

BUSHFIRE CONSTRUCTION CONDITIONS

	BAL Low	BAL 12.5	BAL 19	BAL 29	BAL40	BAL FZ
ALTERNATIVE COMPLIANCE FOR SPECIFIC STRUCTURES (GARAGE, CARPORT, VERANDAH or SIMILAR)						
Attached Structure						
Structure below a building						
Adjacent Structure						
SUB FLOOR						
Supports	N/A	N/A	N/A			
FLOORS						
Concrete Slab	N/A	N/A	N/A	N/A	N/A	N/A
Enclosed Sub-Floor	N/A	N/A	N/A	N/A	N/A	N/A
Unenclosed Sub-Floor	N/A	N/A	N/A			
EXTERNAL WALLS						
Walls	N/A					
Joints	N/A					
Vents & Weepholes	N/A					
EXTERNAL GLAZED ELEMENTS & ASSEMBLIES and EXTERNAL DOORS						
Bushfire Shutters	N/A					
Screens – Windows & Doors	N/A					
Windows	N/A					
Doors – Side Hung	N/A					
Doors – Sliding	N/A					
Doors – Vehicle Access	N/A					
ROOFS (INCLUDING VERANDAH, CARPORTS, EAVES, FASCIAS, GABLES, GUTTERS & DOWNPIPES)						
General	N/A					
Tiled Roof	N/A					
Sheet Roof	N/A					
Verandah, Carport or Awning	N/A					
Roof Penetrations	N/A					
Eaves, Fascias and Gables	N/A					
Gutters & Downpipes	N/A					
VERANDAHS, DECKS, STEPS, RAMPS and Landings						
General	N/A					
Enclosed Sub Floor	N/A					
Unenclosed Sub Floor	N/A					
Balustrades, Handrails, Etc	N/A					
WATER & GAS SUPPLY PIPES						
Above Ground Pipes	N/A					

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ATTACHED STRUCTURES (Clause 3.2.1)

Where any part of a garage, carport, verandah or similar roofed structure is attached to, or shares a common roof space with, a building required to comply with AS3959, the entire garage, carport, verandah or similar roofed structure shall comply with the construction requirements of AS3959, as applicable to the subject building

Alternatively, the structure shall be separated from the subject building by a wall that extends to the underside of a non-combustible roof covering, and that complies with one of the following:

- (a) The wall shall have an FRL of not less than 60/60/60 for loadbearing walls and -/60-60 for non-loadbearing walls when tested from the attached structure side and shall have openings protected as follows:
- (i) Doorways – by FRL -/60/30 self-closing fire doors
 - (ii) Windows – by FRL -/60/- fire windows permanently fixed in the closed position
 - (iii) Other Openings – by construction with an FRL not less than -/60/-.
- Note: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above item (iii).

Or

- (b) The wall shall be of masonry, earth wall or masonry-veneer construction with the masonry leaf of not less than 90mm in thickness and shall have openings protected as follows:
- (i) Doorways – by FRL -/60/30 self-closing fire doors
 - (ii) Windows – by FRL -/60/- fire windows permanently fixed in the closed position
 - (iii) Other Openings – by construction with an FRL not less than -/60/-.
- Note: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above item (iii).

GARAGES AND CARPORTS BELOW THE SUBJECT BUILDING (Clause 3.2.2)

Where a garage or carport is below a building required to comply with AS3959, it shall comply with the construction requirements of AS3959, as applicable to the subject building.

Alternatively, any construction separating the garage or carport (including walls and flooring systems) from the remainder of the building shall comply with one of the following:

- (a) The separating construction shall have an FRL of not less than 60/60/60 for loadbearing construction and -/60/60 for non-loadbearing construction when tested from the garage or carport side and shall have openings protected in accordance with the following:
- (i) Doorways – by FRL -/60/30 self-closing fire doors
 - (ii) Windows – by FRL -/60/- fire windows permanently fixed in the closed position
 - (iii) Other Openings – by construction with an FRL not less than -/60/-.
- Note: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above item (iii).

Or

- (b) Where part or all of the separating construction is a wall, the wall need not comply with Item 1 above, provided the wall is of masonry, earth wall or masonry-veneer construction with the masonry leaf of not less than 90mm in thickness and shall have openings protected as follows:
- (i) Doorways – by FRL -/60/30 self-closing fire doors
 - (ii) Windows – by FRL -/60/- fire windows permanently fixed in the closed position
 - (iii) Other Openings – by construction with an FRL not less than -/60/-.
- Note: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above item (iii).

ADJACENT STRUCTURES (Clause 3.2.3)

Where any garage, carport, or similar roofed structure is not attached to a building required to comply with AS3959, the entire garage, carport, or similar roofed structure on the subject allotment shall comply with the construction requirements of AS3959.

Alternatively, the adjacent structure shall be separated from the subject building by one of the following:

- (a) The garage/carport/shed is to be sited a distance of not less than 6m from the dwelling.

Or

- (b) A wall that extends to the underside of a non-combustible roof covering and has an FRL of not less than 60/60/60 for loadbearing walls and -/60/60 for non-loadbearing walls when tested from the attached structure side, any openings in the wall shall be protected in accordance with the following:
- (i) Doorways – by FRL -/60/30 self-closing fire doors

- (ii) Windows – by FRL -/60/- fire windows permanently fixed in the closed position
 - (iii) Other Openings – by construction with an FRL not less than -/60/-.
- Note: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above item (iii).

Or

- (c) A wall that extends to the underside of a non-combustible roof covering and is of masonry, earth wall or masonry-veneer construction with the masonry leaf of not less than 90mm in thickness, any openings in the wall shall be protected in accordance with the following:
 - (i) Doorways – by FRL -/60/30 self-closing fire doors
 - (ii) Windows – by FRL -/60/- fire windows permanently fixed in the closed position
 - (iii) Other Openings – by construction with an FRL not less than -/60/-.

Note: Control and construction joints, subfloor vents, weepholes and penetrations for pipes and conduits need not comply with the above item (iii).

BUSHFIRE CONSTRUCTION CONDITIONS (BAL 12.5) as per AS3959

SUB-FLOOR (Clause 5.2)

It is recommended storage of combustible materials beneath a floor does not occur, however should combustible materials be stored, it is recommended the area be protected as materials stored in the sub-floor space may be ignited by embers and cause an impact on the building

EXTERNAL WALLS (Clause 5.4)

Walls (Clause 5.4.1)

That part of an external wall surface that is less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the wall shall be of:

- (a) Non-combustible material; *or*
- (b) Fibre-cement external cladding, a minimum of 6mm in thickness; *or*
- (c) Bushfire-resisting timber as shown in AS3959 (Appendix F); *or*
- (d) A timber species as specified in AS3959 (Paragraph E1, Appendix E); *or*
- (e) A combination of any of Items (a), (b), (c) or (d) above.

There are no requirements for external wall surfaces 400mm or more from the ground or for external wall surfaces 400mm 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 110mm in width from the wall as per AS3959 (Figure D3, Appendix D).

Joints (Clause 5.4.2)

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

Vents and Weepholes (Clause 5.4.3)

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

EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS (Clause 5.5)

Bushfire Shutters (Clause 5.5.1)

Bushfire shutters shall:

- (a) Be fixed to the building and be non-removable;
- (b) When in the closed position, have no gap greater than 3mm between the shutter and the wall, the sill or the head;
- (c) Be readily manually openable from either inside or outside;
- (d) Protect the entire window assembly or door assembly;
- (e) Be made from
 - (i) Non-combustible material; *or*
 - (ii) A timber species as specified in AS3959 (Paragraph E1, Appendix E); *or*
 - (iii) Bushfire-resisting timber as specified in AS3959 (Appendix F); *or*
 - (iv) A combination of any Items (i), (ii) or (iii) above.
- (f) Where perforated, have:
 - (i) Uniformly distributed perforations with a maximum aperture of 3mm when the shutter is providing radiant heat protection or 2mm 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

Screens for Windows and Doors (Clause 5.5.1A)

Where fitted, screens for windows and doors shall have a mesh or perforated sheet with a maximum aperture of 2mm, 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 3mm.

