified in Tables 13.2.3a to 13.2.3g as appropriate, is reduced by 0.5 where—
   (a) the *required* insulation is laid on the ceiling; and
   (b) the roof space is ventilated by—
      (i) gable vents, ridge vents, eave vents, roof vents or the like that—
         (A) are evenly distributed to allow an unobstructed flow of air; and
         (B) are located to ensure, where practicable, there are no dead airspaces; and
         (C) have an aggregate fixed open area of greater than or equal to 1% of the ceiling area; or
      (ii) having—
         (A) not less than 2 wind-driven roof ventilators having an aggregate opening area of greater than or equal to 0.14 m^2; and

(B) gable vents, ridge vents, eave vents, roof vents or the like that have an aggregate fixed open area of greater than or equal to 0.2% of the ceiling area.

(3) A roof that—

(a) is required to achieve a minimum ; and

(b) has metal sheet roofing directly fixed to metal purlins, metal rafters or metal battens; and

(c) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens,

must have a thermal break, consisting of a material with an *R-Value* of greater than or equal to 0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters, or metal battens.

(4) A roof, or roof and associated ceiling, is deemed to have the following :

(a) For a flat roof, skillion roof and cathedral ceiling with a ceiling lining under the rafter, unventilated and constructed as shown in Figure 13.2.3a:

(i) Downwards direction of heat flow: = 0.48

(ii) Upwards direction of heat flow: = 0.36.

(b) For a flat roof, skillion roof and cathedral ceiling with exposed rafters, unventilated and constructed as shown in Figure 13.2.3b:

(i) Downwards direction of heat flow: = 0.44.

(ii) Upwards direction of heat flow: = 0.38.

(c) For a tiled pitched roof with flat ceiling constructed as shown in Figure 13.2.3c:

(i) Ventilated roof space:

(A) Downwards direction of heat flow: = 0.74.

(B) Downwards direction of heat flow: = 0.23.

(i) Unventilated roof space:

(A) Downwards direction of heat flow: = 0.56.

(B) Downwards direction of heat flow: = 0.41.

(d) For a metal pitched roof with flat ceiling constructed as shown in Figure 13.2.3d:

(i) Ventilated roof space:

(A) Downwards direction of heat flow: = 0.72.

(B) Downwards direction of heat flow: = 0.21.

(ii) Unventilated roof space:

(A) Downwards direction of heat flow: = 0.54.

(B) Downwards direction of heat flow: = 0.39.

(5) For the purposes of (4)(a) to (d):

(a) The of the roof and ceiling construction shown in Figures 13.2.3a to 13.2.3d is based there being a roof space.

(b) If the roof space is filled, the roof space *R-Value* needs to be subtracted from the of the roof and ceiling materials.

(c) The of the unventilated roof and ceiling construction in Figure 13.2.3c for tiled roofs is based on there being a *sarking-type material* which would prevent ventilation of the roof space through gaps in the roof tiles.

(6) Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of required ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the *R-Value* of insulation in the remainder of the ceiling in accordance with Table 13.2.3h.

(7) Where the minimum *R-Value* of ceiling insulation required to satisfy (1) is not stated in Table 13.2.3h, interpolation may be used to determine the adjusted minimum *R-Value*.

Table 13.2.3a: Roof—minimum Total R-values (climate zone 1)

Direction of heat flow	Upper surface solar absorptance value	Minimum
Down	≤ 0.4	3.1
Down	> 0.4 but ≤ 0.6	4.1
Down	> 0.6	5.1

Table 13.2.3b: Roof—minimum Total R-values (climate zone 2—altitude less than 300 m)

Direction of heat flow	Upper surface solar absorptance value	Minimum
Down	≤ 0.4	4.1
Down	> 0.4 but ≤ 0.6	4.6
Down	> 0.6	5.1

Table Notes:

Altitude means the height above the Australian Height Datum at the location where the building is to be constructed.

Table 13.2.3c: Roof—minimum Total R-values (climate zone 2—altitude 300 m or more)

Direction of heat flow	Upper surface solar absorptance value	Minimum
Down	≤ 0.4	4.1
Down	> 0.4 but ≤ 0.6	4.6
Down	> 0.6	5.1

Table Notes:

Altitude means the height above the Australian Height Datum at the location where the building is to be constructed.

Table 13.2.3d: Roof—minimum Total R-values (climate zone 3)

Direction of heat flow	Upper surface solar absorptance value	Minimum
Down and Up	≤ 0.4	4.1
Down and Up	> 0.4 but ≤ 0.6	4.6
Down and Up	> 0.6	5.1

Table 13.2.3e: Roof—minimum Total R-values (climate zones 4 and 5)

Direction of heat flow	Upper surface solar absorptance value	Minimum
Up	≤ 0.4	4.1
Up	> 0.4 but ≤ 0.6	4.6
Up	> 0.6	5.1

Table 13.2.3f: Roof—minimum Total R-values (climate zones 6 and 7)

Direction of heat flow	Upper surface solar absorptance value	Minimum
Up	≤ 0.4	4.6

Direction of heat flow	Upper surface solar absorptance value	Minimum
Up	> 0.4 but ≤ 0.6	5.1
Up	> 0.6	5.1

Table 13.2.3g: Roof—minimum Total R-values (climate zone 8)

Direction of heat flow	Upper surface solar absorptance value	Minimum
Up	≤ 0.4	6.3
Up	> 0.4 but ≤ 0.6	6.3
Up	> 0.6	6.3

Table 13.2.3h: Adjusted minimum R-Value of ceiling insulation required to compensate for loss of ceiling insulation area

Percentage of ceiling area uninsulated	Minimum *R-Value* of ceiling insulation required to satisfy 13.2.3(a)										
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
0.5 to less than 1.0%	1.0	1.6	2.2	2.8	3.4	4.0	4.7	5.4	6.2	6.9	x
1.0% to less than 1.5%	1.1	1.7	2.3	2.9	3.6	4.4	5.2	6.1	7.0	x	x
1.5% to less than 2.0%	1.1	1.7	2.4	3.1	3.9	4.8	5.8	6.8	x	x	x
2.0% to less than 2.5%	1.1	1.8	2.5	3.3	4.2	5.3	6.5	x	x	x	x
2.5% to less than 3.0%	1.2	1.9	2.6	3.6	4.6	5.9	x	x	x	x	x
3.0% to less than 4.0%	1.2	2.0	3.0	4.2	5.7	x	x	x	x	x	x
4.0% to less than 5.0%	1.3	2.2	3.4	5.0	x	x	x	x	x	x	x
5.0% or more	x	x	x	x	x	x	x	x	x	x	x

Table Notes:

1. X = not permitted
2. Where the minimum *R-Value* of ceiling insulation required to satisfy 13.2.3(1) is greater than or equal to 6.0, adjustment to compensate for loss of ceiling insulation area is not permitted.

Figure 13.2.3a: Flat roof, skillion roof and cathedral ceiling with a ceiling lining under the rafter

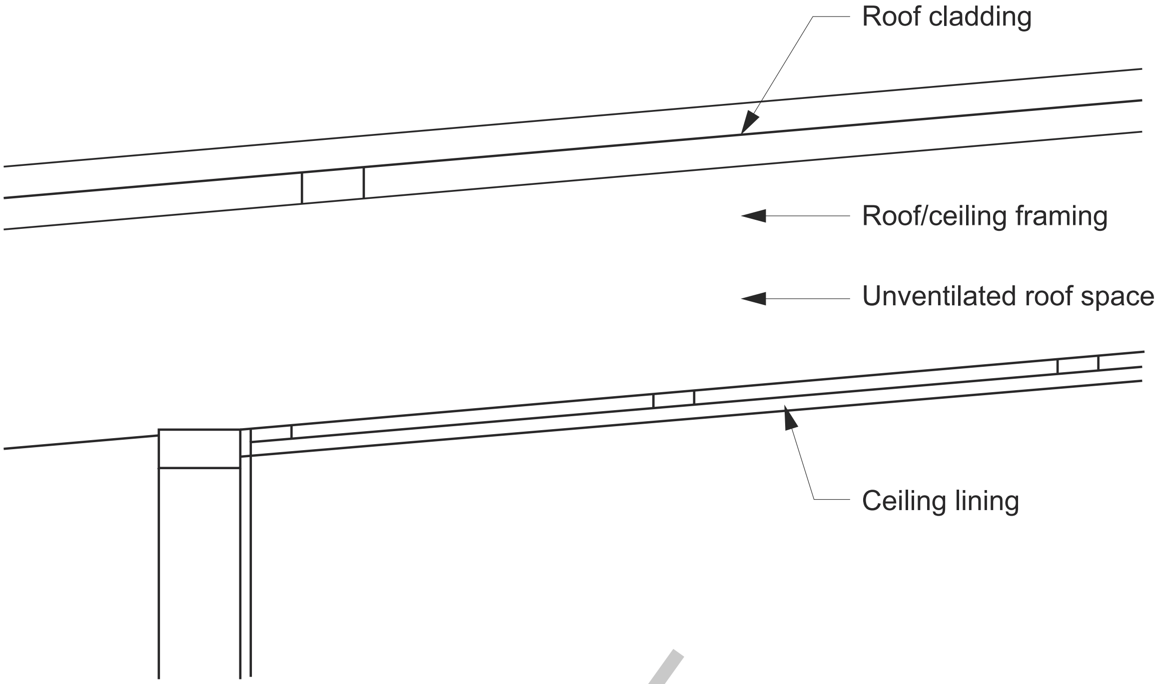


Figure Notes:

1. The *Total R-Value* of the roof and ceiling construction in Figure 13.2.3a is based on there being a roof space.
2. If the roof space is filled, the roof space *R-Value* needs to be subtracted from the *Total R-Value* of the roof and ceiling materials.

Figure 13.2.3b: **Flat roof, skillion roof and cathedral ceiling with exposed rafters**

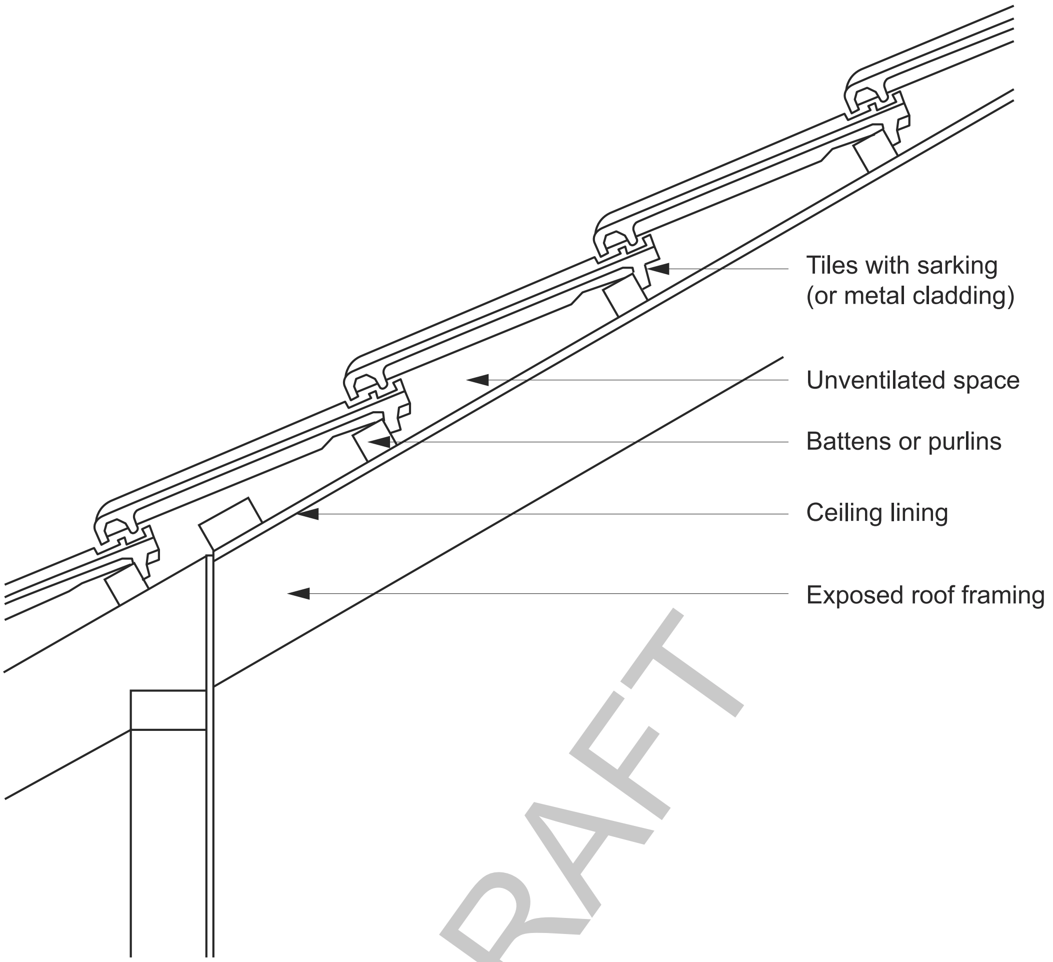


Figure Notes:

1. The *Total R-Value* of the roof and ceiling construction in Figure 13.2.3b is based on there being a roof space.
2. If the roof space is filled, the roof space *R-Value* needs to be subtracted from the *Total R-Value* of the roof and ceiling materials.

Figure 13.2.3c: **Tiled pitched roof with flat ceiling**

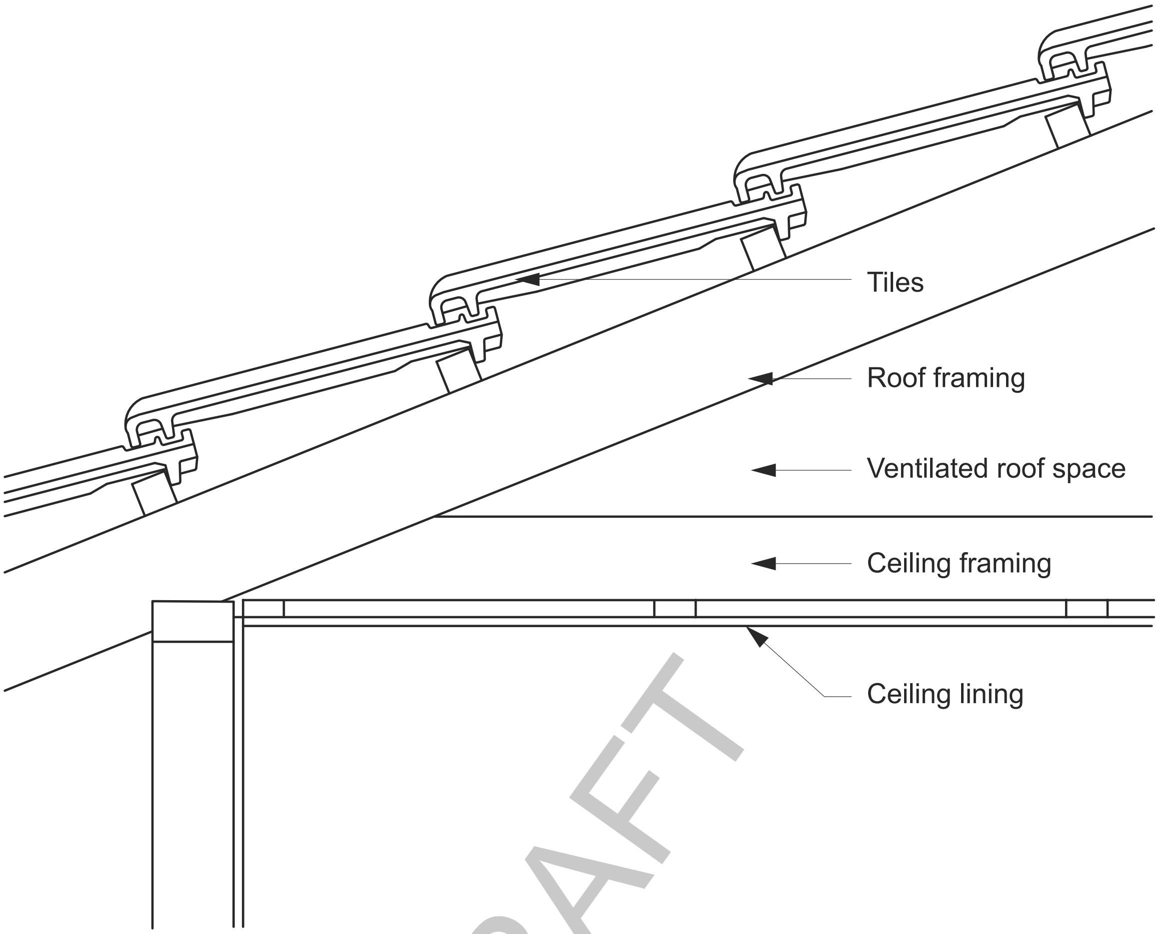


Figure Notes:

1. The *Total R-Value* of the roof and ceiling construction in Figure 13.2.3c is based on there being a roof space.
2. If the roof space is filled, the roof space *R-Value* needs to be subtracted from the *Total R-Value* of the roof and ceiling materials.
3. The *Total R-Value* of the unventilated roof and ceiling construction in Figure 13.2.3c for tiled roofs are based on there being *sarking-type material* which would prevent ventilation of the roof space through the gaps in the roof tiles.

Figure 13.2.3d: Metal pitched roof with flat ceiling

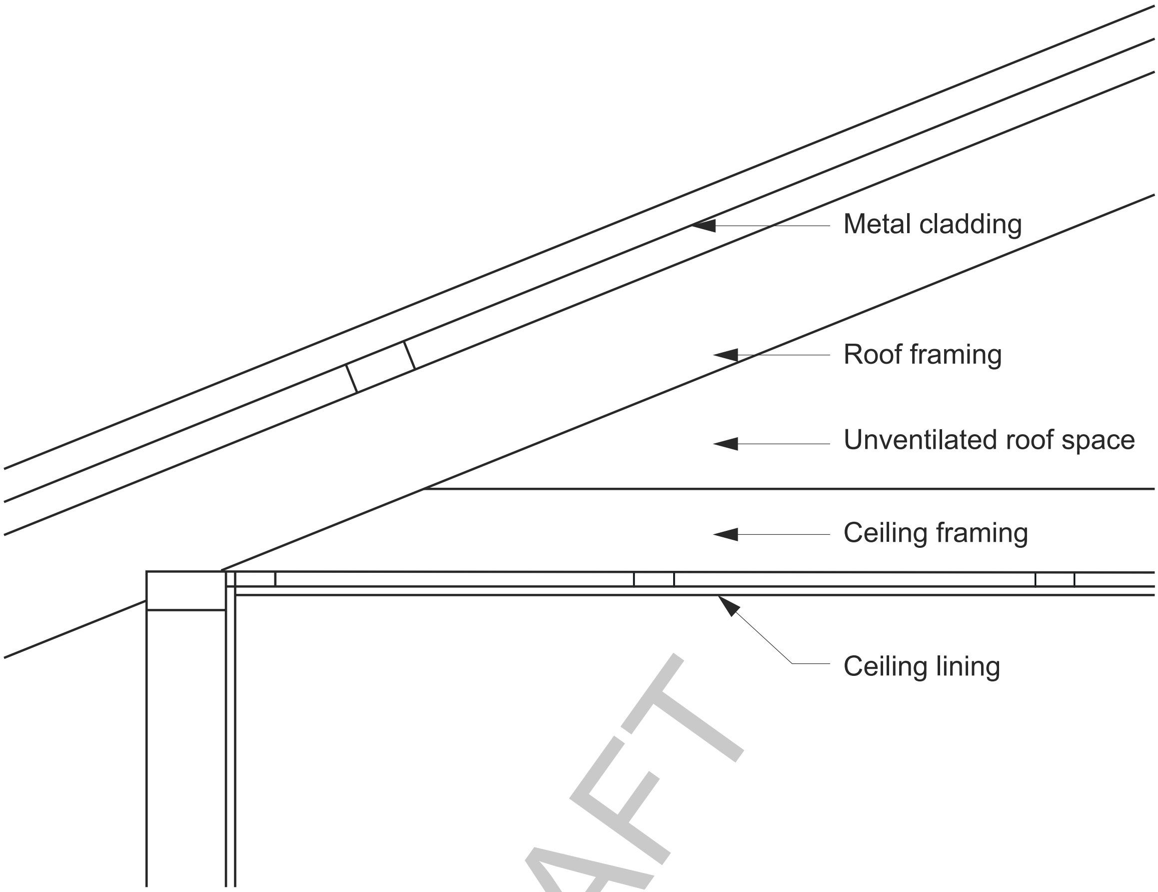


Figure Notes:

1. The *Total R-Value* of the roof and ceiling construction in Figure 13.2.3d is based on there being a roof space.
2. If the roof space is filled, the roof space *R-Value* needs to be subtracted from the *Total R-Value* of the roof and ceiling materials.

Explanatory Information: Tables 13.2.3a to 13.2.3g

1. The term 'as appropriate' used in reference to Tables 13.2.3a to 13.2.3g, means the table used must be appropriate to the *climate zone* in which the building is to be located.
2. The roof space ventilation option, in *climate zones* 1, 2, 3, 4 and 5, applies to a pitched roof with a flat ceiling to ensure that efficient cross ventilation is achieved in the roof space to remove hot air. Roof space ventilation is generally not suitable for most flat, skillion, cathedral ceiling and similar roof types because of the lack of space between the ceiling and roof.
3. Care should be taken to ensure that the roof *ventilation openings* do not allow rain penetration and that they comply with appropriate bushfire provisions.
4. Gaps between roof tiles with sarking (or *reflective insulation* at rafter level) and metal sheet roofing are not acceptable methods of providing roof space ventilation.
5. Compliance with the ventilation provisions in 13.2.3(2)(b) may result in the ingress of wind driven rain, fine dust, corrosive aerosols, or stimulate the growth of mould or fungus in the roof enclosure. Consideration should therefore be given to the surrounding environmental features, including exposure to marine or industrial environments, prior to adopting this as an alternative to the roof insulation provisions in 13.2.3(2)(b)(ii).
6. A low solar absorptance roof reduces the flow of heat from solar radiation better than a high solar absorptance roof. A roof with a solar absorptance value of less than 0.4 typically corresponds to a roof of light colour such as white, off-white or cream. Typical absorptance values based on ASTM E903 are shown in explanatory Table 13.2.3a below.
7. The direction of heat flow in Tables 13.2.3a to 13.2.3g, as appropriate, is considered to be the predominant direction of heat flow for the hours of occupation of the building. It takes into account the higher rate of occupancy of houses at night time rather than day time.

8. The weight of roof or ceiling insulation, particularly if additional ceiling insulation is used for compliance with the energy efficiency provisions, needs to be considered in the selection of plasterboard, plasterboard fixings and building framing.

Table 13.2.3a (explanatory): Typical absorbtance values

Colour	Value
Slate (dark grey)	0.90
Red, green	0.75
Yellow, buff	0.60
Zinc aluminium — dull	0.55
Galvanised steel — dull	0.55
Light grey	0.45
Off white	0.35
Light cream	0.30

Explanatory Information: Typical construction

1. Figures 13.2.3a to 13.2.3d provide examples of various roof and ceiling construction. The *R-Value* of the *required* insulation is calculated by subtracting the inherent *Total R-Value* of the roof and ceiling construction from the *Total R-Value* in Tables 13.2.3a to 13.2.3g. The inherent *Total R-Value* of the typical roof and ceiling has been determined by adding together the *R-Values* of the outdoor air film, roof cladding, roof airspace, ceiling sheet lining and internal film.
2. The *Total R-Value* of the roof and ceiling materials may need to be adjusted if other building elements such as sarking are also installed. For example, sarking or sheet insulation under tiles may change a roof space from "ventilated" to "unventilated".

Explanatory Information: Thermal bridging

Irrespective of the framing material used, the minimum added *R-Value* specified in Figures 13.2.3a to 13.2.3d, Figures 13.2.5b to 13.2.5i and Table 13.2.6a is deemed to include the effect of thermal bridging created by framing members in situations other than described in the explanatory information regarding thermal breaks.

Explanatory Information: Thermal break

Because of the high thermal conductance of metal, a thermal break is to be provided where the ceiling lining of a house is fixed directly to the underside of the metal purlins or metal battens of a metal deck roof or where there is no ceiling lining. The purpose of the thermal break is to ensure that the thermal performance of this form of roof construction is comparable to that of a similar roof with timber purlins or timber battens.

A thermal break may be provided by materials such as timber, expanded polystyrene strips, plywood or compressed bulk insulation. The material used as a thermal break must separate the metal purlins or metal battens from the metal deck roofing and achieve the specified *R-Value*. *Reflective insulation* alone is not suitable for use as a thermal break because it requires an adjoining airspace to achieve the specified *R-Value* (see explanatory information regarding choice of insulation)

For the purposes of 13.2.3(3), expanded polystyrene strips of not less than 12 mm thickness, compressed bulk insulation, and timber of not less than 20 mm thickness are considered to achieve an *R-Value* of not less than 0.2.

Explanatory Information: Location of insulation

The thermal performance of the roof may vary depending on the position of the insulation, the climatic conditions, the design of the house and the way in which it is operated. For example, insulation installed under the roof, rather than on the ceiling, of a conditioned house with a large roof space is less effective because of the additional volume of roof airspace that would need to be heated or cooled. Conversely, for an unconditioned house, the use of *reflective insulation* is more effective when placed directly under the roof.

Explanatory Information: Choice of insulation

There are a number of different insulation products that may be used to achieve the minimum added *R-Value*. However, care should be taken to ensure that the choice made is appropriate for the construction and climatic conditions as the location and relationship between options in Figures 13.2.3a to 13.2.3d, Figures 13.2.5b to 13.2.5i and Table 13.2.6a may not be suitable in all circumstances for both practical and technical reasons. For instance, in some *climate zones*, insulation should be installed with due consideration of *condensation* and associated interaction with adjoining building materials. As an example, *reflective insulation* or sarking installed on the cold side of the building *envelope* should be vapour permeable. Note that Part 10.8 contains specific provisions for *condensation*.

Reflective insulation is considered to provide the following additional *R-Values* when used in conjunction with the *Total R-Value* of a pitched roof and flat ceiling construction described in Figures13.2.3a to 13.2.3d. To achieve these values, the *reflective insulation* must be laid directly under the roof cladding and have a minimum airspace of 15 mm between a reflective side of the *reflective insulation* and the adjoining lining or roof cladding (see 13.2.2(2)).

The actual *R-Value* added by *reflective insulation* and its adjoining airspace should be determined for each product in accordance with relevant standards, taking into consideration factors such as the number of adjacent airspaces, dimensions of the adjacent airspace, whether the space is ventilated and the presence of an anti-glare coating. When *reflective insulation* has an anti-glare coating on one side, the emittance value of that side will be greater than the value of the uncoated side. See explanatory Tables 13.2.3b to 13.2.3d

Also, where another emittance value for *reflective insulation* is used (other than the value used in the table below), care should be taken to ensure that the number of airspaces allowed for is consistent with the form of construction and whether the airspace is reflective, partially reflective or non-reflective. Where bulk insulation fills the airspace, the *Total R-Value* should be reduced to take account of the loss of airspace.

Table 13.2.3b (explanatory): R-Value added by reflective insulation — pitched roof (>10°) with horizontal ceiling

Emittance of added *reflective insulation*	Direction of heat flow Note 1	*R-Value* added—unventilated roof space	*R-Value* added—ventilated roof space Note 2
0.2 outer/0.05 inner	Down	1.12	1.21
0.2 outer/0.05 inner	Up	0.75	0.59
0.9 outer/0.05 inner	Down	0.92	1.01
0.9 outer/0.05 inner	Up	0.55	0.40

Table Notes:

1. The *required* direction of heat flow applicable in each of the *climate zones* specified in Tables 13.2.3a to 13.2.3g.
2. Ventilated roof space means ventilated in accordance with 13.2.3(2).

Table 13.2.3c (explanatory): R-Value added by reflective insulation — flat skillion or pitched roof (≤ 10°) with horizontal ceiling

Emittance of added *reflective insulation*	Direction of heat flow Note	*R-Value* added
0.2 outer/0.05 inner	Down	1.28
0.2 outer/0.05 inner	Up	0.68
0.9 outer/0.05 inner	Down	1.06
0.9 outer/0.05 inner	Up	0.49

Table Notes:

The *required* direction of heat flow applicable in each of the *climate zones* specified in Tables 13.2.3a to 13.2.3g.

Table 13.2.3d (explanatory): R-Value added by reflective insulation — pitched roof with cathedral ceilings

Emittance of added *reflective insulation*	Direction of heat flow Note	*R-Value* added — pitch ≥ 15° to ≤ 25°	*R-Value* added — pitch > 25° to ≤ 35°	*R-Value* added — pitch > 35° to ≤ 45°
0.2 outer/0.05 inner	Down	0.96	0.86	0.66
0.2 outer/0.05 inner	Up	0.72	0.74	0.77
0.9 outer/0.05 inner	Down	0.74	0.64	0.44
0.9 outer/0.05 inner	Up	0.51	0.51	0.53

Table Notes:

The *required* direction of heat flow applicable in each of the *climate zones* specified in Tables 13.2.3a to 13.2.3g.

Explanatory Information: Table 13.2.3h

1. When considering the reduction of insulation because of exhaust fans, flues or recessed downlights, 0.5% of the ceiling area for a 200 m^2 house would permit 2 bathroom heater-light assemblies, a laundry exhaust fan, a kitchen exhaust fan and either approximately 20 recessed down-lights with 50 mm clearance to insulation, 10 recessed downlights with 100 mm clearance to insulation or only 3 recessed downlights with 200 mm clearance to insulation.
2. Note that Table 13.2.3h refers to the *R-Value* of the insulation located on the ceiling and not the *Total R-Value* required of the roof. The roof has an inherent *R-Value* and there may also be insulation at the roof line.
3. Note that 13.2.3(6) does not require an increase in ceiling insulation for *roof lights*.
4. Placing some of the *required* insulation at the roof level may result in a more practical outcome. Insulation at the roof level is effective in warm climates and significantly moderates the roof space extremes and *condensation* risk in cold climates. Note that Part 10.8 contains specific provisions for *condensation*.

13.2.4 Roof lights

[2019: 3.12.1.3]

(1) *Roof lights* (including any associated shaft and diffuser) serving a habitable room or an interconnecting space such as a corridor, hallway, stairway or the like must—

(a) if the *roof lights* are not *required* for compliance with H4D5 or —

(i) comply with Table 13.2.4; and

(ii) have an aggregate area of not more than 3% of the total *floor area* of the storey served; or

(b) if the *roof lights* are *required* for compliance with H4D5 or H4D6—

(i) have an area not more than 150% of the minimum area *required* by H4D6; and

(ii) have transparent and translucent elements, including any imperforate ceiling diffuser with—

(A) a of not more than 0.29; and

(B) a of not more than 2.9.

(2) For the purposes of Table 13.2.4, the following applies:

(a) The *roof light* shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.

(b) The *roof light* area index is the total area of *roof lights* serving the room or space as a percentage of the *floor area* of the room or space.

(c) The total area of *roof lights* is the combined area for all roof lights serving the room or space.

(d) The area of a *roof light* is the area of the roof opening that allows light to enter the building.

(e) The thermal performance of an imperforate ceiling diffuser may be included in the of the *roof light*.

(3) The total area of roof lights serving the room or space as a percentage of the *floor area* of the room or space must not be more than 5% unless allowed by (1)(b).

Table 13.2.4: Roof lights – thermal performance of transparent and translucent elements

Roof light shaft index	Roof light area index ≤ 2%	Roof light area index > 2% to ≤ 3%	Roof light area index > 3% to ≤ 4%	Roof light area index > 4% to ≤ 5%
<0.5	≤0.83	≤0.57	≤0.43	≤0.34
	≤8.5	≤5.7	≤4.3	≤3.4
≥0.5 to <1.0	≤0.83	≤0.72	≤0.54	≤0.43
	≤8.5	≤5.7	≤4.3	≤3.4
≥1.0 to <2.5	≤0.83	≤0.83	≤0.69	≤0.55
	≤8.5	≤5.7	≤4.3	≤3.4
≥2.5	≤0.83	≤0.83	≤0.83	≤0.83
	≤8.5	≤5.7	≤4.3	≤3.4

Explanatory Information:

1. The and are expressed as Australian Fenestration Rating Council (AFRC) values.
2. The and are for a *roof light* with or without a ceiling diffuser. A *roof light* may achieve the *required* performance on its own or in conjunction with a ceiling diffuser.
3. The and for some simple types of *roof lights* are shown in the tables below. Lower *U-Value* figures represent higher thermal resistance. Lower *SHGC* figures represent less solar heat transmission. The table gives worst case assessments, which can be improved by obtaining generic or custom product assessments from suppliers, manufacturers, industry associations (including their online resources) and from competent assessors.

Table 13.2.4a (explanatory): Worst case whole roof light element performance values without a ceiling diffuser or with a perforated ceiling diffuser

Translucent or transparent element description	Domed panel	Flat, framed panel
Single layer clear	: 0.80	: 0.79
	: 8.4	: 8.0
Single tinted	: 0.66	: 0.63
	: 8.4	: 7.9
Single layer translucent (“opal”)	: 0.57	: 0.56
	: 8.4	: 7.9
Double layer clear	: 0.71	: 0.70
	: 5.4	: 4.9

Table 13.2.4b (explanatory): Worst case whole roof light element performance values with an imperforate ceiling diffuser

Translucent or transparent element description	Domed panel	Flat, framed panel
Single layer clear	: 0.72	: 0.71
	: 4.3	: 4.2
Single tinted	: 0.59	: 0.57
	: 4.3	: 4.2
Single layer translucent (“opal”)	: 0.51	: 0.50
	: 4.3	: 4.2
Double layer clear	: 0.64	: 0.63

Translucent or transparent element description	Domed panel	Flat, framed panel
	: 3.4	: 3.2

13.2.5 External walls

[2019: 3.12.1.4]

(1) Each part of an *external wall* must satisfy the requirements of —

(a) (2) for all walls; or

(b) (3) for walls with a surface density greater than or equal to 220 kg/m^2, except for—

(i) opaque non-glazed openings such as doors (including garage doors), vents, penetrations, shutters and the like; and

(ii) unless covered by (3).

(2) Each part of an external wall must—

(a) in *climate zones* 1, 2, 3, 4 and 5—

(i) achieve a minimum of 2.8; or

(ii) achieve a minimum of 2.4 and shade the external wall of the storey with a verandah, balcony, eaves, carport or the like, which projects at a minimum angle of 15 degrees in accordance with Figure 13.2.5a; or

(b) in *climate zones* 6 and 7, achieve a minimum of 2.8; or

(c) in *climate zone* 8, achieve a minimum of 3.8.

(3) Each part of an external wall with a wall surface density of greater than or equal to 220 kg/m^2 must—

(a) in *climate zones* 1, 2 and 3—

(i) for a storey, other than one with a storey above, shade the wall with a verandah, balcony, eaves, carport or the like that projects at a minimum angle of 15 degrees in accordance with Figure 13.2.5a; and

(ii) when the external walls are not shaded in accordance with (i) and there is another storey above, external glazing complies with 13.3.2 with the applicable value for C_{SHGC} in Tables 13.3.2a to 13.3.2c reduced by 20%; and

(iii) incorporate insulation with an *R-Value* of greater than or equal to 0.5; and

(iv) on the lowest storey containing *habitable rooms*, have either—

(A) a concrete slab-on-ground floor; or

(B) masonry internal walls; or

(b) in *climate zone* 5 (option a)—

(i) for a storey, other than one with a storey above, shade the wall with a verandah, balcony, eaves, carport or the like that projects at a minimum angle of 15 degrees in accordance with Figure 13.2.5a; and

(ii) when the external walls are not shaded in accordance with (i) and there is another storey above, external glazing complies with 13.3.2 with the applicable value for C_{SHGC} in Table 13.3.2e reduced by 15%; and

(iii) incorporate insulation with an *R-Value* of greater than or equal to 0.5; and

(iv) on the lowest storey containing *habitable rooms*, have either—

(A) a concrete slab-on-ground floor; or

(B) masonry internal walls; or

(c) in *climate zone* 5 (option b)—

(i) shade the wall with a verandah, balcony, eaves, carport or the like that projects at a minimum angle of 15 degrees in accordance with Figure 13.2.5a; and

(ii) have external glazing that complies with 13.3.2 with the applicable value for C_{SHGC} in Table 13.3.2e reduced by 15%; and

(iii) on the lowest storey containing *habitable rooms*, have either—

(A) a concrete slab-on-ground floor; or

(B) masonry internal walls; or

(d) in *climate zones* 4 and 6 (option a)—

(i) have external that complies with 13.3.2 with the applicable value for C_U in Tables 13.3.2d and 13.3.2f reduced by 15%; and

(ii) incorporate insulation with an *R-Value* of greater than or equal to 0.5; and

(iii) on the lowest storey containing *habitable rooms*, have either—

(A) a concrete slab-on-ground floor; or

(B) masonry internal walls; or

(e) in *climate zones* 4 and 6 (option b), have external glazing that complies with 13.3.2 with the applicable value for C_U in Tables 13.3.2d and 13.3.2f reduced by 20%; or

(f) in *climate zones* 4 and 6 (option c)—

(i) incorporate insulation with an *R-Value* of greater than or equal to 1.0; and

(ii) on the lowest storey containing *habitable rooms*, have either—

(A) a concrete slab-on-ground floor; or

(B) masonry internal walls; or

(g) in *climate zone* 7 (option a)—

(i) have external glazing that complies with 13.3.2 with the applicable value for C_U in Table 13.3.2g reduced by 15%; and

(ii) incorporate insulation with an *R-Value* of greater than or equal to 1.0; or

(h) in *climate zone* 7 (option b)—

(i) have external glazing that complies with 13.3.2 with the applicable value for C_U in Table 13.3.2g reduced by 20%; and

(ii) incorporate insulation with an *R-Value* of greater than or equal to 0.5; or

(i) in *climate zone* 7 (option c), incorporate insulation with an *R-Value* of greater than or equal to 1.5; or

(j) in *climate zone* 8, achieve a minimum of 3.8.

