

# Technical Solution Sheet 0.05

## 0: Roof Plumbing

### Sheet Roof Systems in Bushfire Prone Areas (BAL-FZ)

#### AIM

The aim of this technical solution is to inform Practitioners of the two Deemed-to-Satisfy generic roofing system solutions, which can be installed on a dwelling constructed in a Bushfire Attack Level – Flame Zone (BAL - FZ). This technical solution has been created as a result of amendments made to [AS 3959-2009](#) Construction of buildings in bushfire-prone areas.

#### Note:

While [AS 3959](#) is not regulated under plumbing regulations, plumbing practitioners are required to meet the specific construction requirements necessary to comply with the building surveyors requirements.

#### BUILDING REGULATIONS 2018

The *Building Code of Australia* (BCA) is adopted by and forms part of the *Building Regulations 2018*. Part 3.7.4 Bushfire Areas of BCA Volume Two specifies the objectives and performance requirements related to the construction of buildings in bushfire prone areas. [AS 3959](#) is a “Deemed-to-Satisfy” document that if complied with, meets the performance requirements of the BCA.

#### BACKGROUND

In November 2011, [AS 3959](#) was amended in part to incorporate two Deemed-to-Satisfy generic roofing systems for BAL - FZ, that when complied with, meet the performance

requirements of the BCA. These amendments were adopted on 1 May 2012. Prior to these amendments, roofing systems were required to satisfy the test criteria of [AS 1530.8.2 – 2007](#) Part 8.2: Tests on elements of construction for buildings exposed to simulated bushfire attack – Large flaming sources to be able to be installed in bushfire attack level BAL – FZ. The details of the roof system specified in this sheet are the result of testing to [AS 1530.8.2](#) and are now included in Amendment 3 to [AS 3959](#) as a Deemed-to-Satisfy solution.

#### BUSHFIRE ATTACK LEVEL

A Bushfire Attack Level (BAL) is a means of measuring the severity of a buildings potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and is the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire. BAL – FZ is the highest level of bushfire attack as a consequence of direct exposure to flames from the fire front in addition to heat flux and ember attack.

#### GENERAL ROOF REQUIREMENTS

##### General Roofing

The following apply to all types of roofs and roofing systems: The roof / wall junction to 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

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underside of the roof and between the rafters at the line of the wall. Roof ventilation openings, such as gable and roof vents, to 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.

## Roof Penetrations

The following apply to roof penetrations:

Pipe or conduit that penetrates the roof covering to comply with [AS 1530.8.2](#) Roof penetrations, including 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 3 mm, the material used to seal the penetration shall be non-combustible. Roof lights and roof ventilators shall be systems complying with [AS 1530.8.2](#) when tested from the outside with the Deemed-to-Satisfy roof system described in Appendix I of [AS 3959](#)

## Gutters and downpipes

There are no requirements for downpipes. Gutters shall be non-combustible. Leaf guards (gutter & valley) shall be non-combustible. Box gutters shall be non-combustible and flashed at the junction with the roof with non-combustible materials.

### Note:

Evaporative coolers must not be installed where the site has been classified as BAL – FZ

## BAL - FZ METHOD OF COMPLIANT ROOFING SHEET ROOF

Sheet roof construction (see Figure 1 on page 3) shall comprise all the following:

- (a) A continuous membrane of 15 mm tongue and groove plywood fixed to timber or steel rafters or trusses. The face veneer shall be at right angles to the rafter or truss direction and the end joint over rafter edges or, if unavoidable, over a noggling.

The plywood shall be continuous over more than one span and shall be fixed.

