



# A Guide to Windows & Doors in Bushfire Prone Areas



In response to devastating bushfires Australian Standard 3959 has been revised. This booklet is a guide for the different construction requirements for windows and doors



## A Guide to Windows and Doors in Bushfire Prone Areas

In response to recent devastating bushfires, Australian Standard 3959 has been updated and republished AS3959:2009

At the time of publication Victoria and ACT have adopted the new standard for construction. All other states will adopt the new standard in 2010; the Building Code of Australia will reference the new Standard on the 1st May 2010.

The old standard had 4 levels of bushfire attack, the new Standard has 6 levels of severity expressed as Bushfire Attack Levels (BAL):

- BAL - Low
- BAL - 12.5
- BAL - 19
- BAL - 29
- BAL - 40
- BAL - FZ

This booklet is a guide for the different construction requirements for windows and doors in each level.

*This guide is not a replacement for AS 3959:2009, for more information refer to AS 3959:2009 Construction of Buildings in Bushfire Prone Areas.*



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### DISCLAIMER:

*This key message has been developed to provide general guidance, awareness and education to AWA members only. It should not be viewed as a definitive guide and should be read in conjunction with the full Standard AS3959:2009 (visit [www.siaglobal.com.au](http://www.siaglobal.com.au)). While every effort has been made to ensure the information is accurate the AWA expressly disclaims all and any liability to any person for anything done in reliance on this publication. No responsibility is accepted by the AWA for any mistakes, errors or omissions in this publication.*

*Images courtesy of Bradnams Windows, ABC News, News Items Today*

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## 1 Bushfire Attack Levels

**A**S3959:2009 is primarily concerned with improving the ability of buildings in designated bushfire-prone areas to better withstand attack from bushfire thus giving a measure of protection to the building occupants (until the fire front passes) as well as to the building itself.

Research is continuing with regards to the effects of bushfires on buildings, determination of bushfire-prone areas within various States and particular construction techniques designed to maximize the performance of buildings when subjected to bushfire attack. The outcomes of this research will be reflected in subsequent editions of AS3959.

*Note: AS 2047 and AS 1288 must be complied with.*

Bushfire Attack Level (BAL)	Description of predicted bushfire attack and levels of exposure
BAL-LOW	There is insufficient risk to warrant specific construction requirements
BAL-12.5	Ember attack
BAL-19	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux between 12.5 and 19 kW m <sup>2</sup>
BAL-29	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux between 19 and 29 kW m <sup>2</sup>
BAL-40	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux with the increased likelihood of exposure to flames
BAL-FZ	Direct exposure to flames from fire front in addition to heat flux and ember attack

*Bushfire Attack Levels*

## 2 Condensed Explanation of Window & Door Requirements

- Systems tested to AS 1530.8.1 may be used for all levels up to and inclusive of BAL 40
- Systems tested to AS 1530.8.2 may be used for all BAL levels

*If any material, element of construction or system satisfies the test criteria without screening for ember protection, the requirements of this Standard for screening of openable parts of windows or doors shall still apply.*

### a. BAL – Low

Standard window and door products may be used at this level. There are no special requirements.

### b. BAL – 12.5

#### **For windows:**

Comply with one of the following options:

Option 1: Standard windows can be used provided they are completely protected by bushfire shutters complying with AS3959:2009.

Option 2: Standard windows can be used provided they are completely protected by external metal mesh screens with a maximum aperture of 2mm. Screen must be steel, bronze or aluminium wire.

Option 3: Windows must meet the following:

1. All openings must be screened internally or externally with metal screens with maximum aperture of 2mm (steel, bronze or aluminium)
2. Exposed external hardware that supports the sash in its function of opening and closing to be made from metal
3. All glass within 400mm of ground or other structures within 18 degrees of horizontal must be glazed in toughened safety glass minimum 4mm. (refer 4 Diagrams pp.12-13)
4. If windows are within 400mm of ground or other structures within 18 degrees of horizontal (refer 4 Diagrams pp.12-13) they must be manufactured in:
  - a. Bushfire resistant timber – See p.16
  - b. A timber species from p.14 & 15
  - c. Metal this includes aluminium
  - d. uPVC with metal reinforcing

*Note: Internal and External screens must be fitted in a way that does not allow gaps greater than 3mm in diameter.*

#### **For side hung external doors including french and bi-fold doors:**

Option 1: As per windows.

Option 2: As per windows.

Option 3: As per windows above parts 2, 3 & 4 including:

1. Doors must be made of:
  - a. Non combustible; or
  - b. 35mm solid timber for the first 400mm above threshold; or
  - c. Have a non combustible kickplate on the outside for the first 400mm above the threshold; or
  - d. A fully framed glazed door must be made from materials required by AS3959:2009 or a timber species from p.14&15
2. Glazing shall comply with the requirements of windows.
3. Doors shall be tight fitting.
4. Weather strips and draught seals shall be installed at base of side hung external doors.

## 2 Condensed Explanation of Window & Door Requirements

### For external sliding doors:

Option 1: As per windows.

Option 2: As per windows.

