

SECTION 3: CONSTRUCTION GENERAL

3.3 EXTERNAL MOULDINGS

Unless otherwise required in Sections 4 to 9, combustible external mouldings, jointing strips, trims and sealants may be used for decorative purposes or to cover joints between sheeting material.

3.6 VENTS, WEEPHOLES AND GAPS

Where a circular probe of 3 mm diameter is capable of being passed through external vents, weepholes or gaps, the vents, weepholes and gaps shall be screened as specified in Sections 3, 5, 6, 7, 8 and 9, except for weepholes from the frames of windows and glazed doors.

To determine the maximum aperture size of screening material, it shall not be possible to pass a circular probe of 2 mm diameter through the aperture.

Gaps between doors and the door jambs, heads or sills (thresholds) shall be as shown in Figure 3.2. Alternatively, gaps shall be protected by draught excluders.

C3.6 Weepholes from the frames of windows and glazed doors and those gaps between doors and door jambs, heads or sills (thresholds) that may exceed 3 mm (see Figure 3.2) are exempt from screening because they do not provide a direct passage for embers to the interior of the building or building cavity.

3.7 BUSHFIRE SHUTTERS

Bushfire shutters shall—

- (a) be fixed to the building and be non-removable;
- (b) when in the closed position, have no gap greater than 3 mm between the shutter and the wall, the sill or the head;
- (c) be readily manually operable from either inside or outside;
- (d) protect the entire window assembly or door assembly;
- (e) consist of materials specified in Clauses 5.5.1, 6.5.1, 7.5.1, 8.5.1 and 9.5.1 for the relevant BAL; and
- (f) where perforated, have—
 - (i) uniformly distributed perforations with a maximum aperture of 3 mm when the shutter is providing radiant heat protection or 2 mm when the shutter is also providing ember protection (such as where the openable portion of the window is not screened in accordance with the requirements of the respective BAL); and
 - (ii) a perforated area no greater than 20% of the shutter.

If bushfire shutters are fitted to all external doors then at least one of those shutters shall be operable from the inside to facilitate safe egress from the building.



SECTION 5: CONSTRUCTION FOR BUSHFIRE ATTACK LEVEL 12.5 (BAL — 12.5)

5.1 GENERAL

A building assessed in Section 2 as being BAL—12.5 shall comply with Section 3 and Clauses 5.2 to 5.8. There are a number of Standards that specify requirements for construction; however, where this Standard does not provide construction requirements for a particular element, the other Standards apply.

Any element of construction or system that satisfies the test criteria of AS 1530.8.1 may be used in lieu of the applicable requirements contained in Clauses 5.2 to 5.8 (see Clause 3.8).

NOTE: BAL—12.5 is primarily concerned with protection from ember attack and radiant heat up to and including 12.5 kW/m² where the site is less than 100 m from the source of bushfire attack.

5.2 SUBFLOOR SUPPORTS

NSW RURAL FIRE SERVICE VARIATION

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with—

- (a) wall that complies with **(Clause 5.4 as appropriate)**; or
- (b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; or
- (c) a combination of Items (a) and (b) above.

Where the subfloor space is unenclosed, the support posts, columns, stumps, piers and poles shall be—

- (i) of non-combustible material; or
- (ii) of bushfire-resisting timber (see Appendix (ii) F); or
- (iii) a combination of Items (i) and (ii) above. (iii)

NOTE: This requirement applies to the principal building only and not to verandas, decks, steps, ramps and landings.

5.3 FLOORS

5.3.1 Concrete slabs on ground

This Standard does not provide construction requirements for concrete slabs on the ground.

5.3.2 Elevated floors

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring.

See NSW Variation Following Page



NSW RURAL FIRE SERVICE VARIATION

Enclosed Subfloor Space

This Standard does not provide construction requirements for elevated floors, including bearers, joists and flooring, where the subfloor space is enclosed with—

- (a) a wall that complies with **(Clause 5.4 appropriate)**; *or*
- (b) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion resistant steel, bronze or aluminium; *or*
- (c) a combination of Items (a) and (b) above.