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

- (a) Metal; *or*
- (b) Bushfire-resisting timber as specified in AS3959 (Appendix F); *or*
- (c) A timber species as specified in AS3959 (Paragraph E2, Appendix E)

Windows (Clause 5.5.2)

Window assemblies shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with AS3959 Clause 5.5.1; *or*
- (b) They shall be completely protected externally by screens that comply with AS 3959 Clause 5.5.1A
- (c) They shall comply with the following:
 - (i) For window assemblies less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the window frame as specified in AS3959 (Figure D3, Appendix D), window frames and window joinery shall be made from one of the following:
 - (A) Bushfire-resisting timber as specified in AS3959 (Appendix F); *or*
 - (B) A timber species as specified in AS3959 (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 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the window frame as specified in AS3959 (Figure D3, Appendix D), the glazing shall be Grade A safety glass minimum 4mm, 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 AS3959 Clause 5.5.1A.

Doors - Side-Hung External Doors, including French Doors, Panel Fold & Bi-Fold Doors (Clause 5.5.3)

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

- (a) They shall be protected by a bushfire shutter that complies with AS3959 Clause 5.5.1; *or*
- (b) They shall be completely protected externally by screens that comply with AS3959 Clause 5.5.1A; *or*
- (c) They shall comply with the following:
 - (i) Doors shall be:
 - (A) Non-combustible; *or*
 - (B) A solid timber door, having a minimum thickness of 35mm for the first 400mm above the threshold; *or*
 - (C) A door, including a hollow core door, with a non-combustible kickplate on the outside for the first 400mm above the threshold; *or*
 - (D) A fully framed glazed door, where the framing is made from materials required for bushfire shutters (see AS3959 Clause 5.5.1), or from a timber species as specified in AS3959 (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 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the door

(see AS3959 Figure D3, Appendix D), that part of the door frame shall be made from one of the following:

- (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

Doors – Sliding Doors (Clause 5.5.4)

Sliding doors shall comply with one of the following:

- (a) They shall be protected by a bushfire shutter that complies with AS3959 Clause 5.5.1; *or*
- (b) They shall be completely protected externally by screens that comply with AS3959 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 one of the following:
 - (A) Bushfire-resisting timber (see AS3959 Appendix F); *or*
 - (B) A timber species as specified in AS3959 (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 AS3959 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.

Doors—Vehicle access doors - garage doors (Clause 5.5.5)

The following apply to vehicle access doors:

- (a) The lower portion of a vehicle access door that is within 400mm of the ground when the door is closed (see AS3959 Figure D4, Appendix D) shall be made from:
 - (i) Non-combustible material; *or*
 - (ii) Bushfire-resisting timber (see AS3959 Appendix F); *or*
 - (iii) Fibre-cement sheet, a minimum of 6mm in thickness; *or*
 - (iv) A timber species as specified in AS3959 (Paragraph E1, Appendix E); *or*
 - (v) A combination of any of Items (a), (b), (c) or (d) 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 3mm.
- (c) Roller doors shall have guide tracks with a maximum gap no greater than 3mm and shall be fitted with a nylon brush that is in contact with the door (see AS3959 Figure D4, Appendix D).
- (d) Vehicle access doors shall not include ventilation slots.

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

General (Clause 5.6.1)

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 3mm, 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 2mm, made of corrosion-resistant steel, bronze or aluminium.

Tiled roofs (Clause 5.6.2)

Tiled roofs shall be fully sarked. The sarking shall:

- (a) Have a flammability index of not more than 5;
- (b) Be located directly below the roof battens;
- (c) Cover the entire roof area including the ridge; *and*
- (d) Be installed so that there are no gaps that would allow the entry of embers where the sarking meets fascias, gutters, valleys and the like.

Sheet Roofs (Clause 5.6.3)

Sheet roofs shall

- (a) Be fully sarked in accordance with AS3959 Clause 5.6.2, except that foil-backed insulation blankets may be installed over the battens; *or*
- (b) Have any gaps greater than 3mm, 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 2mm, 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.

Verandah, Carport and Awning Roofs (Clause 5.6.4)

The following apply to verandah, carport and awning roofs:

- (a) A verandah, carport or awning roof forming part of the main roof space [see AS3959 Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in AS3959 Clauses 5.6.1, 5.6.2, 5.6.3, 5.6.5 and 5.6.6.
- (b) A verandah, carport or awning roof separated from the main roof space by an external wall [see AS3959 Figures D1(b) and D1(c), Appendix D] complying with AS3959 Clause 5.4 shall have a non-combustible roof covering.

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

Roof Penetrations (Clause 5.6.5)

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 3mm. 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 2mm, made of corrosion-resistant steel, bronze or aluminium.
- (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 AS1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass minimum 4 mm, 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 butterfly closers at or near the ceiling 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.

Eaves Linings, Fascias and Gables (Clause 5.6.6)

The following apply to eaves linings, fascias and gables:

- (a) Gables shall comply with AS3959 Clause 5.4.
- (b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in AS3959 Clause 5.6.5.
- (c) Eaves ventilation openings greater than 3mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2mm, 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.

AS3959 does not provide construction requirements for fascias, bargeboards and eaves linings.

Gutters and Downpipes (Clause 5.6.7)

AS3959 does not provide material 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.

VERANDAHS, DECKS, STEPS, RAMPS AND LANDINGS (Clause 5.7)

General (Clause 5.7.1)

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

Spaced decking is nominally spaced at 3mm (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 0–5mm during service. The preferred dimension for gaps is 3mm (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 5mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

Enclosed subfloor spaces of verandahs, decks, steps, ramps and landings (Clause 5.7.2)

Materials to enclose a subfloor space (Clause 5.7.2.1)

AS3959 does not provide construction requirements for the materials used to enclose a subfloor space except where those materials are less than 400 mm from the ground.

Where the materials used to enclose a subfloor space are less than 400 mm from the ground, they shall comply with AS3959 Clause 5.4.

Decking, Stair Treads and the Trafficable Surfaces of Ramps and Landings (Clause 5.7.2.4)

AS3959 does not provide construction requirements for decking, stair treads and the trafficable surfaces of ramps and landings that are more than 300mm from a glazed element.

Decking, stair treads and the trafficable surfaces of ramps and landings less than 300mm (measured horizontally at deck level) from glazed elements that are less than 400mm (measured vertically) from the surface of the deck (see AS3959 Figure D2, Appendix D) shall be made from:

- (a) Non-combustible material; *or*
- (b) Bushfire-resisting timber (see AS3959 Appendix F); *or*
- (c) A timber species as specified in AS3959 (Paragraph E1, Appendix E);
- (d) PVC-U; *or*
- (e) A combination of any of Items (a), (b), (c) or (d) above.

Unenclosed Subfloor Spaces of Verandahs, Decks, Steps, Ramps and Landings (Clause 5.7.3)

Decking, Stair Treads and the Trafficable Surfaces of Ramps and Landings (Clause 5.7.3.3)

This Standard does not provide construction requirements for decking, stair treads and the trafficable surfaces of ramps and landings that are more than 300 mm from a glazed element.