Option 3: Sliding doors must meet the following

1. They shall be glazed in Grade A safety glass to AS1288:2006
2. If screened the screen must be steel, bronze or aluminium.

*Note: Sliding doors are not required to be screened.*

3. Sliding doors shall be tight fitting in the frame. The construction of sliding doors should prevent the entry of embers when closed.

### c. BAL – 19

#### For windows

Comply with one of the following options:

Option 1: Standard windows can be used provided they are completely protected by bushfire shutters complying with AS3959:2009.

Option 2: Standard windows can be used provided they are completely protected by external metal mesh screens with a maximum aperture of 2mm. Screen must be steel, bronze or aluminium wire.

Option 3: Windows must meet the following:

1. Where annealed glass is used, glass must be screened externally with metal screens with maximum aperture of 2mm. (steel, bronze or aluminium)
2. If 5mm toughened glass used throughout, openings must be internally or externally screened with metal screens with maximum aperture of 2mm. (steel, bronze or aluminium)
3. Exposed external hardware that supports the sash in its function of opening and closing to be made from metal.
4. All glass within 400mm of ground or other structures within 18 degrees of horizontal (refer 4 Diagrams pp.12-13) must be glazed in toughened safety glass minimum 5mm.
5. If windows are within 400mm of ground or other structures within 18 degrees of horizontal (refer 4 Diagrams pp.12-13) they must be manufactured in:
  - a. Bushfire resistant timber – See p.16
  - b. A timber species from p.14 & 15
  - c. Metal - this includes aluminium
  - d. uPVC with metal reinforcing

*Note: Internal and External screens must be fitted in a way that does not allow gaps greater than 3mm in diameter. Where IGU's are used and 5mm toughened glass is required it only needs to be applied to the external face.*

### For side hung external doors including french and bi-fold doors:

Option 1: As per windows.

Option 2: As per windows.

Option 3: As per windows above parts 2, 3 & 4 including:

1. Doors must be made of:
  - a. Non combustible; or
  - b. 35mm solid timber for the first 400mm above threshold; or
  - c. Have a non combustible kickplate on the outside for the first 400mm above the threshold; or
  - d. A fully framed glazed door must be made from materials required by AS3959:2009 or a timber species from p.14 & 15
2. Glazing shall comply with the requirements of windows.
3. Doors shall be tight fitting.
4. Weather strips, draught seals shall be installed at base of side hung external doors.



## 2 Condensed Explanation of Window & Door Requirements

### For external sliding doors:

Option 1: As per windows.

Option 2: As per windows.

Option 3: Sliding doors must meet the following

1. They shall be glazed in toughened safety glass minimum 5mm.
2. If screened the screen must be steel, bronze or aluminium.

*Note: Sliding doors are not required to be screened.*

3. Sliding doors shall be tight fitting in the frame. The construction of sliding doors should prevent the entry of embers when closed.

### d. BAL – 29

#### For windows

Comply with one of the following options:

Option 1: Standard windows can be used provided they are completely protected by bushfire shutters complying with AS3959:2009.

Option 2: Windows must meet the following:

1. All glazing shall be toughened safety glass minimum 5mm.
2. Window frames shall be made from one of the following:
  - a. Bushfire resistant timber – See p.16
  - b. Metal – this includes aluminium
  - c. uPVC with metal reinforcing
3. Exposed external hardware that supports the sash in its function of opening and closing to be made from metal
4. All glass within 400mm of ground or other structures within 18 degrees of horizontal (refer 4 Diagrams pp.12-13) must be screened externally with metal screens with maximum aperture of 2mm. (steel, bronze or aluminium).
5. All openings must be screened internally or externally with metal screens with maximum aperture of 2mm. (steel, bronze or aluminium)

*Note: Internal and External screens must be fitted in a way that does not allow gaps greater than 3mm in diameter. Where IGU's are used and 5mm toughened glass is required it only needs to be applied to the external face.*

#### For side hung external doors including french and bi-fold doors:

Option 1: As per windows.

Option 2: Are completely protected by external metal mesh screens with a maximum aperture of 2mm. (steel, bronze or aluminium)

Option 3:

1. Doors shall be:
  - a. Non combustible; or
  - b. 35mm solid timber for the first 400mm above threshold; or
  - c. Hollow core doors must be protected externally with metal screens with maximum aperture of 2mm. (steel, bronze or aluminium)
  - d. A fully framed glazed door made from non combustible materials or bushfire resistant timber (p.16).
2. Exposed external hardware must be metal.
3. All glazing shall be toughened safety glass minimum 5mm.
4. All glass within 400mm of ground or other structures within 18 degrees of horizontal (refer 4 Diagrams pp.12-13) must be screened externally with metal screens with maximum aperture of 2mm. (steel, bronze or aluminium).

## 2 Condensed Explanation of Window & Door Requirements

5. Door frames shall be made of:
  - a. Bushfire resisting timber (see p.16) or
  - b. Metal – this includes aluminium or
  - c. uPVC with metal reinforcing
6. Doors shall be tight fitting.
7. Weather strips, draught seals shall be installed at base of side hung external doors.

### For external sliding doors:

Option 1: As per windows.