(4) A wall in (2) that—

(a) has lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to the metal frame; and

(b) does not have a wall lining or has a wall lining that is fixed directly to the metal frame (see Figure 13.2.5b and 13.2.5c),

must have a thermal break, consisting of a material with an *R-Value* greater than or equal to 0.2, installed between the external cladding and the metal frame.

(5) A wall constructed in accordance with Figure 13.2.5b to 13.2.5i is deemed to have the specified in that Figure.

Figure 13.2.5a: Measurement of a projection for wall shading

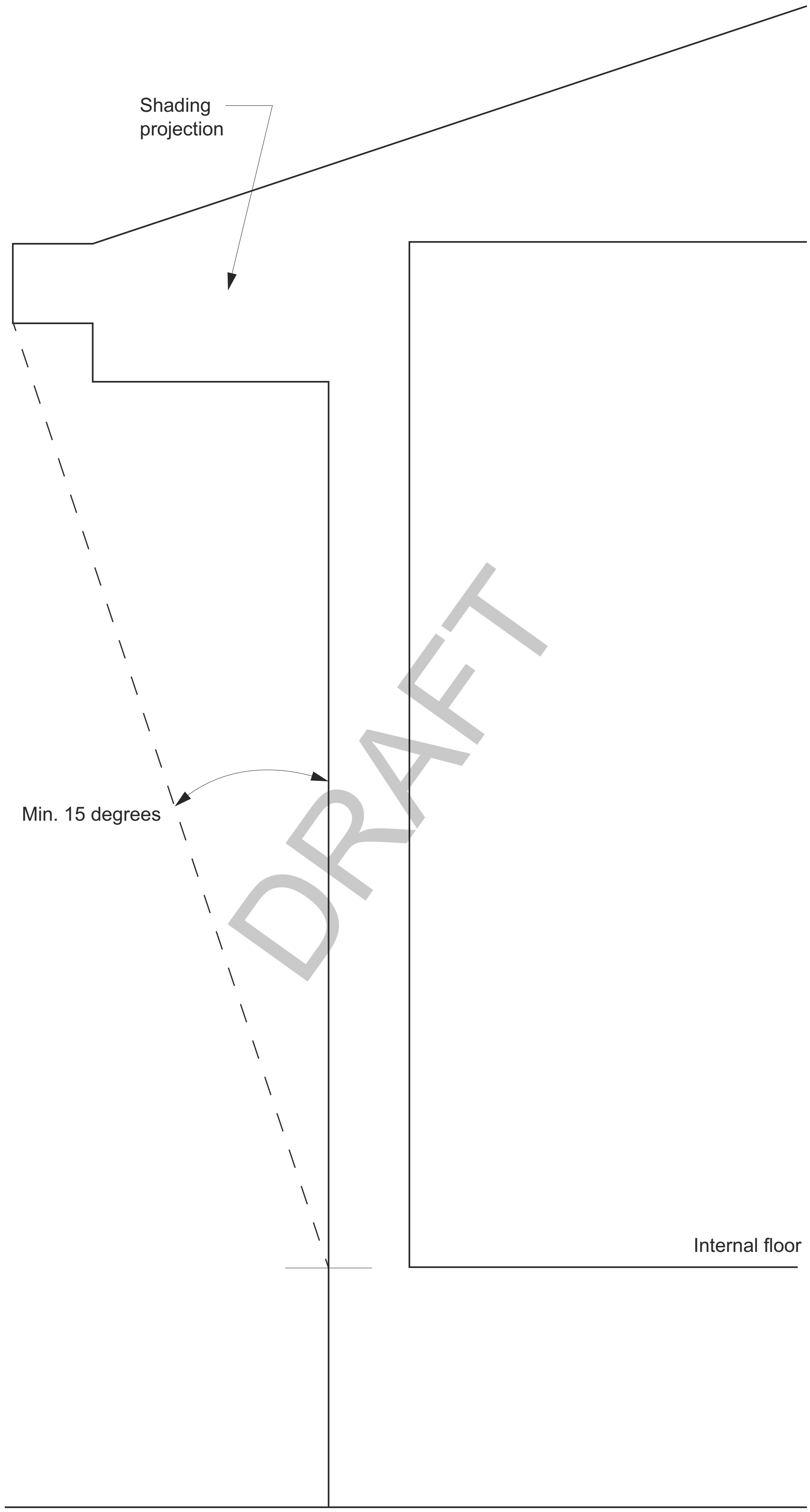


Figure Notes:

Guttering can be considered as providing shading if attached to a shading projection.

Figure 13.2.5b: Weatherboard external wall construction — Total R-Value of 0.48

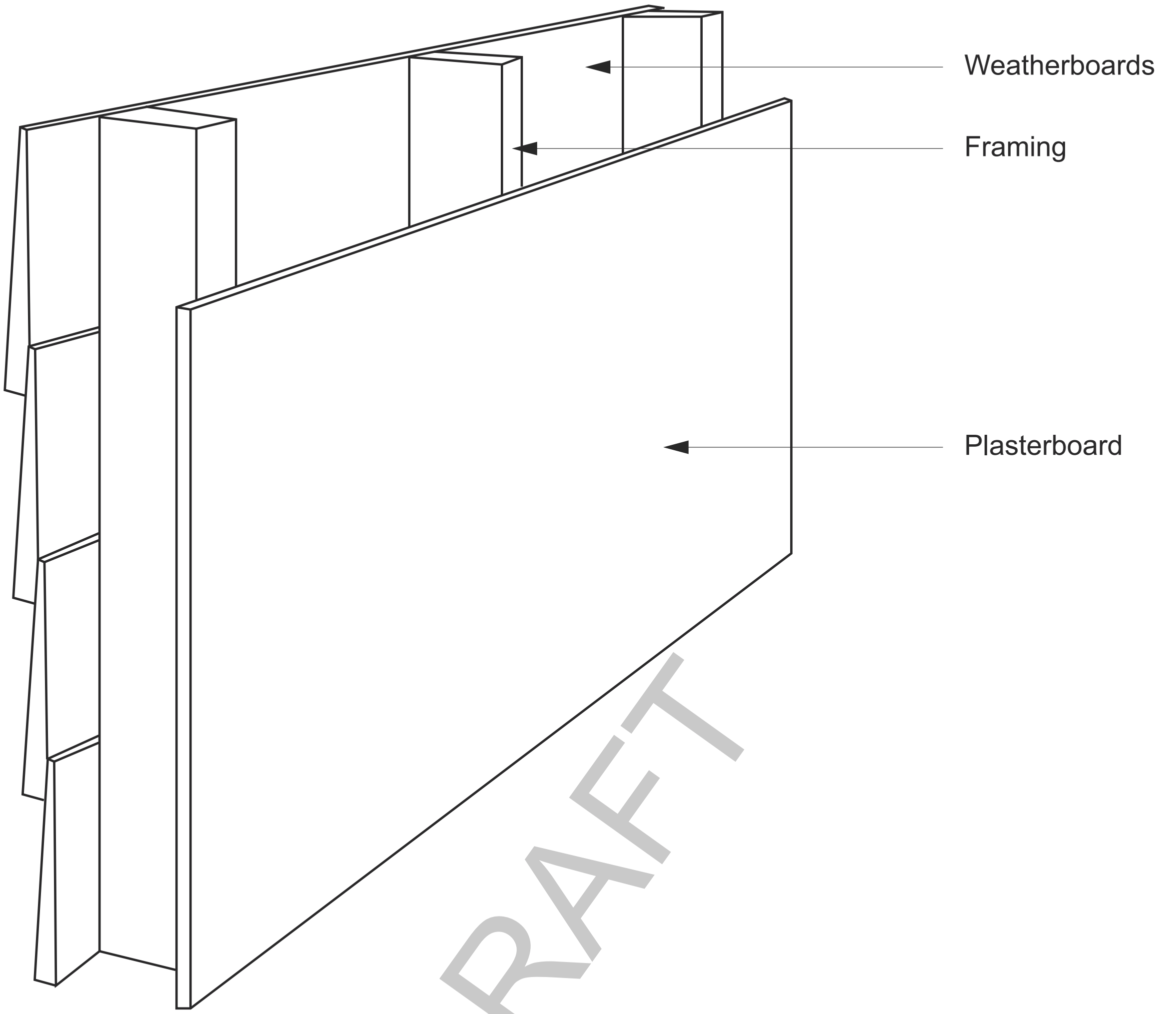


Figure 13.2.5c: **Fibre-cement sheet external wall construction — Total R-Value of 0.42**

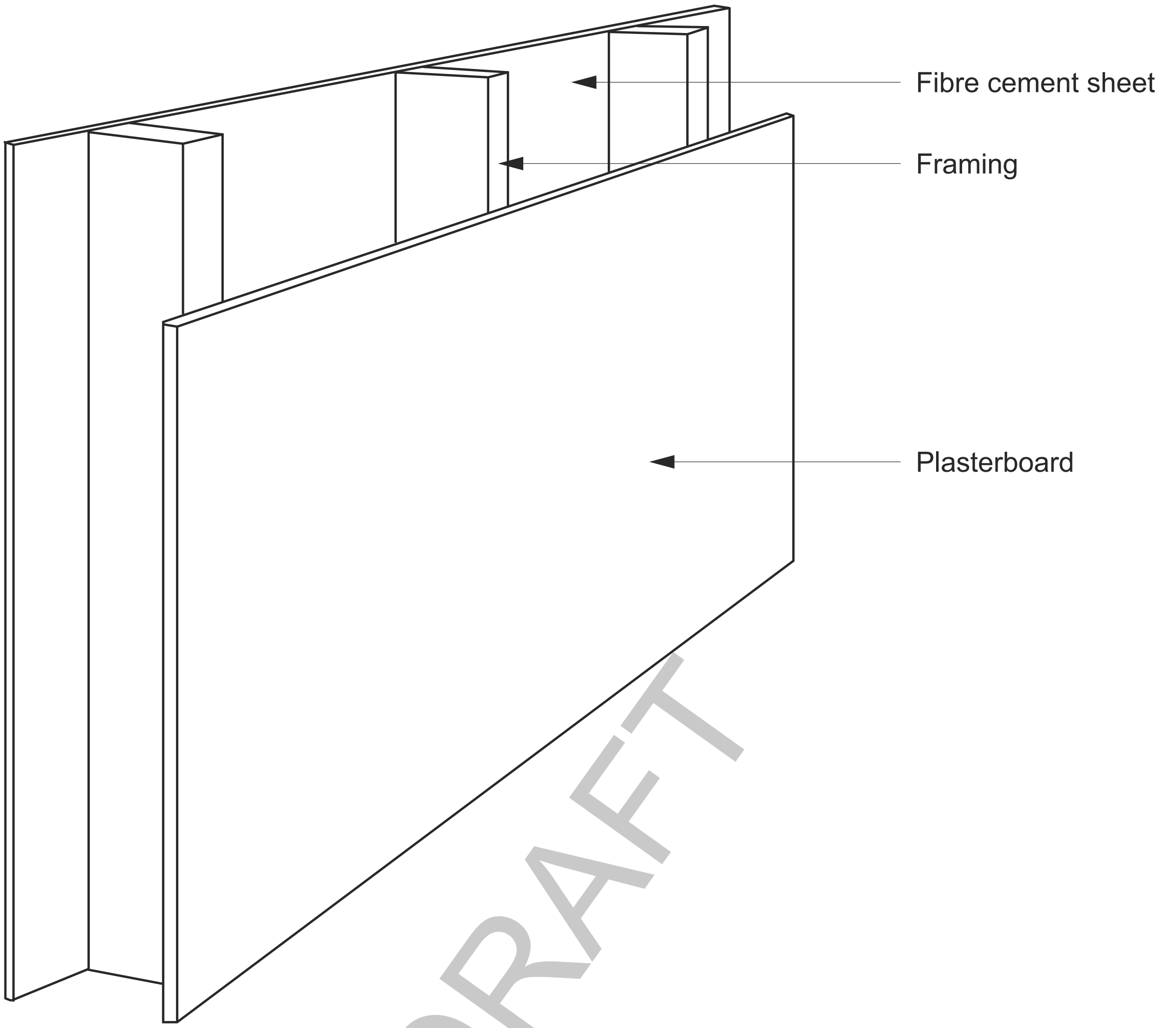


Figure 13.2.5d: **Clay masonry veneer external wall construction — Total R-Value of 0.56**

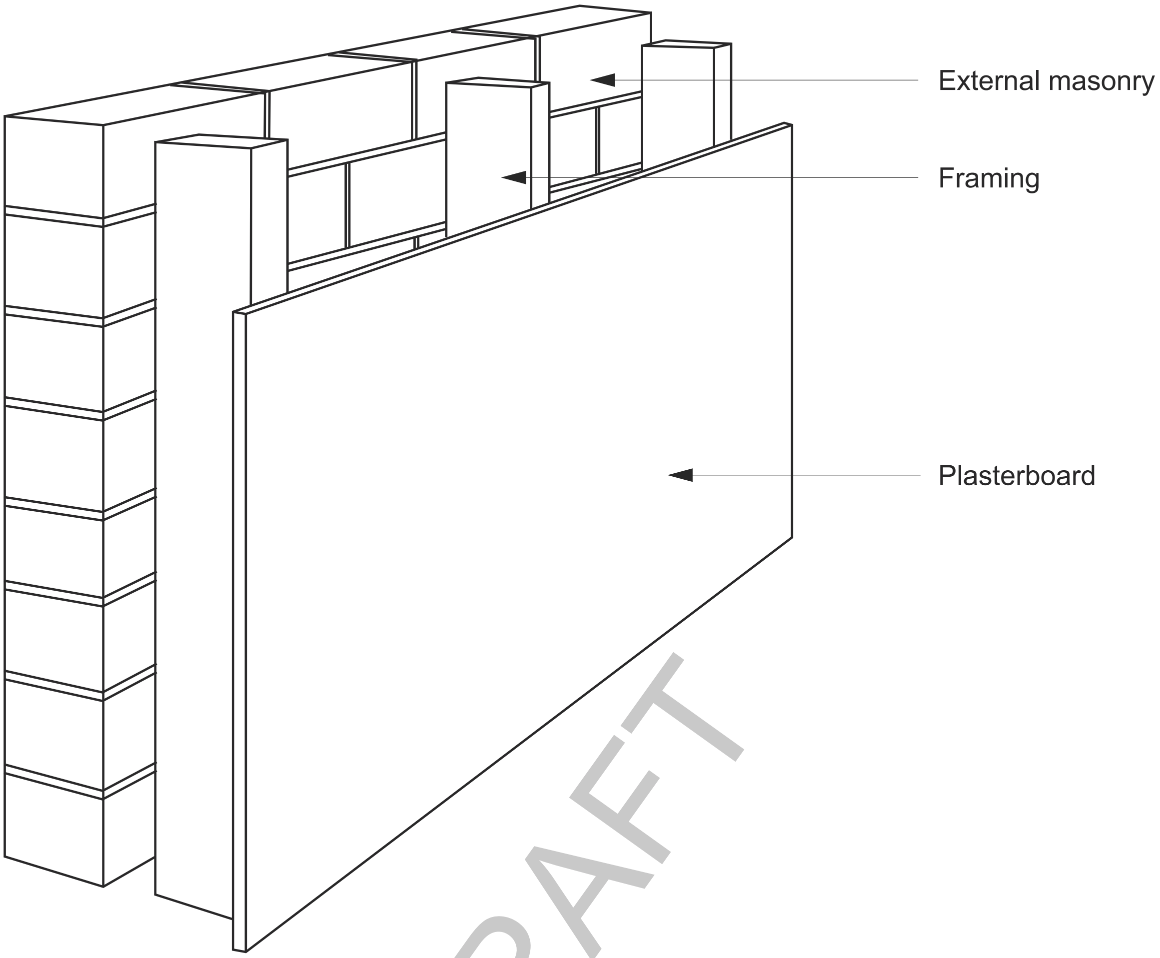


Figure 13.2.5e: Concrete blockwork masonry external wall construction — Total R-Value of 0.54

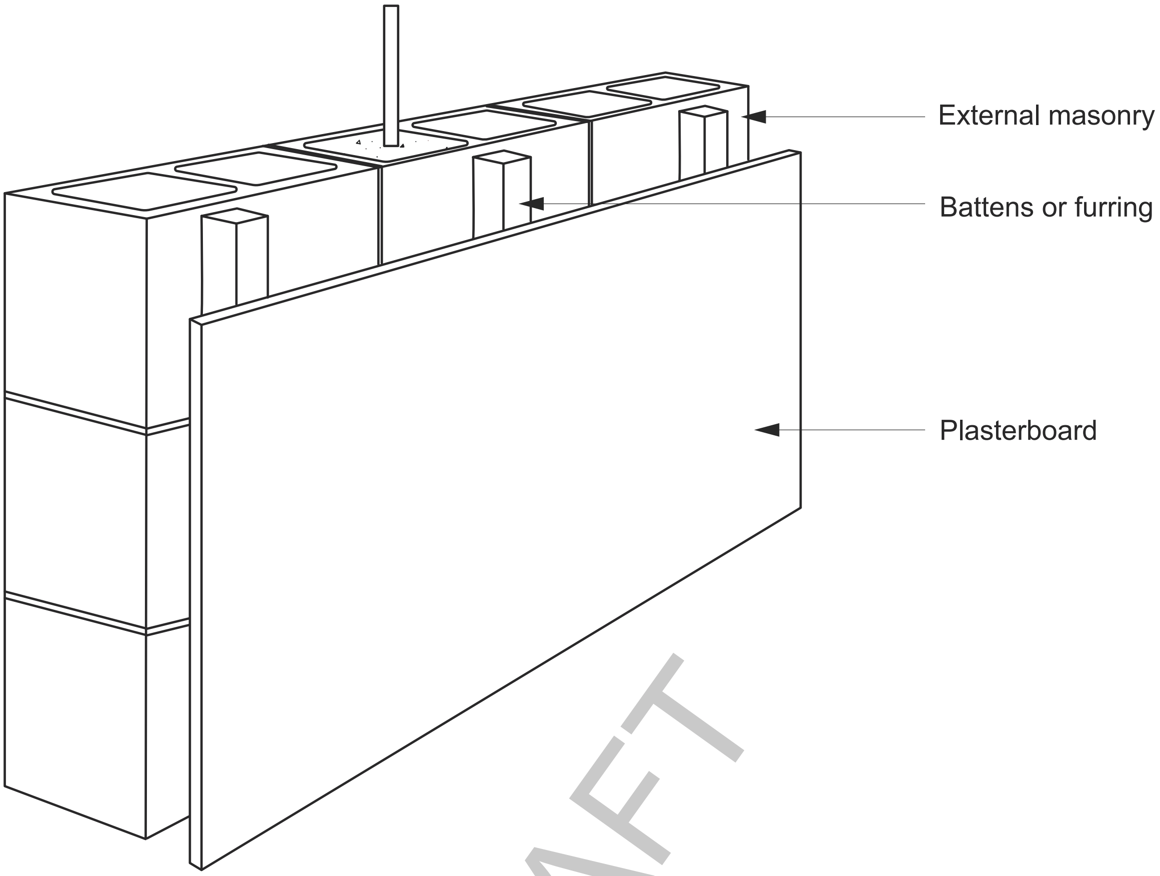


Figure 13.2.5f: Cavity clay masonry external wall construction — Total R-Value of 0.69

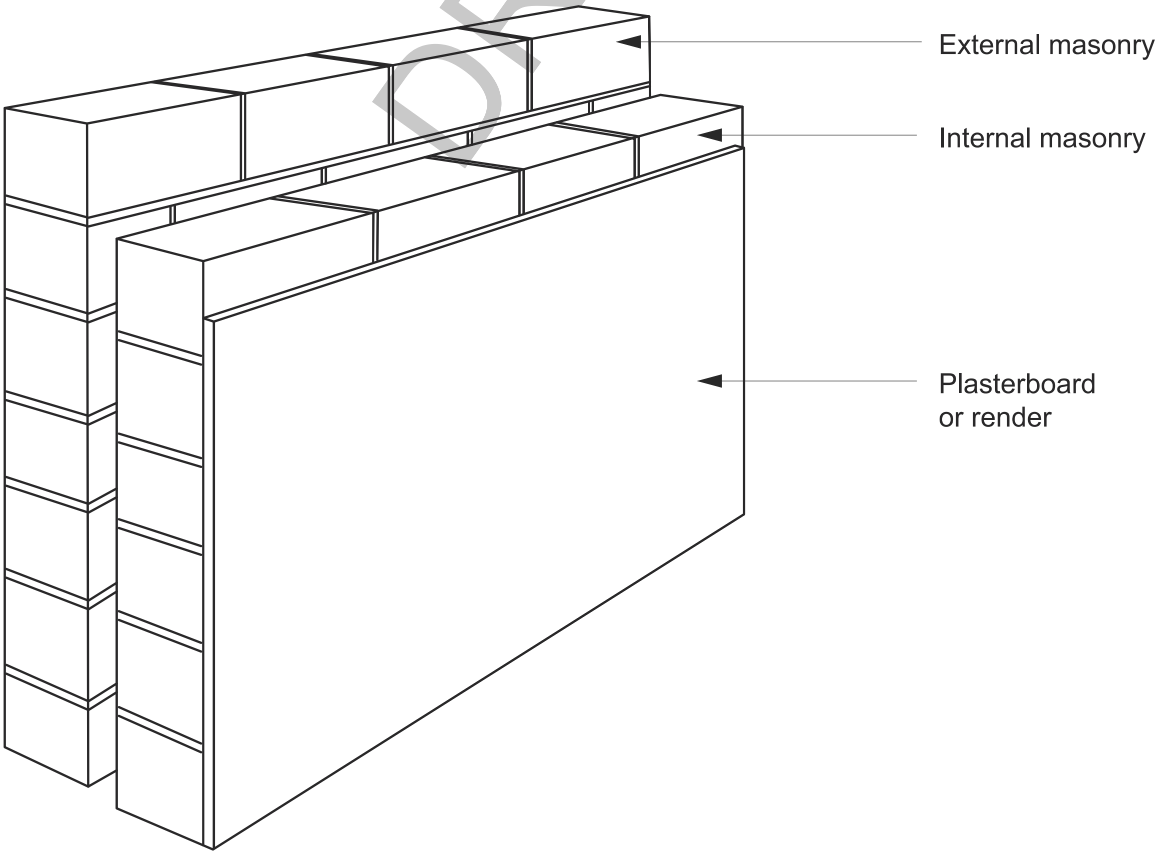


Figure 13.2.5g: **Externally insulated clay masonry (reverse clay masonry veneer) external wall construction — Total R-Value of 0.53**

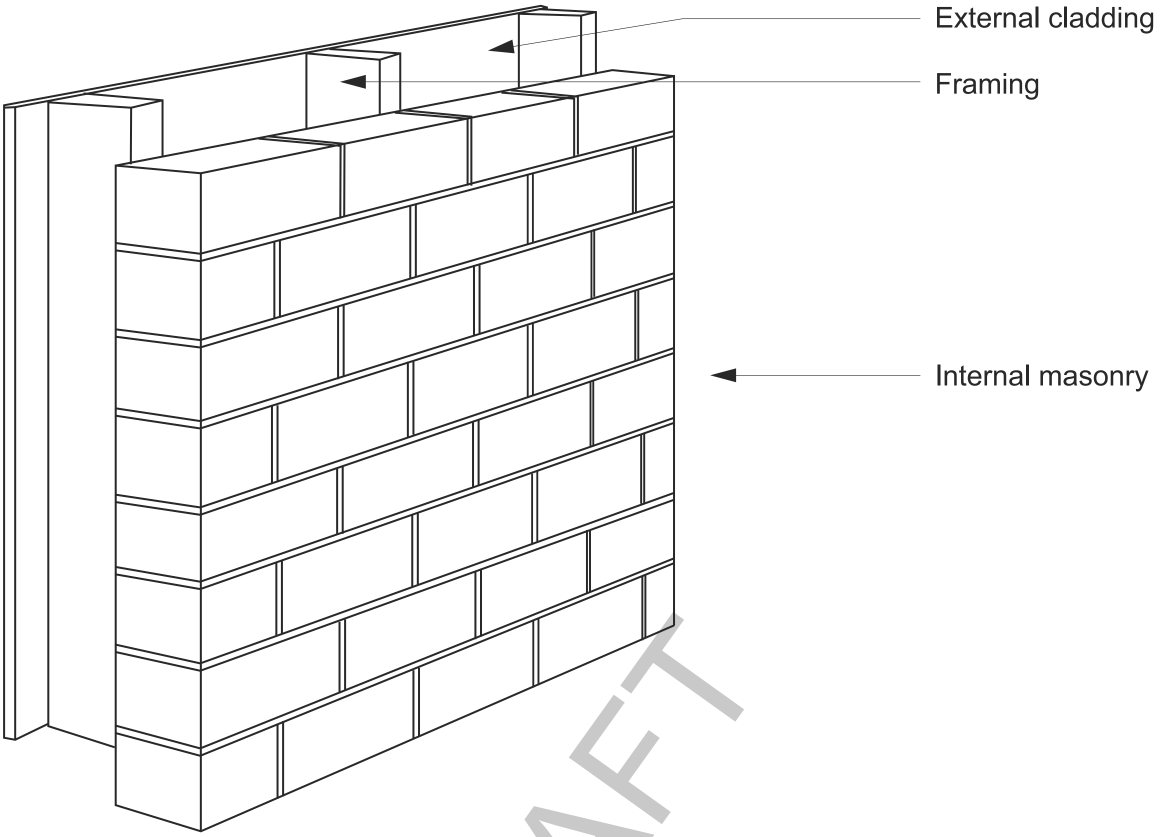


Figure 13.2.5h: **Externally insulated concrete masonry external wall construction — Total R-Value of 0.46**

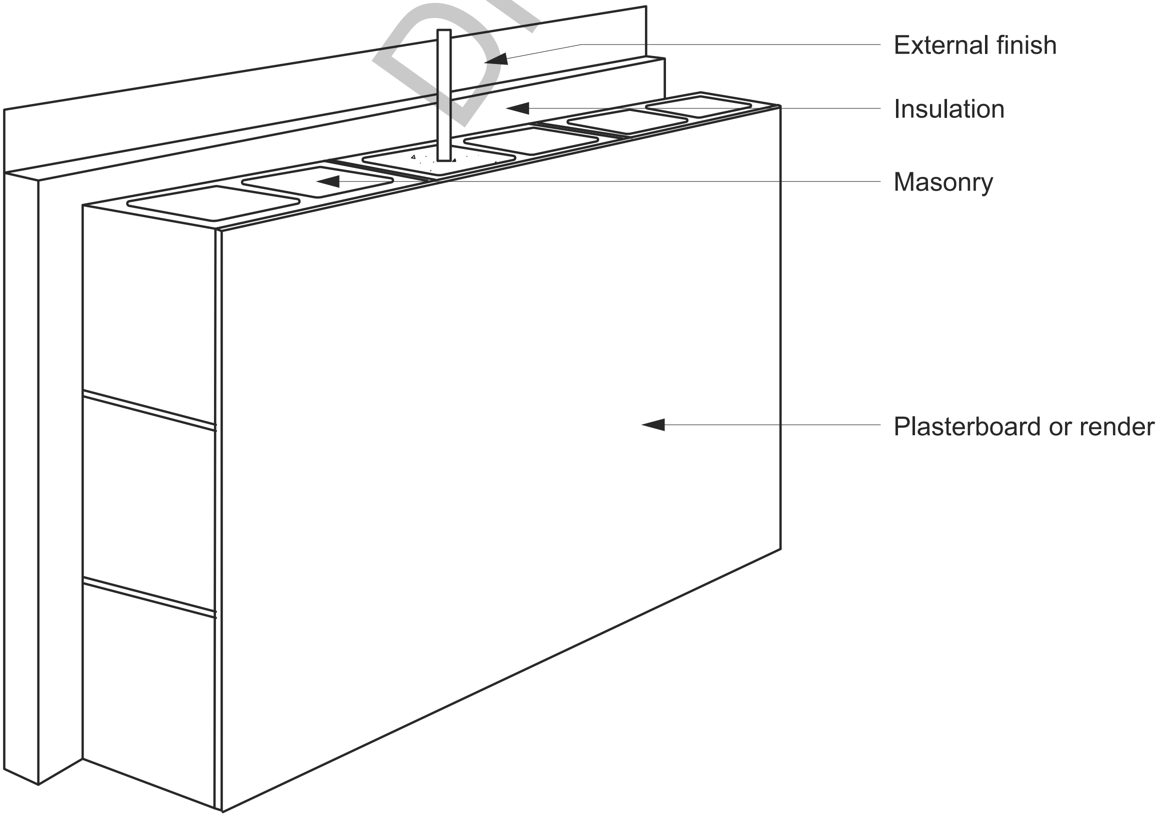
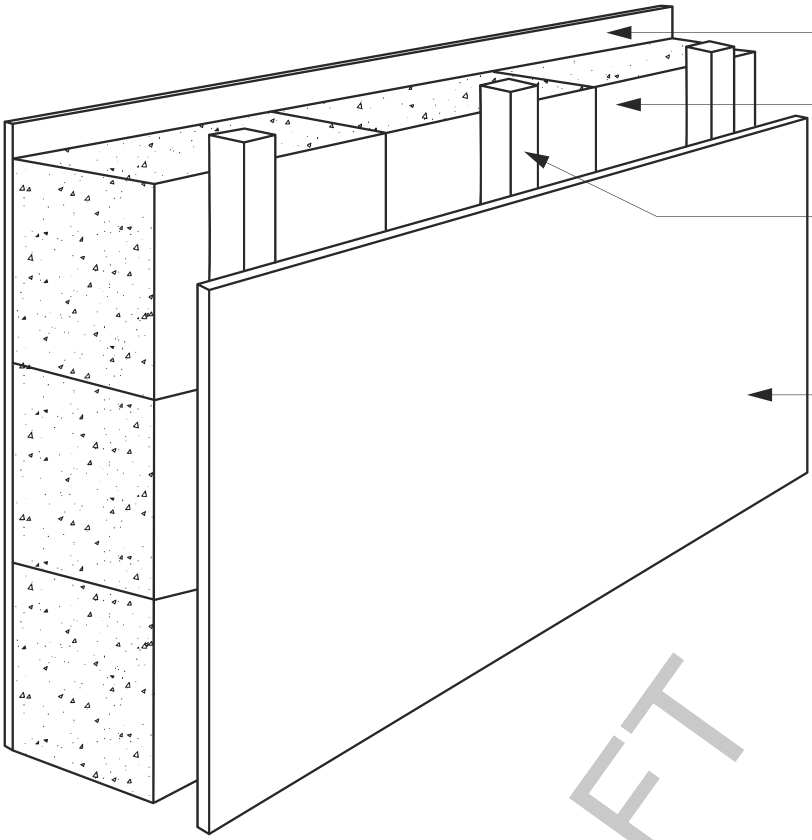


Figure 13.2.5i: Autoclaved aerated concrete masonry external wall construction — Total R-Value of 2.42



Explanatory Information:

1. In 13.2.5(1), surface density is the mass on one vertical square metre of wall.
2. In 13.2.5(2), guttering can be considered as providing shading if attached to a shading projection.
3. The thermal performance of metal and timber-framed walls is affected by conductive thermal bridging by the framing members and convective thermal bridging at gaps between the framing and any added bulk insulation. Metal framed walls are more prone to conductive thermal bridging than timber-framed walls.
4. Because of the high thermal conductance of metal, a thermal break is needed when a metal framing member directly connects the external cladding to the internal lining or the internal environment. The purpose of the thermal break is to ensure that the thermal performance of the metal framed wall is comparable to that of a similarly clad timber-framed wall.
5. A thermal break may be provided by materials such as timber battens, plastic strips or polystyrene insulation sheeting. The material used as a thermal break must separate the metal frame from the cladding and achieve the specified *R-Value*.
6. For the purposes of 13.2.5(4)(b), expanded polystyrene strips greater than or equal to 12 mm thickness and timber greater than or equal to 20 mm thickness are deemed to achieve an *R-Value* greater than or equal to 0.2.
7. The *R-Value* of the thermal break is not included when calculating the *Total R-Value* of the wall, if the thermal break is only applied to the metal frame, because this calculation is done for locations free of framing members.
8. Figures 13.2.5a to 13.2.5i provide examples of typical types of wall construction. The additional *R-Value required* can be calculated by subtracting the inherent *Total R-Value* of the typical wall construction in Figures 13.2.5a to 13.2.5i from the *required Total R-Value*. The inherent *Total R-Value* of the typical wall construction has been arrived at by adding together the *R-Values* for outdoor air film, wall cladding or veneer, wall *cavity* or airspace, internal lining and internal air film. Where a *cavity* or airspace is filled the *Total R-Value* should be reduced by 0.17 to take account for the loss of the *cavity* or airspace.
9. *Reflective insulation* with one reflective surface having an emittance and direction as indicated, is considered to achieve the following *R-Values* when used in conjunction with the *Total R-Value* of a wall construction, as described in Figures 13.2.5a to 13.2.5i. The actual *R-Value* added by *reflective insulation* should be determined for each product in accordance with the standard prescribed in 13.2.2(1), which takes into consideration factors such as the

number of adjacent airspaces, dimensions of the adjacent airspace, whether the airspace is ventilated and the presence of an anti-glare coating.

10. For further information on *reflective insulation*, refer to the explanatory information following 13.2.2.
11. Walls with a surface density of 220 kg/m^2 or more are deemed to achieve acceptable levels of thermal performance in certain *climate zones* due to their ability to store heat and therefore slow the heat transfer through the building *fabric*. These walls are defined by surface density (kg/m^2), which is the mass of one vertical square metre of wall, in order to reduce the complexity when measuring the mass of walls with voids.
12. The following are examples of some typical wall constructions that achieve a surface density of 220 kg/m^2:
    a. Two leaves each of 90 mm thick or greater clay or concrete masonry.
    b. 140 mm thick or greater dense-weight hollow concrete or clay blocks with—
        i. 10 mm plasterboard or render; and
        ii. at least one concrete grouted horizontal bond beam; and
        iii. vertical cores filled with concrete grout at centres not exceeding 1000 mm.
    c. 140 mm thick or greater concrete wall panels and dense-weight hollow concrete or clay blocks with all vertical cores filled with concrete grout.
    d. 190 mm thick or greater dense-weight hollow concrete or clay blocks with—
        i. at least one concrete grouted horizontal bond beam; and
        ii. vertical cores filled with concrete grout at centres not exceeding 1800 mm.
    e. Earth-wall construction with a minimum wall thickness of 200 mm.

