

Architectural Design for Bushfire

aaarchitect.com.au



Sydney Architect **Adam Pressley** runs a residential practice designing homes.

"We work to our clients brief, design in 3-dimensions, offering a partial or full service.

We obtain council or complying development approvals and design passive solar energy efficient homes."

Architecture Design in Bushfire Affected Areas

Firstly, what is BAL?

BAL stands for Bushfire Attack Level.

There are 6 BAL levels, BAL -LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ (Flame Zone).

Each BAL level has its own construction requirements.

A Certified Bushfire Consultant is required to determine which BAL is applicable to your property.

This guide only looks at BAL-29, BAL-40 and BAL-Flame Zone affected areas in NSW. Lesser BAL levels are not discussed here.

Note: This is not a comprehensive guide and all recommendations should be checked carefully as no responsibility is accepted for information that is no longer current, for errors or omissions.

Part 1 - Applicable Standards

Legislation you need to be aware of ...

Links to the RFS, NCC and AS

Part 2 - Helpful Definitions

Terminology that has specific meaning ...

Terminology referred to in this guide

Part 3 - BAL-29

Design that can work with Complying Development

Allows bushfire resistant timber

Part 4 - BAL-40

A Development Application (DA) is required

Potential for flame contact and extreme radiant heat

Part 5 - BAL-FZ

The highest level of compliance - Flame Zone

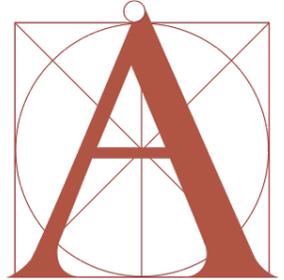
The most restrictive fire rating outside of the National Construction Code's deem to satisfy provisions.

Part 6 - Bushfire products

Products that have been tested for Bushfire zones

Links to producers with bushfire safe products

For more information on our architectural services visit our website www.aaarchitect.com.au



ALL AUSTRALIAN
ARCHITECTURE

Suite 206, 20 Dale St
Brookvale NSW 2100

aaarchitect.com.au

0412 348 575

ABN 95 492 673 232

Adam Pressley FRAIA
Nominated Architect
NSW Reg. No. 6007



Member
Australian Institute
of Architects

Architectural Design for Bushfire

aaarchitect.com.au

Part 1: Applicable Standards

To design for bushfire in NSW you need to be aware of the following resources and standards;

NSW Rural Fire Service (RFS)

Governing body for the NSW fire service.

<http://www.rfs.nsw.gov.au>

NCC

National Construction Code, formerly the BCA, Building Code of Australia, which is updated annually and now available free online;

<https://services.abcb.gov.au/NCCOnline/>

AS 3959-2009

Construction of buildings in bushfire-prone areas.

(Available for purchase from Standards Australia)

<http://www.standards.org.au/Pages/default.aspx>

Other Australian Standards are also referenced from these standards.

Part 2: Helpful Definitions

Bushfire Resisting Timber

Timber species with a density of 650 kg/m or greater may be acceptable to withstand exposure up to BAL-29.

Refer appendix F: AS 3959-2009 for table of tested species.

This table includes commonly available species such as Blackbutt, Spotted Gum and Merbau

Bushfire Shutters

Defined in cl.3.7 AS 3959-2009

Fixed to building, non-removable, must protect entire window or door assembly.

Bushfire shutters are essentially like roller shutters that are triggered by heat to close automatically to protect windows and doors. They can be mounted in their own pelmets or concealed in eaves or bulkheads.

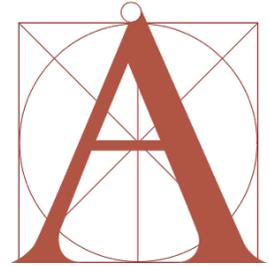
Fire Resistance Levels (FRL)

FRL is the specific measure for the level of fire protection of a particular structure, sometimes referred to as the 'fire rating'.

FRL has 3 parts; Structural adequacy / Integrity / Insulation
ie. -/30/-

Non-combustible

Not deemed combustible as determined by AS 1530.1 or not deemed combustible in accordance with the BCA.