Option 2: Are completely protected by external metal mesh screens with a maximum aperture of 2mm (steel, bronze or aluminium).

Option 3:

1. Frames shall be made of:
  - a. Bushfire resisting timber (see p.16) or
  - b. Metal – this includes aluminium or
  - c. uPVC with metal reinforcing
2. Exposed external hardware must be metal.
3. All glazing shall be toughened safety glass minimum 6mm.
4. Sliding doors shall be tight fitting in the frame. The construction of sliding doors should prevent the entry of embers when closed.

*Note: Sliding doors are not required to be screened*

### e. BAL – 40

#### For windows

Comply with one of the following options:

Option 1: Standard windows can be used provided they are completely protected by bushfire shutters complying with AS3959:2009 and be made from non combustible material.

Option 2: The window system shall comply with AS 1530.8.1 when tested from the outside

Option 3: Windows must meet the following:

1. All glazing shall be toughened safety glass minimum 5mm.
2. Window frames shall be made from metal – this includes aluminium.
3. Hardware that supports the sash in its function of opening and closing to be made from metal
4. Openable and fixed portions must be screened externally with metal screens with maximum aperture of 2mm (steel or bronze).
5. Seals to stiles, head and sills or thresholds shall be manufactured from a material having a flammability index no greater than 5.

*Note: Internal and External screens must be fitted in a way that does not allow gaps greater than 3mm in diameter. Where IGU's are used and 5mm toughened glass is required it only needs to be applied to the external face.*

#### For side hung external doors including french and bi-fold doors:

Option 1: As per windows.

Option 2: The door system shall comply with AS 1530.8.1 when tested from the outside

Option 3:

1. Doors shall be:
  - a. Non combustible or
  - b. A solid timber door having 35mm solid timber for the first 400mm above the threshold and protected externally with metal screens with maximum aperture of 2mm (steel or bronze) or
  - c. A fully framed glazed door made from non combustible materials.



## 2 Condensed Explanation of Window & Door Requirements

2. Exposed external hardware that supports the panel in its function of opening and closing shall be made of materials that have an FRL of at least –/30/–.
  3. All glazing shall be toughened safety glass minimum 6mm.
  4. All glass within 400mm of ground or other structures within 18 degrees of horizontal must be screened externally with metal screens with maximum aperture of 2mm (steel or bronze).
  5. Door frames shall be made of metal – this includes aluminium.
  6. Doors shall be tight fitting.
  7. Seals to stiles, head and sills or thresholds shall be manufactured from silicone. (AWA recommend a material with a flammability index no greater than 5 as per windows for BAL 40).
  8. Weather strips, draught seals shall be installed at base of side hung external doors.

### For external sliding doors:

Option 1: As per windows.

Option 2: The door system shall comply with AS 1530.8.1 when tested from the outside

Option 3: Are completely protected by external metal mesh screens with a maximum aperture of 2mm (steel, bronze or aluminium).

1. Frames shall be made of metal – this includes aluminium.
2. Exposed external hardware must be metal.
3. Where sliding doors incorporate glazing, all glazing shall be toughened safety glass minimum 6mm, both fixed and openable portions shall be screened externally with metal screens with maximum aperture of 2mm (steel or bronze).
4. Seals to stiles, head and sills or thresholds shall be manufactured from silicone. (AWA recommend a material with a flammability index no greater than 5 as per windows for BAL 40).
5. Sliding doors shall be tight fitting in the frame. The construction of sliding doors should prevent the entry of embers when closed.

### f. BAL – FZ

#### For windows:

Comply with one of the following options:

Option 1: Standard windows can be used provided they are completely protected by bushfire shutters complying with AS3959:2009.

Option 2: Windows must meet the following:

1. The window system shall comply with AS1530.8.2 when tested from the outside.

*Note: All openable portions shall be internally or externally screened with metal screens with maximum aperture of 2mm. (steel or bronze).*

#### For side hung external doors including french and bi-fold doors:

Option 1: Standard doors can be used provided they are completely protected by bushfire shutters complying with AS3959:2009

Option 2: Doors must meet the following:

1. The door system shall comply with AS1530.8.2 when tested from the outside.

#### For external sliding doors:

Option 1: Standard doors can be used provided they are completely protected by bushfire shutters complying with AS3959:2009.

Option 2: Doors must meet the following:

1. The door system shall comply with AS1530.8.2 when tested from the outside.

### 3 Easy guide for window and door requirements

Please note, the summary provided herein is for quick reference purposes only and does not contain the full requirement wording used in the Standard. Please refer directly to the standard for full requirements.