Table 13.2.5 (explanatory): Explanatory information for R-Values added by reflective insulation

Wall construction	Reflective airspace details	*R-Value* added by *reflective insulation*
Concrete or masonry with internal plasterboard on battens	One 20 mm reflective airspace located between *reflective insulation* (of not more than 0.05 emittance inwards) and plasterboard.	0.48
External wall cladding (70 mm timber frame with internal lining)	One 70 mm reflective airspace located between *reflective insulation* (of not more than 0.05 emittance inwards) and plasterboard.	0.43
Masonry veneer (70 mm timber frame with internal lining)	One 70 mm reflective airspace located between *reflective insulation* and plasterboard; and one 25 mm anti-glare airspace located between *reflective insulation* (of not more than 0.2 emittance outwards) and masonry.	0.95
Cavity masonry	No airspace between the *reflective insulation* and the inner leaf of masonry; and one 35 mm anti-glare airspace located between *reflective insulation* (of not more than 0.2 emittance outwards) and the outer leaf of masonry.	0.50

13.2.6 Floors

[2019: 3.12.1.5]

(1) A suspended floor, other than an intermediate floor in a building with more than one storey—

(a) must achieve the specified in Table 13.2.6a; and

(b) with an in-slab or in-screed heating or cooling system, must be insulated—

(i) around the vertical edge of its perimeter with insulation having an *R-Value* greater than or equal to 1.0; and

(ii) underneath the slab with insulation having an *R-Value* greater than or equal to 2.0 which may include insulation installed to meet the requirements of (a); and

(c) that is enclosed beneath, must have a barrier installed at or below floor level to prevent convection within the wall cavity, from the airspace under the floor.

(2) A floor is deemed to have the specified in Table 13.2.6b and Table 13.2.6a.

(3) A concrete slab-on-ground—

(a) with an in-slab or in-screed heating or cooling system, must have insulation with an *R-Value* greater than or equal to 1.0, installed around the vertical edge of its perimeter; and

(b) when in *climate zone* 8, must be insulated—

(i) around the vertical edge of its perimeter with insulation having an *R-Value* greater than or equal to 1.0; and

(ii) underneath the slab with insulation having an *R-Value* greater than or equal to 2.0.

(4) Insulation required by (3)(a) and (3)(b)(i) must—

(a) be water resistant; and

(b) be continuous from the adjacent finished ground level—

(i) to a depth of greater than or equal to 300 mm; or

(ii) for at least the full depth of the vertical edge of the concrete slab-on-ground (see Figure 13.2.6).

(5) The requirements of (1)(b), and (3)(a) do not apply to an in-screed heating or cooling system used solely in a bathroom, amenity area or the like.

Table 13.2.6a: Suspended floor – minimum Total R-Value

Climate zone	Direction of heat flow	Minimum
1	Up	1.5
2	Up	1.0
3	Up	1.5
4	Down	2.25
5	Down	1.0
6	Down	2.25
7	Down	2.75
8	Down	3.25

Table Notes:

For an enclosed perimeter treatment, the underfloor airspace and its enclosure may be included in the calculation.

Table 13.2.6b: Total R-Value for typical suspended timber floor

Enclosure and height of floor and direction of heat flow	: Cavity masonry	: 190 mm concrete masonry	: Single skin masonry	: 9 mm fibre-cement sheet
Enclosed ≤0.6 m high with an upwards heat flow	1.00	0.93	0.88	0.77
Enclosed ≤0.6 m high with a downwards heat flow	1.11	1.06	1.01	0.90
Enclosed >0.6 m but	0.86	0.81	0.76	0.65

Enclosure and height of floor and direction of heat flow	: Cavity masonry	: 190 mm concrete masonry	: Single skin masonry	: 9 mm fibre-cement sheet
Enclosed >0.6 m but to ≤1.2 m high with a downwards heat flow	1.00	0.94	0.89	0.77
Enclosed >1.2 m to ≤2.4 m high with an upwards heat flow	0.76	0.72	0.67	0.57
Enclosed >1.2 m to ≤2.4 m high with a downwards heat flow	0.89	0.84	0.79	0.69
Unenclosed with an upwards heat flow	0.39	0.39	0.39	0.39
Unenclosed with a downwards heat flow	0.51	0.51	0.51	0.51

Table Notes:

1. The height of the floor is measured from ground surface to the underside of the floor or the insulation.
2. For the purposes of calculating the of a floor, the *R-Value* attributable to an in-slab or in-screed heating or cooling system is ignored.

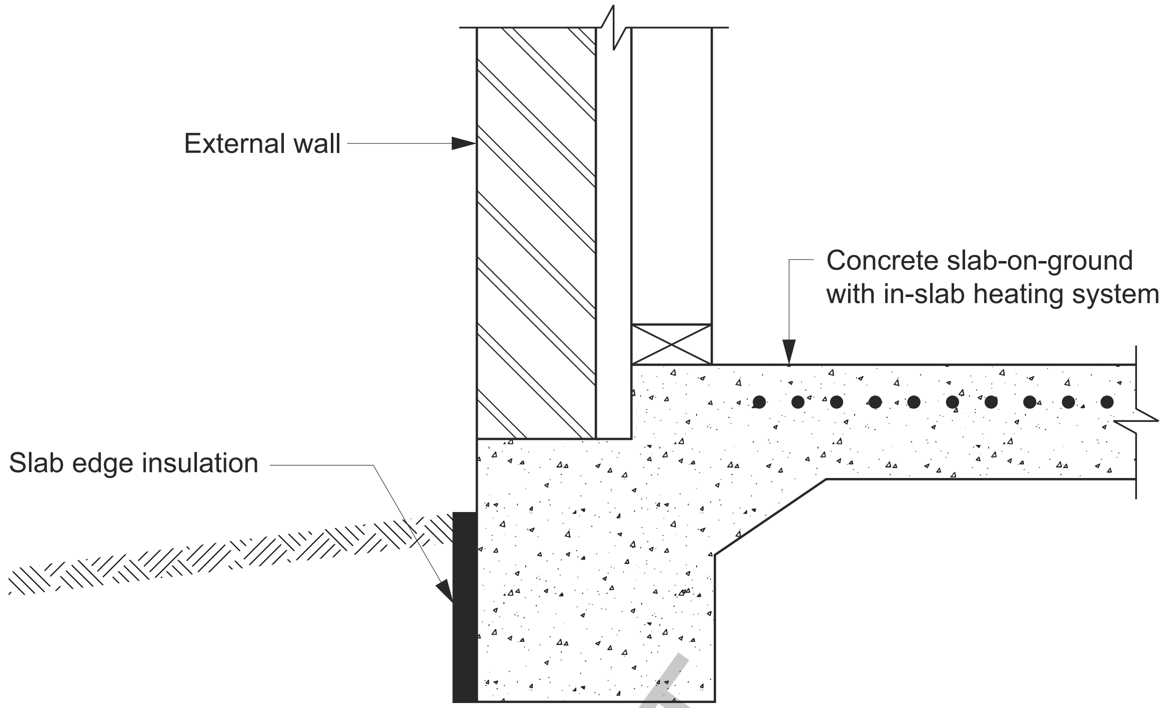
Table 13.2.6c: Total R-Value for typical suspended concrete floor

Enclosure and height of floor and direction of heat flow	: Cavity masonry	: 190 mm concrete masonry	: Single skin masonry	: 9 mm fibre-cement sheet
Enclosed ≤0.6 m high with an upwards heat flow	0.93	0.88	0.83	0.72
Enclosed ≤0.6 m high with an downwards heat flow	1.06	1.01	0.96	0.85
Enclosed >0.6 m but to ≤1.2 m high with an upwards heat flow	0.81	0.76	0.71	0.60
Enclosed >0.6 m but to ≤1.2 m high with a downwards heat flow	0.94	0.89	0.84	0.72
Enclosed >1.2 m to ≤2.4 m high with an upwards heat flow	0.71	0.67	0.62	0.52
Enclosed >1.2 m to ≤2.4 m high with a downwards heat flow	0.84	0.79	0.74	0.64
Unenclosed with an upwards heat flow	0.34	0.34	0.34	0.34
Unenclosed with a downwards heat flow	0.46	0.46	0.46	0.46

Table Notes:

1. The height of the floor is measured from ground surface to the underside of the floor or the insulation.
2. For the purposes of calculating the of a floor, the *R-Value* attributable to an in-slab or in-screed heating or cooling system is ignored.

Figure 13.2.6: Insulation of slab edge



Explanatory Information:

1. An enclosed perimeter treatment means that the airspace under the floor is enclosed between ground and floor level by walls which have only the required subfloor vents.
2. The barrier required by 13.2.6(1)(c) could be an imperforate flashing.
3. Specific solutions for concrete slab and timber floors can be found in documents and online resources prepared by industry associations and product suppliers.
4. Tables 13.2.6b and 13.2.6c provide examples of the inherent *Total R-Values* of enclosed and unenclosed suspended floors of two typical types of construction. Any added *R-Value* can be calculated by subtracting the inherent *R-Value* of the typical construction in Tables 13.2.6b and 13.2.6c from the required *Total R-Value* in Table 13.2.6a.
5. Any non-reflective building membrane fixed between or under floor joists is considered to add an *R-Value* of 0.2 to the *Total R-Value* of the base construction described in Tables 13.2.6b and 13.2.6c. *Reflective insulation* will achieve a higher value which will need to be determined for each product in accordance with relevant standards. Typically, a reflective building membrane attached beneath the floor joists of an unenclosed floor, with a single bright side facing upwards to a 90 mm airspace, can add an *R-Value* of 0.43 for heat flow upwards and 1.32 for heat flow downwards. Double sided *reflective insulation* with a 90 mm airspace installed under an enclosed floor can add an *R-Value* of 0.55 for heat flow upwards and 1.97 for heat flow downwards. Both examples allow for dust on the upper surface.
6. A reflective or non-reflective building membrane should be installed with due consideration of potentially damaging *condensation* in some *climate zones* and associated interaction with adjoining building materials.
7. For further information on *reflective insulation*, refer to the explanatory information accompanying Figures 13.2.3a to 13.2.3d.
8. 13.2.6(5) provides an exemption for an in-screed heating or cooling system used solely in bathrooms, amenity areas and the like, as these are typically small areas.
9. Care should be taken to ensure that the type of termite management system selected is compatible with the slab edge insulation.

13.2.7 Attached Class 10a buildings

[2019: 3.12.1.6]

A Class 10a building attached to a Class 1 building must—

(a) have an external fabric that achieves the *required* level of thermal performance for a Class 1 building; or

(b) be separated from the Class 1 building with construction having the *required* level of thermal performance for the Class 1 building; or

(c) in *climate zone* 5—

(i) be enclosed with masonry walls other than where there are doors and *glazing*; and

(ii) be separated from the Class 1 building with a masonry wall that extends to the ceiling or roof; and

(iii) achieve a *Total R-Value* in the roof equivalent to that *required* by Tables 13.2.3a to 13.3.2h as appropriate for the Class 1 building; and

(iv) not have a garage door facing the east or west orientation other than if the Class 1 building complies with 13.3.2 with the applicable value for C_{SHGC} in Tables 13.3.2a to 13.3.2h as appropriate reduced by 15%.

Explanatory Information:

The attachment of a Class 10a building, such as a garage, glasshouse, solarium, pool enclosure or the like should not compromise the thermal performance of the Class 1 building. In addition, the Class 10a building may be insulated and so assist the Class 1 building achieve the *required* thermal performance.

Explanatory Figure 13.2.7 below depicts examples of a Class 1 building with an attached Class 10a garage.

Figure 13.2.7 (explanatory): Attached Class 10a building examples

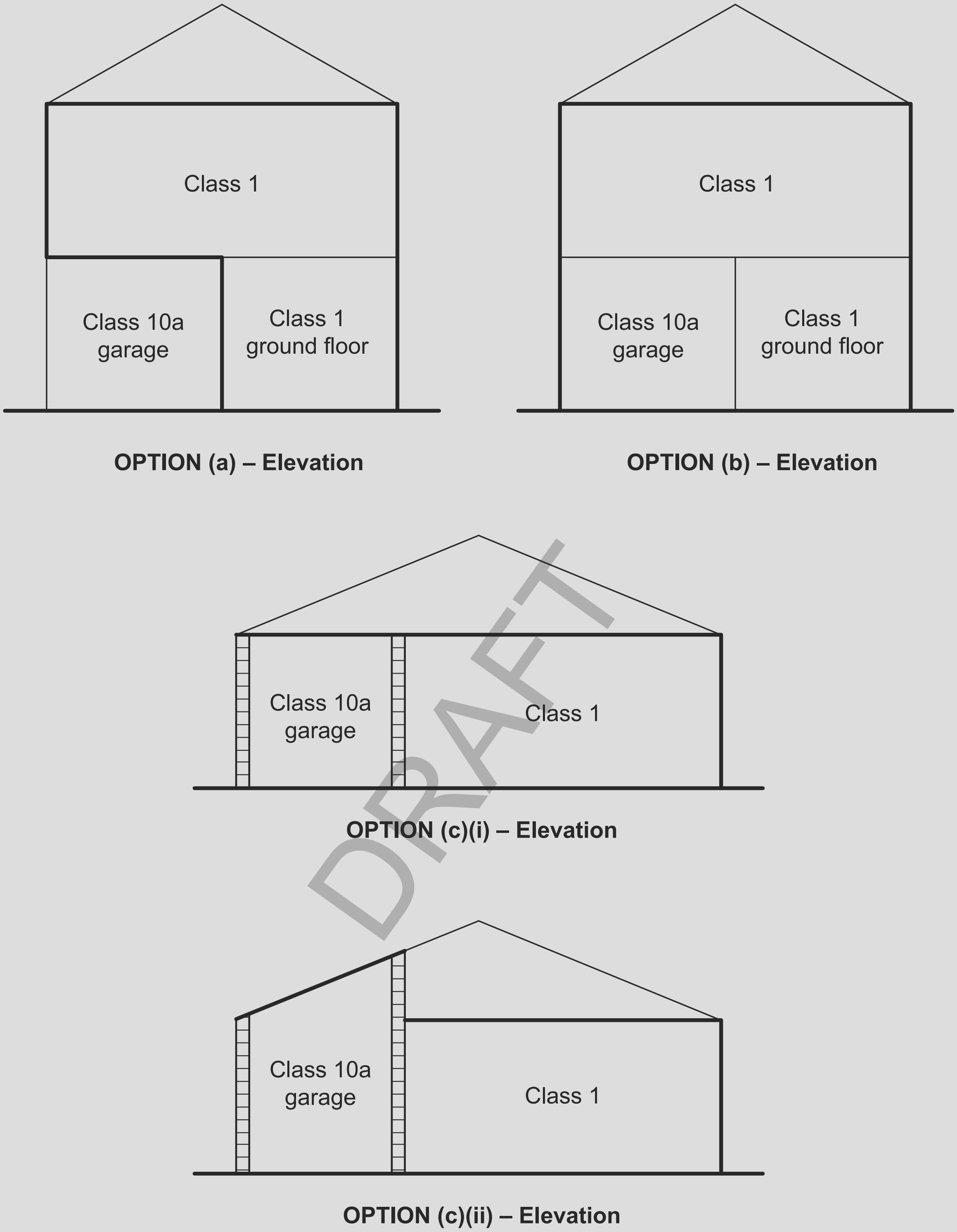


Figure Notes:

In (a), the thermal performance *required* for the Class 1 building may be achieved by including the walls and floor of the Class 1 building that adjoin the Class 10a garage.

In (b), the thermal performance *required* for the Class 1 building may be achieved by including the outside walls and floor of the Class 10a garage.

In (c), in *climate zone* 5, the thermal performance of the Class 1 building may be achieved by ensuring that the roof of the Class 10a building satisfies Tables 13.2.3a to 13.2.3h and the walls are of masonry construction.

Part 13.3 External glazing

13.3.1 Application of Part 13.3

[2019: 3.12.2]

(1) This Part applies to—

(a) a Class 1 building; and

(b) a Class 10a building with a *conditioned space*.

(2) Part 13.3 must be applied as directed in H6D2(1)(a) or (b).

13.3.2 External glazing

[2019: 3.12.2.1]

(1) The aggregate conductance of the in each storey, including any mezzanine, of a building must—

(a) not exceed the allowances resulting from—

(i) in *climate zone* 1, multiplying the area of the storey, including any mezzanine, measured within the enclosing walls, by the constant C_U obtained from Table 13.3.2a; and

(ii) in *climate zones* 2 to 8, using the constant C_U obtained from Tables 13.3.2b to 13.3.2h, as appropriate; and

(b) be calculated in accordance with the following calculation—

(i) in *climate zone* 1: $(A1 \times U1) + (A2 \times U2) + (A3 + U3) + \ldots$, where—

(A) $A1,2,etc$ = the area of each element; and

(B) $U1,2,etc$ = the *Total System U-Value* of each element; and

(ii) in *climate zones* 2 to 8: $[(A1 + U1) + (A2 + U2) + \ldots]/[(A1 \times SHGC1 \times EW1) + (A2 \times SHGC2 \times EW2) + \ldots]$, where—

(A) $A1,2,etc$ = the area of each element; and

(B) $U1,2,etc$ = the *Total System U-Value* of each element; and

(C) $SHGC1,2,etc$ = the for each *glazing* element; and

(D) $EW1,W2,etc$ = the winter exposure factor for each *glazing* element obtained from Tables 13.3.2i to 13.3.2o.

(2) The aggregate solar heat gain of the in each storey, including any mezzanine, of a building must—

(a) not exceed the allowances resulting from multiplying the area of the storey, including any mezzanine, measured within the enclosing walls, by the constant C_{SHGC} obtained from Tables 13.3.2a to 13.3.2h, as appropriate; and

(b) be calculated in accordance with the following calculation: $(A1 \times SHGC1 \times ES1) + (A2 \times SHGC2 \times ES2) + \ldots$, where—

(i) $A1,2,etc$ = the area of each element; and

(ii) $SHGC1,2,etc$ = the for each *glazing* element; and

(iii) $ES1,2,etc$ = the summer exposure factor for each *glazing* element obtained from Tables 13.3.2p to 13.3.2w.

(3) For the purposes of Tables 13.3.2a to 13.3.2h, the following applies:

(a) A storey has Standard air movement if all *habitable rooms* comply with .

(b) A storey has High air movement if the total *ventilation opening* area serving the *habitable room* is—
   (i) in *climate zones* 1, 2, 3, 4 and 5, not less than that for Standard air movement without a ceiling fan or evaporative cooler, but with ceiling fans complying with 13.5.4 installed in all *habitable rooms*; or
   (ii) greater than or equal to twice that for Standard air movement without a ceiling fan or evaporative cooler.
(c) Where the *ventilation opening* area serving the *habitable rooms* is between Standard and High, interpolation may be used to determine the applicable CSHGC.
(d) Where the floor construction of a storey, including a mezzanine, is partly in direct contact with the ground and partly suspended, the constants for conductance and solar heat gain are to be—
   (i) interpolated between the constants for the two constructions in proportion to their respective areas; or
   (ii) those for a suspended floor.

(4) For the purposes of this clause—
   (a) summer and winter exposure for each *climate zone* must be determined in accordance with Tables 13.3.2i to 13.3.2w; and
   (b) orientation sectors are as shown in Figure 13.3.2a; and
   (c) p and h are to be measured using the method shown in Figure 13.3.2b.

Table 13.3.2a: Constants for conductance and solar heat gain—climate zone 1

Floor construction	Air movement (refer 13.3.2(3))	Constant C_U	Constant C_{SHGC}
Floor in direct contact with the ground	Standard	1.650	0.063
Floor in direct contact with the ground	High	1.650	0.069
Suspended floor	Standard	1.485	0.057
Suspended floor	High	1.485	0.063

Table 13.3.2b: Constants for conductance and solar heat gain—climate zone 2

Floor construction	Air movement (refer 13.3.2(3))	Constant C_U	Constant C_{SHGC}
Floor in direct contact with the ground	Standard	18.387	0.074
Floor in direct contact with the ground	High	18.387	0.081
Suspended floor	Standard	16.548	0.067
Suspended floor	High	16.548	0.074

Table 13.3.2c: Constants for conductance and solar heat gain—climate zone 3

Floor construction	Air movement (refer 13.3.2(3))	Constant C_U	Constant C_{SHGC}
Floor in direct contact with the ground	Standard	14.641	0.062
Floor in direct contact with the ground	High	14.641	0.068
Suspended floor	Standard	13.177	0.056
Suspended floor	High	13.177	0.062

Table 13.3.2d: Constants for conductance and solar heat gain—climate zone 4

Floor construction	Air movement (refer 13.3.2(c))	Constant C_U	Constant C_{SHGC}
Floor in direct contact with the ground	Standard	7.929	0.097
Floor in direct contact with the ground	High	7.929	0.107
Suspended floor	Standard	7.136	0.087
Suspended floor	High	7.136	0.096

Table 13.3.2e: Constants for conductance and solar heat gain—climate zone 5

Floor construction	Air movement (refer 13.3.2(3))	Constant C_U	Constant C_{SHGC}
Floor in direct contact with the ground	Standard	13.464	0.122
Floor in direct contact with the ground	High	13.464	0.134
Suspended floor	Standard	12.118	0.110
Suspended floor	High	12.118	0.121

Table 13.3.2f: Constants for conductance and solar heat gain—climate zone 6

Floor construction	Air movement (refer 13.3.2(3))	Constant C_U	Constant C_{SHGC}
Floor in direct contact with the ground	Standard	6.418	0.153
Floor in direct contact with the ground	High	6.418	0.168
Suspended floor	Standard	5.776	0.138
Suspended floor	High	5.776	0.152

Table 13.3.2g: Constants for conductance and solar heat gain—climate zone 7

Floor construction	Air movement (refer to 13.3.2(3))	Constant C_U	Constant C_{SHGC}
Floor in direct contact with the ground	Standard	5.486	0.189
Floor in direct contact with the ground	High	5.486	0.208
Suspended floor	Standard	4.937	0.170
Suspended floor	High	4.937	0.187

Table 13.3.2h: Constants for conductance and solar heat gain—climate zone 8

Floor construction	Air movement (refer 13.3.2(3))	Constant C_U	Constant C_{SHGC}
Floor in direct contact with the ground	Standard	3.987	0.234
Floor in direct contact with	High	3.987	0.257

Floor construction	Air movement (refer 13.3.2(3))	Constant C_U	Constant C_{SHGC}
Suspended floor	Standard	3.588	0.211
Suspended floor	High	3.588	0.232

Table 13.3.2i: Orientation Sector winter exposure factor (E_W) for climate zone 2

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	1.86	1.44	0.86	0.40	0.37	0.41	0.91	1.48
0.05	1.80	1.37	0.80	0.34	0.31	0.36	0.84	1.42
0.10	1.73	1.33	0.76	0.32	0.29	0.34	0.81	1.34
0.20	1.51	1.18	0.68	0.29	0.27	0.30	0.73	1.20
0.40	1.25	0.95	0.54	0.24	0.23	0.25	0.61	0.99
0.60	1.04	0.78	0.48	0.21	0.20	0.22	0.51	0.83
0.80	0.78	0.62	0.39	0.18	0.19	0.20	0.44	0.68
1.00	0.54	0.53	0.32	0.17	0.18	0.17	0.37	0.56
1.20	0.33	0.42	0.28	0.15	0.17	0.16	0.35	0.46
1.40	0.28	0.36	0.23	0.14	0.16	0.15	0.31	0.38
1.60	0.22	0.29	0.22	0.14	0.15	0.14	0.26	0.34
1.80	0.19	0.25	0.19	0.13	0.14	0.13	0.23	0.28
2.00	0.15	0.19	0.17	0.12	0.14	0.13	0.22	0.27

Table 13.3.2j: Orientation Sector winter exposure factor (E_W) for climate zone 3

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	1.92	1.49	0.88	0.32	0.25	0.33	0.95	1.56
0.05	1.90	1.44	0.82	0.28	0.22	0.29	0.91	1.52
0.10	1.76	1.37	0.87	0.27	0.21	0.28	0.87	1.44
0.20	1.57	1.22	0.70	0.24	0.20	0.25	0.78	1.30
0.40	1.25	1.00	0.60	0.20	0.18	0.21	0.67	1.08
0.60	0.94	0.77	0.48	0.18	0.17	0.18	0.54	0.87
0.80	0.63	0.61	0.43	0.16	0.15	0.17	0.46	0.70
1.00	0.42	0.52	0.35	0.14	0.14	0.16	0.41	0.56
1.20	0.29	0.40	0.31	0.13	0.14	0.14	0.34	0.48
1.40	0.23	0.36	0.25	0.12	0.13	0.13	0.30	0.41
1.60	0.17	0.31	0.24	0.11	0.12	0.12	0.29	0.34
1.80	0.15	0.22	0.19	0.11	0.12	0.11	0.24	0.31
2.00	0.13	0.22	0.18	0.10	0.12	0.11	0.22	0.27

Table 13.3.2k: Orientation Sector winter exposure factor (E_W) for climate zone 4

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	1.97	1.51	0.83	0.39	0.35	0.39	0.85	1.53
0.05	1.93	1.45	0.76	0.33	0.29	0.33	0.79	1.47
0.10	1.91	1.40	0.74	0.31	0.28	0.31	0.75	1.42
0.20	1.62	1.28	0.67	0.28	0.25	0.28	0.68	1.28
0.40	1.48	1.09	0.56	0.24	0.22	0.24	0.58	1.10
0.60	1.22	0.90	0.49	0.21	0.19	0.21	0.49	0.90
0.80	1.06	0.74	0.43	0.19	0.18	0.19	0.44	0.75
1.00	0.85	0.66	0.37	0.17	0.16	0.17	0.37	0.64
1.20	0.61	0.51	0.33	0.15	0.16	0.16	0.34	0.56
1.40	0.47	0.47	0.30	0.14	0.15	0.15	0.30	0.47
1.60	0.34	0.41	0.28	0.14	0.14	0.14	0.26	0.41
1.80	0.26	0.35	0.25	0.13	0.14	0.13	0.24	0.35
2.00	0.24	0.32	0.22	0.12	0.13	0.12	0.22	0.29

Table 13.3.2l: Orientation Sector winter exposure factor (E_W) for climate zone 5

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	2.01	1.48	0.77	0.39	0.37	0.39	0.85	1.58
0.05	1.95	1.42	0.70	0.33	0.31	0.33	0.78	1.51
0.10	1.95	1.36	0.66	0.31	0.30	0.32	0.75	1.47
0.20	1.63	1.21	0.59	0.28	0.27	0.28	0.67	1.32
0.40	1.49	1.00	0.49	0.24	0.23	0.24	0.55	1.10
0.60	1.21	0.83	0.40	0.21	0.21	0.21	0.47	0.90
0.80	0.98	0.68	0.35	0.19	0.19	0.19	0.42	0.73
1.00	0.80	0.52	0.28	0.17	0.18	0.17	0.36	0.63
1.20	0.54	0.46	0.25	0.16	0.17	0.16	0.29	0.50
1.40	0.40	0.34	0.21	0.15	0.16	0.15	0.28	0.43
1.60	0.28	0.30	0.19	0.14	0.14	0.13	0.23	0.36
1.80	0.22	0.25	0.16	0.13	0.14	0.13	0.20	0.32
2.00	0.18	0.19	0.15	0.12	0.14	0.12	0.19	0.24

Table 13.3.2m: Orientation Sector winter exposure factor (E_W) for climate zone 6

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	1.90	1.43	0.80	0.45	0.43	0.45	0.88	1.53
0.05	1.84	1.35	0.73	0.38	0.36	0.38	0.81	1.45
0.10	1.82	1.30	0.70	0.36	0.34	0.36	0.76	1.42
0.20	1.56	1.17	0.62	0.32	0.30	0.32	0.70	1.30

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.40	1.43	1.03	0.53	0.27	0.26	0.27	0.60	1.10
0.60	1.22	0.86	0.45	0.23	0.23	0.23	0.52	0.95
0.80	1.08	0.73	0.38	0.21	0.21	0.22	0.46	0.79
1.00	0.86	0.58	0.34	0.19	0.19	0.19	0.39	0.69
1.20	0.70	0.54	0.29	0.18	0.17	0.18	0.36	0.58
1.40	0.53	0.41	0.26	0.16	0.17	0.17	0.32	0.52
1.60	0.44	0.37	0.22	0.15	0.16	0.15	0.28	0.44
1.80	0.32	0.30	0.21	0.14	0.15	0.14	0.27	0.40
2.00	0.25	0.27	0.20	0.13	0.14	0.14	0.24	0.32

Table 13.3.2n: Orientation Sector winter exposure factor (E_W) for climate zone 7

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	2.08	1.63	0.83	0.38	0.35	0.38	0.75	1.50
0.05	2.01	1.56	0.77	0.32	0.29	0.32	0.69	1.44
0.10	2.01	1.53	0.73	0.30	0.28	0.30	0.66	1.41
0.20	1.89	1.43	0.68	0.27	0.25	0.27	0.60	1.28
0.40	1.62	1.24	0.58	0.23	0.21	0.23	0.50	1.13
0.60	1.49	1.09	0.50	0.20	0.19	0.20	0.44	0.96
0.80	1.27	0.94	0.44	0.18	0.17	0.18	0.39	0.83
1.00	1.16	0.83	0.41	0.16	0.16	0.16	0.34	0.71
1.20	0.91	0.70	0.34	0.15	0.15	0.15	0.30	0.63
1.40	0.83	0.68	0.33	0.14	0.14	0.14	0.27	0.48
1.60	0.64	0.49	0.30	0.13	0.13	0.12	0.25	0.45
1.80	0.52	0.47	0.24	0.12	0.13	0.12	0.23	0.39
2.00	0.39	0.39	0.24	0.11	0.12	0.12	0.20	0.33

Table 13.3.2o: Orientation Sector winter exposure factor (E_W) for climate zone 8

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	1.93	1.48	0.81	0.47	0.45	0.47	0.81	1.46
0.05	1.87	1.41	0.73	0.39	0.38	0.39	0.73	1.39
0.10	1.85	1.36	0.70	0.37	0.35	0.37	0.70	1.34
0.20	1.56	1.22	0.63	0.33	0.32	0.33	0.63	1.20
0.40	1.41	1.02	0.51	0.28	0.27	0.28	0.51	0.99
0.60	1.18	0.83	0.44	0.24	0.24	0.24	0.44	0.82
0.80	1.00	0.68	0.37	0.21	0.22	0.21	0.36	0.67
1.00	0.79	0.59	0.32	0.20	0.20	0.19	0.30	0.58
1.20	0.54	0.46	0.28	0.18	0.19	0.18	0.27	0.47
1.40	0.44	0.42	0.25	0.17	0.18	0.17	0.24	0.38

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
1.60	0.31	0.31	0.21	0.16	0.17	0.15	0.22	0.32
1.80	0.23	0.28	0.19	0.14	0.16	0.14	0.19	0.29
2.00	0.19	0.25	0.16	0.14	0.15	0.14	0.17	0.23

Table 13.3.2p: Orientation Sector summer exposure factor (E_S) for climate zone 1

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	0.52	0.84	1.29	1.24	0.87	1.27	1.32	0.85
0.05	0.44	0.74	1.19	1.13	0.75	1.17	1.23	0.75
0.10	0.41	0.68	1.11	1.07	0.68	1.09	1.15	0.69
0.20	0.37	0.59	1.01	0.94	0.55	0.94	1.00	0.60
0.40	0.30	0.45	0.79	0.69	0.42	0.75	0.83	0.47
0.60	0.25	0.37	0.66	0.59	0.34	0.60	0.66	0.38
0.80	0.22	0.31	0.53	0.47	0.30	0.52	0.58	0.32
1.00	0.19	0.26	0.45	0.41	0.25	0.43	0.48	0.28
1.20	0.18	0.23	0.37	0.33	0.22	0.39	0.42	0.26
1.40	0.17	0.21	0.32	0.30	0.22	0.32	0.37	0.22
1.60	0.15	0.18	0.28	0.26	0.18	0.29	0.34	0.21
1.80	0.13	0.18	0.27	0.22	0.17	0.28	0.30	0.18
2.00	0.12	0.17	0.23	0.21	0.16	0.24	0.28	0.17

Table 13.3.2q: Orientation Sector summer exposure factor (E_S) for climate zone 2

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	0.72	1.05	1.22	1.04	0.72	1.12	1.34	1.11
0.05	0.60	0.92	1.10	0.92	0.60	1.01	1.23	0.99
0.10	0.55	0.85	1.04	0.86	0.57	0.94	1.14	0.90
0.20	0.47	0.74	0.92	0.76	0.50	0.84	1.00	0.78
0.40	0.39	0.56	0.73	0.61	0.40	0.67	0.83	0.60
0.60	0.33	0.44	0.60	0.49	0.33	0.55	0.67	0.45
0.80	0.29	0.37	0.50	0.41	0.29	0.46	0.58	0.39
1.00	0.26	0.30	0.43	0.35	0.24	0.40	0.47	0.32
1.20	0.23	0.27	0.35	0.30	0.22	0.34	0.41	0.28
1.40	0.21	0.24	0.32	0.28	0.21	0.30	0.36	0.24
1.60	0.19	0.23	0.28	0.25	0.19	0.27	0.31	0.22
1.80	0.17	0.20	0.24	0.22	0.17	0.26	0.28	0.20
2.00	0.17	0.19	0.22	0.21	0.16	0.22	0.27	0.19

Table 13.3.2r: Orientation Sector summer exposure factor (E_S) for climate zone 3

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	0.56	1.04	1.42	1.18	0.66	1.16	1.36	1.01
0.05	0.47	0.94	1.32	1.08	0.57	1.05	1.26	0.90
0.10	0.44	0.85	1.25	1.02	0.54	0.99	1.19	0.83
0.20	0.38	0.73	1.10	0.90	0.46	0.87	1.06	0.73
0.40	0.32	0.56	0.88	0.71	0.38	0.72	0.84	0.56
0.60	0.28	0.43	0.74	0.58	0.31	0.57	0.71	0.44
0.80	0.24	0.35	0.59	0.47	0.27	0.50	0.60	0.35
1.00	0.20	0.29	0.50	0.40	0.24	0.43	0.53	0.29
1.20	0.19	0.26	0.42	0.34	0.21	0.37	0.43	0.26
1.40	0.17	0.22	0.35	0.31	0.20	0.32	0.41	0.23
1.60	0.17	0.20	0.33	0.27	0.16	0.31	0.35	0.21
1.80	0.15	0.19	0.30	0.24	0.16	0.28	0.33	0.19
2.00	0.15	0.18	0.25	0.24	0.15	0.24	0.27	0.17

Table 13.3.2s: Orientation Sector summer exposure factor (E_S) for climate zone 4

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	0.72	1.19	1.40	1.05	0.57	0.99	1.31	1.12
0.05	0.61	1.10	1.31	0.97	0.49	0.91	1.22	1.02
0.10	0.56	1.00	1.24	0.91	0.46	0.85	1.17	0.94
0.20	0.43	0.87	1.12	0.82	0.41	0.76	1.05	0.81
0.40	0.30	0.66	0.92	0.67	0.34	0.62	0.85	0.62
0.60	0.27	0.50	0.74	0.56	0.29	0.53	0.72	0.45
0.80	0.24	0.38	0.63	0.49	0.25	0.45	0.59	0.36
1.00	0.20	0.31	0.55	0.42	0.22	0.39	0.51	0.30
1.20	0.19	0.26	0.46	0.37	0.20	0.35	0.45	0.25
1.40	0.16	0.23	0.39	0.34	0.17	0.33	0.38	0.21
1.60	0.16	0.20	0.38	0.30	0.16	0.29	0.33	0.20
1.80	0.14	0.18	0.32	0.27	0.14	0.25	0.32	0.17
2.00	0.13	0.17	0.28	0.23	0.14	0.24	0.26	0.16

Table 13.3.2t: Orientation Sector summer exposure factor (E_S) for climate zone 5

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	0.82	1.09	1.19	0.96	0.68	1.04	1.30	1.16
0.05	0.69	0.96	1.07	0.85	0.57	0.92	1.19	1.04
0.10	0.63	0.88	1.01	0.79	0.54	0.86	1.11	0.94
0.20	0.51	0.76	0.89	0.70	0.48	0.76	0.99	0.83