Unenclosed subfloor space

Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400 mm above finished ground level, shall be one of the following:

- (a) Materials that comply with the following:
 - (i) Bearers and joists shall be—
 - A. non-combustible; *or*
 - B. bushfire-resisting timber (see Appendix F); *or*
 - C. a combination of Items (A) and (B) above
 - (ii) Flooring shall be—
 - A. non-combustible; *or*
 - B. bushfire-resisting timber (see Appendix F); *or*
 - C. timber (other than bushfire-resisting timber), particleboard or plywood flooring where the underside is lined with sarking-type material or mineral wool insulation; *or*
 - D. a combination of any of Items (A), (B) or (C) above *or*
- (b) A system complying with AS 1530.8.1

This Standard does not provide construction requirements for elements of elevated floors, including bearers, joists and flooring, if the underside of the element is 400 mm or more above finished ground level.

5.4 EXTERNAL WALLS

5.4.1 Walls

The exposed components of an external wall that are less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D) shall be:

- (a) Non-combustible material.
NOTE: Examples include, but are not limited to, the following (with a minimum of 90 mm in thickness):
 - (a) Full masonry or masonry veneer walls with an outer leaf of clay, concrete, calcium silicate or natural stone.
 - (b) Precast or in situ walls of concrete or aerated concrete.
 - (c) Earth wall including mud brick.
- or*
- (b) Timber logs of a species with a density of 680 kg/m³ or greater at a 12 percent moisture content; of a minimum nominal overall thickness of 90 mm and a minimum thickness of 70 mm (see Clause 3.11); and gauge planed.

or



- (c) Cladding that is fixed externally to a timber-framed or a steel-framed wall and is—
- (i) non-combustible material; or
 - (ii) fibre-cement a minimum of 6 mm in thickness; or
 - (iii) bushfire-resisting timber (see Appendix F); or
 - (iv) a timber species as specified in Paragraph E1, Appendix E; or
 - (v) a combination of any of Items (i), (ii), (iii) or (iv) above.
- or
- (d) A combination of any of Items (a), (b) or (c) above.

This Standard does not provide construction requirements for the exposed components of an external wall that are 400 mm or more from the ground or 400 mm or more above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the wall (see Figure D3, Appendix D).'

5.4.2 Joints

All joints in the external surface material of walls shall be covered, sealed, overlapped, backed or butt-jointed to prevent gaps greater than 3 mm.

5.4.3 Vents and weepholes

Vents and weepholes in external walls shall be screened with a mesh with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium, except where the vents and weepholes have an aperture less than 3 mm (see Clause 3.6), or are located in an external wall of a subfloor space.

5.5 EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS

5.5.1 Bushfire shutters

Where fitted, bushfire shutters shall comply with Clause 3.7 and be made from—

- (a) non-combustible material; *or*
- (b) a timber species as specified in Paragraph E1, Appendix E; *or*
- (b) bushfire-resisting timber (see Appendix F); *or*
- (d) a combination of any of Items (a), (b) or (c) above.

5.5.1A Screens for windows and doors

Where fitted, screens for windows and doors shall have a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. Gaps between the perimeter of the screen assembly and the building element to which it is fitted shall not exceed 3 mm.

The frame supporting the mesh or perforated sheet shall be made from—

- (a) metal; *or*
- (b) bushfire-resisting timber (see Appendix F); *or*
- (c) a timber species as specified in Paragraph E2, Appendix E.