#### Requirements for Windows – Bushfire Attack Level (BAL) 12.5 to FZ

BAL 12.5	BAL 19	BAL 29	BAL 40	BAL FZ
Completely protected by a bushfire shutter compliant with AS3959:2009	Completely protected by a bushfire shutter compliant with AS3959:2009	Completely protected by a bushfire shutter compliant with AS3959:2009	Completely protected by a bushfire shutter compliant with AS3959:2009	Completely protected by a bushfire shutter compliant with AS3959:2009
or	or	or	or	or
Completely protected by external metal mesh screens with max aperture of 2mm (Steel, Bronze or Al)	Completely protected by external metal mesh screens with max aperture of 2mm (Steel, Bronze or Al)		Window frames and hardware shall be metal.	
or	or			
Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of bushfire resistant timber (see p.16)	Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of bushfire resistant timber (see p.16)	Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of bushfire resistant timber (see p.16)		
or	or	or		
Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of timber species from p.14&15	Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of timber species from p.14 & 15			
or	or			
Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of metal	Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of metal	Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of metal		
or	or	or		
Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of metal reinforced uPVC	Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of metal reinforced uPVC	Within 400mm of ground or other structures within 18 degrees of horizontal: Frames & joinery of metal reinforced uPVC		
Sash supporting, opening and closing hardware to be made from metal	Sash supporting, opening and closing hardware to be made from metal	Sash supporting, opening and closing hardware to be made from metal		
Within 400mm of ground or other structures within 18 degrees of horizontal: Grade A safety glass min 4mm	Within 400mm of ground or other structures within 18 degrees of horizontal: Toughened glass min 5mm	Glass shall be 5mm toughened minimum	Glass shall be 5mm toughened minimum	
Above 400mm of ground or other structures within 18 degrees of horizontal: Annealed glass allowable	Above 400mm of ground or other structures within 18 degrees of horizontal: Annealed glass allowable	Within 400mm of ground or other structures within 18 degrees of horizontal: Metal mesh screens with max aperture of 2mm to all glass (Steel, Bronze or Al)		
Openable portions of windows to be screened with metal mesh screens with max aperture of 2mm (Steel, Bronze or Al)	Metal mesh screens with max aperture of 2mm to all annealed glass including fixed glass (Steel, Bronze or Al)	Openable portions of windows to be screened with Metal mesh screens with max aperture of 2mm (Steel, Bronze or Al)	Openable and fixed portions of windows to be screened with metal mesh screens with max aperture of 2mm (Steel or Bronze only)	Openable portions of windows to be screened with metal mesh screens with max aperture of 2mm (Steel or Bronze only)
	Internal or external mesh screens to openable sashes if toughened glass used throughout (Steel, Bronze or Al)		Seals to stiles, heads, sills or thresholds to be of materials having a flammability index no greater than 5	
	or			
	Glazing elements designed to take internal screens shall use toughened glass and openable sashes to be fitted with with metal mesh screens with max aperture of 2mm with no external gaps greater than 3mm (Steel, Bronze or Al)			Window system will comply with AS1530.8.2 when tested from outside.

Denotes increased requirement over previous BAL

Denotes increased requirement over previous BAL


Denotes increased requirement over previous BAL


Denotes increased requirement over previous BAL


### 3 Easy guide for window and door requirements


#### Requirements for Side Hung External Doors (Including French & Bi-fold Doors) – Bushfire Attack Level (BAL) 12.5 to FZ

BAL 12.5	BAL 19	BAL 29	BAL 40	BAL FZ
Completely protected by a bushfire shutter compliant with AS3959:2009 <u>or</u>	Completely protected by a bushfire shutter compliant with AS3959:2009 <u>or</u>	Completely protected by a bushfire shutter compliant with AS3959:2009 <u>or</u>	Completely protected by a bushfire shutter compliant with AS3959:2009 <u>or</u>	Completely protected by a bushfire shutter compliant with AS3959:2009 <u>or</u>
Completely protected by external metal mesh screens with max aperture of 2mm (Steel, Bronze or Al) <u>or</u>	Completely protected by external metal mesh screens with max aperture of 2mm (Steel, Bronze or Al) <u>or</u>	Completely protected by external metal mesh screens with max aperture of 2mm (Steel, Bronze or Al) <u>or</u>		
Shall be: Non-combustible <u>or</u>	Shall be: Non-combustible <u>or</u>	Shall be: Non-combustible <u>or</u>	Shall be: Non-combustible <u>or</u>	All door systems will comply with AS1530.8.2 when tested from outside.
Shall be: A solid timber door with min 35mm thickness for first 400mm above threshold <u>or</u>	Shall be: A solid timber door with min 35mm thickness for first 400mm above threshold <u>or</u>	Shall be: A solid timber door with min 35mm thickness for first 400mm above threshold <u>or</u>	A solid timber door with min 35mm thickness for first 400mm above t/hold and protected outside with metal framed screen door with a metal mesh screen with max aperture of 2mm (Steel or Bronze only), <u>or</u>	Seals shall not compromise the FRL or the performance achieved in AS1530.4
Shall be: A door (inc hollow core) with non combustibile external kick plate for first 400mm above the threshold <u>or</u>	Shall be: A door (inc hollow core) with non combustibile external kick plate for first 400mm above the threshold <u>or</u>	A door (inc hollow core) protected on the outside by a metal mesh screen with max aperture of 2mm (Steel, Bronze or Al) <u>or</u>		
A fully framed glazed door with frame made from materials req'd by AS3959:2009 <u>or</u>	A fully framed glazed door with frame made from materials req'd by AS3559:2009 <u>or</u>	A fully framed glazed door with frame made from non-combustible materials or bushfire resistant timber (Ref p.16) <u>or</u>	A fully framed glazed door with frame made from non-combustible materials.	
A fully framed glazed door made from a timber species from p.14 & 15		Panel supporting, opening and closing hardware to be made from metal	Panel supporting, opening and closing hardware to be made from metal	
Where glazed, glazing as per BAL 12.5 requirements for windows	Where glazed, glazing shall be 5mm toughened minimum	Where glazed, glazing shall be 5mm toughened minimum	Where glazed, glazing shall be 6mm toughened minimum	
Doors shall be tight fitting to door frames and abutting door panels where applicable	Doors shall be tight fitting to door frames and abutting door panels where applicable	Doors shall be tight fitting to door frames and abutting door panels where applicable	Doors shall be tight fitting to door frames and abutting door panels where applicable	Doors shall be tight fitting to door frames and abutting door panels where applicable
		Within 400mm of ground or other structures within 18 degrees of horizontal: That portion shall be screened by a metal mesh screen with max aperture of 2mm (Steel, Bronze or Al)	Within 400mm of ground or other structures within 18 degrees of horizontal: That portion shall be screened by a metal mesh screen with max aperture of 2mm (Steel or Bronze only)	
Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Bushfire Resistant Timber (Ref p16) <u>or</u>	Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Bushfire Resistant Timber (Ref p.16) <u>or</u>	Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Bushfire Resistant Timber (Ref p.16) <u>or</u>	Seals to stiles, heads, sills or thresholds shall be made of silicon	
Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Timber species from p.14 & 15 <u>or</u>	Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Timber Species from p.14 & 15 <u>or</u>		Doorframes shall be metal	
Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Metal frame <u>or</u>	Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Metal frame <u>or</u>	Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Metal frame <u>or</u>		
Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Metal reinforced uPVC	Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Metal reinforced uPVC	Within 400mm of ground or other structures within 18 degrees of horizontal door frames shall be: Metal reinforced uPVC		
Weather strips, draught excluders or draught seals to base of side hung external doors	Weather strips, draught excluders or draught seals to base of side hung external doors	Weather strips, draught excluders or draught seals to base of side hung external doors	Weather strips, draught excluders or draught seals to base of side hung external doors	Weather strips, draught excluders or draught seals to base of side hung external doors