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.40	0.39	0.58	0.71	0.57	0.38	0.62	0.81	0.62
0.60	0.35	0.46	0.58	0.47	0.33	0.51	0.65	0.48
0.80	0.30	0.37	0.50	0.40	0.28	0.43	0.52	0.40
1.00	0.26	0.31	0.42	0.34	0.25	0.37	0.46	0.31
1.20	0.24	0.26	0.36	0.30	0.22	0.33	0.40	0.27
1.40	0.21	0.23	0.32	0.27	0.20	0.29	0.34	0.24
1.60	0.20	0.22	0.29	0.23	0.18	0.27	0.30	0.21
1.80	0.18	0.20	0.25	0.21	0.17	0.23	0.27	0.20
2.00	0.17	0.17	0.24	0.21	0.16	0.21	0.25	0.19

Table 13.3.2u: Orientation Sector summer exposure factor (E_S) for climate zone 6

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	0.84	1.08	1.15	0.87	0.61	1.05	1.40	1.24
0.05	0.71	0.97	1.05	0.78	0.52	0.96	1.30	1.13
0.10	0.65	0.90	0.99	0.74	0.49	0.91	1.25	1.04
0.20	0.52	0.77	0.88	0.65	0.44	0.82	1.12	0.91
0.40	0.36	0.58	0.71	0.54	0.36	0.67	0.90	0.69
0.60	0.30	0.43	0.61	0.45	0.31	0.58	0.76	0.51
0.80	0.26	0.35	0.50	0.38	0.26	0.50	0.66	0.40
1.00	0.22	0.29	0.42	0.32	0.23	0.42	0.56	0.36
1.20	0.20	0.24	0.37	0.29	0.23	0.39	0.48	0.29
1.40	0.18	0.22	0.32	0.26	0.19	0.34	0.42	0.26
1.60	0.16	0.19	0.28	0.24	0.18	0.31	0.38	0.21
1.80	0.15	0.18	0.26	0.22	0.17	0.28	0.34	0.20
2.00	0.14	0.17	0.24	0.21	0.17	0.26	0.31	0.17

Table 13.3.2v: Orientation Sector summer exposure factor (E S) for climate zone 7

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	0.96	1.17	1.21	0.94	0.64	0.91	1.19	1.18
0.05	0.83	1.05	1.10	0.83	0.54	0.81	1.09	1.07
0.10	0.76	0.97	1.04	0.80	0.51	0.76	1.03	0.98
0.20	0.62	0.85	0.93	0.70	0.45	0.68	0.91	0.86
0.40	0.40	0.65	0.76	0.58	0.38	0.55	0.74	0.64
0.60	0.32	0.51	0.65	0.50	0.33	0.47	0.63	0.51
0.80	0.28	0.40	0.54	0.44	0.28	0.41	0.53	0.40
1.00	0.25	0.33	0.48	0.37	0.25	0.35	0.44	0.32
1.20	0.22	0.28	0.41	0.34	0.23	0.31	0.38	0.27
1.40	0.19	0.23	0.36	0.30	0.21	0.28	0.33	0.24

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
1.60	0.18	0.21	0.33	0.27	0.20	0.26	0.31	0.21
1.80	0.17	0.20	0.28	0.24	0.18	0.24	0.27	0.19
2.00	0.16	0.19	0.27	0.23	0.18	0.21	0.25	0.18

Table 13.3.2w: Orientation Sector summer exposure factor (E_S) for climate zone 8

P/H (refer Figure 13.3.2a)	North	North east	East	South east	South	South west	West	North west
0.00	0.85	1.12	1.20	0.96	0.68	1.01	1.27	1.16
0.05	0.71	0.99	1.09	0.85	0.57	0.90	1.16	1.04
0.10	0.65	0.90	1.02	0.79	0.54	0.84	1.09	0.95
0.20	0.52	0.79	0.90	0.70	0.48	0.73	0.98	0.83
0.40	0.39	0.60	0.73	0.57	0.39	0.61	0.79	0.63
0.60	0.34	0.46	0.60	0.48	0.33	0.50	0.66	0.49
0.80	0.30	0.37	0.50	0.41	0.29	0.43	0.53	0.40
1.00	0.25	0.30	0.42	0.35	0.25	0.37	0.47	0.33
1.20	0.23	0.28	0.37	0.31	0.23	0.33	0.39	0.26
1.40	0.21	0.23	0.32	0.29	0.20	0.29	0.34	0.24
1.60	0.20	0.21	0.30	0.25	0.18	0.25	0.31	0.22
1.80	0.19	0.20	0.25	0.22	0.17	0.23	0.28	0.20
2.00	0.16	0.18	0.23	0.21	0.16	0.22	0.24	0.19

Figure 13.3.2a: Orientation sectors

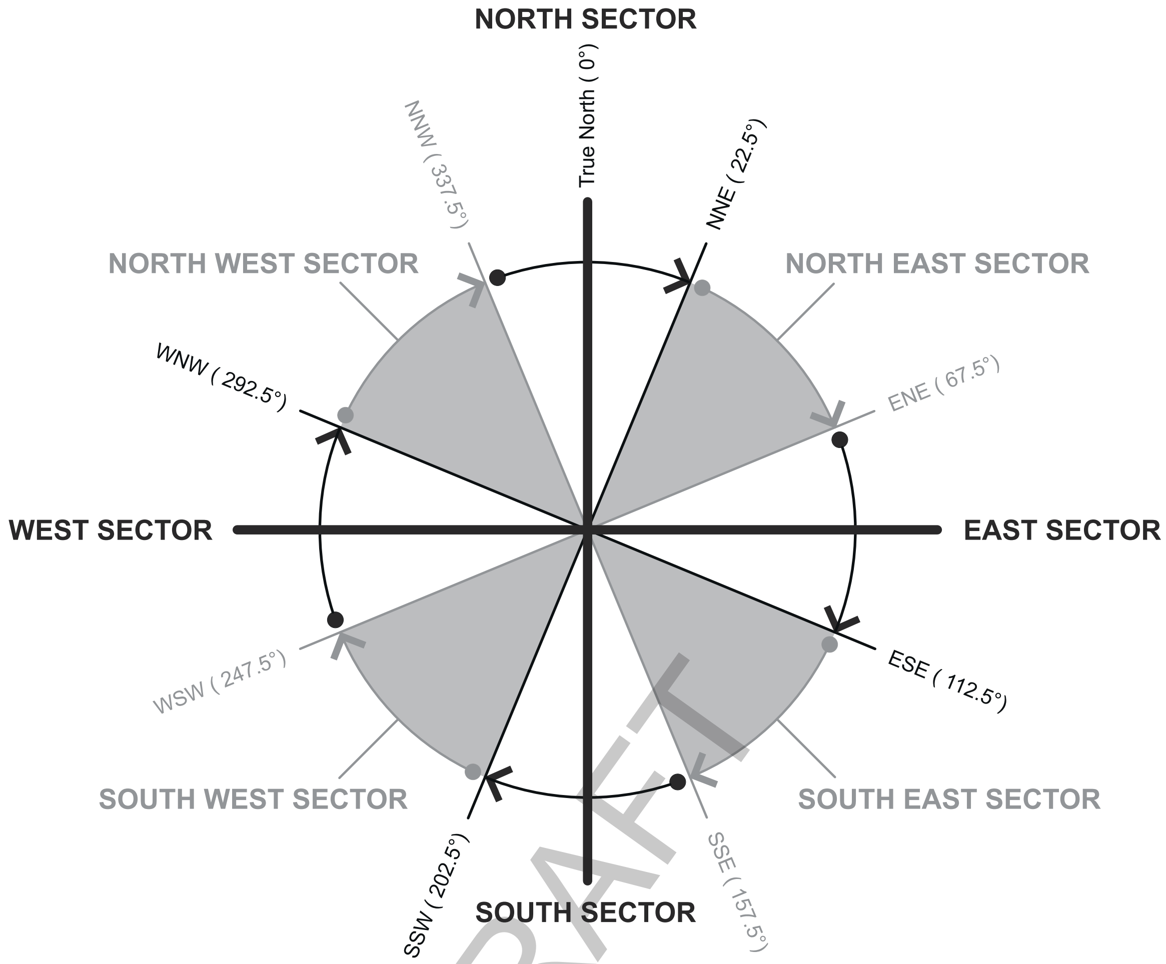


Figure 13.3.2b: Method of measuring p and h

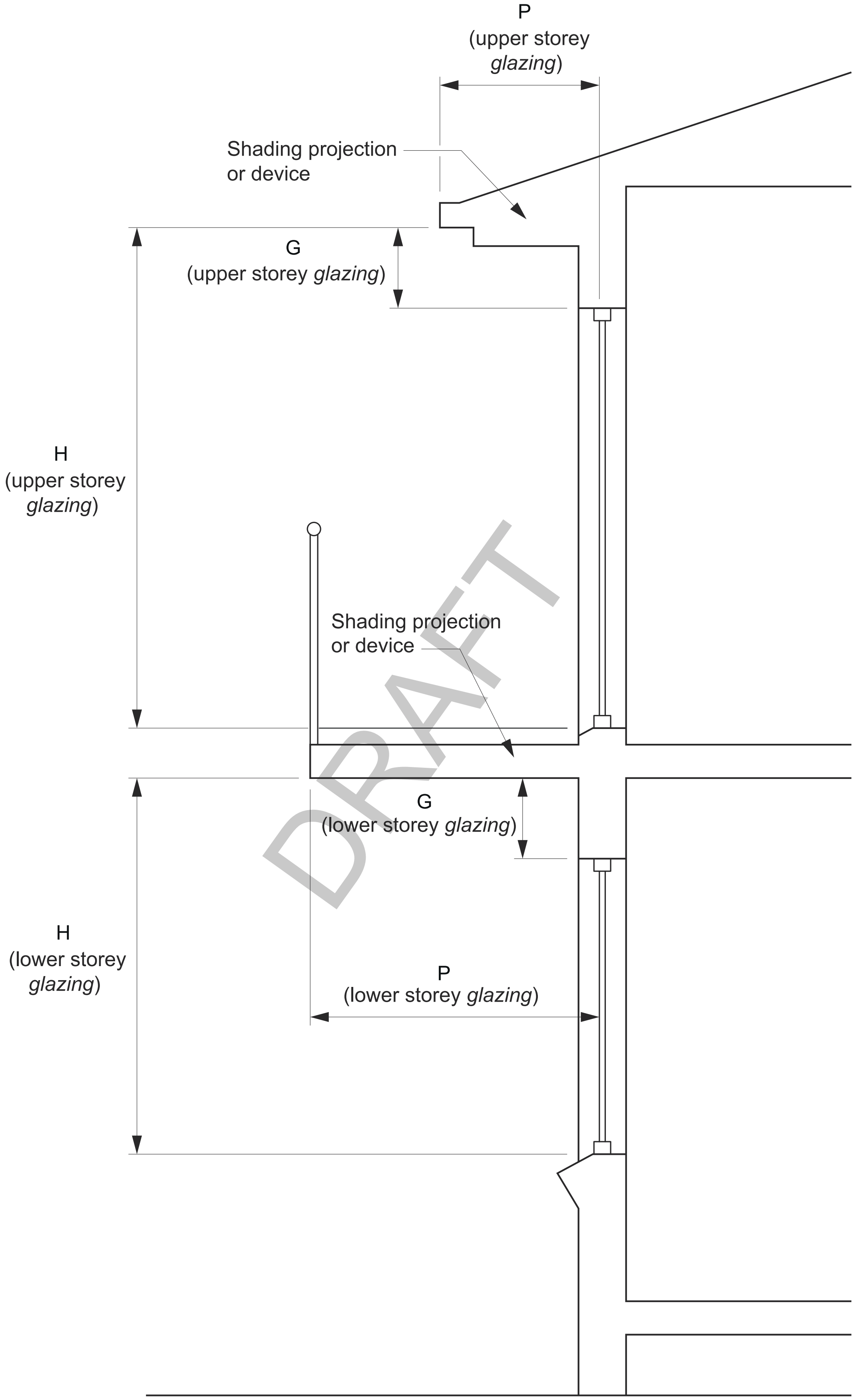


Figure Notes:

1. An external shading device that complies with 13.3.3(b) is considered to achieve a P/H value of 2.00.
2. Where G exceeds 500 mm, the value of P must be halved.

Explanatory Information: Exposure factors

1. Winter exposure factors are not needed for *climate zone* 1.
2. For exposure factors between those in Tables 13.3.2i to 13.3.2o, either use the next highest P/H or interpolate.
3. For exposure factors between those in Tables 13.3.2p to 13.3.2w, either use the next lowest P/H or interpolate.

Explanatory Information: Conductance and performance values for external glazing

1. The conductance formula for *climate zone* 1 differs from the formula for all other *Climate zones* because there is little or no need for heating at any time of the year in climate zone 1. The conductance allowance is calculated to limit the rate of heat conduction through glazing into an air conditioned interior from a hotter outside environment. The limit is set at a level that allows the use of basic *glazing* systems in dwellings with average *glazing* areas whether or not they are air conditioned.
2. The conductance formula for *climate zones* 2 to 8 is based on wintertime conditions to account for the balance between potential solar gains and heat loss by conduction through *glazing*. The calculation favours orientations with higher potential solar gains in winter and the use of shading rather than glass toning. The improved insulation performance of *glazing* resulting from the calculations will also be beneficial under summertime conditions when outside temperatures exceed inside temperatures.
3. By referring to "*glazing* elements", 13.3.2 requires and *Total System SHGCs* to be assessed for the combined effect of glass and frames. The measurement of these and *Total System SHGCs* is specified in the Technical Protocols and Procedures Manual for Energy Rating of Fenestration Products by the Australian Fenestration Rating Council (AFRC).
4. Various assessors using AFRC procedures might refer to their published performance values by slightly different terms including "U-factor" or "Uw" for or "SHGC" for *Total System SHGC*. Such values can be used under 13.3.2 provided they measure the combined glass and frame performance according to AFRC requirements.
5. and *Total System SHGC* are shown for some simple types of *glazing* elements in the table below. Lower figures indicate better *glazing* performance, although its effect on a dwelling's energy efficiency can vary depending on the climate and orientation of the *glazing*. Explanatory Table 13.3.2a gives worst case assessments, which can be improved by obtaining generic or custom product assessments from suppliers, manufacturers, industry associations (including their online resources) and from competent assessors.
6. Typical ranges of generic ratings are set out in Explanatory Tables 13.2.3b to 13.3.2e below to illustrate the levels of performance available through such assessments. Numbers from this table should not be used in compliance calculations.
7. Custom assessments consider *glazing* element components in most detail and return the highest levels of assessed performance for a given type of *glazing* element. Generic assessments consider the components of *glazing* elements in less detail and return lower levels of assessed performance.
8. The calculations for conductance and solar heat gain both consider seasonal solar radiation, orientation, shading and the solar performance of the *glazing*.

Table 13.3.2a (explanatory): Worst case whole glazing element performance values

Glass description	Framing type		*Total System SHGC*
Single clear	Aluminium	7.9	0.81
	Timber or uPVC	5.6	0.77
Tinted single	Aluminium	7.9	0.65
	Timber or uPVC	5.6	0.61
Clear double (3/6/3)	Aluminium	6.2	0.72
	Timber or uPVC	3.8	0.68

Table 13.3.2b (explanatory): Indicative ranges of whole glazing element performance—single glazed (monolithic or laminated)—aluminium frame

Glass description	Comment	range	*Total System SHGC* range
Clear	Minimum variation in glass U-Value and SHGC for different glass thicknesses.	7.9 - 5.5	0.81 - 0.64
Tinted	Glass SHCG depends on glass thickness and type of tint.	7.9 - 5.6	0.65 - 0.33
Coated	Glass U-Value and SHGC depend on coating type.	7.8 - 3.8	0.68 - 0.36
Tinted and coated	Glass U-Value depends on coating type and glass SHGC depends on coating type, type of tint, and glass thickness.	7.8 - 3.8	0.45 - 0.31

Table 13.3.2c (explanatory): Indicative ranges of whole glazing element performance—single glazed (monolithic or laminated)—timber or uPVC frame

Glass description	Comment	range	*Total System SHGC* range
Clear	Minimum variation in glass U-Value and SHGC for different glass thicknesses.	5.6 - 4.3	0.77 - 0.51
Tinted	Glass SHCG depends on glass thickness and type of tint.	5.6 - 4.3	0.61 - 0.25
Coated	Glass U-Value and SHGC depend on coating type.	5.5 - 2.9	0.64 - 0.27
Tinted and coated	Glass U-Value depends on coating type and glass SHGC depends on coating type, type of tint, and glass thickness.	5.5 - 3.1	0.42 - 0.23

Table 13.3.2d (explanatory): Indicative ranges of whole glazing element performance—double glazed—aluminium frame

Glass description	Comment	range	*Total System SHGC* range
Clear	Glass U-Value depends on cavity width.	6.2 - 3.1	0.72 - 0.63
Tinted	Glass U-Value depends on cavity width and glass SHGC depends on type of tint, tinted glass thickness and on cavity width.	6.2 - 3.1	0.57 - 0.36
Coated	Glass U-Value depends on cavity width and type of coating and glass SHGC depends on type of coating	6.1 - 2.4	0.60 - 0.22

Glass description	Comment	range	*Total System SHGC* range
Tinted and coated	Glass U-Value depends on cavity width and type of	6.1 - 2.5	0.41 - 0.21

Table 13.3.2e (explanatory): Indicative ranges of whole glazing element performance—double glazed—timber or uPVC

Glass description	Comment	range	*Total System SHGC* range
Clear	Glass U-Value depends on cavity width.	3.8 - 2.5	0.68 - 0.47
Tinted	Glass U-Value depends on cavity width and glass SHGC depends on type of tint, tinted glass thickness and on cavity width.	3.8 - 2.5	0.57 - 0.27
Coated	Glass U-Value depends on cavity width and type of coating and glass SHGC depends on type of coating and cavity width.	3.8 - 2.1	0.59 - 0.17
Tinted and coated	Glass U-Value depends on cavity width and type of coating and glass SHGC depends on type of coating, tinted glass thickness and cavity width.	3.8 - 2.1	0.37 - 0.16

Explanatory Information: Tables 13.3.2a to 13.3.2h

1. A floor in direct contact with the ground includes a concrete slab-on-ground or concrete slab-on-fill.
2. A suspended floor includes a suspended timber floor, suspended steel-framed floor or suspended concrete floor.
3. In general, a floor in direct contact with the ground more readily assimilates solar heat gains than a suspended floor. Consequently, lower stringency levels apply to *glazing* in a storey that has a floor in direct contact with the ground.
4. Whether a storey has Standard or High air movement depends upon the total *ventilation opening* area provided to *habitable rooms* on that storey and the presence of ceiling fans. The additional *ventilation opening* area *required* for High air movement without fans can be distributed to any of the *habitable rooms* on the storey. In *climate zones* 1 to 5, the storey can achieve High air movement when the total *ventilation opening* area is as for Standard air movement (without a ceiling fan or evaporative cooler) but with ceiling fans installed in every *habitable rooms*. Explanatory Table 13.3.2f below shows an example for *climate zone* 2.
5. The provisions of Part 13.3 assume that internal *window* coverings will be installed for privacy reasons. This assumption is already incorporated in the allowances for *glazing*.

Table 13.3.2f (explanatory): Air movement with/without ceiling fans

Air movement	With ceiling fans	Without ceiling fans
Standard	10%	7.5%
High	20%	10%

Explanatory Information: Tables 13.3.2i to 13.3.2w

1. Higher exposure factor (E_W) values in Tables 13.3.2i to 13.3.2o indicate greater exposure to desirable winter solar gains and should be adopted as far as possible.
2. Higher exposure factor (E_S) values in Tables 13.3.2p to 13.3.2w indicate greater exposure to unwanted summer

solar gains and should be avoided as far as possible.

Explanatory Information: Orientation sectors (Figure 13.3.2a)

1. The orientation sector for a wall or *glazing* element is the sector that contains a line drawn perpendicular to the face of the wall or *glazing* element.
2. Figure 13.3.2a is based on True North and all angles are measured clockwise from True North. Survey angles on site plans are usually marked in angles from True North. These angles can be used to establish True North for a particular site.
3. Magnetic North, found by a magnetic compass, varies from True North over time and by different amounts in different locations. Magnetic North is not an acceptable approximation of True North.
4. The eight orientation sectors shown in Figure 13.3.2a do not overlap at their boundaries. For example, north sector begins just clockwise after the NNW line and ends exactly on the NNE line. The start and end of other sectors are determined in a similar way, as indicated by the outer curved arrows.

13.3.3 Shading

[2019: 3.12.2.2]

Where shading is *required* to comply with 13.3.2, it must—

(a) be provided by an external permanent projection, such as a verandah, balcony, fixed canopy, eaves, shading hood or carport, which—
  (i) extends horizontally on both sides of the *glazing* for a distance greater than or equal to the projection distance P in Figure 13.3.2b; or
  (ii) provide the equivalent shading to (i) with a reveal or the like; or
(b) be provided by an external shading device, such as a shutter, blind, vertical or horizontal building screen with blades, battens or slats, which—
  (i) is capable of restricting at least 80% of the summer solar radiation; and
  (ii) if adjustable, is readily operated either manually, mechanically or electronically by the building occupants.

Explanatory Information:

1. Shading devices can include fixed louvres, shading screens and other types of perforated or fixed angle slatted shades. However, such devices need to be designed for the climate and latitude to ensure that summer sun penetration is restricted, while winter sun access is achieved. Winter access refers to the availability of winter solar gains to offset conducted heat losses.
2. The impact of shading is assessed with respect to the solar heat gain for the window. The requirements of 13.3.2 consider solar heat gain to be either beneficial or detrimental to the energy efficiency of a building based on seasonal variation (winter/summer), *climate zone*, orientation and P/H. Higher P/H values are more beneficial in minimising summer solar heat gain where as lower P/H values are more beneficial in allowing winter access.
3. Gutters can only be considered as providing shading if attached to a shading projection such as a verandah, fixed canopy, eaves, shading hood, balcony or the like.
4. Shading devices can be either attached or located adjacent to the building. For example, a free-standing lattice screen may be considered to provide shading to *glazing* if it complies with 13.3.3(b).
5. An adjustable shading device in 13.3.3(b)(ii) should be readily operated from a safe location or platform that does not require ladders, rigging, harnessing, or the like.

Part 13.4 Building sealing

13.4.1 Application of Part 13.4

[2019: 3.12.3]

(1) This Part applies to—
   (a) a Class 1 building; and
   (b) a Class 10a building with a *conditioned space*.
(2) The provisions of (1) do not apply to the following:
   (a) A building in *climate zones* 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler.
   (b) A permanent building *ventilation opening* that is necessary for the safe operation of a gas appliance.
(3) Part 13.4 must be applied as directed in H6D2(1)(a) or (b).

Explanatory Information:

1. An evaporatively cooled building in *climate zones* 4 and 6 must be sealed because of the likelihood of the building being heated during colder periods.
2. Appropriate ventilation requirements for gas appliances can be obtained from relevant legislation, referenced standards and product installation manuals.

13.4.2 Chimneys and flues

[2019: 3.12.3.1]

The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.

Explanatory Information:

1. The requirements of this Part are to be read in conjunction with the fire safety requirements in Section 9 of the ABCB Housing Provisions.
2. A solid-fuel burning appliance is a heater that burns materials such as timber, coal and the like. This clause does not apply to gas and liquid fuel burning appliances.

13.4.3 Roof lights

[2019: 3.12.3.2]

(1) A *roof light* must be sealed, or capable of being sealed, when serving—
   (a) a *conditioned space*; or
   (b) a *habitable room* in *climate zones* 4, 5, 6, 7 and 8.
(2) A *roof light required* by (1) to be sealed, or capable of being sealed, must be constructed with—
   (a) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or
   (b) a weatherproof seal; or
   (c) a shutter system readily operated either manually, mechanically or electronically by the occupant.

Explanatory Information:

A *roof light* should be sealed regardless of which room it serves in *climate zones* 4, 5, 6, 7 and 8. For example, a *roof light* located in a hallway should be sealed to stop the transfer of cold air into adjoining *conditioned spaces*. This principle also applies to external doors and *windows*, exhaust fans, wall and floor junctions and evaporative coolers.

13.4.4 External windows and doors

[2019: 3.12.3.3]

(1) An external door, internal door between a Class 1 building and an unconditioned Class 10a building, openable *window* and other such opening must be sealed when serving—

(a) a *conditioned space*; or

(b) a *habitable room* in *climate zones* 4, 5, 6, 7 and 8.

(2) A seal to restrict air infiltration—

(a) for the bottom edge of a door, must be a draft protection device; and

(b) for the other edges of a door or the edges of an openable *window* or other such opening, may be a foam or rubber compressible strip, fibrous seal or the like.

(3) A *window* complying with the maximum air infiltration rates specified in AS 2047 need not comply with (2)(b).

13.4.5 Exhaust fans

[2019: 3.12.3.4]

An exhaust fan must be fitted with a sealing device such as a self-closing damper, filter or the like when serving—

(a) a *conditioned space*; or

(b) a *habitable room* in *climate zones* 4, 5, 6, 7 and 8.

Explanatory Information:

An exhaust fan is considered to be adequately sealed if it is fitted with a filter such as the type commonly used in kitchen range hoods.

13.4.6 Construction of ceilings, walls and floors

[2019: 3.12.3.5]

(1) Ceilings, walls, floors and any opening such as a *window* frame, door frame, *roof light* frame or the like must be constructed to minimise air leakage in accordance with (2) when forming part of the external fabric of—

(a) a *conditioned space*; or

(b) a *habitable room* in *climate zones* 4, 5, 6, 7 and 8.

(2) Construction *required* by (1) must be—

(a) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or

(b) sealed at junctions and penetrations with—

(i) close-fitting architrave, skirting or cornice; or

(ii) expanding foam, rubber compressive strip, caulking or the like.

Explanatory Information:

1. A close fitting internal lining system is considered suitable to include an allowance for minimum lining movement gaps at wall, floor and ceiling junctions.
2. Caulking includes sealant, mastic or other gap filling material.

3. In 13.4.6(2)(b), penetrations include *windows*, doors, *roof lights* , flues, exhaust fans, heating and cooling ductwork and the like.

13.4.7 Evaporative coolers

[2019: 3.12.3.6]

An evaporative cooler must be fitted with a self-closing damper or the like when serving—

(a) a heated space; or

(b) a *habitable room* in *climate zones* 4, 5, 6, 7 or 8.

Explanatory Information:

The self-closing damper should create an effective seal against air infiltration.

Part 13.5 Air movement

13.5.1 Application of Part 13.5

[2019: 3.12.4]

(1) This Part applies to a *habitable room* in a Class 1 building.

(2) Part 13.5 must be applied as directed in H6D2(1)(a) or (b).

13.5.2 Air movement

[2019: 3.12.4.1]

(1) Air movement must be provided to *habitable rooms* in accordance with Table 13.5.2.

(2) Air movement *required* by (1) may be provided through an opening from an adjoining room (including an enclosed verandah) if—

(a) the adjoining room is not a *sanitary compartment*; and

(b) the opening between the adjoining room and the *habitable room* complies with Table 13.5.2 as if it were a *ventilation opening* to the *habitable room* or a proportion thereof if some ventilation is provided from another source; and

(c) the *ventilation opening* to the adjoining room complies with Table 13.5.2 for the *floor area* of the adjoining room and the proportion of the *habitable room* that is ventilated from the adjoining room.

(3) The requirements of (1) do not apply to buildings in Region D severe tropical cyclone areas (see Figure 2.2.3 provided the *external walls* are shaded with a verandah, balcony, eaves, carport or the like that projects at a minimum angle of 15 degrees in accordance with Figure 13.2.5a.

Table 13.5.2: Minimum total ventilation opening area as a percentage of the floor area for each habitable room

Climate zone	Without a ceiling fan or evaporative cooler	With a ceiling fan	With an evaporative cooler
1	10%	7.5%	10% (see Note)
2	10%	7.5%	10% (see Note)
3	10%	7.5%	7.5%
4	10%	5%	5%
5	7.5%	5%	7.5% (see Note)
6, 7 and 8	As required by Part 10.6	As required by Part 10.6	As required by Part 10.6

Table Notes:

Because evaporative coolers are less effective than ceiling fans in more humid locations, the requirement for *ventilation opening* in *climate zones* 1, 2 and 5 with an evaporative cooler is the same as without one.

Explanatory Information:

In humid locations, such as Darwin and Cairns, evaporative coolers would not provide the same cooling effect as in drier climates. Although they would provide some benefit from air movement if operated in 'fan-only' mode, they would cause discomfort, possible *condensation* and possible mould growth if operated in evaporative 'water-on' mode. However, even though a concession is not given in *climate zones* 1, 2 and 5, there are location, particularly in *climate zone* 5, where evaporative coolers would be effective.

13.5.3 Ventilation openings

[2019: 3.12.4.2]

(1) In *climate zones* 1, 2, 3, 4 and 5, the total *ventilation opening* area *required* by Table 13.5.2 to a *habitable room* must—

(a) be connected by a breeze path complying with (2) to another *ventilation opening* in another room or space; or

(b) be provided by a minimum of two *ventilation openings* located within the same *habitable room*, with each *ventilation opening* having an area of not less than 25% of the area *required* by Table 13.5.2.

(2) A breeze path *required* by (1)(a) must—

(a) pass through not more than two openings in the internal walls with each opening having an area of not less than 1.5 m^2; and

(b) have a distance along the breeze path between *ventilation openings* of not more than 20 m.

Explanatory Information:

1. *Ventilation openings* should be designed to allow the interior of the building to take full advantage of any natural breeze. Careful consideration should be given to the type and location of openings to ensure optimum effect is achieved and that internal 'dead air' pockets are avoided.
2. An opening may serve more than one breeze path.
3. Two openings are stated in (2)(a) as limit of the number of openings permitted in a breeze path. These are typically doorways. Larger openings, such as those between adjoining lounge and dining areas in the same space are unlikely to restrict air movement significantly.

13.5.4 Ceiling fans and evaporative coolers

[2019: 3.12.4.3]

Ceiling fans or evaporative coolers *required* to comply with H6D3, Tables 13.3.2a to 13.2.3h, as appropriate or Table 13.5.2 must—

(a) be permanently installed; and

(b) have a speed controller; and

(c) for ceiling fans, serve the whole room, with the *floor area* that a single fan serves not exceeding—

(i) 15 m^2 if it has a blade rotation diameter of greater than or equal to 900 mm; and

(ii) 25 m^2 if it has a blade rotation diameter of greater than or equal to 1200 mm.

Part 13.6 Services

13.6.1 Application of Part 13.6

[2019: 3.12.5]

(1) This Part applies to—
   (a) a Class 1 building; and
   (b) a Class 10a building; and
   (c) a Class 10b *swimming pool* associated with a Class 1 or 10a building.

(2) Part 13.6 must be applied as directed in H6D2(2).

(3) For a heated water supply system, Part 13.6 need not be complied with if H6D2(2)(b) is complied with.

13.6.2 Insulation of services

[2019: 3.12.5.1]

Thermal insulation for central heating water *piping* and heating and cooling ductwork must—
   (a) be protected against the effects of weather and sunlight; and
   (b) be able to withstand the temperatures within the *piping* or ductwork; and
   (c) use thermal insulation material in accordance with AS/NZS 4859.1.

Explanatory Information:

The central heating water *piping* provisions apply to systems designed to heat the building via water, such as a hydronic heating system.

13.6.3 Central heating water piping

[2019: 3.12.5.2]

(1) Central heating water *piping* that is not within a *conditioned space* must be thermally insulated to achieve the minimum material *R-Values* as set out in (2) to (6).

(2) Internal *piping* including—
   (a) flow and return *piping* that is—
      (i) within an unventilated wall space; or
      (ii) within an internal floor between storeys; or
      (iii) between ceiling insulation and a ceiling; and
   (b) heated water piping encased within a concrete floor slab (except that which is part of a floor heating system),

   must, in all *climate zones*, have a minimum material *R-Value* of 0.4.

(3) *Piping* located within a ventilated wall space, an enclosed building subfloor or a roof space, including—
   (a) flow and return *piping*; and
   (b) cold water supply *piping* within 500 mm of the connection to the central water heating system; and
   (c) relief valve *piping* within 500 mm of the connection to the central water heating system,

   must have a minimum material *R-Value* in accordance with (5).

(4) *Piping* located outside the building or in an unenclosed building subfloor or roof space, including—
   (a) flow and return *piping*; and

(b) cold water supply *piping* within 500 mm of the connection to the central water heating system; and

(c) relief valve *piping* within 500 mm of the connection to the central water heating system,

must have a minimum material *R-Value* in accordance with (3).

(5) *Piping* referred to in (3) must have a minimum material *R-Value* of—

(a) in *climate zones* 1, 2, 3 and 5 — 0.6; and

(b) (b) in *climate zones* 4, 6 and 7 — 0.9; and

(c) in *climate zone* 8 — 1.3.

(6) *Piping* referred to in (4) must have a minimum material *R-Value* of—

(a) in *climate zones* 1, 2, 3 and 5 — 0.6; and

(b) in *climate zones* 4, 6 and 7 — 1.3; and

(c) in *climate zone* 8 — 1.3.

Explanatory Information:

1. The insulation levels in the following table are typical examples of materials that can be used to insulate central heating water *piping* calculated in accordance with AS/NZS 4859.1.
2. The *R-Value* is that of the insulation and not the *Total R-Value* of the pipe, air film and insulation. Where *piping* has a significant inherent *R-Value* it may be subtracted from the material *R-Value* required. However, the inherent *R-Value* of most piping is not sufficient to satisfy the requirements of 13.6.3.
3. *Piping* within a timber member, such as that passing through a wall stud, is considered to have sufficient insulation for the purposes of 13.6.3.
4. The following table provides examples for the *R-Value* of the insulation used for smaller diameter *piping*.

Table 13.6.3 (explanatory): R-Value of insulation used for smaller diameter piping

Insulation	*R-Value*
9 mm of closed cell polymer	0.4
13 mm of closed cell polymer	0.6
19 mm of closed cell polymer	0.9
25 mm of closed cell polymer	1.3
25 mm of glasswool	1.3

13.6.4 Heating and cooling ductwork

[2019: 3.12.5.3]

(1) Heating and cooling ductwork and fittings must—

(a) achieve the material *R-Value* in (4); and

(b) be sealed against air loss—

(i) by closing all openings in the surface, joints and seams of ductwork with adhesives, mastics, sealants or gaskets in accordance with AS 4254.1 and AS 4254.2 for a Class C seal; or

(ii) for flexible ductwork, with a draw band in conjunction with a sealant or adhesive tape.

(2) Duct insulation must—

(a) abut adjoining duct insulation to form a continuous barrier; and

(b) be installed so that it maintains its position and thickness, other than at flanges and supports; and

(c) where located outside the building, under a suspended floor, in an attached Class 10a building or in a roof space—

(i) be protected by an outer sleeve of protective sheeting to prevent the insulation becoming damp; and

(ii) have the outer protective sleeve sealed with adhesive tape not less than 48 mm wide creating an airtight and waterproof seal.

(3) The requirements of (1) do not apply to heating and cooling ductwork and fittings located within the insulated building *envelope* including a service riser within the *conditioned space*, internal floors between storeys and the like.

(4) The material *R-Value required* by (1)(a) must be determined in accordance with the following:

(a) In a heating-only system or cooling-only system including an evaporative cooling system—

(i) ductwork must have a minimum material *R-Value* of—

(A) in *climate zones* 1 to 7 — 1.0; and

(B) in *climate zone* 8 — 1.5; and

(ii) fittings must have a minimum material *R-Value* of 0.4.

(b) In a combined heating and refrigerated cooling system—

(i) ductwork must have a minimum material *R-Value* of—

(A) in *climate zones* 1, 3, 4, 6 and 7 — 1.5; and

(B) in *climate zones* 2 and 5 — 1.0; and

(C) in *climate zone* 8 — 1.5; and

(ii) fittings must have a minimum material *R-Value* of 0.4.

(c) For the purposes of (b)(i), the minimum material *R-Value required* for ductwork may be reduced by 0.5 for combined heating and refrigerated cooling systems in *climate zones* 1, 3, 4, 6 and 7 if the ducts are—

(i) under a suspended floor with an enclosed perimeter; or

(ii) in a roof space that has an insulation of greater than or equal to R0.5 directly beneath the roofing.