Decking, stair treads and the trafficable surfaces of ramps and landings less than 300mm (measured horizontally at deck level) from glazed elements that are less than 400mm (measured vertically) from the surface of the deck (see Figure D2, Appendix D) shall be made from:

- (a) Non-combustible material; *or*
- (b) Bushfire-resisting timber (see AS3959 Appendix F); *or*
- (c) A timber species as specified in AS3959 (Paragraph E1, Appendix E); *or*
- (d) A combination of any of Items (a), (b) or (c) above.

Water and Gas Supply Pipes (Clause 5.8)

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

BUSHFIRE CONSTRUCTION CONDITIONS (BAL 19) as per AS3959

SUB-FLOOR (Clause 6.2)

It is recommended storage of combustible materials beneath a floor does not occur, however should combustible materials be stored, it is recommended the area be protected as materials stored in the sub-floor space may be ignited by embers and cause an impact on the building

EXTERNAL WALLS (Clause 6.4)

Walls (Clause 6.4.1)

That part of an external wall surface that is less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the wall (see AS3959 Figure D3, Appendix D) shall be made from:

- (a) Non-combustible material; *or*
- (b) Fibre-cement external cladding, a minimum of 6 mm in thickness; *or*
- (c) Bushfire-resisting timber (see Appendix F); *or*
- (d) A timber species as specified in Paragraph E1, Appendix E; *or*
- (e) A combination of any of Items (a), (b), (c) or (d) above.

AS3959 does not provide construction requirements for external wall surfaces 400mm or more from the ground or for external wall surfaces 400mm 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 AS3959 Figure D3, Appendix D).

Joints (Clause 6.4.2)

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.

Alternatively, sarking-type material may be applied over the outer face of the frame prior to fixing any external cladding.

Vents and Weepholes (Clause 6.4.3)

Vents and weepholes in external walls shall be screened with mesh with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium, except where they are less than 3mm (see AS3959 Clause 3.6), or are located in an external wall of a subfloor space.

EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS (Clause 6.5)

Bushfire Shutters (Clause 6.5.1)

Bushfire shutters shall:

- (a) Be fixed to the building and be non-removable;
- (b) When in the closed position, have no gap greater than 3mm between the shutter and the wall, the sill or the head;
- (c) Be readily manually openable from either inside or outside;
- (d) Protect the entire window assembly or door assembly;
- (e) Be made from
 - (i) Non-combustible material; *or*
 - (ii) A timber species as specified in AS3959 (Paragraph E1, Appendix E); *or*
 - (iii) Bushfire-resisting timber as specified in AS3959 (Appendix F); *or*
 - (iv) A combination of any Items (i), (ii) or (iii) above.
- (f) Where perforated, have:
 - (i) Uniformly distributed perforations with a maximum aperture of 3mm when the shutter is providing radiant heat protection or 2mm 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

Screens for Windows and Doors (Clause 6.5.1A)

Where fitted, screens for windows and doors shall have a mesh or perforated sheet with a maximum aperture of 2mm, 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 3mm. The frame supporting the mesh or perforated sheet shall be made from:

- (a) Metal; *or*
- (b) Bushfire-resisting timber (see AS3959 Appendix F); *or*
- (c) A timber species as specified in AS3959 (Paragraph E2, Appendix E).

Windows (Clause 6.5.2)

Window assemblies shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with AS3959 Clause 6.5.1; *or*
- (b) They shall be completely protected externally by screens that comply with AS3959 Clause 6.5.1A. *or*
- (c) They shall comply with the following:

- (i) For window assemblies less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the window frame (see AS3959 Figure D3, Appendix D), window frames and window joinery, shall be made from one of the following:
 - (A) Bushfire-resisting timber (see AS3959 Appendix F); *or*
 - (B) A timber species as specified in AS3959 (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.
- (ii) Externally fitted hardware that supports the sash in its functions of opening and closing, shall be metal.
- (iii) Where glazing is less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings, having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the window frame (see AS3959 Figure D3, Appendix D), the glazing shall be toughened glass minimum 5mm, 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. Where annealed glass is used, both the fixed and openable portions of windows shall be screened externally with screens that comply with AS3959 Clause 6.5.1A.
- (v) Where toughened glass is used, it shall be toughened glass of minimum 5mm and the openable portions of windows shall be screened internally or externally with screens that comply with AS3959 Clause 6.5.1A.
- (vi) Glazed elements that are designed to take internal screens shall use toughened glass of minimum 5mm and the openable portion shall be screened with screens that comply with AS3959 Clause 6.5.1A.

Doors - Side-Hung External Doors, including French Doors, Panel Fold and Bi-Fold Doors (Clause 6.5.3)

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

- (a) They shall be protected by a bushfire shutter that complies with AS3959 Clause 6.5.1; *or*
- (b) They shall be completely protected externally by screens that comply with AS3959 Clause 6.5.1A; *or*
- (c) They shall comply with the following:
 - (i) Doors shall be:
 - (A) non-combustible; *or*
 - (B) a solid timber door, having a minimum thickness of 35mm for the first 400mm above the threshold; *or*
 - (C) a door, including a hollow core door, with a non-combustible kickplate on the outside for the first 400mm above the threshold; *or*
 - (D) a fully framed glazed door, where the framing is made from materials specified for bushfire shutters (see AS3959 Clause 6.5.1), or from a timber species as specified in AS3959 (Paragraph E2, Appendix E).
 - (ii) Where doors incorporate glazing, the glazing shall be toughened glass minimum 5mm.
 - (iii) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.
 - (iv) Where the door frame is less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the door (see AS3959 Figure D3, Appendix D), the door frame shall be made from one of the following:
 - (A) Bushfire-resisting timber (see AS3959 Appendix F); *or*
 - (B) A timber species as specified in AS3959 (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.

Doors - Sliding Doors (Clause 6.5.4)

Sliding doors shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with AS3959 Clause 6.5.1; or
- (b) They shall be completely protected externally by screens that comply with AS3959 Clause 6.5.1A; or
- (c) They shall comply with the following:
 - (i) Any glazing incorporated in sliding doors shall be toughened glass minimum 5mm.
 - (ii) Both the door frame supporting the sliding door and the framing surrounding any glazing shall be made of one of the following:
 - (A) Bushfire-resisting timber (see AS3959 Appendix F); or
 - (B) A timber species as specified in AS3959 (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 AS3959 Clause 6.5.1A.
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 or 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.

Doors - Vehicle Access Doors - Garage Doors (Clause 6.5.5)

The following apply to vehicle access doors:

- (a) The lower portion of a vehicle access door that is within 400mm of the ground when the door is closed (see AS3959 Figure D4, Appendix D) shall be made from:
 - (i) Non-combustible material; or
 - (ii) Bushfire-resisting timber (see AS3959 Appendix F); or
 - (iii) Fibre-cement sheet, a minimum of 6mm 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 3mm.
- (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 AS3959 Figure D4, Appendix D).
- (d) Vehicle access doors shall not include ventilation slots.

ROOFS, INCLUDING VERANDAH AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES (Clause 6.6)

General (Clause 6.6.1)

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 3mm, 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 2mm, made of corrosion-resistant steel, bronze or aluminium.

Tiled Roofs (Clause 6.6.2)

Tiled roofs shall be fully sarked. The sarking shall:

- (a) Have a flammability index of not more than 5, when tested to AS 1530.2;
- (b) Be located directly below the roof battens;
- (c) Cover the entire roof area including the ridge; *and*
- (d) Be installed so that there are no gaps that would allow the entry of embers where the sarking meets fascias, gutters, valleys and the like.

Sheet Roofs (Clause 6.6.3)

Sheet roofs shall:

- (a) Be fully sarked in accordance with AS3959 Clause 6.6.2, except that foil-backed insulation blankets may be installed over the battens; or
- (b) Have any gaps greater than 3mm 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 2mm, 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.