 Denotes increased requirement over previous BAL

 Denotes increased requirement over previous BAL


 Denotes increased requirement over previous BAL


 Denotes increased requirement over previous BAL


### 3 Easy guide for window and door requirements


#### Requirements for External Sliding Doors – Bushfire Attack Level (BAL) 12.5 to FZ

BAL 12.5	BAL 19	BAL 29	BAL 40	BAL FZ
Completely protected by a bushfire shutter compliant with AS3959:2009 <u>or</u>	Completely protected by a bushfire shutter compliant with AS3959:2009 <u>or</u>	Completely protected by a bushfire shutter compliant with Clause AS3959:2009 <u>or</u>	Completely protected by a bushfire shutter compliant with AS3959:2009 <u>or</u>	Completely protected by a bushfire shutter compliant with AS3959:2009 <u>or</u>
Completely protected by external metal mesh screens with max aperture of 2mm (Steel, Bronze or Al) <u>or</u>	Completely protected by external metal mesh screens with max aperture of 2mm (Steel, Bronze or Al) <u>or</u>	Completely protected by external metal mesh screens with max aperture of 2mm (Steel, Bronze or Al) <u>or</u>	The doorframe shall be of metal	
All glazing shall be Grade A safety in accordance with AS1288	Any glazing shall be 5mm toughened minimum	Door frames shall be of bushfire resistant timber (Refer p. 16) or aluminium or steel		All sliding door systems will comply with AS1530.8.2 when tested from outside.
When glazed in accordance with the above, openable panels are not required to have screens.	When glazed in accordance with the above, openable panels are not required to have screens.	Panel supporting, opening and closing hardware to be made from metal	Panel supporting, opening and closing hardware to be made from metal	
If screens are fitted they shall be metal mesh screens with max aperture of 2mm (Steel, Bronze or Al)	If screens are fitted they shall be metal mesh screens with max aperture of 2mm (Steel, Bronze or Al)	Where glazed, glazing shall be 6mm toughened minimum except where both fixed and openable portions of the door are protected with metal mesh screens with max aperture of 2mm (Steel, Bronze or Al)		
			Seals to stiles, heads, sills or thresholds shall be made of silicon	
Sliding doors shall be tight fitting in the frames	Sliding doors shall be tight fitting in the frames	Sliding doors shall be tight fitting in the frames	Sliding doors shall be tight fitting in the frames	Sliding doors shall be tight fitting in the frames

