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Content



- **A little bit about us – who we are and what we do**
- **NCC 2022 – new content and key changes**
- **AS 1288:2021 Glass in Buildings - important changes to balustrades and sloped overhead glazing**
- **Current Issues – common issues and trends affecting our industry**

About AGWA



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- Peak association for the window and glazing industry
- Representing over 1000 member companies covering
 - Window manufacturers,
 - Glass manufacturers,
 - Glass processors,
 - Glaziers, and
 - Suppliers.



Statement of Purpose

We endorse compliant, sustainable and fit-for-purpose products and provide services to members that support their efforts to operate successfully.

About AGWA



The AGWA delivers access to increased expertise for all members and stakeholders in key areas including:

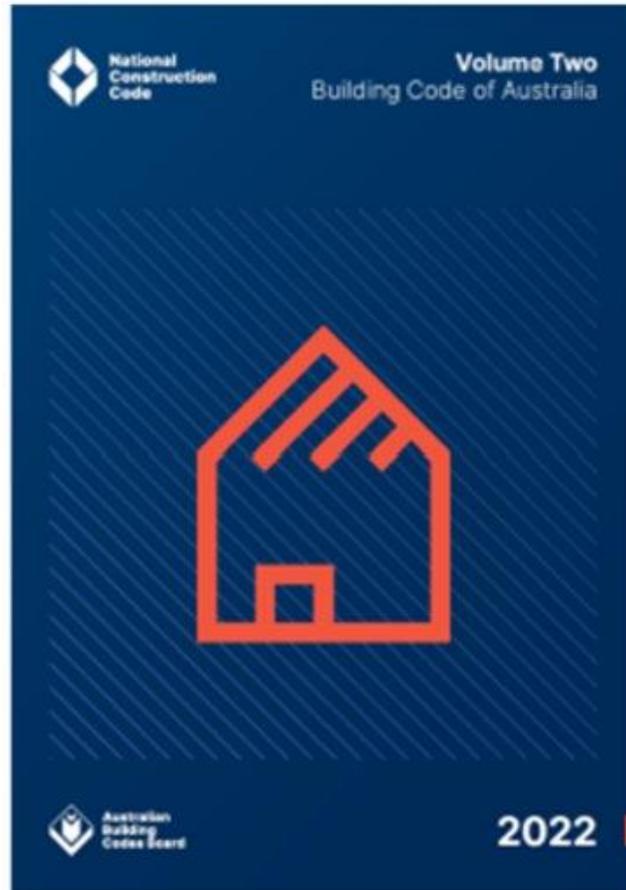
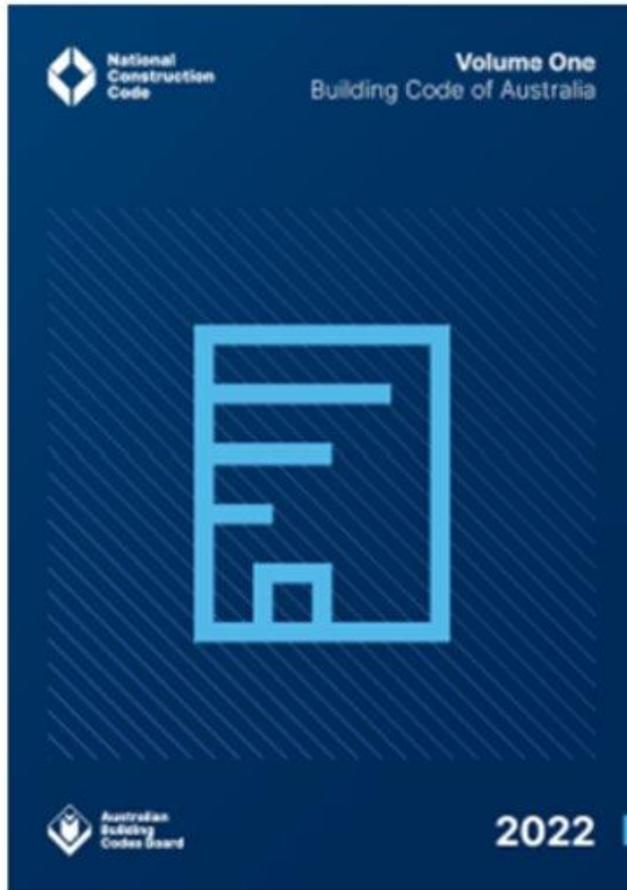
- Technical support
- Training
- Accreditation
- Workplace Health and Safety
- Business and HR support
- Marketing & Communication
- Events



NCC 2022



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NCC2022 Public Comment



Consultation undertaken in two stages.