ALL AUSTRALIAN
ARCHITECTURE

Suite 206, 20 Dale St
Brookvale NSW 2100

aaarchitect.com.au

0412 348 575

ABN 95 492 673 232

Adam Pressley FRAIA
Nominated Architect
NSW Reg. No. 6007



Member
Australian Institute
of Architects

Architectural Design for Bushfire

aaarchitect.com.au

Part 3: BAL-29

Attack from burning debris and radiant heat levels between **19 - 29kW/m²**.

Properties affected up to BAL-29 can achieve approval under complying development, but not higher.

Subfloor / Supports

Option 1 - Concrete slab on ground

Option 2 - Enclosed subfloor

(ie. Walls in masonry, concrete, aerated concrete, stone, mud brick)

Option 3 - Tested system

(ie. A proprietary system tested under AS 1530)

Option 4 - Unenclosed but non-combustible

(ie. Steel structure, concrete)

Option 5 - Protected

(ie. Mesh screens of corrosion resistant steel, aluminium or brass, fibre cement sheet)

Option 6 - Unenclosed but with Bushfire Resisting Timber

Bushfire Resistant Timber can be used up to BAL-29 but not higher.

(Excludes verandahs, decks, steps, landings, see cl.7.7 AS 3959-2009.)

Dividing Fences

Dividing Fences need to be of non-combustible material

(ie. masonry, concrete, steel)

Floors

Option 1 - Concrete slab on ground or enclosed subfloor

Option 2 - Tested system

(ie. A proprietary system tested under AS 1530)

Option 3 - Unenclosed but non-combustible

(ie. Steel structure, concrete)

Option 5 - Protected

(ie: sarking / insulation lined particle or plywood flooring)

Option 4 - Unenclosed but with Bushfire Resisting Timber

Joints, Vents and Weepholes

Option 1 - No gaps bigger than 3mm

Option 2 - Sarking to cover frame prior to fixing cladding

Vents and weepholes to be screened with steel or bronze or aluminium mesh

Windows & Doors

Garage doors need to be non-combustible and meet other requirements depending upon their operation.

Option 1 - Bushfire Shutters

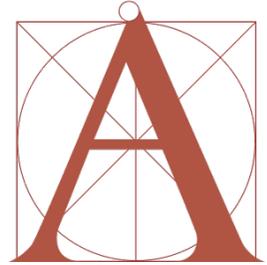
Option 2 - Tested system

(ie. A proprietary system tested under AS 1530)

Option 3 - Specific requirements under AS 3959 -2009

(include only uPVC or metal frames & hardware, toughened glass and metal screening to openable parts.)

Sliding doors and hinge doors are treated differently, as are doors and windows. Screening requirements also vary.



ALL AUSTRALIAN
ARCHITECTURE

Suite 206, 20 Dale St
Brookvale NSW 2100

aaarchitect.com.au

0412 348 575

ABN 95 492 673 232

Adam Pressley FRAIA
Nominated Architect
NSW Reg. No. 6007



Member
Australian Institute
of Architects

Architectural Design for Bushfire

aaarchitect.com.au

Part 4: BAL-40

Attack from burning debris and radiant heat levels between **29 - 40 kW/m²**.

Subfloor / Supports

Option 1 - Concrete slab on ground

Option 2 - Enclosed subfloor

(ie. Walls in masonry, concrete, aerated concrete, stone, mud brick)

Option 3 - Tested system

(ie. A proprietary system tested under AS 1530)

Option 4 - Unenclosed but non-combustible

(ie. Steel structure, concrete)

Dividing Fences

Dividing Fences need to be of non-combustible material

(ie. masonry, concrete, steel)

Bushfire Resistant Timber cannot be used.

Floors

Option 1 - Concrete slab on ground or enclosed subfloor

Option 2 - Tested system

(ie. A proprietary system tested under AS 1530)

Option 3 - Unenclosed but non-combustible

(ie. Steel structure, concrete)

Option 5 - Protected

(ie: Fibre-cement sheet or metal sheet)

Joints, Vents and Weepholes

Option 1 - No gaps bigger than 3mm

Option 2 - Sarking to cover frame prior to fixing cladding

Vents and weepholes to be screened with steel, bronze or aluminium mesh.

Windows & Doors

Garage doors need to be non-combustible and meet other requirements depending upon their operation.