Explanatory Information:

1. Ductwork within a fully insulated building may still benefit from insulation particularly when the system is only operating for short periods.
2. In some *climate zones* condensation may create problems with uninsulated ductwork, in which case insulation should still be considered.
3. For information on an enclosed perimeter, refer to the explanatory information following 13.2.6.
4. Insulation for refrigerated cooling ductwork should have a vapour barrier to prevent possible damage by condensation.
5. The insulation levels in the following tables are typical examples of materials that can be used to insulate ductwork and the *R-Values* they contribute. Other methods are available for meeting the minimum material *R-Value* required by 13.6.4(4). These values do not take into account all issues that may reduce the effectiveness of insulation. AS/NZS 4859.1 should be used to confirm in-situ values.
6. For fittings, 11 mm polyurethane typically provides an *R-Value* of 0.4.
7. Any flexible ductwork used for the transfer of products, initiating from a heat source that contains a flame, must also have the fire hazard properties *required* by H3D2(2).

Table 13.6.4a (explanatory): R-Values for typical ductwork insulation materials – flexible ductwork

Insulating material and thickness	*R-Value*
45 mm glasswool (11 kg/m^3)	1.0
70 mm polyester (6.4 kg/m^3)	1.0
63 mm glasswool (11 kg/m^3)	1.5
90 mm polyester (8.9 kg/m^3)	1.5
85 mm glasswool (11 kg/m^3)	2.0

Table 13.6.4b (explanatory): R-Value for typical ductwork insulation materials – sheetmetal ductwork – external insulation

Insulating material and thickness	*R-Value*
38 mm glasswool (22 kg/m^3)	1.0
50 mm polyester (20 kg/m^3)	1.1
50 mm glasswool (22 kg/m^3)	1.5
75 mm polyester (20 kg/m^3)	1.7

Table 13.6.4c (explanatory): R-Values for typical ductwork insulation materials – sheetmetal ductwork – internal insulation

Insulating material and thickness	*R-Value*
38 mm glasswool (32 kg/m^3)	1.0
50 mm polyester (32 kg/m^3)	1.3
50 mm glasswool (32 kg/m^3)	1.5

13.6.5 Electric resistance space heating

[2019: 3.12.5.4]

An electric resistance space heating system that serves more than one room must have—

(a) separate isolating switches for each room; and

(b) a separate temperature controller and time switch for each group of rooms with common heating needs; and

(c) power loads of not more than 110 W/m^2 for living areas, and 150 W/m^2 for bathrooms.

13.6.6 Artificial lighting

[2019: 3.12.5.5]

(1) The *lamp power density* or *illumination power density* of artificial lighting, excluding heaters that emit light, must not exceed the allowance of—

(a) 5 W/m^2 in a Class 1 building; and

(b) 4 W/m^2 on a verandah, balcony or the like attached to a Class 1 building; and

(c) 3 W/m^2 in a Class 10a building associated with a Class 1 building.

(2) The *illumination power density* allowance in (1) may be increased by dividing it by the relevant *illumination power density* adjustment factor for a control device in (6) as applicable.

(3) When designing the *lamp power density* or *illumination power density*, the power of the proposed installation must be used rather than nominal allowances for exposed batten holders or luminaires.

(4) If halogen lamps are installed, they must be separately switched from fluorescent lamps.

(5) Artificial lighting around the perimeter of a building must—

(a) be controlled by a daylight sensor; or

(b) have an average light source efficacy of not less than 40 Lumens/W.

(6) The following *illumination power density* adjustment factors apply to control devices for artificial lighting:

(a) Lighting timer for corridor lighting: 0.7.

(b) Motion detector —

(i) 0.9, where —

(A) at least 75% of the area of a space is controlled by one or more motion detectors; or

(B) an area of less than 200 m^2 is switched as a block by one or more motion detectors; and

(i) 0.7, where up to 6 lights are switched as a block by one or more detectors; and

(ii) 0.55, where up to 2 lights are switched as a block by one or more detectors.

(c) Manual dimming system where not less than 75% of the area of a space is controlled by manually operated dimmers: 0.85.

(d) Programmable dimming system where not less than 75% of the area of a space is controlled by manually operated dimmers: 0.85.

(e) Dynamic dimming system, with automatic compensation for lumen depreciation, the design lumen depreciation factor is not less than —

(i) 0.9 for fluorescent lights; or

(ii) 0.8 for high pressure discharge lights.

(f) Fixed dimming where at least 75% of the area is controlled by fixed dimmers that reduce the overall lighting level and the power consumption of the lighting — equal to the % of full power to which the dimmer is set divided by 0.95.

(g) Daylight sensor and dynamic lighting control device, with dimmed or stepped switching of lights adjacent to *windows*:

(i) Lights within the space adjacent to *windows* other than *roof lights* for a distance from the *window* equal to the depth of the floor at *window* head height: 0.5.

(ii) Lights within the space adjacent to *roof lights*: 0.6.

(7) For the purposes of (6)(c), manual dimming is where lights are controlled by a knob, slider or other mechanism or where there are pre-selected scenes that are manually selected.

(8) For the purposes of (6)(d), programmed dimming is where pre-selected scenes or levels are automatically selected by the time of day, photoelectric cell or occupancy sensor.

(9) For the purposes of (6)(e), dynamic dimming is where the lighting level is varied automatically by a photoelectric cell to either proportionately compensate for the availability of daylight or the lumen depreciation of the lamps.

(10) For the purposes of (6)(f), fixed dimming is where lights are controlled to a level and that level cannot be adjusted by the user.

(11) For the purposes of (6)(g)(i) and (ii), the *illumination power density* adjustment factor is only applied to lights controlled by that item — this adjustment factor does not apply to tungsten halogen or other incandescent sources.

Explanatory Information:

1. There are two approaches available for achieving compliance with (1) in Class 1 and associated Class 10a buildings. These are through the determination of the *lamp power density* or the *illumination power density*.
2. The first step in achieving compliance is to determine the relevant *lamp power density* or *illumination power density* allowance. Generally, the *lamp power density* or *illumination power density* is the relevant value in (1)(a), (b) or (c), however the *illumination power density* allowance can be increased in accordance with (2) if a control device is used.
3. When *illumination power density* and one or more control devices are used, the adjustment factor is only applied to the space(s) served by the control device. The adjusted allowance for this space is then combined with the allowances for the remaining spaces using an area weighted average, which subsequently increases the allowance provided in (1)(a), (b) or (c).
4. Where no control device is used the adjustment factor is equal to 1.
5. The second step in achieving compliance is to assess the overall *lamp power density* or overall *illumination power density* of the building.
6. The overall *lamp power density* is calculated by adding the maximum power ratings of all of the permanently wired lamps in a space and dividing this sum by the area of the space.
7. The overall *illumination power density* is calculated by adding the illumination power load for each space and dividing this sum by the area of the space.
8. Control device factors in (2) are only applied to the *illumination power density*, not the overall *illumination power*

density.

9. To comply with (1), the overall *lamp power density* or overall *illumination power density* must be less than or equal to the allowance.
10. Trading of allowances between (1)(a), (b) and (c) is not permitted.
11. (1)(b) includes outdoor living spaces such as verandahs, balconies, patios, alfresco spaces or the like that are attached to a Class 1 building.
12. The artificial lighting requirements in 13.6.6 are to be read in conjunction with the artificial lighting requirements in 10.5.2.
13. The artificial lighting around the perimeter of a building does not need to comply to a maximum power density as neither the lighting required or the area of the space can be easily defined. Instead, external lights are required to be controlled by daylight sensors or to be efficient.
14. In (4), separate switching is required for halogen lamps to facilitate less frequent usage. This is because they are significantly less energy efficient that fluorescent lamps.

13.6.7 Water heater in a heated water supply system

[2019: 3.12.5.6]

A water heater in a heated water supply system must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia.

13.6.8 Swimming pool heating and pumping

[2019: 3.12.5.7]

(1) Heating for a *swimming pool* must be by—
  (a) a solar heater not boosted by electric resistance heating; or
  (b) a heater using reclaimed energy; or
  (c) a gas heater; or
  (d) a heat pump; or
  (e) a combination of (a) to (d).
(2) Where some or all of the heating *required* by (1) is by a gas heater or a heat pump, the *swimming pool* must have—
  (a) a cover unless located in a *conditioned space*; and
  (b) a time switch to control the operation of the heater.
(3) A time switch must be provided to control the operation of a circulation pump for a *swimming pool*.
(4) For the purposes of 13.6.8, a *swimming pool* does not include a spa pool.

Explanatory Information:

Some jurisdictions may have requirements for a pool cover under the Smart Approved WaterMark Scheme.

13.6.9 Spa pool heating and pumping

[2019: 3.12.5.8]

(1) Heating for a spa pool that shares a water recirculation system with a *swimming pool* must be by—
  (a) a solar heater; or
  (b) a heater using reclaimed energy; or
  (c) a gas heater; or
  (d) a heat pump; or

(e) a combination of (a) to (d).

(2) Where some or all of the heating *required* by (1) is by a gas heater or a heat pump, the spa pool must have—

(a) a cover; and

(b) a push button and a time switch to control the operation of the heater.

(3) A time switch must be provided to control the operation of a circulation pump for a spa pool having a capacity of 680 L or more.

Schedule 1 Definitions

Abbreviations

Symbols

Glossary

Abbreviations

Abbreviation	Definitions
ABCB	Australian Building Codes Board
AC	Alternating Current
ACP	Aluminium Composite Panel
AS	Australian Standard
ASET	Available Safe Egress Time
ASTM	American Society for Testing and Materials
BCA	Building Code of Australia
BE	Fire blocks evacuation route
CCT	Correlated Colour Temperature
CF	Challenging fire
CHF	Critical Heat Flux
CRF	Critical Radiant Flux
CS	Fire starts in a concealed space
CSHGC	Constant for solar heat gain
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CU	Constant for conductance
DC	Direct Current
FED	Fractional Effective Dose
FI	Fire brigade intervention
FRL	Fire Resistance Level
GRP	Glass fibre reinforced polyester
HRR	Heat Release Rate
HS	Horizontal fire spread
IS	Rapid fire spread involving internal surface linings
ISO	International Organisation for Standardisation
LED	Light-Emitting Diode
MEPS	Minimum Energy Performance Standards
NABERS	National Australian Built Environment Rating System
NATA	National Association of Testing Authorities
NatHERS	Nationwide House Energy Rating Scheme
NCC	National Construction Code
PBDB	Performance-based design brief
PCA	Plumbing Code of Australia
PMV	Predicted Mean Vote
ppm	parts per million
PVC	Polyvinyl chloride
RC	Robustness check
RSET	Required Safe Egress Time
RW	Weighted sound reduction index
SF	Smouldering fire

Abbreviation	Definitions
SHGC	Solar Heat Gain Coefficient
SS	Structural stability and other property
STC	Sound Transmission Class
UF	Unexpected catastrophic failure
UPVC	Unplasticized polyvinyl chloride
UT	Fire in normally unoccupied room threatening occupants of other rooms
U-Value	Thermal transmittance
VS	Vertical fire spread involving external cladding or external openings

Symbols

Symbols	Definitions
°	degree(s)
°C	degree(s) Celsius
°CDB	degree(s) Celsius Dry Bulb
°CWB	degree(s) Celsius Wet Bulb
-e/MJ	equivalent per Megajoule(s)
μm	micrometre
dB(A)	decibels “A” scale weighting network
f’c	Characteristic compressive strength of concrete at 28 days
f’y	Yield stress used in design
G	Dead load
J	Joule(s)
J/kg.K	Joules per kilogram degree Kelvin
J/s.m2	Joules per second square metre
K	Kelvin(s)
kg	kilogram(s)
kg/m	kilogram(s) per metre
kg/m2	kilogram(s) per square metre
kg/m3	kilogram(s) per cubic metre
kJ/m2.hour	kilojoules per square metre hour
km	kilometre(s)
kPa	kilopascal(s)
kW/m2	kilowatt(s) per square metre
kWheating	kilowatt(s) of heating
kWr	kilowatt(s) of refrigeration
L	litre(s)
L/min	litre(s) per minute
L/s	litre(s) per second
L/s.m2	litre(s) per second square metre
Lumens/W	Lumens per Watt
lx	lux
m	metre(s)
m/s	metre(s) per second
m2	square metre(s)
m2.K/W	square metre Kelvin(s) per Watt
m3	cubic metre(s)
m3/hour	cubic metre(s) per hour
m3/s	cubic metre(s) per second
mcd/m2	millicandelas per square metre
min	minute(s)
MJ/hour	Megajoules per hour

Symbols	Definitions
MJ/m2.annum	Megajoules per square metre annum
mm	millimetre(s)
mm2	square millimetre(s)
MW	megawatt(s)
N	newton(s)
N/m	Newton(s) per metre
Pa	pascal(s)
Pa/m	pascal(s) per metre
Q	Live load
s	second(s)
ULS	Ultimate limit state
V	Volt(s)
W	Watt(s)
Winput power	Watts of input power
Wr /Winput power	Watts of thermal refrigeration per watt of input power
W/kWrej	Watts per kilowatt of heat rejected
W/m.K	Watts per metre degree Kelvin
W/m2	Watts per square metre
°south	degree south
%	percent
>	greater than
<	less than
≤	less than or equal to
≥	equal to or more than

Glossary

Above ground rainwater tank: A rainwater tank that is not in any way set into the ground.

Accessible: Having features to enable use by people with a disability.

Accessway: A continuous *accessible* path of travel (as defined in AS 1428.1) to, into or within a building.

Accredited Testing Laboratory: One of the following:

(a) An organisation accredited by the National Association of Testing Authorities (NATA) to undertake the relevant tests.

(b) An organisation outside Australia accredited to undertake the relevant tests by an authority recognised by NATA through a mutual recognition agreement.

(c) An organisation recognised as being an Accredited Testing Laboratory under legislation at the time the test was undertaken.

Activity support level: The degree to which occupants can undertake activities with respect to the likely *activity traits* and *occupant traits*.

> **Explanatory Information:**
>
> This term is used to articulate whether the height of a room or space is sufficient and by what degree. This is achieved by having regard to the room or space's intended use by occupants, through consideration of the defined terms '*activity traits*' and '*occupant traits*'.

(a) For the purposes of Volume One, the features of the activities that will be undertaken in a *habitable room* or space.

(b) For the purposes of Volume Two, the features of the activities that will be undertaken in a room or space.

> **Explanatory Information:**
>
> This term is used to describe the characteristics of the activities that will be undertaken in a room or space.
>
> For example, the activities likely to be undertaken in a bedroom, and the associated features are—
>
> - sleeping — a person laying horizontally; and
> - resting — a person laying horizontally or sitting upright on the bed; and
> - leisure activities, such as reading a book — a person sitting upright on the bed, with enough space to stretch their arms vertically; and
> - dressing/changing clothes — a person standing with enough space to stretch their arms vertically.

Administering body: The body responsible for administering the *WaterMark Certification Scheme*.

Aged care building: A Class 9c building for residential accommodation of aged persons who, due to varying degrees of incapacity associated with the ageing process, are provided with *personal care services* and 24 hour staff assistance to evacuate the building during an emergency.

NSW

Air-conditioning: For the purposes of Section J of Volume One, a *service* that actively cools or heats the air within a space, but does not include a *service* that directly—

(a) cools or heats cold or hot rooms; or

(b) maintains specialised conditions for equipment or processes, where this is the main purpose of the *service*.

Alarm zone: For the purposes of Specification 23, an area of a building protected by one or more smoke alarms connected to one alarm circuit.

Alteration: In relation to a building, includes an addition or extension to a building.

Aluminium Composite Panel (ACP): Flat or profiled aluminium sheet material in composite with any type of materials.

Amenity: An attribute which contributes to the health, physical independence, comfort and well-being of people.

Ancillary element: An element that is secondary to and not an integral part of another element to which it is attached.

Annual exceedance probability: The probability that a given rainfall total accumulated over a given duration will be exceeded in any one year.

Annual greenhouse gas emissions: The theoretical amount of greenhouse gas emissions attributable to the energy used annually by a building's *services*, excluding kitchen exhaust and the like.

Appropriate authority: For the purposes of the Fire Safety Verification Method, means the relevant authority with the statutory responsibility to determine the particular matter satisfies the relevant *Performance Requirement*.

Explanatory Information:

The Appropriate Authority is typically the building surveyor or building certifier charged with the statutory responsibility to determine building compliance and issue the building permit / approval and occupancy certificate / approval.

NSW Appropriate authority

Appropriate authority: The relevant authority with the statutory responsibility to determine the particular matter.

Appropriately qualified person: A person recognised by the *appropriate authority* as having qualifications and/or experience in the relevant discipline in question.

Approved disposal system: A system for the disposal of sewage, sullage or stormwater approved by an authority having jurisdiction.

Articulated masonry: Masonry construction in which special provisions have been made for movement by articulation.

NSW Assembly building

SA Assembly building

Assembly building: A building where people may assemble for—

- (a) civic, theatrical, social, political or religious purposes including a library, theatre, public hall or place of worship; or
- (b) educational purposes in a *school*, *early childhood centre*, preschool, or the like; or
- (c) entertainment, recreational or sporting purposes including—
  - (i) a discotheque, nightclub or a bar area of a hotel or motel providing live entertainment or containing a dance floor; or
  - (ii) a cinema; or
  - (iii) a sports stadium, sporting or other club; or
- (d) transit purposes including a bus station, railway station, airport or ferry terminal.

Assessment Method: A method that can be used for determining that a *Performance Solution* or *Deemed-to-Satisfy Solution* complies with the *Performance Requirements*.

Atrium: A space within a building that connects 2 or more *storeys* and—

- (a) is enclosed at the top by a floor or roof (including a glazed roof structure); and
- (b) includes any adjacent part of the building not separated by an appropriate barrier to fire; but
- (c) does not include a stairwell, rampwell or the space within a *shaft*; and
- (d) for the purposes of (a) a space is considered enclosed if the area of the enclosing floor or roof is greater than 50% of the area of the space, measured in plan, of any of the *storeys* connected by the space.

Atrium well: A space in an *atrium* bounded by the perimeter of the openings in the floors or by the perimeter of the floors and the *external walls*.

Automatic: Designed to operate when activated by a heat, smoke or fire sensing device.

- (a) The time between ignition of a fire and the onset of untenable conditions in a specific part of a building.
- (b) The time referred to in (1) is the calculated interval between the time of ignition of a fire and the time at which conditions become such that the occupant is unable to take effective action to escape to a place of safety.

Average daylight factor: The ratio of the illumination level within a room provided by daylight to the level of daylight outside the building during overcast conditions.

~~**Average recurrence interval**: Applied to rainfall, means the expected or average interval between exceedances for a 5 minute duration rainfall intensity.~~

Average specific extinction area: The average specific extinction area for smoke as determined by AS 5637.1.

Backflow prevention device: An air gap, break tank or mechanical device that is designed to prevent the unplanned reversal of flow of water or *contaminants* into the water service or a *Network Utility Operator's* water supply.

Backpressure: A reversal of water flow caused by the downstream pressure becoming greater than the supply pressure.

Backsiphonage: A reversal of flow of water caused by negative pressure in the distributing pipes of a water service or supply.

Backstage: A space associated with, and adjacent to, a *stage* in a Class 9b building for scenery, props, equipment, dressing rooms, or the like.

Battery system: One or more chemical cells connected in series, parallel or a combination of the two for the purpose of electrical energy storage.

Blockage: An obstruction within a water service or sanitary plumbing or *drainage* system.

Boiler: A vessel or an arrangement of vessels and interconnecting parts, wherein steam or other vapour is generated, or water or other liquid is heated at a pressure above that of the atmosphere, by the application of fire, the products of combustion, electrical power, or similar high temperature means, and—

(a) includes superheaters, reheaters, economisers, boiler piping, supports, mountings, valves, gauges, fittings, controls, the boiler settings and directly associated equipment; but

(b) excludes a fully flooded or pressurised system where water or other liquid is heated to a temperature lower than the normal atmospheric boiling temperature of the liquid.

Bond breaker: A material used as part of a *waterproofing system* that prevents the *membrane* bonding to the substrate, bedding or lining.

Breaking surf: Any area of salt water in which waves break on an average of at least 4 days per week but does not include white caps or choppy water.

Explanatory Information:

Breaking surf normally occurs in areas exposed to the open sea. Breaking surf does not normally occur in sheltered areas, such as that which occurs around Port Phillip Bay, Sydney Harbour, Swan River, Derwent River and similar locations.

Brittle failure: Loss of strength to resist design actions without first undergoing significant deformation which, for the purposes of the *Performance Requirements*, may be taken to include (but is not limited to) buckling, fatigue failure and soil bearing failure.

Building complexity criteria: Are used to determine whether all or part of a building is low, medium, high or very high building complexity — the building complexity criteria are:

(a) Attributes — the building is designed or constructed with any of the following sub-criteria:

(i) An *effective height* of more than 25 m.

(ii) One or more *Performance Solutions* used to demonstrate compliance with *Performance Requirements* relating to material and systems for structural safety.

(iii) One or more *Performance Solutions* used to demonstrate compliance with *Performance Requirements* relating to material and systems for fire safety.

(iv) In an area prone to natural disaster or adverse environmental conditions.

(b) Class 2 — all or part of the building is Class 2 of three or more *storeys*.

(c) Occupant numbers — the building is to occupied by more than 100 people determined in accordance with D2D18.

(d) Occupant characteristics — the building is to be occupied by more than 10 people who will require assistance to evacuate the building in an emergency.

(e) Building Importance Level 4 — the building is determined to be Importance Level 4 in accordance with Table B1D3a.

Building complexity: high: Where a building meets three of *building complexity criteria* (a) (Attributes), (b) (Class 2), (c) (Occupant numbers), or (d) (Occupant characteristics).

Building complexity: low: Where a building meets one only of *building complexity criteria* (a) (Attributes), (b) (Class 2), (c) (Occupant numbers), or (d) (Occupant characteristics).

Building complexity: medium: Where a building meets two of *building complexity criteria* (a) (Attributes), (b) (Class 2), (c) (Occupant numbers), or (d) (Occupant characteristics).

Building complexity: very high: Where a building meets—

(a) all *building complexity criteria* (a) (Attributes), (b) (Class 2), (c) (Occupant numbers), and (d) (Occupant characteristics); or

(b) *building complexity criterion* (e) (Building Importance Level 4).

Notes:

The NCC currently does not include corresponding technical requirements relating to the defined term '*building complexity criteria*' and the various building complexity levels. It is intended that these terms will be integrated into future editions of the NCC.

Buried rainwater tank: A rainwater tank that is set into and completely covered by earth.

Burnout: Exposure to fire for a time that includes *fire growth*, full development, and decay in the absence of intervention or automatic suppression, beyond which the fire is no longer a threat to building elements intended to perform *loadbearing* or fire separation functions, or both.

Carpark: A building that is used for the parking of motor vehicles but is neither a *private garage* nor used for the servicing of vehicles, other than washing, cleaning or polishing.

Cavity: A void between 2 leaves of masonry, or in masonry veneer construction, a void between a leaf of masonry and the supporting frame.

Cavity wall: For the purposes of F1V1 and H2V1, a wall that incorporates a drained cavity.

Certificate of Accreditation: A certificate issued by a State or Territory accreditation authority stating that the properties and performance of a building material or method of construction or design fulfil specific requirements of the NCC.

Certificate of Conformity: A certificate issued under the ABCB scheme for products and systems certification stating that the properties and performance of a building material or method of construction or design fulfil specific requirements of the NCC.

Certification body: A person or organisation operating in the field of material, product, form of construction or design certification that has been accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ), and is accredited for a purpose other than as part of the CodeMark Australia Certification Scheme or *WaterMark Certification Scheme*.

Characteristic: The occupant data to be used in the modelling of access solutions which define how an occupant interacts with a building, i.e. occupant movement speeds, turning ability, reach capability, perception of luminance contrast and hearing threshold.

Clad frame: Timber or metal frame construction with exterior timber or sheet wall cladding that is not sensitive to minor movement and includes substructure masonry walls up to 1.5 m high.

Climate zone: Climate zone means an area defined in Figure 2 and in Tables 2a to 2h for specific locations, having energy efficiency provisions based on a range of similar climatic characteristics.

Table 2a: Climate zones for thermal design — Australian Capital Territory

Location	*Climate zone*
Canberra	7

Table 2b: Climate zones for thermal design — New South Wales

Location	*Climate zone*
Albury	4
Armidale	7
Batemans Bay	6

Location	*Climate zone*
Bathurst	7
Bega	6
Bellingen Shire - Dorrigo Plateau	7
Bellingen Shire - Valley & seaboard	2
Bourke	4
Broken Hill	4
Byron Bay	2
Cobar	4
Coffs Harbour	2
Dubbo	4
Goulburn	7
Grafton	2
Griffith	4
Ivanhoe	4
Lismore	2
Lord Howe Island	2
Moree	4
Newcastle	5
Nowra	6
Orange	7
Perisher - Smiggins	8
Port Macquarie	5
Sydney East	5
Sydney West	6
Tamworth	4
Thredbo	8
Wagga Wagga	4
Williamtown	5
Wollongong	5
Yass	6

Table 2c: Climate zones for thermal design — Northern Territory

Location	*Climate zone*
Alice Springs	3
Darwin	1
Elliot	3
Katherine	1
Renner Springs	3
Tennant Creek	3

Table 2d: Climate zones for thermal design — Queensland

Location	*Climate zone*
Birdsville	3

Location	*Climate zone*
Brisbane	2
Bundaberg	2
Cairns	1
Cooktown	1
Cunnamulla	3
Gladstone	2
Hervey Bay	2
Hughenden	3
Longreach	3
Mackay	2
Mount Isa	3
Normanton	1
Rockhampton	2
Roma	3
Southport	2
Toowoomba	5
Townsville	1
Warwick	5
Weipa	1

Table 2e: Climate zones for thermal design — South Australia

Location	*Climate zone*
Adelaide	5
Bordertown	6
Ceduna	5
Cook	4
Elliston	5
Kingscote	6
Leigh Creek	5
Lobethal	6
Loxton	5
Naracoorte	6
Marree	4
Mount Gambier	6
Murray Bridge	6
Oodnadatta	4
Port Augusta	4
Port Lincoln	5
Renmark	5
Tarcoola	4
Victor Harbour	6
Whyalla	4

Table 2f: **Climate zones for thermal design — Tasmania**

Location	*Climate zone*
Burnie	7
Bicheno	7
Deloraine	7
Devonport	7
Flinders Island	7
Hobart	7
Huonville	7
King Island	7
Launceston	7
New Norfolk	7
Oatlands	7
Orford	7
Rossarden	7
Smithton	7
St Marys	7
Zeehan	7

Table 2g: **Climate zones for thermal design — Victoria**

Location	*Climate zone*
Anglesea	6
Ararat	7
Bairnsdale	6
Ballarat	7
Benalla	6
Bendigo	6
Bright	7
Colac	6
Dandenong	6
Echuca	4
Geelong	6
Hamilton	7
Horsham	6
Melbourne	6
Mildura	4
Portland	6
Sale	6
Shepparton	4
Swan Hill	4
Traralgon	6
Wangaratta	7
Warrnambool	6

Location	*Climate zone*
Wodonga	6

Table 2h: Climate zones for thermal design — Western Australia

Location	*Climate zone*
Albany	6
Balladonia	4
Broome	1
Bunbury	5
Carnarvon	3
Christmas Island	1
Cocos Island	1
Derby	1
Esperance	5
Exmouth	1
Geraldton	5
Halls Creek	3
Kalgoorlie-Boulder	4
Karratha	1
Meekatharra	4
Northam	4
Pemberton	6
Perth	5
Port Hedland	1
Wagin	4
Wyndham	1

Figure 2: **Climate zones for thermal design**

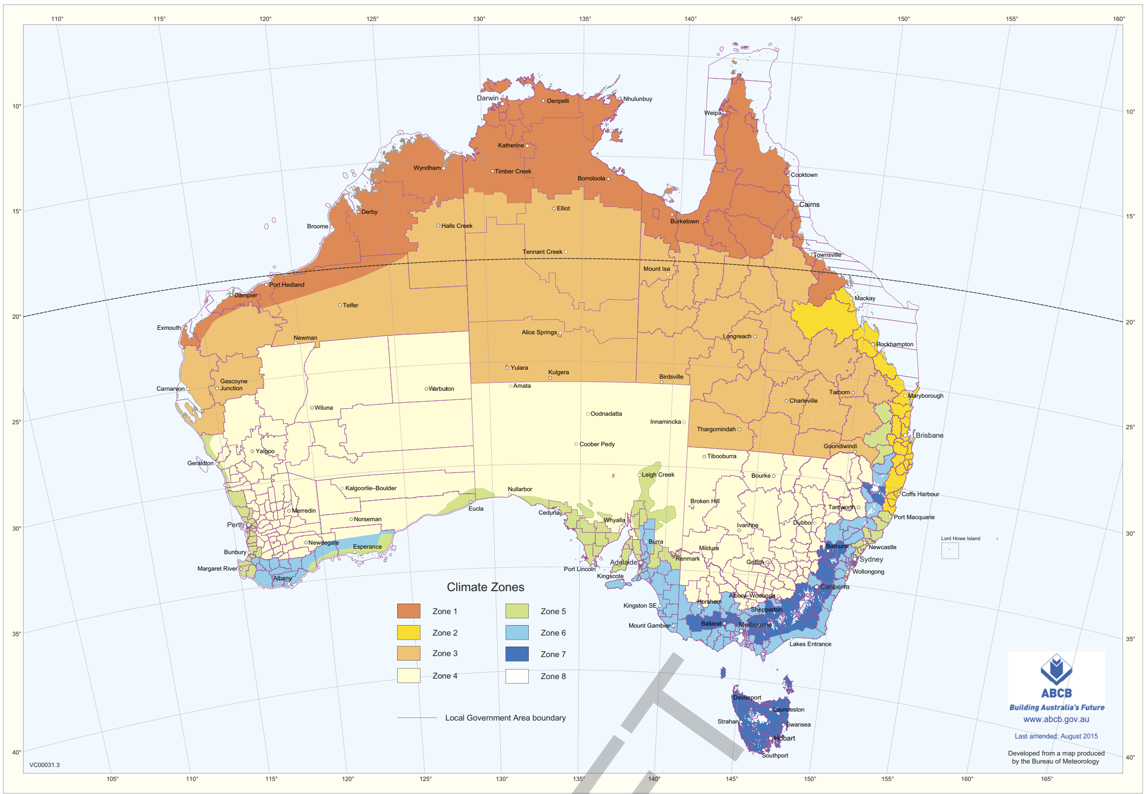


Figure Notes:

(a) This map can be viewed in enlargeable form on the ABCB website at abcb.gov.au.

(b) A Zone 4 area in South Australia, other than a council area, at an altitude greater than 300 m above the Australian Height Datum is to be considered as Zone 5.

(c) The areas referred to in (2) have been defined in an enlarged format on the following maps produced by the Department of Planning, Transport and Infrastructure (these maps can be viewed on the Government of South Australia website at www.sa.gov.au):

(i) Adelaide Hills Climate Zone Map.

(ii) Barossa Council Climate Zone Map.

(iii) Regional Council of Goyder Climate Zone Map.

(d) Locations in *climate zone* 8 are in *alpine areas*.

Combustible: Applied to—

(a) a material — means combustible as determined by AS 1530.1; and

(b) construction or part of a building — means constructed wholly or in part of combustible materials.

(a) For the purposes of Volume One, a wall that is common to adjoining buildings.

(b) For the purposes of Volume Two and the ABCB Housing Provisions, a wall that is common to adjoining buildings other than Class 1 buildings.

Condensation: The formation of moisture on the surface of a building element or material as a result of moist air coming into contact with a surface which is at a lower temperature.

(a) For the purposes of Volume One, a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by *air-conditioning*.

(b) For the purposes of Volume Two, a space within a building that is heated or cooled by the building's *domestic services*, excluding a non-*habitable room* in which a heater with a capacity of not more than 1.2 kW or 4.3 MJ/hour is installed.

Connections: The parts that fix the members into the structure, through which the loads pass.

Construction activity actions: Actions due to stacking of building materials or the use of equipment, including cranes and trucks, during construction or actions which may be induced by floor to floor propping.

Containment protection: The installation of a *backflow prevention device* at the *point of connection* of a *Network Utility Operator's* water supply to a site.

Contaminant: Any substance (including gases, liquids, solids or micro-organisms), energy (excluding noise) or heat, that either by itself or in combination with the same, similar or other substances, energy or heat, changes or is likely to change the physical, chemical or biological condition of water.

Controlled fill: Material that has been placed and compacted in layers with compaction equipment (such as a vibrating plate) within a defined moisture range to a defined density requirement.

Cooling load: The calculated amount of energy removed from the cooled spaces of the building annually by artificial means to maintain the desired temperatures in those spaces.

Critical radiant flux (CRF): The critical heat flux at extinguishment (CHF in kW/m^2) as determined by AS ISO 9239.1.

Cross-connection: Any actual or potential connection between a water supply and any *contaminant*.

Curtain wall: A non-*loadbearing external wall* that is not a *panel wall*.

Damp-proof course (DPC): A continuous layer of impervious material placed in a masonry wall or pier, or between a wall or pier and a floor, to prevent the upward or downward migration of water.

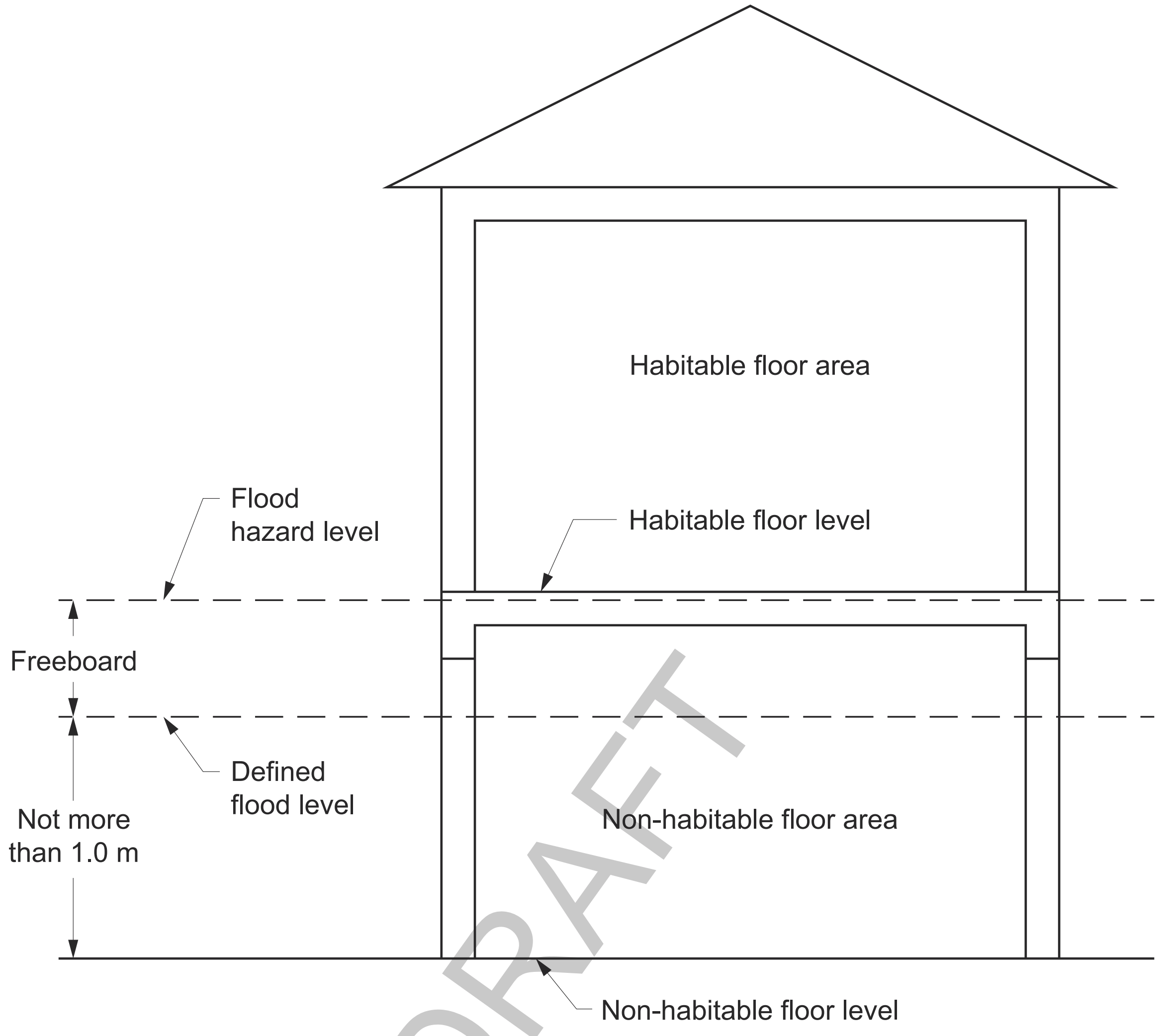
Deemed-to-Satisfy Provisions: Provisions which are deemed to satisfy the *Performance Requirements*.