Fixings shall be—

- (i) hand-driven nails with 2.8mm minimum diameter flathead or bullet head nails with a minimum length of 40mm;  
or
  - (ii) gun-driven nails with 2.5mm minimum diameter gun nails with a minimum length of 40mm ; or
  - (iii) self-drilled countersunk screws No. 8 X 30;  
or
  - (iv) a combination of (i) (ii) or (iii) above.
- (b) Timber batten with a maximum size of 45 mm × 90 mm (on flat), fixed through the plywood with fixings as required by the site location's tie-down requirements and [AS 1684 - 2010 Residential Timber Framed Construction](#).  
or  
Steel top hat battens 40 mm in height and nominally 0.55 mm in thickness fixed through the plywood to the roof framing as required by the site locations tie-down requirements.
- (c) A glasswool roofing blanket with a minimum R-value of R1.8 and a minimum thickness of 75 mm, laminated with light duty reflective foil, complying with [AS/NZS 4859.1:2002](#) Materials for the thermal insulation of buildings - General criteria and technical provisions and having a density not less than 11 Kg/m<sup>3</sup>, installed in accordance with [AS 3999 - 1992](#) Thermal insulation of dwellings— Bulk insulation—Installation requirements. The reflective foil to be installed facing down and filling the void between the plywood membrane and the sheet roof.

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(d) Corrugated roof sheets with Base Metal Thickness (BMT) between 0.42 mm to 0.6 mm complying with [AS 1445 - 1986](#) Hot-dipped zinc-coated or aluminium/zinc coated steel sheet - 76 mm pitch corrugated fixed to battens with at least one fixing every second corrugation in the field of the roof and at the edge of the roof at locations such as fascia, hip, bargeboard and valley, fixed at every corrugation (see Figure 2 on page 3).

**FIGURE 3 – EXAMPLE OF SELF DRILLING HEX HEAD SCREW**



(e) A mineral wool strip, 115 mm thick and 100 mm wide with a density of not less than 80 kg/m<sup>3</sup>, and having a fusion temperature in excess of 1120°C and long-term surface operating temperature of not less than 650°C, installed –

(i) between the sarking and the ridge cap; and

(ii) above the glasswool roofing blanket compressed to 50% of its thickness into the interface of the roof sheet, fascia and plywood membrane.

(f) A minimum 35 × 35 × 0.55 mm BMT galvanized angle fixed at minimum 600 mm centres along the plywood membrane ridge line to cover gaps.

(g) A 40 × 40 × 40 × 0.55 mm BMT galvanized Z flashing fixed at minimum 600 mm centres along the eaves end into the plywood membrane.

**FIGURE 1 – SHEET ROOF DETAILS**

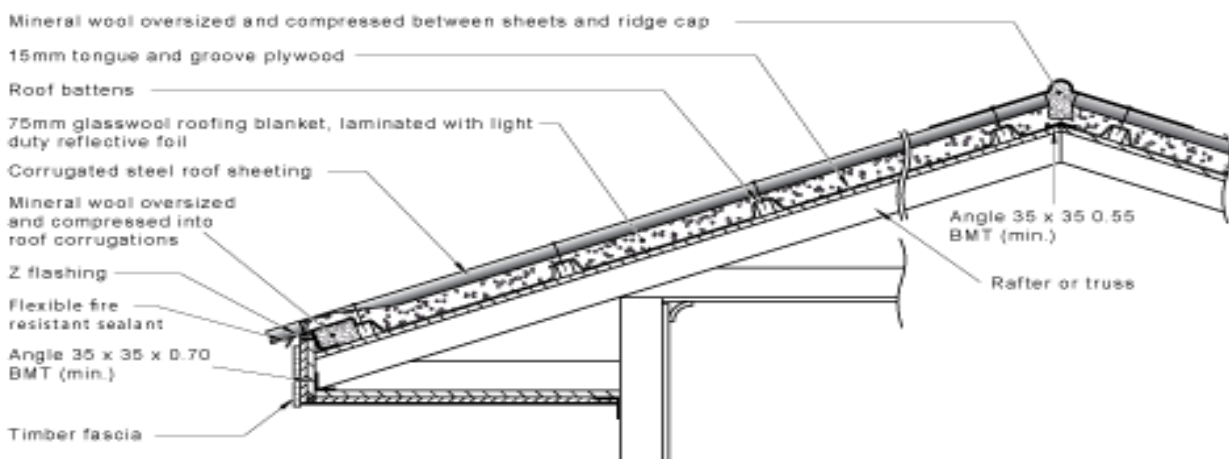


FIGURE 2 – SHEET ROOF FIXING PATTERNS

Second row of screws  
to be fixed on every  
second corrugation

First row of  
screws to be  
fixed on every  
corrugation to  
Z flashing