 Denotes increased requirement over previous BAL

 Denotes increased requirement over previous BAL

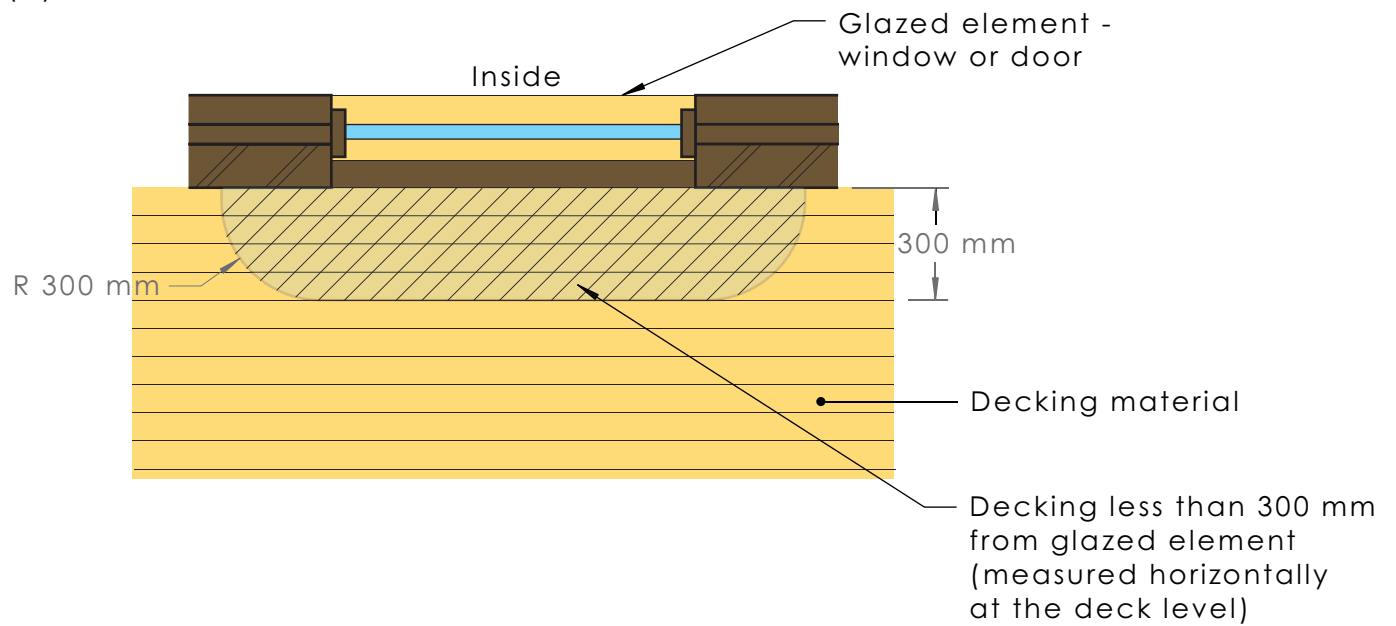
 Denotes increased requirement over previous BAL