5.5.2 Windows

Window assemblies shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with Clause 5.5.1.
or
- (b) They shall be completely protected externally by screens that comply with Clause 5.5.1A.
or
- (c) They shall comply with the following:
 - (i) For window assemblies less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), window frames and window joinery shall be made from:



- (A) Bushfire-resisting timber (see Appendix F). *or*
 - (B) A timber species as specified in Paragraph E2, Appendix E. *or*
 - (C) Metal. *Or*
 - (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the frame and sash shall satisfy the design load, performance and structural strength of the member.
- (ii) Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal.
 - (iii) Where glazing is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the window frame (see Figure D3, Appendix D), the glazing shall be Grade A safety glass minimum 4 mm thickness, or glass blocks with no restriction on glazing methods.

NOTE: Where double glazed units are used the above requirements apply to the external face of the window assembly only.

- (iv) Where glazing is other than that specified in Item (iii) above, annealed glass may be used.
- (v) The openable portions of windows shall be screened internally or externally with screens that comply with Clause 5.5.1A.

5.5.3 Doors—Side-hung external doors (including French doors, panel fold and bi-fold doors)

Side-hung external doors, including French doors, panel fold and bi-fold doors, shall comply with one of the following:

- (a) Doors and door frames shall be protected by bushfire shutters that comply with Clause 5.5.1.
or
- (b) Doors and door frames shall be protected externally by screens that comply with Clause 5.5.1A.
or
- (c) Doors and door frames shall comply with the following:
 - (i) Doors shall be—
 - (A) non-combustible; *or*
 - (B) a solid timber, laminated timber or reconstituted timber door, having a minimum thickness of 35 mm for the first 400 mm above the threshold; *or*
 - (C) a door, including a hollow core door, with a non-combustible kickplate on the outside for the first 400 mm above the threshold; *or*
 - (D) a door, including a hollow core door, protected externally by a screen that complies with Clause 5.5.1A; *or*
 - (E) a fully framed glazed door, where the framing is made from materials specified for bushfire shutters (see Clause 5.5.1), or from a timber species as specified in Paragraph E2, Appendix E.
 - (ii) Where doors incorporate glazing, the glazing shall comply with the glazing requirements for windows.
 - (iii) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.
 - (iv) Where any part of the door frame is less than 400 mm from the ground or less than 400 mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110 mm in width from the door (see Figure D3, Appendix D), that part of the door frame shall be made from:
 - (A) Bushfire-resisting timber (see Appendix F). *or*
 - (B) A timber species as specified in Paragraph E2, Appendix E. *or*
 - (C) Metal. *Or*



- (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the door assembly shall satisfy the design load, performance and structural strength of the member.
- (v) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.

5.5.4 Doors—Sliding doors

Sliding doors shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with Clause 5.5.1.
or
- (b) They shall be completely protected externally by screens that comply with Clause 5.5.1A.
or
- (c) They shall comply with the following:
 - (i) Any glazing incorporated in sliding doors shall be Grade A safety glass complying with AS 1288.
 - (ii) Both the door frame supporting the sliding door and the framing surrounding any glazing shall be made from:
 - (A) Bushfire-resisting timber (see Appendix F). *or*
 - (B) A timber species as specified in Paragraph E2, Appendix E. *or*
 - (C) Metal. *or*
 - (D) Metal-reinforced PVC-U. The reinforcing members shall be made from aluminium, stainless steel, or corrosion-resistant steel and the frame and the sash shall satisfy the design load, performance and structural strength of the member.
 - (iii) There is no requirement to screen the openable part of the sliding door. However, if screened, the screens shall comply with Clause 5.5.1A.

NOTE: The construction of manufactured sliding doors should prevent the entry of embers when the door is closed. There is no requirement to provide screens to the openable part of these doors as it is assumed that a sliding door will be closed if occupants are not present during a bushfire event. Screens of materials other than those specified may not resist ember attack.

- (iv) Sliding doors shall be tight-fitting in the frames.