Verandah, Carport and Awning Roofs (Clause 6.6.4)

The following apply to verandah, carport and awning roofs:

- (a) A verandah, carport or awning roof forming part of the main roof space [see AS3959 Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in AS3959 Clauses 6.6.1, 6.6.2, 6.6.3, 6.6.5 and 6.6.6.
- (b) A verandah, carport or awning roof separated from the main roof space by an external wall [see AS3959 Figures D1(b) and D1(c), Appendix D] complying with AS3959 Clause 6.4 shall have a non-combustible roof covering.

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

Roof Penetrations (Clause 6.6.5)

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 3mm. 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 2mm, made of corrosion-resistant steel, bronze or aluminium.
- (c) All overhead glazing shall be Grade A safety glass complying with AS1288.
- (d) Glazed elements in roof lights and skylights may be of polymer provided a Grade A safety glass diffuser, complying with AS1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass of minimum 4mm 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 butterfly closers at or near the ceiling level or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium.

Eaves Linings, Fascias and Gables (Clause 6.6.6)

The following apply to eaves linings, fascias and gables:

- (a) Gables shall comply with AS3959 Clause 6.4.
- (b) Eaves penetrations shall be protected the same as for roof penetrations, as specified in AS3959 Clause 6.6.5.
- (c) Eaves ventilation openings greater than 3mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2mm, 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.

AS3959 does not provide construction requirements for fascias, bargeboards and eaves linings.

Gutters and Downpipes (Clause 6.6.7)

This Standard does not provide material 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.

VERANDAHS, DECKS, STEPS, RAMPS AND LANDINGS (Clause 6.7)

General (Clause 6.7.1)

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

Spaced decking is nominally spaced at 3mm (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 0–5mm during service. The preferred dimension for gaps is 3mm (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 5mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

Enclosed Subfloor Spaces of Verandahs, Decks, Steps, Ramps and Landings (Clause 6.7.2)

Materials to Enclose a Subfloor Space (Clause 6.7.2.1)

This Standard does not provide construction requirements for the materials used to enclose a subfloor space except where those materials are less than 400 mm from the ground.

Where the materials used to enclose a subfloor space are less than 400 mm from the ground, they shall comply with AS3959 Clause 6.4.

Decking, Stair Treads and the Trafficable Surfaces of Ramps and Landings (Clause 6.7.2.4)

This Standard does not provide construction requirements for decking, stair treads and the trafficable surfaces of ramps and landings that are more than 300mm from a glazed element.

Decking, stair treads and the trafficable surfaces of ramps and landings less than 300mm (measured horizontally at deck level) from glazed elements that are less than 400mm (measured vertically) from the surface of the deck (see AS3959 Figure D2, Appendix D) shall be made from:

- (a) Non-combustible material; or
- (b) Bushfire-resisting timber (see AS3959 Appendix F); or
- (c) A timber species as specified in AS3959 (Paragraph E1, Appendix E); or
- (d) A combination of any of Items (a), (b), or (c) above.

Unenclosed Subfloor Spaces of Verandahs, Decks, Steps, Ramps and Landings (Clause 6.7.3)

Decking, stair treads and the trafficable surfaces of ramps and landings (Clause 6.7.3.3)

This Standard does not provide construction requirements for decking, stair treads and the trafficable surfaces of ramps and landings that are more than 300mm from a glazed element.

Decking, stair treads and the trafficable surfaces of ramps and landings less than 300mm (measured horizontally at deck level) from glazed elements that are less than 400mm (measured vertically) from the surface of the deck (see AS3959 Figure D2, Appendix D) shall be made from:

- (a) Non-combustible material; or
- (b) Bushfire-resisting timber (see AS3959 Appendix F); or
- (c) A timber species as specified in AS3959 (Paragraph E1, Appendix E); or
- (d) A combination of any of Items (a), (b), or (c) above.

WATER AND GAS SUPPLY PIPES (Clause 6.8)

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

BUSHFIRE CONSTRUCTION CONDITIONS (BAL 29) as per AS3959

SUBFLOOR SUPPORTS (Clause 7.2)

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

- (a) A wall that complies with AS3959 Clause 7.4; or
- (b) A mesh or perforated sheet with a maximum aperture of 2mm, 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:

- (a) Of non-combustible material; or
- (b) Of bushfire-resisting timber (see AS3959 Appendix F); or
- (c) A combination of Items (a) and (b) above.

NOTE: This requirement applies to the principal building only and not to verandahs, decks, steps, ramps and landings (see AS3959 Clause 7.7).

Combustible materials stored in the subfloor space may be ignited by embers and cause an impact to the building.

FLOORS (Clause 7.3)

Elevated floors (Clause 7.3.2)

Enclosed Subfloor Space (Clause 7.3.2.1)

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 AS3959 Clause 7.4; *or*
- (b) A mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium; *or*
- (c) A combination of Items (a) and (b) above.

Unenclosed Subfloor Space (Clause 7.3.2.2)

Where the subfloor space is unenclosed, the bearers, joists and flooring, less than 400mm 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 AS3959 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 AS3959 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 AS1530.8.1

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

EXTERNAL WALLS (Clause 7.4)

Walls (Clause 7.4.1)

Walls shall be one of the following:

- (a) Made of non-combustible material (e.g., full masonry, brick veneer, mud brick, concrete, aerated concrete); *or*
- (b) Made of timber-framed or steel-framed walls that are sarked on the outside of the frame and clad with:
 - (i) Fibre-cement external cladding, a minimum of 6 mm in thickness; *or*
 - (ii) Steel sheet; *or*
 - (iii) Bushfire-resisting timber (see AS3959 Appendix F); *or*
 - (iv) A combination of any of Items (i), (ii) or (iii) above.

or

- (c) A combination of Items (a) and (b) above.

Joints (Clause 7.4.2)

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

Alternatively, sarking-type material can be applied over the frame prior to fixing any external cladding.

Vents and Weepholes (Clause 7.4.3)

Vents and weepholes in external walls shall be screened with a mesh with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium, except where they are less than 3mm (see AS3959 Clause 3.6).

EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS (Clause 5.5)

Bushfire Shutters (Clause 5.5.1)

Bushfire shutters shall:

- (a) Be fixed to the building and be non-removable;
- (b) When in the closed position, have no gap greater than 3mm between the shutter and the wall, the sill or the head;
- (c) Be readily manually openable from either inside or outside;
- (d) Protect the entire window assembly or door assembly;
- (e) Be made from
 - (i) Non-combustible material; *or*
 - (ii) Bushfire-resisting timber as specified in AS3959 (Appendix F); *or*
 - (iii) A combination of any Items (i) or (ii) above.

- (f) Where perforated, have:
 - (i) Uniformly distributed perforations with a maximum aperture of 3mm when the shutter is providing radiant heat protection or 2mm 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

Screens for Windows and Doors (Clause 7.5.1A)

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 AS3959 Appendix F).

Windows (Clause 7.5.2)

Windows shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with AS3959 Clause 7.5.1; *or*
- (b) They shall comply with the following:
 - (i) Window frames and window joinery and shall be made from one of the following:
 - (A) Bushfire-resisting timber (see AS3959 Appendix F); *or*
 - (B) Metal; *or*
 - (C) 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.
 - (ii) Externally fitted hardware that supports the sash in its functions of opening and closing shall be metal.
 - (iii) Glazing shall be toughened glass minimum 5mm.
 - (iv) Where glazing is less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the window frame (see AS3959 Figure D3, Appendix D), that portion shall be screened externally with a screen that complies with AS3959 Clause 7.5.1A.
 - (v) The openable portions of windows shall be screened internally or externally with screens that comply with AS3959 Clause 7.5.1A.