Option 1 - Bushfire Shutters

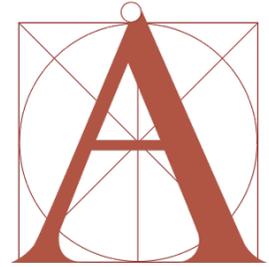
Option 2 - Tested system

(ie. A proprietary system tested under AS 1530)

Option 3 - Specific requirements under AS 3959 -2009

(include only uPVC or metal frames & hardware, toughened glass and metal screening.)

Sliding doors and hinge doors are treated differently, as are doors and windows. Screening requirements also vary.



ALL AUSTRALIAN
ARCHITECTURE

Suite 206, 20 Dale St
Brookvale NSW 2100

aaarchitect.com.au

0412 348 575

ABN 95 492 673 232

Adam Pressley FRAIA
Nominated Architect
NSW Reg. No. 6007



Member
Australian Institute
of Architects

Architectural Design for Bushfire

aaarchitect.com.au

Part 5: BAL-FZ

Attack from burning debris and radiant heat levels between **40+ kW/m²**.

BAL-FZ is outside the scope of the Building Code of Australia's (BCA) deemed to satisfy provisions.

Subfloor / Supports

Option 1 - Concrete slab on ground

Option 2 - Enclosed subfloor

(ie. Walls in masonry, concrete, aerated concrete, stone, mud brick)

Option 3 - Tested system

(ie. A proprietary system tested under AS 1530)

Option 4 - Unenclosed but non-combustible

(ie. Steel structure, concrete)

Option 5 - Protected

(ie. Mesh screens of corrosion resistant steel, aluminium or brass, fibre cement sheet)

Dividing Fences

Dividing Fences need to be of non-combustible material

(ie. masonry, concrete, steel)

Floors

Option 1 - Concrete slab on ground or enclosed subfloor

Option 2 - Tested system

(ie. A proprietary system tested under AS 1530)

Option 3 - Unenclosed but non-combustible

(ie. Steel structure, concrete)

Option 5 - Protected

(ie: Fibre-cement sheet or metal sheet)

Joints, Vents and Weepholes

Option 1 - No gaps bigger than 3mm

Option 2 - Sarking to cover frame prior to fixing cladding

Vents and weepholes to be screened with steel or bronze or aluminium mesh

Windows & Doors

Garage doors need to be non-combustible and meet other requirements depending upon their operation.

Option 1 - Bushfire Shutters

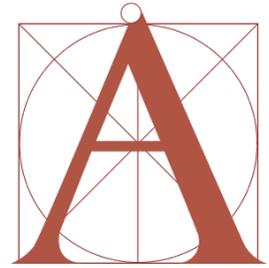
Option 2 - Tested system

(ie. A proprietary system tested under AS 1530)

Option 3 - Specific requirements under AS 3959 -2009

(include only uPVC or metal frames & hardware, toughened glass and metal screening.)

Sliding doors and hinge doors are treated differently, as are doors and windows. Screening requirements also vary.



ALL AUSTRALIAN
ARCHITECTURE

Suite 206, 20 Dale St
Brookvale NSW 2100

aaarchitect.com.au

0412 348 575

ABN 95 492 673 232

Adam Pressley FRAIA
Nominated Architect
NSW Reg. No. 6007



Member
Australian Institute
of Architects

Architectural Design for Bushfire

aaarchitect.com.au

Part 6: Bushfire Products

Windows & Doors

AWS - Architectural Window Systems

AWS have designed a system of BAL-40 bushfire tested products that may reduce the amount of screening needed for doors and windows in bushfire affected areas.

<http://www.bal40windows.com.au/#!about-bal-40-windows/cy7q>

Aneeta

Aneeta have created two ranges of windows designed to work in bushfire affected areas. Their Firesmart sashless windows have been tested up to BAL-40 compliance.

http://www.aneetawindows.com/pdf/general/Aneeta_FireSmart.pdf

Stegbar

Stegbar have designed a range of windows and doors designed to work in bushfire affected areas without the use of screening up to BAL-40

<https://www.stegbar.com.au/~/.media/Files/Stegbar/Stegbar%20Brochure%20Downloads/Stegbar%20Bushfire%20Product%20Range%20Brochure.pdf?as=1&la=en&vs=1>

Airlite

Arlite produce a range of windows and doors designed to work up to BAL-40 with a combination of screened and unscreened windows.