Deemed-to-Satisfy Solution: A method of satisfying the *Deemed-to-Satisfy Provisions*.

Defined flood event (DFE): The flood event selected for the management of flood hazard for the location of specific development as determined by the *appropriate authority*.

Defined flood level (DFL): The flood level associated with a *defined flood event* relative to a specified datum (see Figure 3).

Figure 3: **Identification of defined flood level, flood hazard level and freeboard**



NSW Designated bushfire prone area

Designated bushfire prone area: Land which has been designated under a power of legislation as being subject, or likely to be subject, to bushfires.

Design bushfire: The characteristics of a bushfire, its initiation, spread and development, which arises from weather conditions, topography and fuel (vegetation) in a given setting, used to determine *fire actions*.

Design fire: The quantitative description of a representation of a fire within the *design scenario*.

Design scenario: The specific scenario of which the sequence of events is quantified and a *fire safety engineering* analysis is conducted against.

Design wind speed: The design gust wind speed for the area where the building is located, calculated in accordance with AS/NZS 1170.2 or AS 4055 (see Table 4~~3~~ for wind classes).

Wind classes

Non-cyclonic Region A and B	Cyclonic Region C and D
N1, N2, N3	C1
N4, N5, N6 (these wind classes are covered in the Housing Provisions Part 2.2, Structural provisions).	C2, C3, C4 (these wind classes are covered in the Housing Provisions Part 2.2, Structural provisions).

Table Notes:

(a) Wind classification map identifying wind regions is contained in Housing Provisions Part 2.2 (see Figure 2.2.3).

(b) Information on wind classes for particular areas may be available from the *appropriate authority*.

(c) "N" = non-cyclonic winds and "C" = cyclonic winds.

Detention centre: A building in which persons are securely detained by means of the built structure including a prison, remand centre, juvenile detention centre, holding cells or psychiatric detention centre.

Direct fix cladding wall: For the purposes of F1V1 and H2V1, means a wall with cladding attached directly to the wall framing without the use of a drained cavity.

(a) A wall having a minimum 20 mm cavity between 2 separate leaves, and—

(i) for masonry, where wall ties are used to connect leaves, the ties are of the resilient type; and

(ii) for other than masonry, there is no mechanical linkage between the leaves, except at the periphery.

(b) A staggered stud wall is not deemed to be discontinuous construction.

Display glazing: *Glazing* used to display retail goods in a shop or showroom directly adjacent to a walkway or footpath, but not including that used in a café or restaurant.

Domestic services: The basic engineering systems that use energy or control the use of energy; and—

(a) includes—

(i) heating, air-conditioning, mechanical ventilation and artificial lighting; and

(ii) pumps and heaters for *swimming pools* and spa pools; and

(iii) heated water systems; but

(b) excludes cooking facilities and portable appliances.

Drainage: Any part of— ~~sanitary drainage, liquid trade waste drainage or stormwater drainage system.~~

(a) a sanitary drainage system, including any liquid trade waste drainage; or

(b) a stormwater drainage system.

Drainage flange: A flange connected to a waste pipe, at the point at which it passes through the floor substrate, to prevent leakage and which enables tile bed drainage into the waste pipe.

Drainage riser: A waste pipe between the *floor waste* and the drainage system.

Drinking water: Water intended primarily for human consumption but which has other domestic uses.

Explanatory Information:

See also the Australian Drinking Water Guidelines produced by the National Health and Medical Research Council.

Ductile failure: Significant deformation of a member without loss of strength to resist design actions which, for the purposes of the *Performance Requirements*, may be taken to include (but not limited to) soil settlement and creep failure.

TAS Early childhood centre

VIC Early childhood centre

Early childhood centre: Any premises or part thereof providing or intending to provide a centre-based education and care service within the meaning of the Education and Care Services National Law Act 2010 (Vic), the Education and Care Services National Regulations and centre-based services that are licensed or approved under State and Territory children's services law, but excludes education and care primarily provided to school aged children in outside school hours settings.

Effective height: The vertical distance between the floor of the lowest *storey* included in the calculation of *rise in storeys* and the floor of the topmost *storey* (excluding the topmost *storey* if it contains only heating, ventilating, lift or other equipment, water tanks or similar service units).

Efficacy: The degree to which a system achieves a design objective given that it performs to a level consistent with the system specification during the relevant fire scenario.

Electricity network substation: A building in which high voltage supply is converted or transformed and which is controlled by a licensed network service provider designated under a power of legislation.

Electric passenger lift: A power-operated lift for raising or lowering people in a car in which the motion of the car is obtained from an electric motor mechanically coupled to the hoisting mechanism.

Electrohydraulic passenger lift: A power-operated lift for raising or lowering people in a car in which the motion of the car is obtained from the action of liquid under pressure acting on a piston or ram, the pressure being generated by a pump driven by an individual electric motor.

Engaged pier: A pier bonded to a masonry wall by course bonding of masonry units or by masonry ties.

(a) For the purposes of Section J in Volume One, the parts of a building's *fabric* that separate a *conditioned space* or *habitable room* from—

(i) the exterior of the building; or

(ii) a non-*conditioned space* including—

(A) the floor of a rooftop plant room, lift-machine room or the like; and

(B) the floor above a *carpark* or warehouse; and

(C) the *common wall* with a *carpark*, warehouse or the like.

(b) For the purposes of Part H6 in Volume Two and Section 13 of the Housing Provisions, the parts of a building's *fabric* that separate artificially heated or cooled spaces from—

(i) the exterior of the building; or

(ii) other spaces that are not artificially heated or cooled.

Equivalent: Equivalent to the level of health, safety and amenity provided by the *Deemed-to-Satisfy Provisions*.

Evacuation route: The continuous path of travel (including *exits*, *public corridors* and the like) from any part of a building, including within a *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part, to a *safe place*.

Evacuation time: The time calculated from when the emergency starts for the occupants of the building to evacuate to a *safe place*.

(a) Any, or any combination of the following if they provide egress to a road or *open space*:

(i) An internal or external stairway.

(ii) A ramp.

(iii) A *fire-isolated passageway*.

(iv) A doorway opening to a road or *open space*.

(b) A *horizontal exit* or a *fire-isolated passageway* leading to a *horizontal exit*.

TAS Expert Judgement

Expert Judgement: The judgement of an expert who has the qualifications and experience to determine whether a *Performance Solution* or *Deemed-to-Satisfy Solution* complies with the *Performance Requirements*.

Explanatory Information:

Contemporary and relevant qualifications and/or experience are necessary to determine whether a *Performance Solution* complies with the *Performance Requirements*. The level of qualification and/or experience may differ depending on the complexity of the proposal and the requirements of the regulatory authority. Practitioners should seek advice from the authority having jurisdiction or *appropriate authority* for clarification as to what will be accepted.

Exposed joint: A construction joint, control joint, expansion joint, contraction joint or movement joint that is exposed to rainwater.

(a) For the purposes of Volume One, an outer wall of a building which is not a *common wall*.

(b) For the purposes of Volume Two, an outer wall of a building which is not a *separating wall*.

Extra-low voltage: A *voltage* not exceeding 50 V AC or 120 V ripple-free DC.

Fabric: The basic building structural elements and components of a building including the roof, ceilings, walls, glazing and floors.

SA Farm building

Farm building: A Class 7 or 8 building located on land primarily used for *farming*—

(a) that is—

(i) used in connection with *farming*; or

(ii) used primarily to store one or more *farm vehicles*; or

(iii) a combination of (i) and (ii); and

(b) in which the total number of persons accommodated at any time does not exceed one person per 200 m² of floor area or part thereof, up to a maximum of 8 persons; and

(c) with a total *floor area* of not more than 3500 m².

Farming: Includes—

(a) cultivating, propagating and harvesting plants or fungi or their products or parts, including seeds, spores, bulbs or the like, but does not include forestry; or

(b) maintaining animals in any physical environment for the purposes of—

(i) breeding them; or

(ii) selling them; or

(iii) acquiring and selling their bodily produce such as milk, wool, eggs or the like; or

(c) a combination of (a) and (b),

but does not include forestry or maintaining animals for sport or recreational purposes.

Farm shed: A single *storey* Class 7 or 8 building located on land primarily used for *farming*—

(a) that is—

(i) used in connection with *farming*; or

(ii) used primarily to store one or more *farm vehicles*; or

(iii) a combination of (i) and (ii); and

(b) occupied neither frequently nor for extended periods by people; and

(c) in which the total number of persons accommodated at any time does not exceed 2; and

(d) with a total *floor area* of more than 500 m² but not more than 2000 m².

Farm vehicle: A vehicle used in connection with *farming*.

Fatigue failure: Fracture of a material through progressive brittle cracking under repeated alternating or cyclic stresses of an intensity considerably less than strength under static load.

Finished ground level: For the purposes of H1D4 and H2D3 in Volume Two and Section 4 of the Housing Provisions, means the ground level adjacent to footing systems at the completion of construction and landscaping.

Fire actions: Each of the following—

(a) airborne embers; and

(b) burning debris and/or accumulated embers adjacent to building elements; and

(c) heat transfer from combustible materials within the site: and

(d) radiant heat from a bushfire front; and

(e) flame contact from a bushfire front.

Fire brigade: A statutory authority constituted under an Act of Parliament having as one of its functions, the protection of life and property from fire and other emergencies.

Fire brigade station: For the purposes of E1D2(1)(b) and I3D9, means a state or territory government operated premises which is a station for a *fire brigade*.

Fire compartment: Either—

(a) the total space of a building; or

(b) when referred to in—

(i) the *Performance Requirements* — any part of a building separated from the remainder by barriers to fire such as walls and/or floors having an appropriate resistance to the spread of fire with any openings adequately protected; or

(ii) the *Deemed-to-Satisfy Provisions* — any part of a building separated from the remainder by walls and/or floors each having an FRL not less than that *required* for a *fire wall* for that type of construction and where all openings in the separating construction are protected in accordance with the *Deemed-to-Satisfy Provisions* of the relevant Part.

Fire growth: The stage of fire development during which the *heat release rate* and the temperature of the fire are generally increasing.

Fire hazard: The danger in terms of potential harm and degree of exposure arising from the start and spread of fire and the smoke and gases that are thereby generated.

Fire hazard properties: The following properties of a material or assembly that indicate how they behave under specific fire test conditions:

(a) *Average specific extinction area*, *critical radiant flux* and *Flammability Index*, determined as defined in Schedule 2.

(b) *Smoke-Developed Index*, *smoke development rate* and *Spread-of-Flame Index*, determined in accordance with Specification 3.

(c) *Group number* and *smoke growth rate index* ($SMOGRA_{RC}$), determined in accordance with Specification 7.

Fire intensity: The rate of release of calorific energy in watts, determined either theoretically or empirically, as applicable.

Fire-isolated passageway: A corridor, hallway or the like, of *fire-resisting construction*, which provides egress to or from a *fire-isolated stairway* or *fire-isolated ramp* or to a road or *open space*.

Fire-isolated ramp: A ramp within a *fire-resisting* enclosure which provides egress from a *storey*.

Fire-isolated stairway: A stairway within a *fire-resisting shaft* and includes the floor and roof or top enclosing structure.

(a) The sum of the net calorific values of the *combustible* contents which can reasonably be expected to burn within a *fire compartment*, including furnishings, built-in and removable materials, and building elements.

(b) For the purposes of (1), the calorific values must be determined at the ambient moisture content or humidity (the unit of measurement is MJ).

Fire-protected timber: *Fire-resisting* timber building elements that comply with Specification 10.

Fire-protective covering: Any one or more of the following:

(a) 13 mm fire-protective grade plasterboard.

(b) 12 mm cellulose cement flat sheeting complying with AS/NZS 2908.2 or ISO 8336.

(c) 12 mm fibrous plaster reinforced with 13 mm x 13 mm x 0.7 mm galvanised steel wire mesh located not more than 6 mm from the exposed face.

(d) Other material not less fire-protective than 13 mm fire-protective grade plasterboard, fixed in accordance with the normal trade practice for a fire-protective covering.

Fire-resistance level (FRL): The grading periods in minutes determined in accordance with Specifications 1 and 2, for the following criteria—

(a) *structural adequacy*; and

(b) *integrity*; and

(c) *insulation*,

and expressed in that order.

Notes:

A dash means there is no requirement for that criterion. For example, 90/–/– means there is no requirement for an FRL for *integrity* and *insulation*, and –/–/– means there is no requirement for an FRL.

Fire-resisting construction: For the purposes of Volume One, means one of the Types of construction referred to in Part C2 of Volume One.

(a) For the purposes of Volume One, applied to a building element, having an FRL appropriate for that element.

(b) For the purposes of Volume Two, applied to a *structural member* or other part of a building, having the FRL *required* for that *structural member* or other part.

Fire safety engineering: Application of engineering principles, rules and *expert judgement* based on a scientific appreciation of the fire phenomenon, often using specific *design scenario*, of the effects of fire and of the reaction and behaviour of people in order to—

(a) save life, protect property and preserve the environment and heritage from destructive fire; and

(b) quantify the hazards and risk of fire and its effects; and

(c) mitigate fire damage by proper design, construction, arrangement and use of buildings, materials, structures, industrial processes and transportation systems; and
(d) evaluate analytically the optimum protective and preventive measures, including design, installation and maintenance of active and passive fire and life safety systems, necessary to limit, within prescribed levels, the consequences of fire.

Fire safety system: One or any combination of the methods used in a building to—

(a) warn people of an emergency; or
(b) provide for safe evacuation; or
(c) restrict the spread of fire; or
(d) extinguish a fire,

and includes both active and passive systems.

Fire-source feature: Any one or more of the following:

(a) The far boundary of a road, river, lake or the like adjoining the allotment.
(b) A side or rear boundary of the allotment.
(c) An *external wall* of another building on the allotment which is not a Class 10 building.

Fire wall: A wall with an appropriate resistance to the spread of fire that divides a *storey* or building into *fire compartments*.

Fixed wired: For the purposes of Specification 23, a system of electrical wiring (either AC or DC), in which cables are fixed or supported in position.

Flammability Index: The index number as determined by AS 1530.2.

Flashing: A strip or sleeve of impervious material dressed, fitted or built-in to provide a barrier to moisture movement, or to divert the travel of moisture, or to cover a joint where water would otherwise penetrate to the interior of a building.

(a) Perimeter flashing: A *flashing* used at the floor-wall junction.
(b) Vertical flashing: A *flashing* used at wall junctions within *shower areas*.

Flashover: In relation to *fire hazard properties*, means a *heat release rate* of 1 MW.

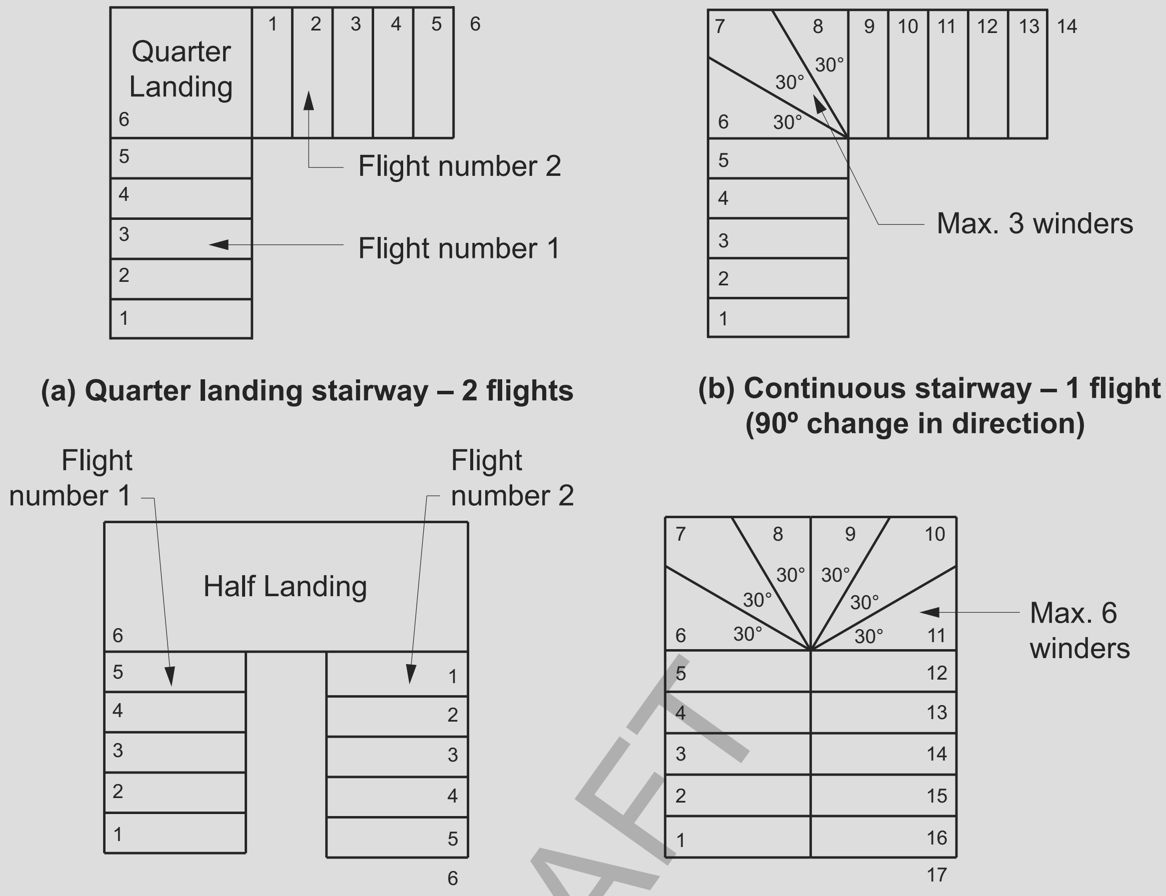
Flight: That part of a stair that has a continuous series of *risers*, including *risers* of *winders*, not interrupted by a *landing* or floor.

Explanatory Information:

A flight is the part of a stair that has a continuous slope created by the nosing line of treads. The length of a flight is limited to restrict the distance a person could fall down a stair.

Quarter *landings*, as shown in Explanatory Figure 1, are considered sufficient to halt a person's fall and therefore are considered for the purposes of Volume Two and the ABCB Housing Provisions not to be part of the flight.

Figure 1 (explanatory): Identification of stair flights — Plan view



(a) Quarter landing stairway – 2 flights

(b) Continuous stairway – 1 flight (90º change in direction)

(c) Half landing stairway – 2 flights

(d) Continuous stairway – 1 flight (180º change in direction)

VIC Flood hazard area

Flood hazard area: The *site* (whether or not mapped) encompassing land lower than the *flood hazard level* which has been determined by the *appropriate authority*.

Flood hazard level (FHL): The flood level used to determine the height of floors in a building and represents the *defined flood level* plus the *freeboard* (see Figure 3).

(a) For the purposes of Volume One—

(i) in relation to a building — the total area of all *storeys*; and

(ii) in relation to a *storey* — the area of all floors of that *storey* measured over the enclosing walls, and includes—

(A) the area of a *mezzanine* within the *storey*, measured within the finished surfaces of any *external walls*; and

(B) the area occupied by any *internal wall* or partitions, any cupboard, or other built-in furniture, fixture or fitting; and

(C) if there is no enclosing wall, an area which has a use that contributes to the *fire load* or impacts on the safety, health or amenity of the occupants in relation to the provisions of the BCA; and

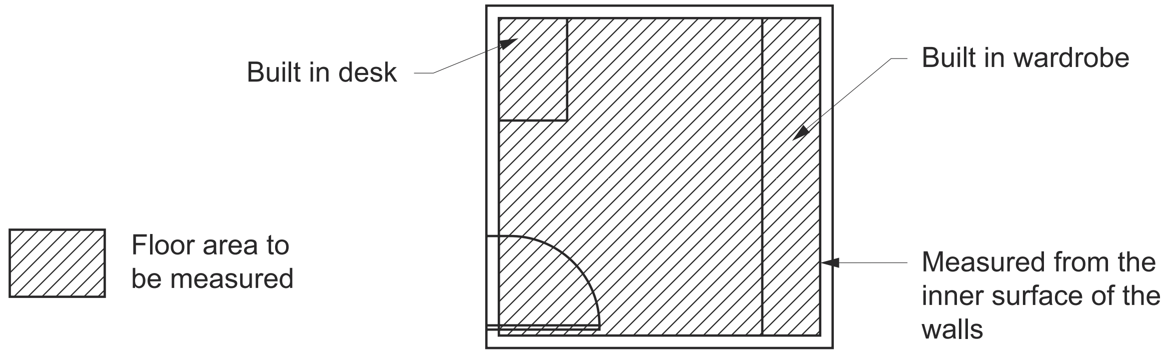
(iii) in relation to a room — the area of the room measured within the internal finished surfaces of the walls, and includes the area occupied by any cupboard or other built-in furniture, fixture or fitting; and

(iv) in relation to a *fire compartment* — the total area of all floors within the *fire compartment* measured within the finished internal surfaces of the bounding construction, and if there is no bounding construction, includes an area which has a use which contributes to the *fire load*; and

(v) in relation to an *atrium* — the total area of all floors within the *atrium* measured within the finished surfaces of the bounding construction and if no bounding construction, within the *external walls*.

(b) For the purposes of Volume Two and the ABCB Housing Provisions, in relation to a room, the area of the room measured within the finished surfaces of the walls, and includes the area occupied by any cupboard or other built-in furniture, fixture or fitting (see Figure 4).

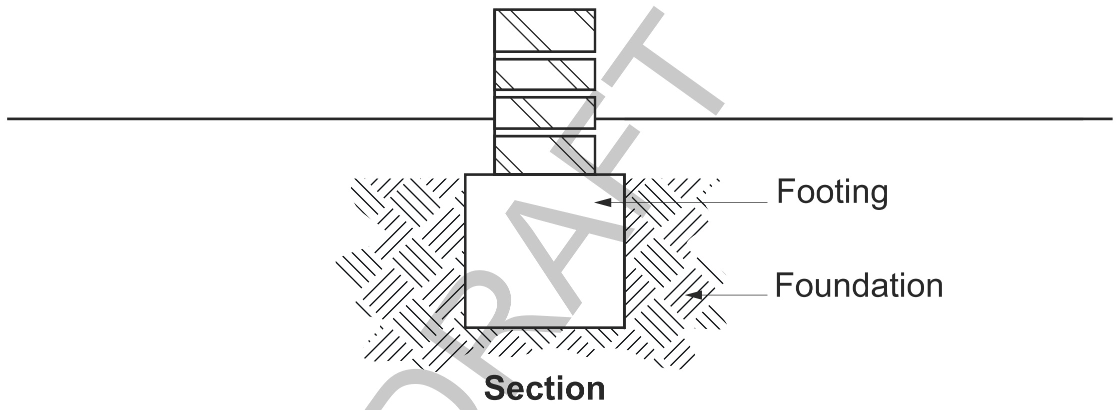
Figure 4: **Identification of floor area of a room**



Floor waste: A grated inlet within a graded floor intended to drain the floor surface.

Foundation: The ground which supports the building (see Figure 5).

Figure 5: **Identification of foundation**



Fractional effective dose (FED): The fraction of the dose (of thermal effects) that would render a person of average susceptibility incapable of escape.

Explanatory Information:

The definition for FED has been modified from the ISO definition to be made specific for the Fire Safety *Verification Method*. The use of CO or CO_2 as part of FED is not part of that *Verification Method*. This is because the ability to measure CO in a repeatable test varies by two orders of magnitude for common cellosic fuel.

VIC Freeboard

Freeboard: The height above the *defined flood level* as determined by the *appropriate authority*, used to compensate for effects such as wave action and localised hydraulic behaviour.

Fully developed fire: The state of total involvement of the majority of available combustible materials in a fire.

(a) For the purposes of Section J, a transparent or translucent element and its supporting frame located in the *envelope*, and includes a *window* other than a *roof light*.

(b) For the purposes of Part H6 and Section 13 of the Housing Provisions—

(i) a transparent or translucent element and its supporting frame located in the external *fabric* of the building; and

(ii) includes a *window* other than a *roof light*.

Going: The horizontal dimension from the front to the back of a tread less any overhang from the next tread or *landing* above (see Figure 11.2.2f in the Housing Provisions).

Gradual failure: Relatively slow collapse of a structure that occurs through significant plastic deformation and/or moment redistribution.

Green Star: The building sustainability rating scheme managed by the Green Building Council of Australia.

Group number: The number of one of 4 groups of materials used in the regulation of *fire hazard properties* and applied to materials used as a finish, surface, lining, or attachment to a wall or ceiling.

Habitable room: A room used for normal domestic activities, and—

(a) includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom; but

(b) excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

Hazard Rating: A level of potential toxicity that may cause contamination in a drinking water system~~.~~, having a~~Theee~~ra~~e~~ ~~A~~ting of ~~either~~ *Low Hazard*, *Medium Hazard* or *High Hazard*, ~~is~~ determined in accordance with NCC Volume Three. ~~Specification 41, for any Deemed-to-Satisfy Solution.~~

Health-care building: A building whose occupants or patients undergoing medical treatment generally need physical assistance to evacuate the building during an emergency and includes—

(a) a public or private hospital; or

(b) a nursing home or similar facility for sick or disabled persons needing full-time care; or

(c) a clinic, day surgery or procedure unit where the effects of the predominant treatment administered involve patients becoming non-ambulatory and requiring supervised medical care on the premises for some time after the treatment.

Heated water: Water that has been intentionally heated; normally referred to as hot water or warm water.

Heating load: The calculated amount of energy delivered to the heated spaces of the building annually by artificial means to maintain the desired temperatures in those spaces.

Heat release: The thermal energy produced by combustion (measured in kJ).

Heat release rate (HRR): The rate of thermal energy production generated by combustion, measured in kW (preferred) or MW.

High Hazard: Any condition, device or practice which, in connection with a water supply, has the potential to cause death.

High wind area: A region that is subject to *design wind speed* more than N3 or C1 (see Table 3).

Hob: The upstand at the perimeter to a shower area.

Horizontal exit: A *required* doorway between 2 parts of a building separated from each other by a *fire wall*.

Hours of operation: The number of hours when the occupancy of the building is greater than 20% of the peak occupancy.

(a) For the purposes of Volume One, means software accredited under the Nationwide House Energy Rating Scheme.

(b) For the purposes of Volume Two—

(i) applied to H6V2—software accredited or previously accredited under the Nationwide House Energy Rating Scheme and the additional functionality provided in non-regulatory mode; and

(ii) applied to H6D3—software accredited under the Nationwide House Energy Rating Scheme.

Explanatory Information:

The Nationwide House Energy Rating Scheme (NatHERS) refers to the Australian Governments' scheme that facilitates consistent energy ratings from software tools which are used to assess the potential thermal efficiency of dwelling envelopes.

Housing Provisions: The requirements for Class 1 and 10 buildings referenced in Volume Two of the National Construction Code, as published by the Australian Building Codes Board.

Illuminance: The luminous flux falling onto a unit area of surface.

Illumination power density: The total of the power that will be consumed by the lights in a space, including any lamps, ballasts, current regulators and control devices other than those that are plugged into socket outlets for intermittent use such as floor standing lamps, desk lamps or work station lamps, divided by the area of the space, and expressed in W/m^2.

Explanatory Information:

Illumination power density relates to the power consumed by the lighting system and includes the light source or luminaire and any control device. The power for the lighting system is the illumination power load. This approach is more complicated than the *lamp power density* approach but provides more flexibility for a dwelling with sophisticated control systems.

The area of the space refers to the area the lights serve. This could be considered a single room, open plan space, verandah, balcony or the like, or the total area of all these spaces.

Importance Level: A number which ranks the relative importance of structures and buildings (shown in Table 3) based on the potential risk to life resulting from their scale and/or use.

Table 3: **Importance Levels for building types**

Importance Level	Description
1	Structures presenting a low degree of hazard to life and other property
2	Normal structures and structures not in other *Importance Levels*
3	Structures that as a whole may contain people in crowds or contents of high value to the community or pose risks to people in crowds
4	Structures with special post-disaster functions
5	Special structures

Explanatory Information:

Examples of Importance Levels of certain buildings, structures and facilities

(a) *Importance Level* 1, include but not limited to:
  (i) Structures with a total floor area < 30 m².
  (ii) Farm buildings, isolated structures, towers in rural situations.

(b) *Importance Level* 2, include but not limited to:
  (i) Buildings not included in *Importance Level* 1, 3 or 4.
  (ii) Single family dwellings.

(c) *Importance Level* 3, include but not limited to:
  (i) Where more than 300 people can congregate in one area.
  (ii) Day care facilities with a capacity greater than 150.
  (iii) Primary *school* or secondary *school* facilities with a capacity greater than 250.
  (iv) Colleges or adult education facilities with a capacity greater than 500.
  (v) Health care facilities with a capacity of 50 or more residents.
  (vi) Airport terminals, principal railway stations with a capacity greater than 250.
  (vii) Correctional institutions.
  (viii) Multi-occupancy residential, commercial (including shops), industrial, office and retailing buildings designed to accommodate more than 5000 people and with a gross area greater than 10,000 m².
  (ix) Public assembly buildings, theatres and cinemas of greater than 1,000 m².
  (x) Emergency medical and other emergency facilities not designated as post-disaster.
  (xi) Power-generating facilities, water treatment and waste-water treatment facilities and other public utilities not designated as post-disaster.
  (xii) Buildings and facilities not designated as post-disaster containing hazardous materials capable of causing hazardous conditions that do not extend beyond the property boundaries.

(d) *Importance Level* 4, include but not limited to:

(i) Buildings and facilities designated as essential facilities buildings and facilities with special post -disaster functions medical emergency or surgical facilities.

(ii) Emergency service facilities such as fire, police stations and emergency vehicle garages.

(iii) Utilities or emergency supplies or installations required as backup for buildings and facilities of *Importance Level* 4.

(iv) Designated emergency shelters, designated emergency centres and ancillary facilities.

(v) Buildings and facilities containing hazardous materials capable of causing hazardous conditions that extend beyond the property boundaries.

(e) *Importance Level* 5, include but not limited to:

(i) Structures that have special functions or whose failure poses catastrophic risk to a large area (e.g. 100 km²) or a large number of people (e.g. 100,000).

(ii) Major dams, extreme hazard facilities.

Inclined lift: A power-operated device for raising or lowering people within a carriage that has one or more rigid guides on an inclined plane.

Individual protection: The installation of a *backflow prevention device* at the point where a water service connects to a single fixture or appliance.

Individual risk: The frequency at which an individual may be expected to sustain a given level of harm from the realisation of a specified hazard.

Insulation: In relation to an FRL, the ability to maintain a temperature on the surface not exposed to the furnace below the limits specified in AS 1530.4.

Integrity: In relation to an FRL, the ability to resist the passage of flames and hot gases specified in AS 1530.4.

(a) For the purposes of Volume One, excludes a *common wall* or a party wall.

(b) For the purposes of Volume Two, excludes a *separating wall*, *common wall* or party wall.

Interstitial condensation: The *condensation* of moisture on surfaces between material layers inside the building component.

Irrigation system: An irrigation system of the following types:

(a) Type A— all permanently open outlets and piping more than 150mm above finished ground level, not subject to ponding or back-pressure and not involving injection systems.

(b) Type B— irrigation systems in domestic or residential buildings with piping or outlets installed less than 150mm above finished surface level and not involving injection systems.

(c) Type C— irrigation systems in other than domestic or residential buildings with piping outlets less than 150mm above finished surface level and not involving injection systems.

(d) Type D— irrigation systems where fertilizers, herbicides, nemacides or the like are injected or siphoned into the system.

JAS-ANZ: The Joint Accreditation System of Australia and New Zealand.

Lamp power density: The total of the maximum power rating of the lamps in a space, other than those that are plugged into socket outlets for intermittent use such as floor standing lamps, desk lamps or work station lamps, divided by the area of the space, and expressed in W/m^2.

Explanatory Information:

Lamp power density is a simple means of setting energy consumption at an efficient level for Class 1 and associated Class 10a buildings.

Lamp refers to the globe or globes that are to be installed in a permanently wired light fitting. The maximum power of a lamp is usually marked on the fitting as the maximum allowable wattage.

The area of the space refers to the area the lights serve. This could be considered a single room, open plan space, verandah, balcony or the like, or the total area of all these spaces.

Landing: An area at the top or bottom of a *flight* or between two *flights*.

Latent heat gain: The heat gained by the vapourising of liquid without change of temperature.

Lateral support: A support (including footing, buttress, cross wall, beam, floor or braced roof structure) that effectively restrains the wall or pier at right angles to the face of the wall or pier.

Lightweight construction: Construction which incorporates or comprises—

(a) sheet or board material, plaster, render, sprayed application, or other material similarly susceptible to damage by impact, pressure or abrasion; or

(b) concrete and concrete products containing pumice, perlite, vermiculite, or other soft material similarly susceptible to damage by impact, pressure or abrasion; or

(c) masonry having a width of less than 70 mm.

Loadbearing: Intended to resist vertical forces additional to those due to its own weight.

Loadbearing wall: For the purposes of H1D4, H2D3 and Section 4 of the Housing Provisions, means any wall imposing on the footing a load greater than 10 kN/m.

Loss: Physical damage, financial loss or loss of *amenity*.

Low Hazard: Any condition, device or practice which, in connection with a water supply, would constitute a nuisance by colour, odour or taste but does not have the potential to injure or endanger health.

Low lead: Where a plumbing product or material in contact with drinking water is calculated using a weighted average lead content of no more than 0.25%.

Low rainfall intensity area: An area with a 5 minute rainfall intensity for an *annual exceedance probability* of 5% ~~average recurrence interval of 20 years~~ of not more than 125 mm/hour.

> **Explanatory Information:**
>
> Rainfall intensity figures can be obtained from Tables 7.4.3d to 7.4.3k in the Housing Provisions.

Low-rise, low-speed constant pressure lift: A power-operated low-rise, low-speed device for raising or lowering people with limited mobility on a carriage that is controlled by the application of constant pressure to a control.

Low-rise platform lift: A power-operated device for raising or lowering people with limited mobility on a platform, that is controlled automatically or by the application of constant pressure to a control.

Low voltage: A *voltage* exceeding *extra-low voltage*, but not exceeding 1000 V AC or 1500 V DC.

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

Massive timber: An element not less than 75 mm thick as measured in each direction formed from solid and laminated timber.

Maximum acceptable annual probability of structural failure of structures, buildings, members and connections: The probability that, in any year, there could be a structural failure leading to collapse of either the whole of the structure or building, or significant members and/or their connections, expressed as 1 in … (e.g. 1 in 1,000 meaning a probability of 1 in 1,000 that the failure could occur).

Maximum retained water level: The point where surface water will start to overflow out of the shower area.

Medium Hazard: Any condition, device or practice which, in connection with a water supply, has the potential to injure or endanger health.

Members: The parts of a structure or component that provide resistance to structural actions.

Members and connections that do not provide primary building support: Those components of a building or other structure that are not necessary to resist collapse of other members, parts of the building or the whole building, including but are not limited to—

(a) non-*loadbearing* walls including framing, wall cladding, roof cladding, roof purlins and battens, mezzanine floors; and

(b) connections and fixings that fix in position only those members that do not provide primary building support.

Members and connections that provide primary building support: Those components of a building or other structure that provide the structural system resisting collapse of other members, parts of the building or the whole building under the design actions, including but are not limited to—

(a) beams, columns, trusses, portal frames, posts, *loadbearing* walls, floor systems, footings, foundations and earth retaining structures; and

(b) connections and fixings that transfer loads between members that provide primary building support.

Membrane: A barrier impervious to moisture.

Explanatory Information:

A barrier may be a single or multi-part system.

Mezzanine: An intermediate floor within a room.

Minimum Acceptable Annual Structural Reliability Index of Structures, Buildings, Members and Connections: The Structural Reliability Index (β), determined in accordance with the ABCB Structural Reliability Handbook (Version 2022.1) that corresponds to the maximum acceptable annual probability of structural failure tabulated in Table B1P1.

Minimum Energy Performance Standards (MEPS): The Minimum Energy Performance Standards for equipment and appliances established through the Greenhouse and Energy Minimum Standards Act 2012.

