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
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 nogging.
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/m3, 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.
(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).

(e) A mineral wool strip, 115 mm thick and 100 mm wide with a density of not less than 80 kg/m3, 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 ×0.55 mm BMT galvanized Z flashing fixed at minimum 600 mm centres along the eaves end into the plywood membrane.
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