 Denotes increased requirement over previous BAL

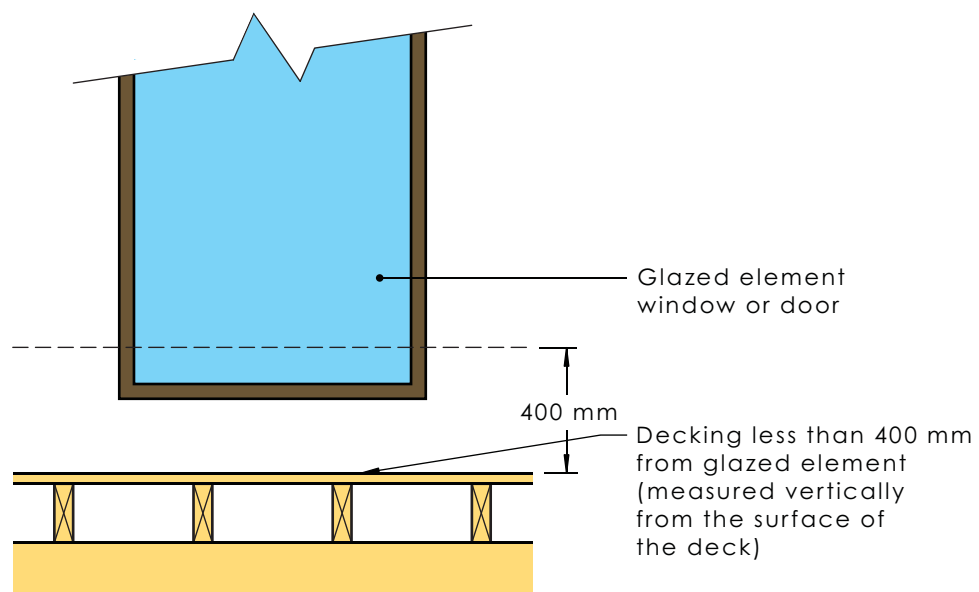
## 4 Diagrams

DIAGRAM A - Decking within Horizontal & vertical Limits of Glazed Elements

(a) Plan view



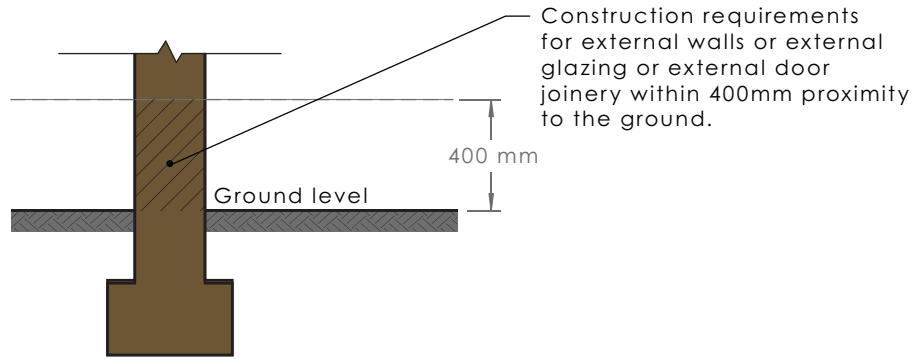
(b) Elevation view



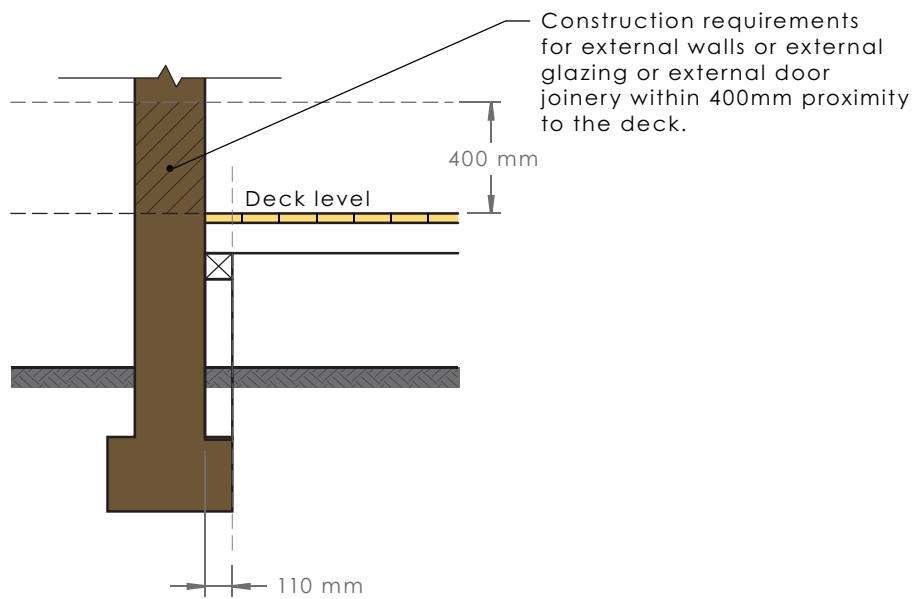
## 4 Diagrams

DIAGRAM B - External Walls Or External Glazing, or External Door Frames Within Limits Above Ground, Decks, Carport Roofs

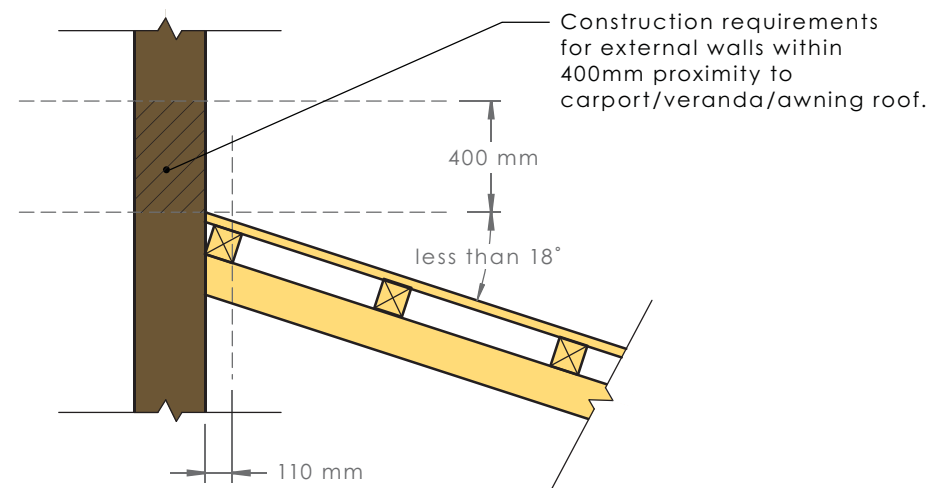
(a)



(b)



(c)





## 5 Timber Species & Densities

Timber species with a density of 650 kg/m<sup>3</sup> or greater at a 12 percent moisture content is suitable for window joinery and doorframes where specified in Sections 5 and 6 of AS3595:2009. Examples of suitable timber species are listed in the table below

Densities of timber species not listed in the table below may be found in AS 1720.2. Many of the timber species listed in Table E2 from various regions of Australia may not be available in all areas.