Doors - Side-Hung External Doors, including French Doors, Panel Fold and Bi-Fold Doors (Clause 7.5.3)

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

- (a) They shall be protected by a bushfire shutter that complies with AS3959 Clause 7.5.1; *or*
- (b) They shall be completely protected externally by screens that comply with AS3959 Clause 7.5.1A; *or*
- (c) They shall comply with the following:
 - (i) Doors shall be:
 - (A) Non-combustible; *or*
 - (B) A solid timber door, having a minimum thickness of 35mm for the first 400mm above the threshold; *or*
 - (C) A door, including a hollow core door, protected externally by a screen that complies with AS3959 Clause 7.5.1A; *or*
 - (D) A fully framed glazed door, where the framing is made from non-combustible materials or from bushfire-resisting timber (see AS3959 Appendix F).
 - (ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.
 - (iii) Where doors incorporate glazing, the glazing shall be toughened glass minimum 6mm.
 - (iv) Where glazing is less than 400mm from the ground or less than 400mm above decks, carport roofs, awnings and similar elements or fittings having an angle less than 18 degrees to the horizontal and extending more than 110mm in width from the door (see Figure D3, Appendix D), that portion shall be screened externally with screens that comply with AS3959 Clause 7.5.1A.
 - (v) Door frames shall be made from one of the following:
 - (A) Bushfire-resisting timber (see Appendix F); *or*

- (B) Metal; or
 - (C) 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.
- (vi) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.
- (vii) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.

Doors - Sliding Doors (Clause 7.5.4)

Sliding doors shall comply with one of the following:

- (a) They shall be protected by a bushfire shutter that complies with AS3959 Clause 7.5.1; or
- (b) They shall be completely protected externally by screens that comply with AS3959 Clause 7.5.1A; or
- (c) They shall comply with the following:
 - (i) Both the door frame supporting the sliding door and the framing surrounding any glazing shall be one of the following:
 - (A) Bushfire-resisting timber (see AS3959 Appendix F); or
 - (B) Metal; or
 - (C) 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.
 - (ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.
 - (iii) Where sliding doors incorporate glazing, the glazing shall be toughened glass minimum 6 mm, except where both the fixed and openable portions of doors are screened externally with screens that comply with AS3959 Clause 7.5.1A.
 - (iv) Sliding doors shall be tight-fitting in the frames.

Doors - Vehicle Access Doors - Garage Doors (Clause 7.5.5)

The following apply to vehicle access doors:

- (a) Vehicle access doors 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 combination of any of Items (i), (ii) or (iii) 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 3mm.
- (c) Roller doors shall have guide tracks with a maximum gap no greater than 3mm and shall be fitted with a nylon brush that is in contact with the door (see AS3959 Figure D4, Appendix D).
- (d) Vehicle access doors shall not include ventilation slots.

ROOFS, INCLUDING VERANDAH AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES (Clause 7.6)

General (General 7.6.1)

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 3mm, 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 2mm, made of corrosion-resistant steel, bronze or aluminium.
- (d) A pipe or conduit that penetrates the roof covering shall be non-combustible.

Tiled Roofs (Clause 7.6.2)

Tiled roofs shall be fully sarked. The sarking shall:

- (a) Have a flammability index of not more than 5, when tested to AS1530.2;
- (b) Be located directly below the roof battens;
- (c) Cover the entire roof area including the ridge; and
- (d) Extend into gutters and valleys.

Sheet Roofs (Clause 7.6.3)

Sheet roofs shall:

- (a) Be fully sarked in accordance with Clause 7.6.2, except that foil-backed insulation blankets may be installed over the battens; or
- (b) Have any gaps greater than 3 mm 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.

Verandah, Carport and Awning Roofs (Clause 7.6.4)

The following apply to verandah, carport and awning roofs:

- (a) A verandah, carport or awning roof forming part of the main roof space [see AS3959 Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in AS3959 Clauses 7.6.1, 7.6.2, 7.6.3, 7.6.5 and 7.6.6.
- (b) A verandah, carport or awning roof separated from the main roof space by an external wall [see AS3959 Figures D1(b) and D1(c), Appendix D] complying with Clause 7.4 shall have a non-combustible roof covering and the support structure shall be:
 - (i) Of non-combustible material; or
 - (ii) Bushfire-resisting timber (see AS3959 Appendix F); or
 - (iii) Timber rafters lined on the underside with fibre-cement sheeting a minimum of 6 mm in thickness, or with material complying with AS1530.8.1; or
 - (iv) A combination of any of Items (i), (ii) or (iii) above.

Roof Penetrations (Clause 7.6.5)

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 3mm. The material used to flash 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 2mm, made of corrosion-resistant steel, bronze or aluminium.
- (c) All overhead glazing shall be Grade A safety glass complying with AS1288.
- (d) Glazed elements in roof lights and skylights may be of polymer provided a Grade A safety glass diffuser, complying with AS1288, is installed under the glazing. Where glazing is an insulating glazing unit (IGU), Grade A toughened safety glass minimum 4 mm, shall be used in the outer pane of the IGU.
- (e) Where roof lights are installed in roofs having a pitch of less than 18 degrees to the horizontal, the glazing shall be protected with ember guards made from a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium.
- (f) Evaporative cooling units shall be fitted with butterfly closers at or near the ceiling level, or the unit shall be fitted with non-combustible covers with a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium.
- (g) External single pane glazed elements of roof lights and skylights, where the pitch of the glazed element is 18 degrees or less to the horizontal, shall be protected with ember guards made from a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium.

Eaves Linings, Fascias and Gables (Clause 7.6.6)

The following apply to eaves linings, fascias and gables:

- (a) Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.
- (b) Gables shall comply with AS3959 Clause 7.4.
- (c) Fascias and bargeboards shall:
 - (i) Where timber is used, be made from bushfire-resisting timber (see AS3959 Appendix F); or
 - (ii) Where made from metal, be fixed at 450mm centres; or
 - (iii) Be a combination of Items (i) and (ii) above.
- (d) Eaves linings shall be:
 - (i) Fibre-cement sheet, a minimum 4.5mm in thickness; or
 - (ii) Bushfire-resisting timber (see AS3959 Appendix F); or
 - (iii) A combination of Items (i) and (ii) above.
- (e) Eaves penetrations shall be protected the same as for roof penetrations (see AS3959 Clause 7.6.5).

- (f) Eaves ventilation openings greater than 3mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium.

Gutters and Downpipes (Clause 7.6.7)

This Standard does not provide construction-specific material requirements for downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

With the exception of box gutters, gutters shall be metal or PVC-U.

Box gutters shall be non-combustible and flashed at the junction with the roof, with non-combustible materials.

VERANDAHS, DECKS, STEPS, RAMPS AND LANDINGS (Clause 7.7)

General (Clause 7.7.1)

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

Spaced decking is nominally spaced at 3mm (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 0–5mm during service. The preferred dimension for gaps is 3mm (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 5mm spacing afford opportunity for embers to become lodged in between timbers, which may contribute to a fire. Larger gap spacings of 10mm may preclude this from happening but such a spacing regime may not be practical for a timber deck.

Enclosed Subfloor Spaces of Verandahs, Decks, Steps, Ramps and Landings (Clause 7.7.2)

Materials to Enclose a Subfloor Space (Clause 7.7.2.1)

The subfloor spaces of verandahs, decks, steps, ramps and landings are considered to be ‘enclosed’ when:

- (a) The material used to enclose the subfloor space complies with AS3959 Clause 7.4; *and*
- (b) All openings greater than 3mm are screened with a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium.