<https://www.airlite.com.au/~/.media/Files/Airlite/Brochures/AirliteBushfireProductRange.pdf?as=1&la=en&vs=1>

NILFIRE

Nilfire have created the Ceasefire range of doors and windows suitable for use in BAL-FZ, without the use of screening on fixed glazing or shutters.

http://www.nilfire.com.au/datasheets/RED_Ceasefire_BAL_FZ_Product%20Information_Sheet.pdf

Timber

Harper Timber

Harper Timbers supply a range of Bushfire Resisting Timbers depending on the BAL rating of the property.

<http://harpertimber.com.au/resources/timber-in-bushfire-prone-areas.php>

Boral Timber

Boral timber supply a range of Bushfire Resisting Timbers depending on the BAL rating of the property

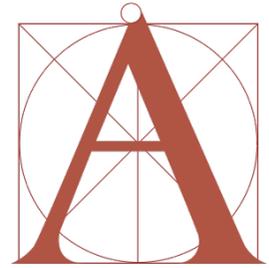
http://www.boral.com.au/brochures/ordering/PDF/12920_NSW%20Bushfire%20broch%20update_Cooee_LR.pdf?pdfName=12920_NSW%20Bushfire%20broch%20update_Cooee_LR.pdf

Weepholes

Weepa

Weepa produce a range of products designed to bushfire protect weepholes, up to BAL-FZ.

<http://weepa.com.au>



ALL AUSTRALIAN
ARCHITECTURE

Suite 206, 20 Dale St
Brookvale NSW 2100

aaarchitect.com.au
0412 348 575

ABN 95 492 673 232

Adam Pressley FRAIA
Nominated Architect
NSW Reg. No. 6007



Member
Australian Institute
of Architects

Architectural Design for Bushfire

aaarchitect.com.au

Decking

UBIQ - INEX Decking

UBIQ have created a decking alternative for bushfire affected area with a cement based decking board that can be coated and stained.

<http://www.ubiq.com.au/ubiq-inexdecking/>

Modwood

Modwood have created a ModWood Flame Shield product tested up to BAL-40. Created from a composite of wood waste and plastic.

<http://www.ubiq.com.au/ubiq-inexdecking/>

Wall Materials

James Hardie

James Hardie has a large selection of products that can be used up to BAL-FZ, including weatherboard sheeting and Matrix cladding.

<http://www.jameshardie.com.au/uploads/file/201502165a5f99-Bush%20Fire%20Prone%20Areas%20Technical%20Supplement%20-%20February%202015.pdf>

UBIQ - INEX Renderboard

UBIQ have created a lightweight rendered board system BAL-FZ rated.

http://www.ubiq.com.au/images/pdfs/INEX_RENDERBOARD_TECHSheet.pdf

Bushfire Shutters

Security Roller Shutters

Security Roller Shutters have had there OZRoll shutters Bushfire tested up to BAL-40.

<http://www.securityrollershutters.com.au/Fire-Protection-Bal-40.php>

Rollashield

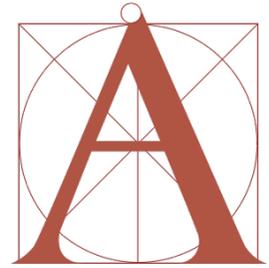
Rollashield have a force shield roller shutter for protection up to BAL-40. These shutters may be made acceptable in BAL-FZ in conjunction with other bushfire strategies.

http://www.rollashieldnsw.com.au/bushfire_resistant_shutters.html

Sonnenschutz

Sonnenschutz have tested there shutters to a BAL-FZ fire protection, with side and rear closing action.

<http://www.sonnenschutz.com.au/bushfire-gallery/>



ALL AUSTRALIAN
ARCHITECTURE

Suite 206, 20 Dale St
Brookvale NSW 2100

aaarchitect.com.au
0412 348 575

ABN 95 492 673 232

Adam Pressley FRAIA
Nominated Architect
NSW Reg. No. 6007



Member
Australian Institute
of Architects