Mixed construction: A building consisting of more than one form of construction, particularly in double-storey buildings.

Mould: A fungal growth that can be produced from conditions such as dampness, darkness, or poor ventilation.

Multiple resistance paths: Situations where the failure of a part of a building or structure is resisted collectively by more than one member or connection, such that the failure of any member or connection will result in the transfer of loads to the other members and connections with sufficient combined capacity to resist the total applied loads.

NABERS Energy for Apartment Buildings: The National Australian Built Environment Rating System for apartment building energy efficiency, which is managed by the New South Wales Government.

NABERS Energy for Hotels: The National Australian Built Environment Rating System for hotel building energy efficiency, which is managed by the New South Wales Government.

NABERS Energy for Offices: The National Australian Built Environment Rating Systems for office energy efficiency, which is managed by the New South Wales Government.

NABERS Energy for Shopping Centres: The National Australian Built Environment Rating System for shopping centre energy efficiency, which is managed by the New South Wales Government.

TAS Network Utility Operator

Network Utility Operator: A person who—

(a) undertakes the piped distribution of *drinking water* or *non-drinking water* for supply; or

(b) is the operator of a sewerage system or a stormwater *drainage* system.

Explanatory Information:

A Network Utility Operator in most States and Territories is the water and sewerage authority licensed to supply water and receive sewage and/or stormwater. The authority operates or proposes to operate a network that undertakes the distribution of water for supply and undertakes to receive sewage and/or stormwater drainage. This authority may be a licensed utility, local government body or council.

(a) Applied to a material — means not deemed *combustible* as determined by AS 1530.1 — Combustibility Tests for Materials.

(b) Applied to construction or part of a building — means constructed wholly of materials that are not deemed *combustible*.

Non-drinking water: Water which is not intended primarily for human consumption, but which may have other uses. ~~drinking water.~~

Non-transient actions: The combination of structural actions in which the combined magnitude of the permanent gravity action and imposed gravity action is equal to or greater than 50% of the magnitude of the total combined actions.

(a) For the purposes of Volume One, the features, needs and profile of the occupants in a *habitable room* or space.

(b) For the purposes of Volume Two, the features, needs and profile of the occupants in a room or space.

Explanatory Information:

For the purpose of Volume Two, this term is used to describe the characteristics of the occupants and their associated requirements in relation to a room or space.

For example, in relation to a bedroom, the following occupant characteristics and associated requirements should be considered:

- Characteristics: height, mobility and how often the space will be used.
- Requirements: a sleeping space and a space to undertake leisure activities.

Occupiable outdoor area: A space on a roof, balcony or similar part of a building—

(a) that is open to the sky; and

(b) to which access is provided, other than access only for maintenance; and

(c) that is not *open space* or directly connected with *open space*.

TAS On-site wastewater management system

On-site wastewater management system: A system ~~installed on premises that~~ that receives and/or treats wastewater generated and discharges ~~on the premises and applies~~ the resulting effluent to an *approved disposal system* or re-use system.

Open-deck carpark: A carpark in which all parts of the parking *storeys* are cross-ventilated by permanent unobstructed openings in not fewer than 2 opposite or approximately opposite sides, and—

(a) each side that provides ventilation is not less than $^1/_6$ of the area of any other side; and

(b) the openings are not less than ½ of the wall area of the side concerned.

Open space: A space on the allotment, or a roof or similar part of a building adequately protected from fire, open to the sky and connected directly with a public road.

Open spectator stand: A tiered stand substantially open at the front.

Other property: All or any of the following—

(a) any building on the same or an adjoining allotment; and

(b) any adjoining allotment; and

(c) a road.

Outdoor air: Air outside the building.

Outdoor air economy cycle: A mode of operation of an *air-conditioning* system that, when the *outdoor air* thermodynamic properties are favourable, increases the quantity of *outdoor air* used to condition the space.

Outfall: That part of the disposal system receiving *surface water* from the drainage system and may include a natural water course, kerb and channel, or soakage system.

Overflow devices: A device that provides relief to a water service, sanitary *plumbing* and *drainage* system, *rainwater service~~harvesting system~~* or stormwater system to avoid the likelihood of *uncontrolled discharge*.

Panel wall: A non-*loadbearing external wall*, in frame or similar construction, that is wholly supported at each *storey*.

Partially buried rainwater tank: A rainwater tank that is not completely covered by earth but is partially set into the ground.

Patient care area: A part of a *health-care building* normally used for the treatment, care, accommodation, recreation, dining and holding of patients including a *ward area* and *treatment area*.

Performance-based design brief (~~PBDB~~): The ~~process and the associated~~ report that defines the scope of work for the performance-based analysis, the technical basis for analysis, and the criteria for acceptance of any relevant *Performance Solution* as agreed by stakeholders.

Performance Requirement: A requirement which states the level of performance which a *Performance Solution* or *Deemed-to-Satisfy Solution* must meet.

Performance Solution: A method of complying with the *Performance Requirements* other than by a *Deemed-to-Satisfy Solution*.

Perimeter of building: For the purposes of Section 8 of the Housing Provisions, means the external envelope of a building.

Personal care services: Any of the following:

(a) The provision of nursing care.

(b) Assistance or supervision in—

(i) bathing, showering or personal hygiene; or

(ii) toileting or continence management; or

(iii) dressing or undressing; or

(iv) consuming food.

(c) The provision of direct physical assistance to a person with mobility problems.

(d) The management of medication.

(e) The provision of substantial rehabilitative or development assistance.

Piping: For the purposes of Section J in Volume One or Part H6 in Volume Two, and Section 13 of the Housing Provisions, means an assembly of pipes, with or without valves or other fittings, connected together for the conveyance of liquids and gases.

Pliable building membrane: A water barrier as classified by AS/NZS 4200.1.

Plumbing: Any water service plumbing or ~~, roof plumbing,~~ sanitary plumbing system ~~or heating, ventilation and air-conditioning plumbing~~.

Plumbing or Drainage Solution: A solution which complies with the *Performance Requirement* and is a—

(a) *Performance Solution*; or

(b) *Deemed-to-Satisfy Solution*; or

(c) combination of (a) and (b).

Point of connection: Any of the following:

(a) For a *heated water* service means the point where the water heater connects to the cold water service downstream of the isolation valve.

(b) For sanitary plumbing means the point where the sanitary plumbing system connects to the sanitary drainage system.

(c) For sanitary drainage ~~sewage disposal~~ means the point where the on-site sanitary drainage ~~*drainage*~~ system connects to— ~~to the Network Utility Operator's sewerage system or to an on-site wastewater management system.~~

(i) the Network Utility Operator' sewerage system; or

(ii) an on-site wastewater management system.

(d) For stormwater disposal means the point where the on-site stormwater *drainage* system connects to— ~~the Network Utility Operator's stormwater system or to an approved disposal system.~~

(i) the Network Utility Operator' stormwater system; or

(ii) an approved on-site disposal system.

(e) For a fire-fighting water service means the point where the service connects to—

(i) a cold water service, downstream of a backflow prevention device; or

(ii) the Network Utility Operator's water supply system; or

(iii) the point of isolation to an alternative water source.

(f) For a cold water service means the point where the cold water service connects to— ~~pipe within the premises connects to the Network Utility Operator's property service or to an alternative water supply system.~~

(i) the Network Utility Operator's water supply system; or

(ii) the point of isolation to an alternative water source where there is no Network Utility Operator's water supply available or is not utilised.

(g) For a rainwater service means the point where the rainwater service connects to the point of isolation to the rainwater storage.

Notes:

A domestic fire sprinkler service conforming to FPAA101D is considered part of the cold water service.

Explanatory Information:

The point of connection is usually determined by the Network Utility Operator according to the water and sewerage

Acts, Regulations and codes that apply within the Network Utility Operator's licensed area and/or jurisdiction.

Point of discharge: The outlet of a—

(a) tap or outlet that discharges water over plumbing fixtures; or

(b) cistern inlet valve or flushing device of a sanitary fixture; or

(c) water service used for the connection of an appliance which is readily accessible and easily connected or disconnected; or

(d) tap, outlet or end of line valve where water is discharged to the atmosphere under normal operating conditions; or

(e) isolating valve or the outlet provided for the connection of industrial or specialist equipment to the water service; or

(f) backflow prevention device connected to a fire service or irrigation system; or

(g) relief drain line or vent pipe from a water heater, temperature and pressure relief valve or expansion control valve.

Explanatory Information:

The point of discharge of a tap or fixture commonly includes the outlets of a basin or bath taps, shower heads, drinking fountains, flush valves or cistern inlet valves.

The point of discharge of a water service used for the connection of an appliance commonly includes outlets of an isolation valve provided for the connection of dishwashers, clothes washers, coffee machines and fridges with beverage dispensing and ice making capabilities.

The point of discharge for a tap discharging to atmosphere may include hose cocks. It does not include any subsequent connections to this outlet such as garden hoses.

Contamination control may be required to avoid contamination of the water service where a hazard exists beyond the point of discharge.

Water services downstream of the backflow prevention device are considered an unprotected water service.

Predicted Mean Vote (PMV): The Predicted Mean Vote of the thermal perception of building occupants determined in accordance with ANSI/ASHRAE Standard 55.

Preformed shower base: A preformed, prefinished *vessel* installed as the finished floor of a shower compartment, and which is provided with a connection point to a sanitary drainage system.

Explanatory Information:

Shower bases are commonly made of plastics, composite materials, vitreous enamelled pressed steel, or stainless steel.

Pressure vessel: A vessel subject to internal or external pressure, including interconnected parts and components, valves, gauges and other fittings up to the first point of connection to connecting piping, and—

(a) includes fire heaters and gas cylinders; but

(b) excludes—

  (i) any vessel that falls within the definition of a *boiler*; and

  (ii) storage tanks and equipment tanks intended for storing liquids where the pressure at the top of the tank is not exceeding 1.4 kPa above or 0.06 kPa below atmospheric pressure; and

  (iii) domestic-type hot water supply heaters and tanks; and

  (iv) pressure vessels installed for the purposes of fire suppression or which serve a fire suppression system.

QLD Primary building element

(a) For the purposes of Volume One, a member of a building designed specifically to take part of the loads specified in B1D3 and includes roof, ceiling, floor, stairway or ramp and wall framing members including bracing members designed for the specific purpose of acting as a brace to those members.

(b) For the purposes of Part 3.4 of the Housing Provisions, means a member of a building designed specifically to take part of the building loads and includes roof, ceiling, floor, stairway or ramp and wall framing members including bracing members designed for the specific purpose of acting as a brace to those members.

Explanatory Information:

The loads to which a building may be subjected are dead, live, wind, snow and earthquake loads. Further information on building loads can be found in the AS 1170 series of Standards.

Private bushfire shelter: A structure associated with, but not attached to, or part of a Class 1a dwelling that may, as a last resort, provide shelter for occupants from immediate life threatening effects of a bushfire.

(a) For the purposes of Volume One—
   (i) any garage associated with a Class 1 building; or
   (ii) any single *storey* of a building of another Class containing not more than 3 vehicle spaces, if there is only one such *storey* in the building; or
   (iii) any separate single *storey* garage associated with another building where such garage contains not more than 3 vehicle spaces.

(b) For the purposes of Volume Two—
   (i) any garage associated with a Class 1 building; or
   (ii) any separate single *storey* garage associated with another building where such garage contains not more than 3 vehicle spaces.

Product: *Plumbing* and *drainage* items within the scope of Volume Three including but not limited to—

(a) materials, fixtures and components used in a *plumbing* or *drainage* installation; and
(b) appliances and equipment connected to a *plumbing* or *drainage* system.

Product Technical Statement: A form of documentary evidence stating that the properties and performance of a building material, product or form of construction fulfil specific requirements of the NCC, and describes—

(a) the application and intended use of the building material, product or form of construction: and
(b) how the use of the building material, product or form of construction complies with the requirements of the NCC Volume One and Volume Two; and
(c) any limitations and conditions of the use of the building material, product or form of construction relevant to (b).

TAS Professional engineer

Professional engineer: A person who is—

(a) if legislation is applicable — a registered professional engineer in the relevant discipline who has appropriate experience and competence in the relevant field; or
(b) if legislation is not applicable—
   (i) registered in the relevant discipline on the National Engineering Register (NER) of the Institution of Engineers Australia (which trades as ‘Engineers Australia’); or
   (ii) eligible to become registered on the Institution of Engineers Australia’s NER and has appropriate experience and competence in the relevant field.

Public corridor: An enclosed corridor, hallway or the like which—

(a) serves as a means of egress from 2 or more *sole-occupancy units* to a *required exit* from the *storey* concerned; or
(b) is *required* to be provided as a means of egress from any part of a *storey* to a *required exit*.

Rainwater service~~harvesting system~~: A water service which distributes water from the isolation valve of the rainwater storage to the rainwater points of discharge for purposes such as for clothes washing, urinal and water closet flushing and external hose cocks.~~A plumbing installation that comprises—~~

~~A plumbing installation that comprises—~~

(a) ~~any *plumbing* that connects a rainwater tank to any *drinking water* or *non-drinking water* outlets; andany top-up line that conveys drinking water from a Network Utility Operator’s water supply to a rainwater tank.~~

Rainwater storage: Any storage of rainwater collected from a roof catchment area which is used to supply water for the primary purposes of drinking, personal hygiene or other uses.

Notes:

Generally this applies to water which is not supplied by a Network Utility Operator. This does not include rainwater storage for non-drinking purposes.

Rapid roller door: A door that opens and closes at a speed of not less than 0.5 m/s.

TAS Recognised expert

Recognised expert: A person with qualifications and experience in the area of *plumbing* or *drainage* in question recognised by the authority having jurisdiction.

Explanatory Information:

A recognised expert is a person recognised by the authority having jurisdiction as qualified to provide evidence under A5G4(5). Generally, this means a hydraulic consultant or engineer, however the specific requirements are determined by the authority having jurisdiction.

Under A5G4(5), a report from a recognised expert may be used as evidence of suitability that a *product* listed on the *WaterMark Schedule of Excluded Products*, or a *plumbing* or *drainage* system, complies with a *Performance Requirement* or *Deemed-to-Satisfy Provisions*.

(a) For the purposes of Volume One, a hypothetical building that is used to calculate the maximum allowable *annual greenhouse gas emissions* and determine the *thermal comfort level* for the proposed building.

(b) For the purposes of Volume Two, means a hypothetical building that is used to determine the maximum allowable *heating load* and *cooling load* for the proposed building.

Reflective insulation: A building membrane with a reflective surface such as a reflective foil laminate, reflective barrier, foil batt or the like capable of reducing radiant heat flow.

Explanatory Information:

For Volume Two:

(a) Typical *R-Value* achieved by adding reflective insulation are given in the explanatory information accompanying Section 13 of the Housing Provisions. Information on specific products may be obtained from reflective insulation manufacturers.

(b) The surface of reflective insulation may be described in terms of its emittance (or infra-red emittance) or in terms of its reflectance (or solar reflectance). Generally, for the surface of a particular reflective insulation –

(c) emittance + reflectance = 1.

(d) Some types of reflective insulation may also serve the purposes of waterproofing or vapour proofing.

Regulated energy: The energy consumed by a building's *services* minus the amount of *renewable energy* generated and used on *site*.

Reinforced masonry: Masonry reinforced with steel reinforcement that is placed in a bed joint or grouted into a core to strengthen the masonry.

Reliability: The probability that a system performs to a level consistent with the system specification.

Renewable energy: Energy that is derived from sources that are regenerated, replenished, or for all practical purposes cannot be depleted and the energy sources include, but are not limited to, solar, wind, hydroelectric, wave action and geothermal.

Reportable fire: A fire that would be reported to the fire brigade.

Required: Required to satisfy a *Performance Requirement* or a *Deemed-to-Satisfy Provision* of the NCC as appropriate.

Required safe egress time (RSET): The time required for safe evacuation of occupants to a place of safety prior to the onset of untenable conditions.

Residential aged care building: A Class 3 or 9a building whose residents, due to their incapacity associated with the ageing process, are provided with physical assistance in conducting their daily activities and to evacuate the building during an emergency.

Residential care building: A Class 3, 9a or 9c building which is a place of residence where 10% or more of persons who reside there need physical assistance in conducting their daily activities and to evacuate the building during an emergency (including any *aged care building* or *residential aged care building*) but does not include a hospital.

Resident use area: Part of a Class 9c building normally used by residents, and—

(a) includes *sole-occupancy units*, lounges, dining areas, activity rooms and the like; but

(b) excludes offices, storage areas, commercial kitchens, commercial laundries and other spaces not for the use of residents.

Resistance to the incipient spread of fire: In relation to a ceiling membrane, means the ability of the membrane to insulate the space between the ceiling and roof, or ceiling and floor above, so as to limit the temperature rise of materials in this space to a level which will not permit the rapid and general spread of fire throughout the space.

Explanatory Information:

Resistance to the incipient spread of fire refers to the ability of a ceiling to prevent the spread of fire and thermally insulate the space between the ceiling and the roof or floor above. "Resistance to the incipient spread of fire" is superior to "fire-resistance" because it requires a higher standard of heat insulation.

The definition is used in Volume Two for separating floors/ceilings for a Class 1a dwelling located above a non-appurtenant *private garage*.

Rise in storeys: The greatest number of *storeys* calculated in accordance with C2D3 of Volume One.

Riser: The height between consecutive treads and between each *landing* and continuous tread.

Rolled fill: Material placed in layers and compacted by repeated rolling by an excavator.

Roof light: For the purposes of Section J and Part F4 in Volume One, Part H6 in Volume Two, and Part 10.5 and Section 13 of the Housing Provisions, a skylight, *window* or the like installed in a roof—

(a) to permit natural light to enter the room below; and

(b) at an angle between 0 and 70 degrees measured from the horizontal plane.

R-Value: The thermal resistance of a component calculated by dividing its thickness by its thermal conductivity, expressed in m^2.K/W.

Safe place: Either—

(a) a place of safety within a building—

  (i) which is not under threat from a fire; and

  (ii) from which people must be able to safely disperse after escaping the effects of an emergency to a road or *open space*; or

(b) a road or *open space*.

Sanitary compartment: A room or space containing a closet pan or urinal (see Figures 6a and 6b).

Figure 6a: **Identification of a sanitary compartment (diagram a)**

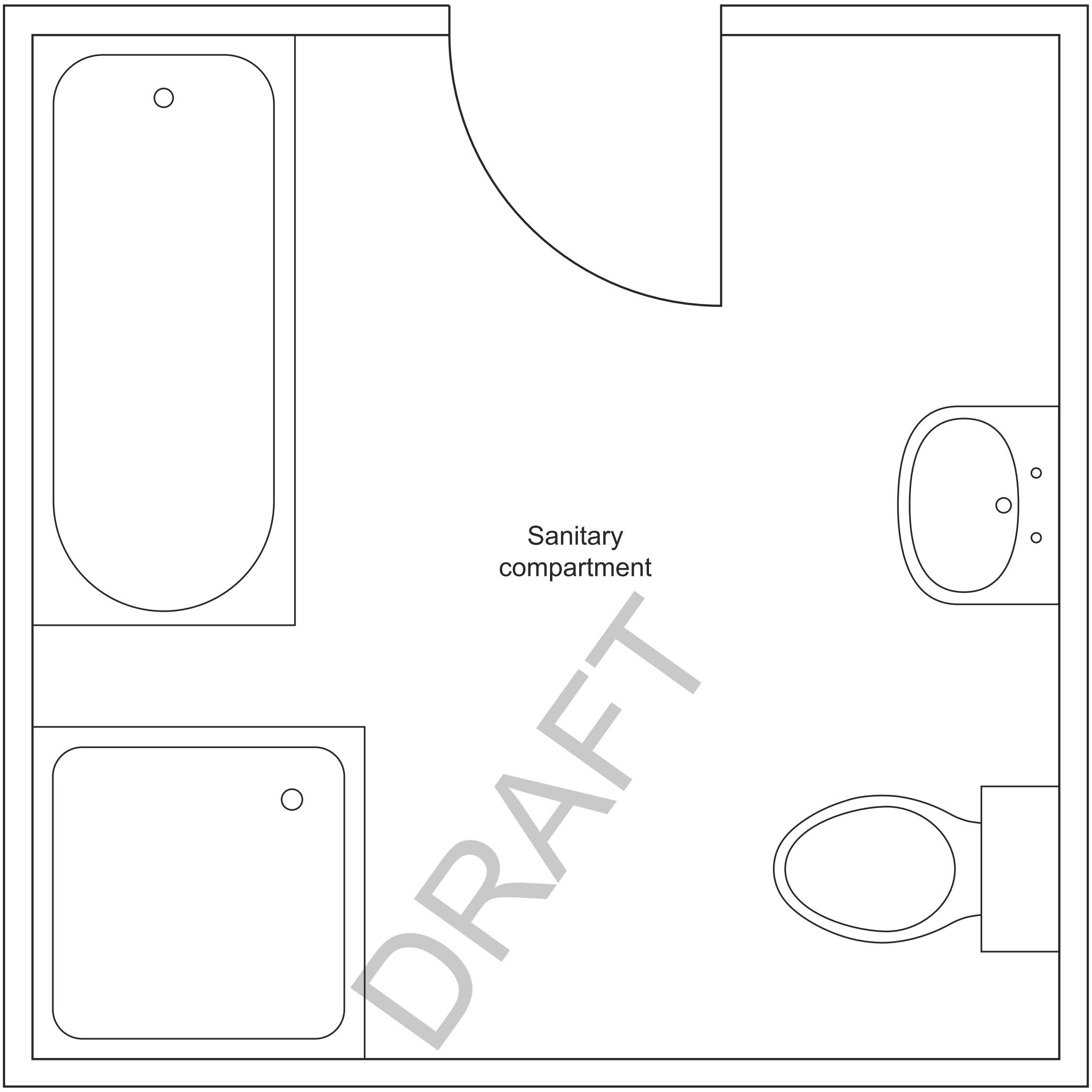
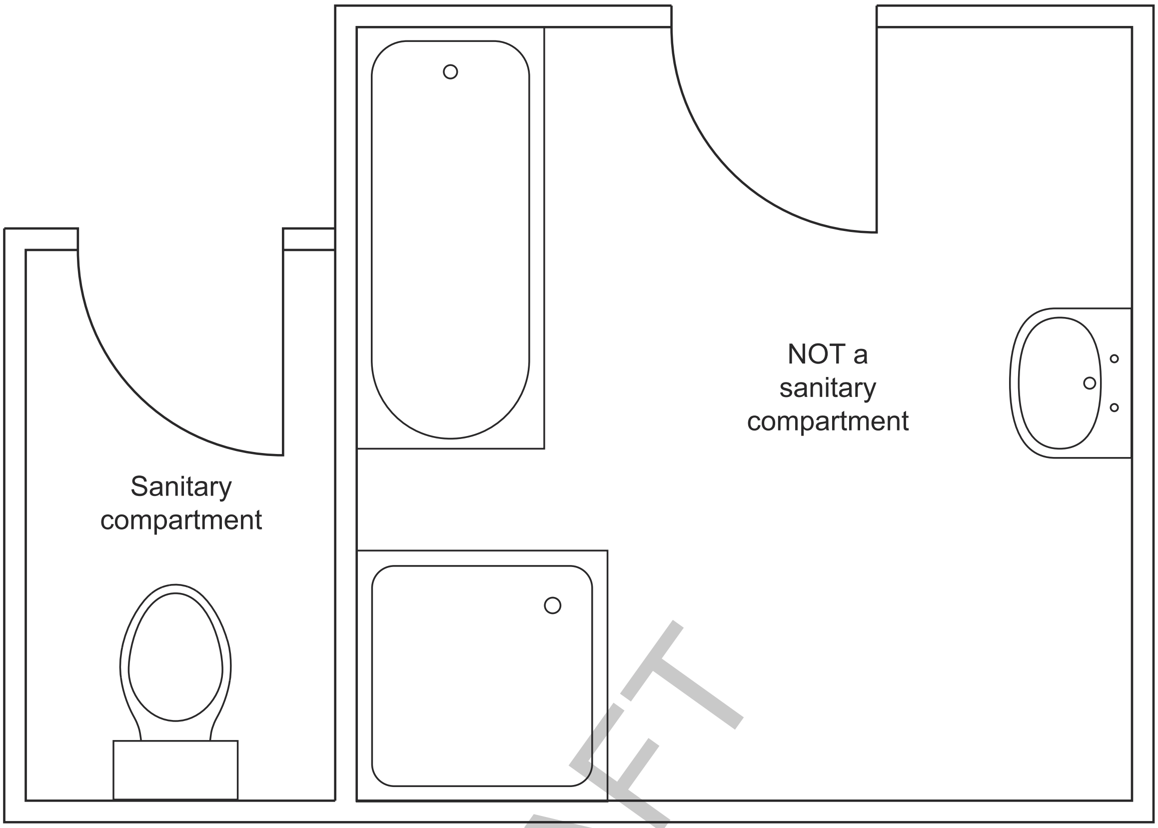


Figure 6b: **Identification of a sanitary compartment (diagram b)**



Sarking-type material: A material such as a *reflective insulation* or other flexible membrane of a type normally used for a purpose such as waterproofing, vapour management or thermal reflectance.

School: Includes a primary or secondary school, college, university or similar educational establishment.

Screed: A layer of material (usually cement based) of defined minimum thickness which sets in situ between a structural base and the finished floor material.

Self-closing: Is defined—

(a) For the purposes of Volume One, applied to a door, means equipped with a device which returns the door to the fully closed position immediately after each opening.

(b) For the purposes of Volume Two, applied to a door or *window*, means equipped with a device which returns the door or *window* to the fully closed and latched position immediately after each manual opening.

Self draining: Materials, systems or ballast that—

(a) are above the structural substrate; and

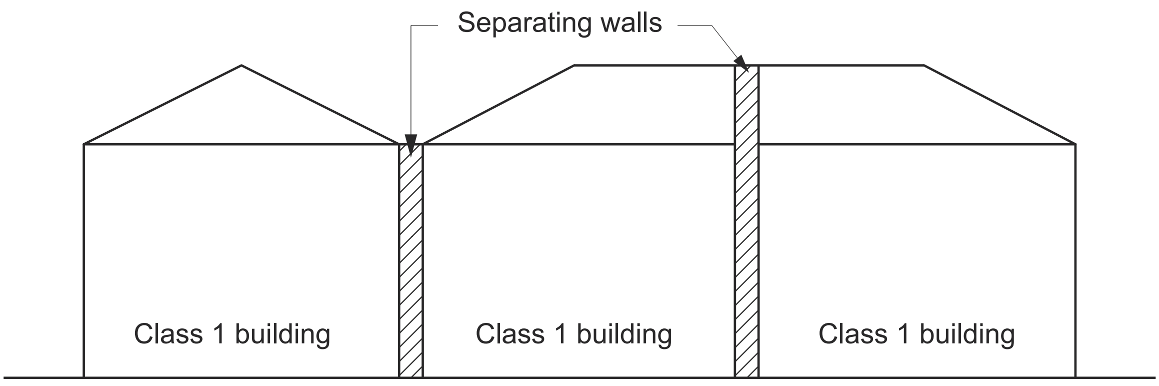
(b) have sufficient gaps or openings to permit drainage of rainwater to a membrane on the structural substrate below.

Sensible heat gain: The heat gained which causes a change in temperature.

Separating element: A barrier that exhibits fire *integrity*, *structural adequacy*, *insulation*, or a combination of these for a period of time under specified conditions (often in accordance with AS 1530.4).

Separating wall: A wall that is common to adjoining Class 1 buildings (see Figure 7).

Figure 7: **Separating wall**



Elevation

Figure Notes:

In Volume Two a separating wall may also be known as a party wall and typically is *required* to be *fire-resisting* construction (see Housing Provisions Parts and).

Service: For the purposes of Section J in Volume One, means a mechanical or electrical system that uses energy to provide *air-conditioning*, mechanical ventilation, heated water supply, artificial lighting, vertical transport and the like within a building, but which does not include—

(a) systems used solely for emergency purposes; and

(b) cooking facilities; and

(c) portable appliances.

Service station: A garage which is not a *private garage* and is for the servicing of vehicles, other than only washing, cleaning or polishing.

Shaft: The walls and other parts of a building bounding—

(a) a well, other than an *atrium well*; or

(b) a vertical chute, duct or similar passage, but not a chimney or flue.

Shower area: ~~The area affected by water from a shower, including a shower over a bath.~~

(a) Enclosed — The area enclosed by walls or screens including hinged or sliding doors that control the spread of water to within the enclosure but excludes—

  (i) a shower fitted with a frameless or semi frameless *shower screen*, shower curtain or the like; and

  (ii) a shower fitted over a bath with a screen less than 1500 mm long.

(b) Unenclosed — The area where, under normal use, water out of the shower rose is not contained within 1500 mm of the shower rose.

Shower screen: The panels, doors or windows enclosing or partially enclosing a *shower area*.

Single leaf masonry: Outer walls constructed with a single thickness of masonry unit.

Single resistance paths: Situations where the failure of a part of a building or structure is resisted by only one member or connection, such that the failure of that member or connection will result in the collapse of a significant part of the building or structure.

Site: The part of the allotment of land on which a building stands or is to be erected.

Sitework: Work on or around a *site*, including earthworks, preparatory to or associated with the construction, *alteration*, demolition or removal of a building.

Small-scale Technology Certificate: A certificate issued under the Commonwealth Government's Small-scale Renewable Energy Scheme.

Small-sized, low-speed automatic lift: A restricted use power-operated device for the infrequent raising or lowering of people with limited mobility on a platform that is controlled automatically but has the capability of being electrically isolated by a key-lockable control.

Smoke-and-heat vent: A vent, located in or near the roof for smoke and hot gases to escape if there is a fire in the building.

Smoke-Developed Index: The index number for smoke as determined by AS/NZS 1530.3.

Smoke development rate: The development rate for smoke as determined by testing flooring materials in accordance with AS ISO 9239.1.

Smoke growth rate index (SMOGRA$_{RC}$): The index number for smoke used in the regulation of *fire hazard properties* and applied to materials used as a finish, surface, lining or attachment to a wall or ceiling.

Societal risk: Frequency and the number of people suffering from a specified level of harm in a given population from the realisation of specified hazards.

Solar admittance: The fraction of incident irradiance on a *wall-glazing construction* that adds heat to a building's space.

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; or

(b) a room or suite of rooms in a Class 3 building which includes sleeping facilities; or

(c) a room or suite of associated rooms in a Class 5, 6, 7, 8 or 9 building; or

(d) a room or suite of associated rooms in a Class 9c building, which includes sleeping facilities and any area for the exclusive use of a resident.

Spandrel panel: For the purposes of Section J, means the opaque part of a façade in curtain wall construction which is commonly adjacent to, and integrated with, *glazing*.

Specialist equipment: Equipment used within hospitality or health care industries which is installed by specialist technicians.

Notes:

Examples may include medical equipment, commercial chemical or beverage dispensers, dental chairs or similar specialist equipment.

Spiral stairway: A stairway with a circular plan, winding around a central post with steps that radiate from a common centre or several radii (see Figures 11.2.2d and 11.2.2e in the Housing Provisions).

Spread-of-Flame Index: The index number for spread of flame as determined by AS/NZS 1530.3.

Sprinkler alarm switch: For the purposes of Specification 23, a device capable of sending an electrical signal to activate an alarm when a residential sprinkler head is activated (e.g. a flow switch).

Stage: A floor or platform in a Class 9b building on which performances are presented before an audience.

Stairway platform lift: A power-operated device for raising or lowering people with limited mobility on a platform (with or without a chair) in the direction of a stairway.

Standard Fire Test: The Fire-resistance Tests of Elements of Building Construction as described in AS 1530.4.

Storey: A space within a building which is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but not—

(a) a space that contains only—

(i) a lift *shaft*, stairway or meter room; or

(ii) a bathroom, shower room, laundry, water closet, or other *sanitary compartment*; or

(iii) accommodation intended for not more than 3 vehicles; or

(iv) a combination of the above; or

(b) a *mezzanine*.

Structural adequacy: In relation to an FRL, means the ability to maintain stability and adequate *loadbearing* capacity as determined by AS 1530.4.

Structural member: A component or part of an assembly which provides vertical or lateral support to a building or structure.

Substantive parts of a building or structure: Those parts of a building or other structure that serve the purpose for which the building or structure has been constructed, including but are not limited to—

(a) the whole of a building or structure; and

(b) any significant portion of a building or structure (such as habitable or non-habitable *storey*, a roof system, a floor system, a system of *loadbearing* walls and the like) which could result in loss of life or injury should it fail.

Sudden failure: Relatively rapid collapse of a structure that occurs with little warning with little plastic deformation and/or moment redistribution.

Surface water: All naturally occurring water, other than sub-surface water, which results from rainfall on or around the *site* or water flowing onto the *site*.

Swimming pool: Any excavation or structure containing water and principally used, or that is designed, manufactured or adapted to be principally used for swimming, wading, paddling, or the like, including a bathing or wading pool, or spa.

Tapered tread: A stair tread with a walking area that grows smaller towards one end.

Thermal comfort level: The level of thermal comfort in a building expressed as a *PMV* sensation scale.

Total R-Value: The sum of the *R-Values* of the individual component layers in a composite element including any building material, insulating material, airspace, thermal bridging and associated surface resistances, expressed in m^2.K/W.

(a) For the purposes of Volume One, the fraction of incident irradiance on a *wall-glazing construction* or a *roof light* that adds heat to a building's space.

(b) For the purposes of Volume Two, the fraction of incident irradiance on *glazing* or a *roof light* that adds heat to a building's space.

(a) For the purposes of Volume One, the thermal transmittance of the composite element allowing for the effect of any airspaces, thermal bridging and associated surface resistances, expressed in W/m^2.K.

(b) For the purposes of Volume Two, means the thermal transmittance of the composite element allowing for the effect of any airspaces and associated surface resistances, expressed in W/m^2.K.

Transient actions: The combination of structural actions in which the combined magnitude of the permanent gravity action and imposed gravity action is less than 50% of the magnitude of the total combined actions.

Treatment area: An area within a *patient care area* such as an operating theatre and rooms used for recovery, minor procedures, resuscitation, intensive care and coronary care from which a patient may not be readily moved.

Uncontrolled discharge: Any unintentional release of fluid from a *plumbing* and *drainage* system and includes leakage and seepage.

Unique wall: For the purposes of F1V1 in Volume One and H2V1 in Volume Two, a wall which is neither a *cavity wall* nor a *direct fix cladding wall*.

Unobstructed opening: For the purposes of Section 8 of the Housing Provisions, a glazed area that a person could mistake for an open doorway or clearway and walk into the glazed panel.

Unreinforced masonry: Masonry that is not reinforced.

Vapour pressure: The pressure at which water vapour is in thermodynamic equilibrium with its condensed state.

Ventilation opening: An opening in the *external wall*, floor or roof of a building designed to allow air movement into or out of the building by natural means including a permanent opening, an openable part of a *window*, a door or other device which can be held open.

Verification Method: A test, inspection, calculation or other method that determines whether a *Performance Solution* complies with the relevant *Performance Requirements*.

Vessel: For the purposes of Volume One and Part 10.2 of the Housing Provisions, an open, pre-formed, pre-finished concave receptacle capable of holding water, usually for the purpose of washing, including a basin, sink, bath, laundry tub and the like.

Visibility: The maximum distance at which an object of defined size, brightness and contrast can be seen and recognised.

Voltage: A difference of potential, measured in Volts (V) and includes *extra-low voltage* and *low voltage*.

(a) In relation to a building — the volume of the total space of the building measured above the lowest floor (including, for a suspended floor, any subfloor space), over the enclosing walls, and to the underside of the roof covering.

(b) In relation to a *fire compartment* — the volume of the total space of the *fire compartment* measured within the inner finished surfaces of the enclosing *fire-resisting* walls and/or floors, and—

(i) if there is no *fire-resisting* floor at the base of the *fire compartment*, measured above the finished surface of the lowest floor in the *fire compartment*; and

(ii) if there is no *fire-resisting* floor at the top of the *fire compartment*, measured to the underside of the roof covering of the *fire compartment*; and

(iii) if there is no *fire-resisting* wall, measured over the enclosing wall and if there is no enclosing wall, includes any space within the *fire compartment* that has a use which contributes to the *fire load*.

(c) In relation to an *atrium* — the volume of the total space of the *atrium* measured within the finished surfaces of the bounding construction and if no bounding construction, within the *external walls*.

Waffle raft: A stiffened raft with closely spaced ribs constructed on the ground and with slab panels supported between ribs.