5.5.5 Doors—Vehicle access doors (garage doors)

The following apply to vehicle access doors:

- (a) The lower portion of a vehicle access door that is within 400 mm of the ground when the door is closed (see Figure D4, Appendix D) shall be made from—
 - (i) non-combustible material; *or*
 - (ii) bushfire-resisting timber (see Appendix F); *or*
 - (iii) fibre-cement sheet, a minimum of 6 mm in thickness; *or*
 - (iv) a timber species as specified in Paragraph E1, Appendix E; *or*
 - (v) a combination of any of Items (i), (ii), (iii) or (iv) above.
- (b) Panel lift, tilt doors or side-hung doors shall be fitted with suitable weather strips, draught excluders, draught seals or guide tracks, as appropriate to the door type, with a maximum gap no greater than 3 mm.
- (c) Roller doors shall have guide tracks with a maximum gap no greater than 3 mm and shall be fitted with a nylon brush that is in contact with the door (see Figure D4, Appendix D).
- (d) Vehicle access doors shall not include ventilation slots.



5.6 ROOFS (INCLUDING VERANDA AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES)

5.6.1 General

The following apply to all types of roofs and roofing systems:

- (a) Roof tiles, roof sheets and roof-covering accessories shall be non-combustible.
- (b) The roof/wall junction shall be sealed, to prevent openings greater than 3 mm, either by the use of fascia and eaves linings or by sealing between the top of the wall and the underside of the roof and between the rafters at the line of the wall.
- (c) Roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

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Any sarking used shall be:

- (a) Non-combustible; or
- (b) Breather-type sarking complying with AS/NZS 4200.1 and with a flammability index of not more than 5 (see AS1530.2) and sarked on the outside of the frame; or
- (c) An insulation material conforming to the appropriate Australian Standard for that material.

5.6.2 Tiled roofs

Tiled roofs shall be fully sarked. The sarking shall—

- (a) be located on top of the roof framing, except that the roof battens may be fixed above the sarking;
- (b) cover the entire roof area including ridges and hips; and
- (c) extend into gutters and valleys.

5.6.3 Sheet roofs

Sheet roofs shall—

- (a) be fully sarked in accordance with Clause 5.6.2, except that foil-backed insulation blankets may be installed over the battens; and
- (b) have any gaps greater than 3 mm (such as under corrugations or ribs of sheet roofing and between roof components) sealed at the fascia or wall line and at valleys, hips and ridges by—
 - (i) a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium; or
 - (ii) mineral wool; or
 - (iii) other non-combustible material; or
 - (iv) a combination of any of Items (i), (ii) or (iii) above.

5.6.4 Veranda, carport and awning roofs

The following apply to veranda, carport and awning roofs:

- (a) A veranda, carport or awning roof forming part of the main roof space [see Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in Clauses 5.6.1, 5.6.2, 5.6.3, 5.6.5 and 5.6.6.
- (b) A veranda, carport or awning roof separated from the main roof space by an external wall [see Figures D1(b) and D1(c), Appendix D] complying with Clause 5.4 shall have a non-combustible roof covering.

NOTE: There is no requirement to line the underside of a veranda, carport or awning roof that is separated from the main roof space.



5.6.5 Roof penetrations

The following apply to roof penetrations:

- (a) Roof penetrations, including roof lights, roof ventilators, roof-mounted evaporative cooling units, aerials, vent pipes and supports for solar collectors, shall be adequately sealed at the roof to prevent gaps greater than 3 mm. The material used to seal the penetration shall be non-combustible.
- (b) Openings in vented roof lights, roof ventilators or vent pipes shall be fitted with ember guards made from a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium. This requirement does not apply to the exhaust flues of heating or cooking devices with closed combustion chambers. In the case of gas appliance flues, ember guards shall not be fitted.
NOTE: Gasfitters are required to provide a metal flue pipe above the roof and terminate with a certified gas flue cowl complying with AS 4566. Advice may be obtained from State gas technical regulators.
- (c) All overhead glazing shall be Grade A safety glass complying with AS 1288.
- (d) Glazed elements in roof lights and skylights may be of polymer provided a Grade A safety glass diffuser, complying with AS 1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass minimum 4 mm thickness, shall be used in the outer pane of the IGU.
- (e) Flashing elements of tubular skylights may be of a fire-retardant material, provided the roof integrity is maintained by an under-flashing of a material having a flammability index no greater than 5.
- (f) Evaporative cooling units shall be fitted with non-combustible butterfly closers as close as practicable to the roof level or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.
- (g) Vent pipes made from PVC are permitted.