Decking, Stair Treads and the Trafficable Surfaces of Ramps and Landings (Clause 7.7.2.4)

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 AS3959 Appendix F); *or*
- (c) A combination of Items (a) and (b) above.

Unenclosed Subfloor Spaces of Verandahs, Decks, Steps, Ramps and Landings (Clause 7.7.3)

Supports (Clause 7.7.3.1)

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

- (a) Of non-combustible material; *or*
- (b) Of bushfire-resisting timber (see AS3959 Appendix F); *or*
- (c) A combination of Items (a) and (b) above.

Framing (Clause 7.7.3.2)

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

- (a) Of non-combustible material; *or*
- (b) Of bushfire-resisting timber (see AS3959 Appendix F); *or*
- (c) A combination of Items (a) and (b) above.

Decking, Stair Treads and the Trafficable Surfaces of Ramps and Landings (Clause 7.7.3.3)

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 AS3959 Appendix F); *or*
- (c) A combination of Items (a) and (b) above.

Balustrades, Handrails or Other Barriers (Clause 7.7.4)

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 AS3959 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.

WATER AND GAS SUPPLY PIPES (Clause 7.8)

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

BUSHFIRE CONSTRUCTION CONDITIONS (BAL 40) as per AS3959

SUBFLOOR SUPPORTS (Clause 8.2)

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with a wall that complies with Clause 8.4.

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

- (a) Of non-combustible material; *or*
- (b) A system complying with AS1530.8.1; *or*
- (c) A combination of Items (a) and (b) above.

NOTE: This requirement applies to the principal building only and not to verandahs, decks, steps, ramps and landings (see AS3959 Clause 8.7).

Combustible materials stored in the subfloor space may be ignited by embers and cause an impact to the building.

FLOORS (Clause 8.3)

Elevated Floors (Clause 8.3.2)

Unenclosed Subfloor Spaces (Clause 8.3.2.2)

Where the subfloor space is unenclosed, the bearers, joists and flooring, shall:

- (a) Be non-combustible; *or*
- (b) Have the underside of the combustible elements of the floor system protected with a non-combustible material (e.g., fibre-cement sheet or metal sheet); *or*
- (c) Be a system complying with AS1530.8.1; *or*
- (d) Be a combination of any of Items (a), (b) or (c) above.

EXTERNAL WALLS (Clause 8.4)

Walls (Clause 8.4.1)

Walls shall be one of the following:

- (a) Walls made from non-combustible material (e.g., full masonry, brick veneer, mud brick, concrete, aerated concrete); *or*
- (b) Timber-framed or steel-framed walls that are sarked on the outside of the frame and clad with:
 - (i) Fibre-cement external cladding, a minimum of 9mm in thickness; *or*
 - (ii) Steel sheeting; *or*
 - (iii) A combination of Items (i) and (ii) above.

or

- (c) A system complying with AS1530.8.1.

or

- (d) A combination of any of Items (a), (b) or (c) above.

Joints (Clause 8.4.2)

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

Alternatively, sarking-type material may be applied over the frame prior to fixing any external cladding.

Vents and Weepholes (Clause 8.4.3)

Vents and weepholes in external walls shall be screened with a mesh with a maximum aperture of 2mm, made of corrosion-resistant steel or bronze except where they are less than 3mm (see AS3959 Clause 3.6).

EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS (Clause 8.5)

Bushfire Shutters (Clause 8.5.1)

Bushfire shutters shall:

- (g) Be fixed to the building and be non-removable;
- (h) When in the closed position, have no gap greater than 3mm between the shutter and the wall, the sill or the head;
- (i) Be readily manually openable from either inside or outside;
- (j) Protect the entire window assembly or door assembly;
- (k) Be made from non-combustible material.

- (l) Where perforated, have:
 - (i) Uniformly distributed perforations with a maximum aperture of 3mm when the shutter is providing radiant heat protection or 2mm 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

Screens for Windows and Doors (Clause 8.5.1A)

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 or bronze. 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 metal.

Windows (Clause 8.5.2)

Window assemblies shall comply with one of the following:

- (e) They shall be completely protected by a bushfire shutter that complies with AS3959 Clause 8.5.1; *or*
- (f) They shall comply with the following:
 - (i) Window frames and hardware shall be metal.
 - (ii) Glazing shall be toughened glass minimum 6mm.
 - (iii) Both the openable and fixed portions of the window shall be screened externally with screens that comply with AS3959 Clause 8.5.1A.
 - (iv) Seals to stiles, head and sills or thresholds shall be manufactured from materials having a flammability index no greater than 5 or from silicone.

Doors - Side-Hung External Doors, including French Doors, Panel Fold and Bi-Fold Doors (Clause 8.5.3)

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

- (a) They shall be protected by a bushfire shutter that complies with AS3959 Clause 8.5.1; *or*
- (b) They shall comply with the following:
 - (i) Doors shall be:
 - (A) Non-combustible; *or*
 - (B) A solid timber door, having a minimum thickness of 35mm for the first 400mm above the threshold and protected on the outside by a metal-framed screen door with a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel or bronze; *or*
 - (C) A fully framed glazed door where the framing is made from non-combustible material.
 - (ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be made of metal.
 - (iii) Where doors incorporate glazing, the glazing shall be toughened glass minimum 6mm.
 - (iv) Where glazing is less than 400mm from the ground or less than 400mm 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 AS3959 Figure D3, Appendix D), that portion of the glazing shall be screened externally with a screen that complies with AS3959 Clause 8.5.1A.
 - (v) Seals to stiles, head and sills or thresholds shall be manufactured from materials with a flammability index no greater than 5 or from silicone.
 - (vi) Door frames shall be metal.
 - (vii) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.
 - (viii) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.

Doors - Sliding Doors (Clause 8.5.4)

Sliding doors shall comply with one of the following:

- (a) They shall be protected by a bushfire shutter that complies with AS3959 Clause 8.5.1; *or*
- (b) They shall comply with the following:
 - (i) Both the door frame supporting the sliding door and the framing surrounding any glazing shall be metal.
 - (ii) Externally fitted hardware that supports the panel in its functions of opening and closing shall be metal.

- (iii) Where sliding doors incorporate glazing, the glazing shall be toughened glass minimum 6 mm and both the fixed and openable portions of doors shall be screened externally with screens that comply with AS3959 Clause 8.5.1A.
- (iv) Seals to stiles, head and sills or thresholds shall be manufactured from materials with a flammability index no greater than 5 or from silicone.
- (v) Sliding doors shall be tight-fitting in the frames.

Doors - Vehicle Access Doors - Garage Doors (Clause 8.5.5)

The following apply to vehicle access doors:

- (a) Vehicle access doors shall be non-combustible.
- (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 3mm.
- (c) Roller doors shall have guide tracks with a maximum gap no greater than 3mm and shall be fitted with a nylon brush that is in contact with the door (see AS3959 Figure D4, Appendix D).
- (d) Vehicle access doors shall not include ventilation slots.

ROOFS, INCLUDING VERANDAH AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES (Clause 8.6)

General (Clause 8.6.1)

The following provisions 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 3mm, 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 2mm, made of corrosion-resistant steel or bronze.
- (d) A pipe or conduit that penetrates the roof covering shall be non-combustible.

Roof-mounted evaporative coolers are excluded from this level (i.e., BAL—40).

Tiled roofs (Clause 8.6.2)

Tiled roofs shall be fully sarked. The sarking shall:

- (a) Have a flammability index of not more than 5, when tested to AS1530.2;
- (b) Be located directly below the roof battens;
- (c) Cover the entire roof area including the ridge; *and*
- (d) Extend into gutters and valleys.