**NOTE: For more information on timber species & densities please refer to Appendix E of AS3959:2009**

### Timber Species with a Density of 650kg/m<sup>3</sup> or greater

Standard trade name	Botanical name
Ash, alpine	<i>Eucalyptus delegatensis</i>
Ash, Crow's	<i>Eucalyptus sieberi</i>
Ash, mountain	<i>Eucalyptus regnans</i>
Ash, silvertop	<i>Eucalyptus Sieberi</i>
Balau (selangan batu)	<i>Shorea</i> spp.
Bangkirai	<i>Shorea laevifolia</i>
Beech, myrtle	<i>Nothofagus canninghamii</i>
Belian	<i>Eusideroxylon zwageri</i>
Blackbutt	<i>Eucalyptus pilularis</i>
Blackbutt, New England	<i>Eucalyptus andrewsii</i>
Blackwood	<i>Acacia melanoxylon</i>
Box, brush	<i>Lophosteman confertus</i>
Box, grey	<i>Eucalyptus microcarpa</i>
Box, grey, coast	<i>Eucalyptus bosistoana</i>
Box, white-topped	<i>Eucalyptus quadrangulata</i>
Box, yellow	<i>Eucalyptus melliodora</i>
Brownbarrel	<i>Eucalyptus fastigata</i>
Candlebark	<i>Eucalyptus rubida</i>
Cypress, white	<i>Callitris glaucophylla</i>
Gum, blue, southern	<i>Eucalyptus globulus</i>
Gum, blue, Sydney	<i>Eucalyptus saligna</i>
Gum, grey	<i>Eucalyptus propinqua</i>
Gum, grey, mountain	<i>Eucalyptus cypellocarpa</i>
Gum Maiden's	<i>Eucalyptus maidenii</i>
Gum, manna	<i>Eucalyptus viminalis</i>
Gum, mountain	<i>Eucalyptus dalrympleana</i>
Gum, red, forest	<i>Eucalyptus teteticornis</i>
Gum, red, river	<i>Eucalyptus camaldulensis</i>
Gum, rose	<i>Eucalyptus grandis</i>
Gum, shinning	<i>Eucalyptus nitens</i>
Gum, spotted	<i>Corymbia maculata</i> <i>Corymbia henry</i> <i>Corymbia citriodora</i>
Gum, sugar	<i>Eucalyptus cladocalyx</i>
Hardwood, Johnstone River	<i>Backhousia bancroftii</i>
Ironbark, grey	<i>Eucalyptus paniculata</i>
Ironbark, red	<i>Eucalyptus sideroxylon</i>

(continued ...)

## 5 Timber Species & Densities

### Timber Species with a Density of 650kg/m<sup>3</sup> or greater

Standard trade name	Botanical name
Jarrah	<i>Eucalyptus marginata</i>
Kapur	<i>Dryobalanops</i> spp.
Karri	<i>Eucalyptus Diversicolor</i>
Kempas	<i>Koompassia malaccensis</i>
Keruing	<i>Dipterocarpus</i> spp.
Kwila (Merbau)	<i>Intsia bijuga</i>
Mahogany, Philippine Red, dark	<i>Shorea</i> spp.
Mahogany red	<i>Eucalyptus resinifera</i>
Mahogany, southern	<i>Eucalyptus botryoides</i>
Mahogany, white	<i>Eucalyptus acmenoides</i>
Messmate	<i>Eucalyptus obliqua</i>
Messmate, Gympie	<i>Eucalyptus cloeziana</i>
Northern Box (Pelawan)	<i>Tristaniopsis</i> spp.
Oak, American	<i>Quercus</i> spp.
Peppermint, narrow-leaved	<i>Eucalyptus australiana</i>
Pine, celery-top	<i>Phylloeladus asplenifolius</i>
Pine, slash	<i>Pinus elliotii</i>
Ramin	<i>Gorlystulus</i> spp.
Rosewoos, New Guinea	<i>Pterocarpus indicus</i>
Satinay	<i>Syncarpia hillii</i>
Stringybark, Blackdown	<i>Eucalyptus sphaerocarpa</i>
Stringybark, blue-leaved	<i>Eucalyptus agglomerata</i>
Stringybark, brown	<i>Eucalyptus baxteri</i>
Stringybark, silvertop	<i>Eucalyptus laevopinea</i>
Stringybark, white	<i>Eucalyptus eugenioides</i>
Stringybark, yellow	<i>Eucalyptus muellerana</i>
Tallowwood	<i>Eucalyptus microcorys</i>
Taun	<i>Pometia Pinnata</i>
Turpentine	<i>Syncarpia glomulifera</i>
Vitex, New Guinea	<i>Vitex Cofassus</i>
Wollybutt	<i>Eucalyptus longifolia</i>

## 6 Bushfire Resisting Timber

Bushfire-resisting timber is timber that is deemed to be acceptable to withstand exposure up to a BAL—29 condition.

To satisfy the requirements for bushfire-resisting timber, timber shall be tested in accordance with AS/NZS 3837

Current Products that have been tested and are approved for use:

Standard trade name	Botanical name
Ash, silvertop	<i>Eucalyptus sieberi</i>
Blackbutt	<i>Eucalyptus pilularis</i>
Gum, red, river	<i>Eucalyptus camaldulensis</i>
Gum, spotted	<i>Corymbia maculate</i> <i>Corymbia henryi</i> <i>Corymbia citriodora</i>
Ironbark, red	<i>Eucalyptus sideroxylon</i>
Kwila (Merbau)	<i>Intsia bijuga</i>
Turpentine	<i>Syncarpia glomulifera</i>