Wall-glazing construction: For the purposes of Section J in Volume One, the combination of wall and *glazing* components comprising the *envelope* of a building, excluding—

(a) *display glazing*; and

(b) opaque non-glazed openings such as doors, vents, penetrations and shutters.

Ward area: That part of a *patient care area* for resident patients and may contain areas for accommodation, sleeping, associated living and nursing facilities.

Water control layer: A *pliable building membrane* or the exterior cladding when no *pliable building membrane* is present.

WaterMark Certification Scheme: The ABCB scheme for certifying and authorising *plumbing* and *drainage products*.

WaterMark Conformity Assessment Body (WMCAB): A conformity assessment body registered with and accredited by the *JAS-ANZ* to conduct evaluations leading to *product* certification and contracted with the *administering body* to issue the *WaterMark Licence*.

WaterMark Licence: A licence issued by a *WaterMark Conformity Assessment Body*.

WaterMark Schedule of Excluded Products: The list maintained by the *administering body* of *products* excluded from the *WaterMark Certification Scheme*.

WaterMark Schedule of Products: The list maintained by the *administering body* of *products* included in the *WaterMark Certification Scheme*, and the specifications to which the *products* can be certified.

Explanatory Information:

The WaterMark Schedule of Products and the *WaterMark Schedule of Excluded Products* can be viewed on the ABCB website at www.abcb.gov.au.

Waterproof: The property of a material that does not allow moisture to penetrate through it.

Waterproofing system: A combination of elements that are required to achieve a waterproof barrier as required by H4D2 and H4D3 including substrate, *membrane*, bond breakers, sealants, finishes and the like.

Water resistant: The property of a system or material that restricts moisture movement and will not degrade under conditions of moisture.

Water sensitive materials: Materials that have an inherent capacity to absorb water vapour and include timber, plasterboard, plywood, oriented strand board and the like.

Waterstop: A vertical extension of the *waterproofing system* forming a barrier to prevent the passage of moisture in the floor.

Watertight: Will not allow water to pass from the inside to the outside of the component or joint and vice versa.

Weighted average: Is calculated across the wetted surface area of a pipe, pipe fitting or plumbing fixture.

Wet area: An area within a building supplied with water from a water supply system, which includes bathrooms, showers, laundries and *sanitary compartments* and excludes kitchens, bar areas, kitchenettes or domestic food and beverage preparation areas.

Wetted surface area: Is calculated by the total sum of diameter (D) in contact with drinking water.

Winders: Treads within a straight *flight* that are used to change direction of the stair (see Figure 4).

Window: includes a *roof light*, glass panel, glass block or brick, glass louvre, glazed sash, glazed door, or other device which transmits natural light directly from outside a building to the room concerned when in the closed position.

Withstand: For the purposes of A8G3(1)means that in response to an imposed fire action the following conditions must not occur:

(a) Fire spread more than 5m above an opening in the façade through which flames are venting.

(b) Fire spread more than 2m beyond the extent of flames from a burning item adjacent to the structure such as a vehicle, waste bin, collection of combustible rubbish depending on the use and access to adjacent areas.

(c) Ignition and propagation as the result of the imposed heat flux from a fire in an adjacent building or potential building on an adjoining allotment (embers are likely to be present and therefore piloted ignition should be considered if combustible materials are present).

(d) Ignition and fire propagation within cladding materials and building cavities.

(e) Release of flaming droplets.

(f) Release of significant quantities of debris (criteria should be developed during the PBDB process having regard for the proximity of other property and the requirements of the emergency services).

(g) Structural failure.

Explanatory Information:

For item (f), the risk to life of occupants evacuating the building from falling debris should be evaluated under A8G2.

Yield: The mass of a combustion product generated during combustion divided by the mass loss of the test specimen as specified in the *design fire*.

Zone protection: The installation of a *backflow prevention device* at the point where a water service is connected to multiple fixtures or appliances, with no *backflow prevention device* installed as *individual protection* downstream of this point.

Schedule 2 Referenced documents

Referenced documents

Referenced documents

The Standards and other documents listed in this Schedule are referenced in the NCC.

Table 1: Schedule of referenced documents

No.	Date	Title	Volume One	Volume Two	Housing Provisions	Volume Three
AS/NZS ISO 717 Part 1	2004	Acoustics — Rating of sound insulation in buildings and of building elements — Airborne sound insulation (See Note 1)	F~~5~~7V1, F~~5~~7V2, F~~5~~7V3, F~~5~~7V4, F~~5~~7D3	H4V4	10.7.2	N/A
AS/NZS ISO 717 Part 2	2004	Acoustics — Rating of sound insulation in buildings and of building elements — Impact sound insulation	F~~5~~7V1, F~~5~~7V3, F~~5~~7D4	N/A	N/A	N/A
AS 1056 Part 1	1991	Storage water heaters — General requirements (incorporating amendments 1, 2, 3, 4 and 5)	N/A	N/A	N/A	B2D2
AS/NZS 1170 Part 0	2002	Structural design actions — General principles (incorporating amendments 1, 3 and 4)	B1V1, B1D2, Spec 4	H1V1, H2D6	2.2.2	N/A
AS/NZS 1170 Part 1	2002	Structural design actions — Permanent, imposed and other actions (incorporating amendments 1 and 2)	B1D3	N/A	2.2.3, 2.2.4, 8.3.1, 11.2.2, 11.2.3, 11.3, 11.3.3	N/A
AS/NZS 1170 Part 2	2011	Structural design actions — Wind actions (incorporating amendments 1, 2, 3, 4 and 5)	B1D3, B1D4, Spec 4, F~~1~~3V1, Schedule 2	H4V4, H2D6 Schedule 2	2.2.3, Schedule 2	Schedule 2
AS/NZS 1170 Part 3	2003	Structural design actions — Snow and ice actions (incorporating amendments 1 and 2)	B1D3, Schedule 2	N/A	2.2.3, Schedule 2	Schedule 2
AS 1170 Part 4	2007	Structural design actions — Earthquake actions in Australia (incorporating amendments 1 and 2)	B1D3	H1D4, H1D5, H1D6, H1D9	2.2.3	N/A
AS 1191	2002	Acoustics — Method for laboratory measurement of airborne sound transmission insulation of building elements	Spec 29	N/A	N/A	N/A
AS 1273	1991	Unplasticized PVC (UPVC) downpipe and fittings for rainwater	N/A	N/A	7.4.2	N/A
AS 1288	2006	Glass in buildings — Selection and installation (incorporating amendments 1, 2 and 3)	B1D4, Spec 11, Spec 12	H1D8, H2D7	8.2.1	N/A
AS 1289.6.3.3	1997	Methods of testing soils for engineering purposes — Method 6.3.3: Soil strength and consolidation tests — Determination of the penetration resistance of a soil — Perth	N/A	N/A	4.2.4	N/A

No.	Date	Title	Volume One	Volume Two	Housing Provisions	Volume Three
AS 1397	2011	Continuous hot-dip metallic coated steel sheet and strip — Coatings of zinc and zinc alloyed with aluminium and magnesium (incorporating amendment 1)	N/A	N/A	7.2.2	N/A
AS 1428 Part 1	2009	Design for access and mobility — General requirements for access — New building work (incorporating amendments 1 and 2)	D3D11, D3D16, D3D22, D4D2, D4D3, D4D4, D4D7, D4D10, D4D11, D4D13, Spec 16, E3D10, F~~2~~4D5, G4D5, Schedule 2	Schedule 2	Schedule 2	Schedule 2, E1D2
AS 1428 Part 1	2001	Design for access and mobility — General requirements for access — New building work	I2D6, I2D8, I2D10, I2D15	N/A	N/A	E1D2
AS 1428 Part 1 (Supplement 1)	1993	Design for access and mobility — General requirements for access — Buildings — Commentary	I2D2	N/A	N/A	N/A
AS 1428 Part 2	1992	Design for access and mobility — Enhanced and additional requirements — Buildings and facilities	I2D2, I2D3, I2D4, I2D5, I2D7, I2D10, I2D11, I2D12, I2D13, I2D14	N/A	N/A	E1D2
AS 1428 Part 4	1992	Design for access and mobility — Tactile ground surface indicators for the orientation of people with vision impairment	I2D11	N/A	N/A	N/A
AS/NZS 1428 Part 4.1	2009	Design for access and mobility — Means to assist the orientation of people with vision impairment — Tactile ground surface indicators (incorporating amendments 1 and 2)	D4D9	N/A	N/A	N/A
AS 1530 Part 1	1994	Methods for fire tests on building materials, components and structures — Combustibility test for materials (See Note 2)	Schedule 2	Schedule 2	Schedule 2	Schedule 2
AS 1530 Part 2	1993	Methods for fire tests on building materials, components and structures — Test for flammability of materials (incorporating amendment 1) (See Note 2)	Schedule 2	Schedule 2	Schedule 2	Schedule 2
AS/NZS 1530 Part	1999	Methods for fire tests on building materials,	Schedule 2, Spec	Schedule 2, Spec	Schedule 2, Spec 3	Schedule 2,

No.	Date	Title	Volume One	Volume Two	Housing Provisions	Volume Three
AS 1530 Part 4	2014	Methods for fire tests on building materials, components and structures — Fire resistance tests for elements of construction (See Note 2)	A5G7, C4D15, C4D16, Spec 9, Spec 10, Spec 13, Spec 14, Schedule 2, Spec 3	A5G7, Schedule 2, Spec 3	A5G7, Schedule 2, Spec 3	A5G7, Schedule 2, Spec 3
AS 1530 Part 8.1	2018	Methods for fire tests on building materials, components and structures, Part 8.1: Tests on elements of construction for buildings exposed to simulated bushfire attack — Radiant heat and small flaming sources	Spec 43			
AS 1562 Part 1	2018	Design and installation of sheet roof and wall cladding — Metal (See Note 3)	B1D4, F~~1~~3D2~~4~~	H2D6	N/A	N/A
AS/NZS 1562 Part 2	1999	Design and installation of sheet roof and wall cladding — Corrugated fibre-reinforced cement	F~~1~~3D2~~4~~	N/A	N/A	N/A
AS~~/NZS~~ 1562 Part 3	~~1996~~2006	Design and installation of sheet roof and wall cladding — Plastic	B1D4, ~~F1D4~~F3D2	~~H2D6~~H1D7	N/A	N/A
AS 1657	2018	Fixed platforms, walkways, stairways and ladders — Design, construction and installation	D2D21, D2D22, D3D23, I1D6, I3D5	N/A	N/A	N/A
AS/NZS 1664 Part 1	1997	Aluminium structures — Limit state design (incorporating amendment 1)	B1D4	N/A	2.2.4	N/A
AS/NZS 1664 Part 2	1997	Aluminium structures — Allowable stress design (incorporating amendment 1)	B1D4	N/A	2.2.4	N/A
AS 1668 Part 1	2015	The use of ventilation and air conditioning in buildings — Fire and smoke control in buildings (incorporating amendment 1)	C3D13, C4D15, Spec 11, D2D12, Spec 19, E2D3, E2D4, F~~4~~6D12, Spec 21, Spec 31	N/A	N/A	N/A
AS 1668 Part 2	2012	The use of ventilation and air conditioning in buildings — Mechanical ventilation in buildings (incorporating amendments 1 and 2)	E2D4, F~~4~~6V1, F~~4~~6D6, F~~4~~6D11, F~~4~~6D12, J5D4	H4V3	9.5.5	N/A
AS 1668 Part 4	2012	The use of ventilation and air conditioning in buildings — Natural ventilation of buildings	F~~4~~6D11	N/A	N/A	N/A
AS 1670 Part 1	2018	Fire detection, warning, control and intercom	C4D6, C4D7,	N/A	9.5.1, 9.5.5	N/A

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AS 1670 Part 3	2018	Fire detection, warning, control and intercom systems — System design, installation and commissioning — Fire alarm monitoring (See Note 4)	Spec 20, Spec 23	N/A	N/A	N/A
AS 1670 Part 4	2018	Fire detection, warning, control and intercom systems — System design, installation and commissioning — Emergency warning and intercom systems (See Note 4)	E3V2, E4D9, Spec 31	N/A	N/A	N/A
AS/NZS 1680 Part 0	2009	Interior lighting — Safe movement	F~~4~~6D4	N/A	10.5.2	N/A
AS 1684 Part 2	2010	Residential timber framed construction — Non-cyclonic areas (incorporating amendments 1 and 2)	B1D4, B1D5, F1D10	H1D6,	2.2.5, 4.2.13, 4.5.7, 6.2.1, 6.3.6, 7.5.2, 7.5.3, 7.5.5	N/A
AS 1684 Part 3	2010	Residential timber framed construction — Cyclonic areas (incorporating amendment 1)	B1D4, B1D5, F1D10	H1D6	2.2.5, 4.2.13, 4.5.7, 6.2.1, 6.3.6, 7.5.2, 7.5.3, 7.5.5	N/A
AS 1684 Part 4	2010	Residential timber framed construction — Simplified — Noncyclonic areas (incorporating amendment 1)	B1D4, B1D5, F1D10	H1D6	2.2.5, 4.2.13, 4.5.7, 6.2.1, 7.5.2, 7.5.3, 7.5.5	N/A
AS 1720 Part 1	2010	Timber structures — Design methods (incorporating amendments 1, 2 and 3)	B1V1, B1D4	H2V2, H1D6	5.3.3	N/A
AS/NZS 1720 Part 4	~~2006~~2019	Timber structures — Fire resistance for structural adequacy of timber members	Spec 1	Spec ~~2~~1	~~Spec 2~~	Spec ~~2~~1
AS 1720 Part 5	2015	Timber structures — Nailplated timber roof trusses (incorporating amendment 1)	B1D4	H1D6	N/A	N/A
AS 1735 Part 11	1986	Lifts, escalators and moving walks — Fire rated landing doors	C4D11	N/A	N/A	N/A
AS 1735 Part 12	1999	Lifts, escalators and moving walks — Facilities for persons with disabilities (incorporating amendment 1)	E3D7, I2D6	N/A	N/A	N/A
AS/NZS 1859 Part 4	2018	Reconstituted wood based panels — Specifications — Wet process fibreboard See Note 5	N/A	N/A	7.5.3, 7.5.4	N/A
AS 1860 Part 2	2006	Particleboard flooring — Installation (incorporating amendment 1)	B1D4	H1D6	N/A	N/A
AS 1905 Part 1	2015	Components for the protection of openings in fire-resistant walls — Fire-resistant	C4D7, Spec 12	N/A	N/A	N/A

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AS 1905 Part 2	2005	Components for the protection of openings in fire-resistant walls — Fire-resistant roller shutters	Spec 12	N/A	N/A	N/A
AS 1926 Part 1	2012	Swimming pool safety — Safety barriers for swimming pools	G1D2, G1D4	H7D2	N/A	N/A
AS 1926 Part 2	2007	Swimming pool safety — Location of safety barriers for swimming pools (incorporating amendments 1 and 2)	G1D2	H7D2	N/A	N/A
AS 1926 Part 3	2010	Swimming pool safety — Water recirculation systems (incorporating amendment 1)	G1D2	H7D2	N/A	N/A
AS 2047	2014	Windows and external glazed doors in buildings (incorporating amendments 1 and 2) See Note 6	B1D4, F~~1~~3V1, F~~1~~3D4~~11~~, J4D5	H2V2, H1D8, H2D7	8.2.1, 13.4.4	N/A
AS 2049	2002	Roof tiles (incorporating amendment 1)	F~~1~~3D2~~4~~	H1D7	N/A	N/A
AS 2050	2018	Installation of roof tiles	B1D4, F~~1~~3D2~~4~~	H2D6	7.3.2	N/A
AS 2118 Part 1	2017	Automatic fire sprinkler systems — General systems (incorporating amendments 1 and 2)	C1V3, E1D2, Spec 17, Spec 18	N/A	N/A	N/A
AS 2118 Part 4	2012	Automatic fire sprinkler systems — Sprinkler protection for accommodation buildings not exceeding four storeys in height	E1D2, Spec 17, Spec 18	N/A	N/A	N/A
AS 2118 Part 6	2012	Automatic fire sprinkler systems — Combined sprinkler and hydrant systems in multistorey buildings	E1D2, Spec 17	N/A	N/A	N/A
AS 2159	2009	Piling — Design and installation (incorporating amendment 1)	B1D4	H1D4, H2D3	N/A	N/A
AS/NZS 2179 Part 1	2014	Specifications for rainwater goods, accessories and fasteners — Metal shape or sheet rainwater goods, and metal accessories and fasteners	N/A	N/A	7.4.2	N/A
AS/NZS 2269 Part 0	2012	Plywood — Structural — Specifications (incorporating amendment 1)	N/A	N/A	7.5.4	N/A
AS/NZS 2293 Part 1	2018	Emergency lighting and exit signs for buildings — System design, installation and operation	E4D4, E4D8, Spec 25, I3D15	N/A	N/A	N/A
AS/NZS 2327	2017	Composite structures — Composite steel-concrete construction in buildings	B1D4, Spec 1	Spec ~~2~~1	2.2.4, ~~Spec 2~~	Spec ~~2~~1

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AS 2419 Part 1	2005	Fire hydrant installations — System design, installation and commissioning (incorporating amendment 1)	C3D13, E1D2, Spec 18, I3D9	N/A	N/A	N/A
AS 2441	2005	Installation of fire hose reels (incorporating amendment 1)	E1D3	N/A	N/A	N/A
AS 2444	2001	Portable fire extinguishers and fire blankets — Selection and location	E1D14, I3D11	N/A	N/A	N/A
AS 2665	2001	Smoke/heat venting systems — Design, installation and commissioning	Spec 22, Spec 31	N/A	N/A	N/A
AS~~/NZS~~ 2699 Part 1	~~2000~~2020	Built-in components for masonry construction — Wall ties. See Note (l)(i)	C2D10	N/A	~~5.2.10,~~ 5.6.5	N/A
AS~~/NZS~~ 2699 Part 3	~~2002~~2020	Built-in components for masonry construction — Lintels and shelf angles (durability requirements). See Note (l)(ii)	C2D10	N/A	~~5.2.12,~~ 5.6.7	N/A
AS 2870	2011	Residential slabs and footings	F1D9~~8~~	H1D3, H1D4, H2D3,	3.3.4, 3.4.3, 4.2.2, 4.2.6, 4.2.8, 4.2.11, 4.2.14, 4.3.3, 4.4.1, 4.5, 4.5.3, 4.5.7, 10.2.10	N/A
AS/NZS 2890 Part 6	2009	Parking facilities — Offstreet parking for people with disabilities	D4D6	N/A	N/A	N/A
AS/NZS 2904	1995	Damp-proof courses and flashings (incorporating amendments 1 and 2)	F1D8~~7~~	N/A	5.2.7, 5.7.3, 7.5.6, 12.3.3	N/A
AS/NZS 2908 Part 1	2000	Cellulose-cement products — Corrugated sheets	B1D4, F~~1~~3D2~~4~~	N/A	N/A	N/A
AS/NZS 2908 Part 2	2000	Cellulose-cement products — Flat sheets	Schedule 2	Schedule 2	7.5.3, 7.5.4, 7.5.5, 10.2.10,10.2.11, Schedule 2	Schedule 2
AS/NZS 2918	2018	Domestic solid fuel burning appliances — Installation See Note 11	G2D2	H7D5,	12.4.4, 12.4.5	N/A
AS/NZS 3013	2005	Electrical installations — Classification of the fire and mechanical performance of wiring system elements	C3D14	N/A	N/A	N/A
AS/NZS 3500 Part 0	2003	Plumbing and drainage — Glossary of terms	A1G1	A1G1	A1G1	A1G1
AS/NZS 3500 Part 1	2018	Plumbing and drainage — Water services	N/A	N/A	N/A	B1D4, B3D3, B4D2, B5D2,

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AS/NZS 3500 Part 2	2018	Plumbing and drainage — Sanitary plumbing and drainage	N/A	N/A	N/A	C1D3, C2V2, C2D3, C2D4
AS/NZS 3500 Part 3	2018	Plumbing and drainage — Stormwater drainage	F1D2	H1D3, H1D7	3.3.4, 7.4.3	N/A
AS/NZS 3500 Part 4	2018	Plumbing and drainage — Heated water services (incorporating amendment 1)	N/A	N/A	N/A	B2D2, B2D6, B2D7, B2D8, B2D9
AS/NZS 3600	2018	Concrete structures (incorporating amendment 1)	B1V1, B1D4, Spec 2	H1V1, H1D4, Spec 2	2.2.4, 3.4.3, 4.2.6, 4.2.10, 4.2.13, 4.3.2, 4.5.7, 5.3.3, 10.2.10, Spec 2	Spec 2
AS 3660 Part 1	2014	Termite management — New building work (incorporating amendment 1)	B1D4, F1D8~~7~~	N/A	3.4.1, 3.4.2	N/A
AS 3660 Part 3	2014	Termite management — Assessment criteria for termite management systems	N/A	N/A	3.4.2	N/A
AS/NZS 3666 Part 1	2011	Air-handling and water systems of buildings — Microbial control — Design, installation and commissioning	F2D10, F~~4~~6D6	N/A	N/A	N/A
AS 3700	2018	Masonry structures	B1D4, Spec 2	H1D5, H2D4,	5.2.4, 5.4.2, 5.6.3, 6.3.6, 10.2.10, 12.4.3, Spec 2	Spec 2
AS 3740	2010	Waterproofing of domestic wet areas (incorporating amendment 1)	F1D2~~6~~	H4D3	10.2.9	N/A
AS 3786	2014	Smoke alarms using scattered light, transmitted light or ionization (incorporating amendment 1 and 2) See Note 7	Spec 20	N/A	9.5.1, 9.5.5	N/A
AS/NZS 3823 Part 1.2	2012	Performance of electrical appliances — Airconditioners and heat pumps — Ducted airconditioners and air-to-air heat pumps — Testing and rating for performance	Spec 33, J5D12	N/A	N/A	N/A
AS 3959	2018	Construction of buildings in bushfire-prone areas	G5D2, G5D3, Spec 44	H7D4	N/A	N/A
AS/NZS 4020	2018	Testing of products for use in contact with drinking water See Note 8	A5G4	A5G4	A5G4	A5G4, A5G7
AS 4055	2012	Wind loads for housing (incorporating amendment 1)	Schedule 2	H1D8, Schedule 2	Schedule 2	Schedule 2
AS 4072 Part 1	2005	Components for the protection of openings	C4D15, C4D16	N/A	9.3.2	N/A

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AS 4100	~~1998~~2020	Steel structures (incorporating amendment 1)	B1D4, Spec ~~2~~1	H1D6, Spec ~~2~~1	4.2.13, ~~4.5.7. 5.2.12~~, 5.6.7, 12.3.2, ~~Spec 2~~	Spec ~~2~~1
AS/NZS 4200 Part 1	2017	Pliable building membranes and underlays — Materials	F~~1~~3D3~~5~~, F~~6~~8D3, Spec 2	Spec 2	7.3.4, 7.5.2, 7.5.8, 10.8.1, Spec 2	Spec 2
AS 4200 Part 2	2017	Pliable building membranes and underlays — Installation requirements (incorporating amendment 1)	F1D5, F~~6~~8D3	N/A	10.8.1	N/A
AS/NZS 4234	2008	Heated water systems — Calculation of energy consumption (incorporating amendments 1, 2 and 3)	N/A	N/A	N/A	B2V1, B2D2
AS 4254 Part 1	2012	Ductwork for airhandling systems in buildings — Flexible duct	Spec 7, J5D7	H3D2	13.6.4	N/A
AS 4254 Part 2	2012	Ductwork for airhandling systems in buildings — Rigid duct	Spec 7, J5D5, J5D7	N/A	13.6.4	N/A
~~AS/NZS 4256 Part 1~~	~~1994~~	~~Plastic roof and wall cladding materials — General requirements~~	~~F1D4~~	~~N/A~~	~~N/A~~	~~N/A~~
~~AS/NZS 4256 Part 2~~	~~1994~~	~~Plastic roof and wall cladding materials — Unplasticized polyvinyl chloride (uPVC) building sheets~~	~~F1D4~~	~~N/A~~	~~N/A~~	~~N/A~~
~~AS/NZS 4256 Part 3~~	~~1994~~	~~Plastic roof and wall cladding materials — Glass fibre reinforced polyester (GRP)~~	~~F1D4~~	~~N/A~~	~~N/A~~	~~N/A~~
~~AS/NZS 4256 Part 5~~	~~1996~~	~~Plastic roof and wall cladding materials — Polycarbonate~~	~~F1D4~~	~~N/A~~	~~N/A~~	~~N/A~~
AS/NZS 4284	2008	Testing of building facades	F~~1~~3V1	H1V1	N/A	N/A
AS/NZS 4505	2012	Garage doors and other large access doors (incorporating amendment 1)	B1D4	N/A	2.2.4	N/A
AS 4552	2005	Gas fired water heaters for hot water supply and/or central heating	N/A	N/A	N/A	B2D2
AS 4586	2013	Slip resistance classification of new pedestrian surface materials (incorporating amendment 1) See Note 10	D3D11, D3D14, D3D15. Spec 27	N/A	11.2.4	N/A
AS 4597	1999	Installation of roof slates and shingles (Noninterlocking type)	B1D4, F3~~4~~D2~~4~~	H2D6	N/A	N/A
AS/NZS 4600	2018	Cold-formed steel structures	B1D4, Spec 2	H1D6, Spec 2	5.3.3, 6.3.6, Spec 2	Spec 2
AS 4654 Part 1	2012	Waterproofing membranes for external above-ground use — Materials	~~F1D3~~	H2D8	N/A	N/A

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AS 4654 Part 2	2012	Waterproofing membranes for external above-ground use — Design and installation	~~F1D3~~	H2D8	N/A	N/A
AS 4678	2002	Earth-retaining structures	N/A	H1D3	N/A	N/A
AS 4773 Part 1	2015	Masonry in small buildings — Design (incorporating amendment 1)	N/A	H1D5, H2D4	5.2.4, 5.6.3, 12.4.3	N/A
AS 4773 Part 2	2015	Masonry in small buildings — Construction	N/A	H1D5, H2D4	5.2.4, 5.6.3, 12.4.3	N/A
AS/NZS 4859 Part 1	2018	Thermal insulation materials for buildings — General criteria and technical provisions	J3D3, J5D6, J5D9	N/A	13.2.2, 13.2.6, 13.6.2, 13.6.3, 13.6.4	N/A
AS/NZS 4859 Part 2	2018	Thermal insulation materials for buildings — Design	J3D3, Spec 37	N/A	N/A	N/A
AS 5113	2016	Classification of external walls of buildings based on reaction-to-fire performance (incorporating amendment 1)	C1V3	N/A	N/A	N/A
AS 5146 Part 1	2015	Reinforced autoclaved aerated concrete — Structures (incorporating amendment 1)	B1D4	H2D6	N/A	N/A
AS 5216	2018	Design of post-installed and cast-in fastenings in concrete	B1D4	N/A	2.2.4	N/A
AS 5637 Part 1	2015	Determination of fire hazard properties — Wall and ceiling linings	Spec 7, Schedule 2	Schedule 2	Schedule 2	Schedule 2
AS ISO 9239 Part 1	2003	Reaction to fire tests for floorings — Determination of the burning behaviour using a radiant heat source	Schedule 2	Schedule 2	Schedule 2	Schedule 2
AS/NZS ISO 9972	2015	Thermal performance of buildings — Determination of air permeability of buildings — Fan pressurization method	J1V4	H6V3	N/A	N/A
AIRAH-DA09	1998	Air conditioning load estimation	Spec 35	N/A	N/A	N/A
AIRAH-DA28	2011	Building management and control systems	Spec 34	N/A	N/A	N/A
ANSI/ASHRAE Standard 55	2013	Thermal environmental conditions for human occupancy	Schedule 2	Schedule 2	Schedule 2	Schedule 2
ANSI/ASHRAE Standard 140	2007	Standard method of test for the evaluation of building energy analysis computer programs	J1V1, J1V2, J1V3	H6V2	N/A	N/A
ASTM E2073-10	2010	Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings	Spec 25	N/A	N/A	N/A
ASTM E72-15	2015	Standard Test Methods of Conducting Strength Tests of Panels for Building	Spec 6	N/A	N/A	N/A

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ASTM E695-03	2003	Standard Test Method of Measuring Relative Resistance of Wall, Floor and Roof Construction to Impact Loading	Spec 6	N/A	N/A	N/A
ASTM E903	2012	Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres	N/A	N/A	13.2.3	N/A
AHRI 460	2005	Performance rating of remote mechanical-draft air-cooled refrigerant condensers	J5D13	N/A	N/A	N/A
AHRI 551/591	2015	Performance rating of water-chilling and heat pump water-heating packages using the vapor compression cycle.	Spec 33, J5D11	N/A	N/A	N/A
ABCB	2011	Protocol for Structural Software, Version 2011.2	B1D5	H1D6	2.2.5	N/A
ABCB	2012	Standard for Construction of Buildings in Flood Hazard Areas, Version 2012.3	B1D6	H1D10	N/A	N/A
ABCB	2022	Fire Safety Verification Method	C1V4, D1V4, E1V1, E2V1, E3V1, E4V2			
ABCB	2019	Standard for NatHERS Heating and Cooling Load Limits, Version 2019.1	J2D3	H6D3	N/A	N/A
CIBSE Guide A	2015	Environmental design	Spec 34, Spec 35, J3D3, J3D7	N/A	N/A	N/A
Disability Standards for Accessible Public Transport	2002		F2D12, I2D1	N/A	N/A	N/A
Education and Care Services National Law Act (Vic)	2010		Schedule 2	Schedule 2	Schedule 2	Schedule 2
European Union Commission Regulation 547/2012	2012	Ecodesign requirements for water pumps	J5D8	N/A	N/A	N/A
European Union Commission Regulation 622/Annexx II, point	2012	Eco-design requirements for glandless standalone circulators and glandless circulators integrated in products	J5D8	N/A	N/A	N/A

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FPAA101D	2018	Automatic Fire Sprinkler System Design and Installation — Drinking Water Supply	C1V3, C2D6, C3D14, C3D2, C3D7, C4D6, C4D7, C4D8, C4D9, C4D12, Spec 5, Spec 7, D2D4, D2D17, D3D26, D3D30, E1D2, Spec 17, Spec 18, E2D3, Spec 20, G3D1, G3D6, Spec 31, I1D2	N/A	N/A	B4D2
FPAA101H	2018	Automatic Fire Sprinkler System Design and Installation — Hydrant Water Supply	C1V3, C2D6, C3D14, C3D2, C3D7, C4D6, Spec 5, Spec 7, E1D2, Spec 17, Spec 18, E2D3, Spec 20, G3D1, G3D6, Spec 31, I1D2	N/A	N/A	B4D2
ISO 140 Part 6	1998E	Acoustics — Measurement of sound insulation in buildings and of building elements — Laboratory measurements of impact sound insulation of floors	Spec 29	N/A	N/A	N/A
ISO 540	2008	Hard coal and coke — Determination of ash fusibility	Spec 13	N/A	N/A	N/A
ISO 8336	1993E	Fibre-cement flat sheets	Schedule 2	Schedule 2	7.5.3, 7.5.4, 7.5.5, Schedule 2	Schedule 2
ISO 25745 Part 2	2015	Energy performance of lifts, escalators and moving walks: Energy calculation and classification for lifts (elevators)	J6D8	N/A	N/A	N/A
NASH Standard	2014	Steel Framed Construction in Bushfire Areas (incorporating amendment A)	N/A	H1D6	N/A	N/A
NASH Standard Part 1	2005	Residential and LowRise Steel Framing — Design Criteria (incorporating amendments A, B and C)	B1D4	H1D6	N/A	N/A
NASH Standard	2014	Residential and LowRise Steel Framing —	B1D4, B1D5,	H1D6	2.2.5, 6.2.1, 6.3.6,	N/A

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N/A	N/A	Northern Territory Deemed to Comply Standards Manual	N/A	N/A	2.2.4	N/A
SA TS 5344	2019	Permanent labelling for Aluminium Composite Panel (ACP) products	A5G8	A5G8	A5G8	A5G8
TN 61		Cement Concrete and Aggregates Australia — Technical note — Articulated walling	N/A	H1D4	N/A	N/A

Table Notes:

1. For AS/NZS ISO 717.1:
   (i) Test reports based on AS 1276—1979 and issued prior to AS/NZS 1276.1—1999 being referenced in the NCC remain valid.
   (ii) The STC values in reports based on AS 1276—1979 shall be considered to be equivalent to R_w values.
   (iii) Test reports based on AS/NZS 1276.1 prepared after the NCC reference date for AS/NZS 1276.1—1999 must be based on that version.
   (iv) Test reports based on ISO 717-1—1996 and issued prior to AS/NZS ISO 717.1—2004 being referenced in the NCC remain valid.
   (v) Reports based on AS/NZS ISO 717.1 relating to tests carried out after the NCC reference date for AS/NZS ISO 717.1—2004 must relate to the amended Standard.
2. For AS 1530 Parts 1 to 4:
   (i) Until 1 May 2022, subject to the note to AS 4072.1, reports relating to tests carried out under earlier editions of AS 1530 Parts 1 to 4 remain valid.
   (ii) Reports relating to tests carried out after the date of an amendment to a Standard must relate to the amended Standard.
3. For AS 1562.1, tests carried out based on AS 1562.1—1992 and issued prior to AS 1562.1—2018 being referenced in the NCC remain valid. Reports relating to tests carried out after the NCC reference date for AS 1562.1 must relate to the revised Standard.
4. For AS 1670.1, AS 1670.3 and AS1670.4:
   (i) Notwithstanding A4G1(5), until 1 May 2022 either the current edition or the previous editions of the documents listed in Table 1.8 of AS 1670.1, AS 1670.3 and AS 1670.4 may be used to meet the requirements of AS 1670.1, AS 1670.3 and AS 1670.4 as applicable.
   (ii) From 1 May 2022 A4G1(5) applies and only the edition of the documents listed in Table 1.8 of AS 1670.1, AS 1670.3 and AS 1670.4 that existed at the time of publication of the primary document may be used.
   (iii) For AS/NZS 1859.4, the 2004 edition has been retained for a transitional period ending on 30 April 2020.
5. For AS 2047:
   (i) Tests carried out under earlier editions of AS 2047 remain valid.
   (ii) Reports based on AS 2047 relating to tests carried out after the NCC reference date for AS 2047—2014 Amendment 2 must relate to the amended Standard.
6. For AS 3786:
   (i) Tests carried out under AS 3786—2014 Amendment 1 remain valid.
   (ii) Reports based on AS 3786 relating to tests carried out after the NCC reference date for AS 3786—2014 Amendment 2 must relate to the amended Standard.
7. Test reports based on the 2005 edition of AS/NZS 4020 will continue to be accepted until 1 May 2024. Test reports prepared after the NCC reference date for the

2018 edition of AS/NZS 4020 must be based on the 2018 edition.

8. For AS 4072.1, until 1 May 2022, systems tested to AS 1530.4 prior to 1 January 1995 need not be retested to comply with the provisions in AS 4072.1.
9. For AS 4586:
   (i) Test reports based on the 2004 edition of AS/NZS 4586 and issued prior to the 2013 edition of AS 4586 being referenced in the NCC remain valid.
   (ii) Test reports prepared after the NCC reference date of the 2013 edition of AS 4586 must be based on that version.
   (iii) For the purposes of assessing compliance, the slip-resistance classifications of V, W and X in reports based on the 2004 edition of AS/NZS 4586 may be considered to be equivalent to slip-resistance classifications of P5, P4 and P3 respectively in the 2013 edition of AS4586.
   (iv) Test reports based on Appendix D of AS 4586—2013 and issued prior to the NCC reference date for AS 4586—2013 (incorporating Amendment 1) remain valid.
   (v) Test reports based on Appendix D of AS 4586—2013 and prepared after the NCC reference date for AS 4586—2013 (incorporating Amendment 1) must be based on that version.
10. Tests carried out based on AS/NZS 2918—2001 and issued prior to AS/NZS 2918—2018 being referenced in the BCA remain valid. Reports relating to tests carried out after the NCC reference date for AS/NZS 2918 must relate to the revised Standard.
11. For AS 2699 Parts 1 and 3:
   (i) For AS 2699.1, the 2000 edition has been retained for a transitional period ending on 30 April 2025.
   (ii) For AS 2699.3, the 2002 edition has been retained for a transitional period ending on 30 April 2025.

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