Sheet Roofs (Clause 8.6.3)

Sheet roofs shall:

- (a) Be fully sarked in accordance with AS3959 Clause 8.6.2, except that foil-backed insulation blankets may be installed over the battens; *or*
- (b) Have any gaps greater than 3mm 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 2mm, made of corrosion-resistant steel or bronze; *or*
 - (ii) Mineral wool; *or*
 - (iii) Other non-combustible material; *or*
 - (iv) A combination of any of Items (i), (ii) or (iii) above.

Verandah, Carport and Awning Roofs (Clause 8.6.4)

The following apply to verandah, carport and awning roofs:

- (a) A verandah, carport or awning roof forming part of the main roof space [see AS3959 Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in AS3959 Clauses 8.6.1, 8.6.2, 8.6.3, 8.6.5 and 8.6.6.
- (b) A verandah, carport or awning roof separated from the main roof space by an external wall [see AS3959 Figures D1(b) and D1(c), Appendix D] complying with AS3959 Clause 8.4 shall have a non-combustible roof covering and the support structure shall be:
 - (i) Of non-combustible material; *or*
 - (ii) timber rafters lined on the underside with fibre-cement sheeting a minimum of 6mm in thickness, or with material complying with AS1530.8.1; *or*
 - (iii) A system complying with AS1530.8.1; *or*
 - (iv) A combination of any of Items (i), (ii) or (iii) above.

Roof Penetrations (Clause 8.6.5)

The following apply to roof penetrations:

- (a) Roof penetrations, including roof lights, roof ventilators, aerials, vent pipes and supports for solar collectors, shall be adequately sealed at the roof to prevent gaps greater than 3mm. The material used to flash the penetration shall be non-combustible.
- (b) Glazed assemblies for roof lights and skylights shall have an FRL of –/30/–.
- (c) External single pane glazed elements of roof lights and skylights, where the pitch of the glazed element is 18 degrees or less to the horizontal, shall be protected with ember guards made from a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel or bronze.

Eaves Linings, Fascias and Gables (Clause 8.6.6)

The following apply to eaves linings, fascias and gables:

- (a) Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.
- (b) Gables shall comply with AS3959 Clause 8.4.
- (c) Fascias and bargeboards shall comply with AS1530.8.1.
- (d) Eaves linings shall be:
 - (i) Fibre-cement sheet, a minimum of 6mm in thickness; or
 - (ii) Calcium silicate sheet, a minimum of 6mm in thickness; or
 - (iii) A combination of Items (i) and (ii) above.
- (e) Eaves penetrations shall be protected the same as for roof penetrations as specified in AS3959 Clause 8.6.5.
- (f) Eaves ventilation openings greater than 3mm 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 or bronze.

Gutters and Downpipes (Clause 8.6.7)

This Standard does not provide construction-specific material requirements for downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

Gutters shall be non-combustible.

Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible materials.

VERANDAHS, DECKS, STEPS, RAMPS AND LANDINGS (Clause 8.7)

Enclosed Subfloor Spaces of Verandahs, Decks, Steps, Ramps and Landings (Clause 8.7.2)

Materials to enclose a subfloor space (Clause 8.7.2.1)

The subfloor spaces of verandahs, decks, steps, ramps and landings are deemed to be 'enclosed' when:

- (a) The material used to enclose the subfloor space complies with AS3959 Clause 8.4; and
- (b) All openings greater than 3mm are screened with a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel or bronze.

Decking, Stair Treads and the Trafficable Surfaces of Ramps and Landings (Clause 8.7.2.4)

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

- (a) Of non-combustible material; or
- (b) A system complying with AS1530.8.1, or
- (c) A combination of Items (a) and (b) above.

Unenclosed Subfloor Spaces of Verandahs, Decks, Steps, Ramps and Landings (Clause 8.7.3)

Supports (Clause 8.7.3.1)

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

- (a) Of non-combustible material; or
- (b) A system complying with AS1530.8.1; or
- (c) A combination of Items (a) and (b) above.

Framing (Clause 8.7.3.2)

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

- (a) Of non-combustible material; or
- (b) A system complying with AS1530.8.1; or
- (c) A combination of Items (a) and (b) above.

Decking, Stair Treads and the Trafficable Surfaces of Ramps and Landings (Clause 8.7.3.3)

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

- (a) Of non-combustible material; or

- (b) A system complying with AS 1530.8.1; or
- (c) A combination of Items (a) and (b) above.

Balustrades, Handrails or Other Barriers (Clause 8.7.4)

Those parts of the handrails and balustrades less than 125 mm from any glazing or any combustible wall shall be of non-combustible material.

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

WATER AND GAS SUPPLY PIPES (Clause 8.8)

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

BUSHFIRE CONSTRUCTION CONDITIONS (BAL FZ) as per AS3959

SUBFLOOR SUPPORTS (Clause 9.2)

This Standard does not provide construction requirements for subfloor supports where the subfloor space is enclosed with a wall that complies with AS3959 Clause 9.4.

Where the subfloor space is unenclosed, systems, including support posts, columns, stumps, piers and poles, shall:

- (a) have an FRL of at least 30/-/- and shall be non-combustible; or
- (b) be a system complying with AS1530.8.2; or
- (c) be a combination of Items (a) and (b) above.

NOTE: This requirement applies to the principal building only and not to verandahs, decks, steps, ramps and landings (see AS3959 Clause 9.7).

Combustible materials stored in the subfloor space may be ignited by embers and cause an impact to the building.

FLOORS (Clause 9.3)

Elevated Floors (Clause 9.3.2)

Unenclosed subfloor spaces (Clause 9.3.2.2)

Where the subfloor space is unenclosed, the floor system, including bearers, joist and flooring, shall:

- (a) Have an FRL of at least 30/30/30 and the surface material shall be non-combustible; or
- (b) Have the underside of the combustible elements of the floor system protected with a 30min resistance to incipient spread of fire system; or
- (c) Comply with AS1530.8.2 when tested from the underside; or
- (d) Be a combination of any of Items (a), (b) or (c) above.

EXTERNAL WALLS (Clause 9.4)

Walls (Clause 9.4.1)

Walls shall be one of the following:

- (a) Walls made of non-combustible material (e.g., masonry, brick veneer, mud brick, aerated concrete, concrete) with a minimum of 90mm in thickness; or
- (b) A system complying with AS1530.8.2 when tested from the outside; or
- (c) A system with an FRL of 30/30/30 or -/30/30 when tested from the outside; or
- (d) A combination of any of Items (a), (b) or (c) above.

Joints (Clause 9.4.2)

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

Alternatively, sarking-type material may be applied over the frame prior to fixing any external cladding.

Vents and Weepholes (Clause 9.4.3)

Vents and weepholes in external walls shall be screened with a mesh with a maximum aperture of 2mm, made of corrosion-resistant steel or bronze, except where they are less than 3mm (see AS3959 Clause 3.6).

EXTERNAL GLAZED ELEMENTS AND ASSEMBLIES AND EXTERNAL DOORS (Clause 9.5)

Bushfire Shutters (Clause 9.5.1)

Bushfire shutters shall:

- (a) Be fixed to the building and be non-removable;
- (b) When in the closed position, have no gap greater than 3mm between the shutter and the wall, the sill or the head;
- (c) Be readily manually openable from either inside or outside;

- (d) Protect the entire window assembly or door assembly;
- (e) Bushfire shutters over the door system are not to be perforated
- (f) Where shutters on windows are perforated, have:
 - (i) Uniformly distributed perforations with a maximum aperture of 3mm when the shutter is providing radiant heat protection or 2mm 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
- (g) Comply with AS1530.8.2 when tested from outside

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

Screens for Windows and Doors (Clause 9.5.1A)

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

The frame supporting the mesh or perforated sheet shall be metal.