5.6.6 Eaves linings, fascias and gables

The following apply to eaves linings, fascias and gables:

- (a) Gables shall comply with Clause 5.4.
- (b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in Clause 5.6.5.
- (c) Eaves ventilation openings greater than 3 mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.

This Standard does not provide construction requirements for fascias, bargeboards and eaves linings.

5.6.7 Gutters and downpipes

This Standard does not provide requirements for—

- (a) gutters, with the exception of box gutters; and
- (b) downpipes.

If installed, gutter and valley leaf guards shall be non-combustible. Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible material.



5.7 VERANDAS, DECKS, STEPS, RAMPS AND LANDINGS

5.7.1 General

Decking may be spaced.

There is no requirement to enclose the subfloor spaces of verandas, decks, steps, ramps or landings.

C5.7.1 Spaced decking is nominally spaced at 3 mm (in accordance with standard industry practice); however, due to the nature of timber decking with seasonal changes in moisture content, that spacing may range from 0–5 mm during service. The preferred dimension for gaps is 3 mm (which is in line with other 'permissible gaps') in other parts of this Standard.

It should be noted that recent research studies have shown that gaps at 5 mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10 mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

5.7.2 Enclosed subfloor spaces of verandas, decks, steps, ramps and landings

5.7.2.1 Materials to enclose a subfloor space

NSW RURAL FIRE SERVICE VARIATION

The subfloor spaces of verandas, decks, steps, ramps and landings are considered to be 'enclosed' when —

- (a) the material used to enclose the subfloor space complies with **(Clause 5.4 as appropriate)**; and
- (b) all openings greater than 3 mm are screened with a mesh or perforated sheet with a maximum aperture of 2 mm, made of corrosion-resistant steel, bronze or aluminium.

5.7.2.2 Supports

This Standard does not provide construction requirements for support posts, columns, stumps, stringers, piers and poles.

5.7.2.3 Framing

This Standard does not provide construction requirements for the framing of verandas, decks, ramps or landings (i.e., bearers and joists).

5.7.2.4 Decking, stair treads and the trafficable surfaces of ramps and landings

NSW RURAL FIRE SERVICE VARIATION

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.



5.7.3 Unenclosed subfloor spaces of verandas, decks, steps, ramps and landings

5.7.3.1 Supports

NSW RURAL FIRE SERVICE VARIATION

Support posts, columns, stumps, stringers, piers and poles shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.

5.7.3.2 Framing

NSW RURAL FIRE SERVICE VARIATION

Framing of verandas, decks, ramps or landings (i.e., bearers and joists) shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.

5.7.3.3 Decking, stair treads and the trafficable surfaces of ramps and landings

NSW RURAL FIRE SERVICE VARIATION

Decking, stair treads and the trafficable surfaces of ramps and landings shall be—

- (a) of non-combustible material; *or*
- (b) of bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (a) and (b) above.

5.7.4 Balustrades, handrails or other barriers

NSW RURAL FIRE SERVICE VARIATION

Those parts of the handrails and balustrades less than 125 mm from any glazing or any combustible wall shall be—

- (a) of non-combustible material; *or*
- (b) bushfire-resisting timber (see Appendix F); *or*
- (c) a combination of Items (i) and (ii) above.

Those parts of the handrails and balustrades that are 125 mm or more from the building have no requirements.

5.8 WATER AND GAS SUPPLY PIPES

Above-ground, exposed water and gas supply pipes shall be metal.