Windows (Clause 9.5.2)

Window assemblies shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with AS3959 Clause 9.5.1; or
- (b) The openable portion of the window shall be screened internally or externally with a screen that complies with AS3959 Clause 9.5.1A; and either:
 - (i) The window system shall have an FRL of at least $-/30/-$; or
 - (ii) The window system shall comply with AS1530.8.2 when tested from the outside.

Doors - Side-Hung External Doors, including French Doors, Panel Fold and Bi-Fold Doors (Clause 9.5.3)

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

- (a) They shall be protected by a bushfire shutter that complies with AS3959 Clause 9.5.1; or
- (b) They shall comply with the following:
 - (i) All door systems, including door frames and doors with glazed panels, shall:
 - (ii) Have an FRL of at least $-/30/-$; or
 - (iii) Comply with AS1530.8.2 when tested from the outside.
 - (iv) Doors shall be tight-fitting to the door frame and to an abutting door, if applicable.
 - (v) Weather strips, draught excluders or draught seals shall be installed at the base of side-hung external doors.
 - (vi) Seals shall not compromise the FRL or the performance achieved in AS 1530.4.

Doors - Sliding Doors (Clause 9.5.4)

Sliding doors shall comply with one of the following:

- (a) They shall be completely protected by a bushfire shutter that complies with AS3959 Clause 9.5.1; or
- (b) They shall comply with the following:
 - (i) All sliding door systems, including those with glazed panels, shall:
 - (A) Have an FRL of at least $-/30/-$; or
 - (B) Comply with AS1530.8.2 when tested from the outside.
 - (ii) Sliding doors shall be tight-fitting in the frames.

Doors - Vehicle Access Doors - Garage Doors (Clause 9.5.5)

The following apply to vehicle access doors:

- (a) Vehicle access doors shall be non-combustible.
- (b) Where the garage is attached to the building, the requirements of AS3959 Clause 3.2.2(b) shall apply.
- (c) 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 3mm.
- (d) Roller doors shall have guide tracks with a maximum gap no greater than 3mm and shall be fitted with a nylon brush that is in contact with the door (see AS3959 Figure D4, Appendix D).
- (e) Vehicle access doors shall not include ventilation slots.

ROOFS, INCLUDING VERANDAH AND ATTACHED CARPORT ROOFS, PENETRATIONS, EAVES, FASCIAS, GABLES, GUTTERS AND DOWNPIPES (Clause 9.6)

General (Clause 9.6.1)

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

- (a) The roof or roofing system shall comply with AS1530.8.2 when tested from the outside.
- (b) The roof/wall junction shall be sealed, to prevent openings greater than 3mm, 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 2mm, made of corrosion-resistant steel or bronze.
- (d) Pipe or conduit that penetrates the roof covering shall be metal, excluding aluminium. Roof-mounted evaporative coolers are excluded from this level.

Verandah, Carport and Awning Roofs (Clause 9.6.2)

The following apply to verandah, carport and awning roofs:

- (a) A verandah, carport or awning roof forming part of the main roof space [see AS3959 Figure D1(a), Appendix D] shall meet all the requirements for the main roof, as specified in AS3959 Clauses 9.6.1, 9.6.3, and 9.6.4.
- (b) A verandah, carport or awning roof separated from the main roof space by an external wall [see AS3959 Figures D1(b) and D1(c), Appendix D] complying with AS3959 Clause 9.4 shall have a non-combustible roof covering and the support structure shall be:
 - (i) Of non-combustible material; or
 - (ii) Timber rafters lined on the underside with fibre-cement sheet a minimum of 6 mm in thickness, or with material complying with AS1530.8.2; or
 - (iii) A system complying with AS1530.8.2; or
 - (iv) A combination of any of Items (i), (ii) or (iii) above.

Roof Penetrations (Clause 9.6.3)

The following apply to roof penetrations:

- (a) Roof penetrations, including roof lights, roof ventilators, aerials, vent pipes and supports for solar collectors, shall be sealed with mineral fibre at the roof to prevent gaps. Where the gap between the roof covering and the roof penetration is greater than 3mm, the material used to seal the penetration shall be non-combustible.

NOTE: As a general principle, the service penetration should not significantly compromise the performance of the element of construction it penetrates nor should it be a means to allow the passage of burning embers or heat transfer such that fire may spread to the interior of a structure.

- (b) Roof lights and roof ventilators shall be one of the following:
 - (i) A system complying with AS1530.8.2 when tested from the outside; or
 - (ii) A system with an FRL of 30/30/30 or -/30/30 when tested from the outside.

Eaves Linings, Fascias and Gables (Clause 9.6.4)

The following apply to eaves linings, fascias and gables:

- (a) Joints in eaves linings, fascias and gables may be sealed with plastic joining strips or timber storm moulds.
- (b) Gables shall comply with AS3959 Clause 9.4.
- (c) Fascias and bargeboards shall comply with AS1530.8.2.
- (d) Eaves linings shall be:
 - (i) a system with an FRL of -/30/30; or
 - (ii) a system complying with AS1530.8.2; or
 - (iii) a combination of Items (i) and (ii) above.
- (e) Eaves penetrations shall be protected the same as for roof penetrations, as specified in AS3959 Clause 9.6.3.
- (f) Eaves ventilation openings greater than 3mm shall be fitted with ember guards made of non-combustible material or a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel or bronze.

Gutters and Downpipes (Clause 9.6.5)

This Standard does not provide construction-specific material requirements for downpipes.

If installed, gutter and valley leaf guards shall be non-combustible.

Gutters shall be non-combustible.

Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible materials.

VERANDAHS, DECKS, STEPS, RAMPS AND LANDINGS (Clause 9.7)

General (Clause 9.7.1)

Decking shall not be spaced.

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

Enclosed Subfloor Spaces of Verandahs, Decks, Steps, Ramps and Landings (Clause 9.7.2)***Materials to Enclose a Subfloor Space (Clause 9.7.2.1)***

The subfloor spaces of verandahs, decks, steps, ramps and landings are deemed to be 'enclosed' when:

- (a) The material used to enclose the subfloor space complies with AS3959 Clause 9.4; and
- (b) All openings greater than 3mm are screened with a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel or bronze.

Decking, Stair Treads and the Trafficable Surfaces of Ramps and Landings (Clause 9.7.2.4)

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

- (a) Of non-combustible material; or
- (b) Of fibre-cement sheet; or
- (c) A system complying with AS1530.8.2; or
- (d) A combination of any of Items (a), (b) or (c) above.

Unenclosed Subfloor Spaces of Verandahs, Decks, Steps, Ramps and Landings (Clause 9.7.3)***Supports (Clause 9.7.3.1)***

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

- (a) Of non-combustible material; or
- (b) A system complying with AS1530.8.2; or
- (c) A combination of Items (a) and (b) above.

Framing (Clause 9.7.3.2)

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

- (a) Of non-combustible material; or
- (b) A system complying with AS1530.8.2; or
- (c) A combination of Items (a) and (b) above.

Decking, Stair Treads and the Trafficable Surfaces of Ramps and Landings (Clause 9.7.3.3)

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

- (a) Of non-combustible material; or
- (b) Fibre-cement sheet; or
- (c) A system complying with AS1530.8.2; or
- (d) A combination of Items (a), (b) or (c) above.

Balustrades, Handrails or Other Barriers (Clause 9.7.4)

Those parts of the handrails and balustrades less than 125mm from any glazing shall be of non-combustible material.

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

WATER AND GAS SUPPLY PIPES (Clause 9.8)

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