- **Stage 1** – all proposed NCC amendments except energy efficiency and condensation.

Closed 11th July

- **Stage 2** –energy efficiency and condensation

Closed 17th October



Consistent Volume Structure



- This volume includes:
- Section A: Governing Requirements
 - Sections B to G
 - Sections I to J
 - Schedules



- This volume includes:
- Section A: Governing Requirements
 - Section H
 - Schedules



- This volume includes:
- Section A: Governing Requirements
 - Sections B to E
 - Schedules

Volume Two's Acceptable Construction Practice [ACP] is moved into its own publication called:



and will consist of 12 ABCB Standards:

- Structure
- Site Preparation
- Footings and Slabs
- Masonry
- Framing
- Roof and Wall Cladding
- Glazing
- Fire Safety
- Health and Amenity
- Safe Movement and Access
- Ancillary Provisions
- Energy Efficiency



SPTC Referencing System

Reference	Example	Description
Section	E	Section lettering will for the most part stay as is, e.g.: Section E
Part	3	Parts will remain numbers, e.g.: Part E3 is the third part of section E
Type	V	Refers to the clause type. O, F, P and V are currently used for Objective, Functional Statement, Performance Requirement and Verification Method (respectively). For consistency, 'D' and 'G' have been added across all the volumes when referring to clauses in the D eemed-to-Satisfy Provisions and G overning Requirements.
Clause	2	The last part of the syntax refers to the clause number, within the Type group.
	E3V2	This clause is the 2nd Verification Method in Part E3: <i>Emergency alerts on the use of lifts</i> . The current reference is: EV3.2

SPTC Referencing System

F6D3

Pliable building membrane

[2019: F6.2]

- (1) Where a *pliable building membrane* is installed in an *external wall*, it must—
- (a) comply with AS/NZS 4200.1; and
 - (b) be installed in accordance with AS 4200.2; and
 - (c) be a vapour permeable membrane for *climate zones* 6, 7 and 8; and
 - (d) be located on the exterior side of the primary insulation layer of wall assemblies that form the external envelope of a building.

Key Changes

- Glazing
- Window and Door Installation
 - Flashing
 - Fixing
- Accessibility – ABCB Standard Livable Housing
- Non-combustible building elements
- Energy Efficiency and Condensation

B1P3 Glass installations at risk of human impact (Volume 1)

B1P3 Glass installations at risk of human impact

[2019: BP1.3]

Glass installations that are at risk of being subjected to human impact must have glazing that—

- (a) if broken on impact, will break in a way that has a lower than 0.13% chance of penetrating adult skin ~~is not likely to cause injury to people~~; and
- (b) resists a ~~reasonably foreseeable~~ 541J human impact without breaking; and
- (c) is ~~protected or marked in a way that will reduce the likelihood of human impact~~ visually distinct with:—
 - (i) markings within the visual range of the occupants which achieve a 30% luminance contrast to both the floor and visual background, and of sizes no less than—
 - (A) in parts of a building required to be accessible, 75,000 mm² of glass marked per metre of width, for the full width of the installation; or
 - (B) in parts of a building not required to be accessible, 20,000 mm² of glass marked per metre of width; or
 - (ii) other measures which achieve an equivalent level of visual impact.

H1P1 Structural stability and resistance (Volume 2)



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- (4) Glass installations that are at risk of being subjected to human impact must have **glazing** that—
- (a) if broken on impact, will break in a way that has a lower than 0.13% chance of penetrating adult skin ~~is not likely to cause injury to people~~; and
 - (b) resists a 541J ~~reasonably foreseeable~~ human impact without breaking; and
 - (c) is visually distinct with ~~protected or marked in a way that will reduce the likelihood of human impact~~.
 - (i) markings within the visual range of the occupants which achieve a 30% luminance contrast to both the floor and visual background, and of sizes no less than—
 - (A) in parts of a building required to be accessible, 75,000 mm² of glass marked per metre of width, for the full width of the installation; or
 - (B) in parts of a building not required to be accessible, 20,000 mm² of glass marked per metre of width; or
 - (ii) other measures which achieve an equivalent level of visual impact.



Rationale for Quantification

- Quantification is part of the ABCB's Increased and Competent Use of Performance project.
- The intention is to provide greater clarity, without changing the level of stringency in order to maintain consistency with the levels of performance offered by other pathways.
- The quantification changes proposed for NCC 2022 are only in relation to the Performance Requirements.
- **They do not include changes to the DTS pathway, nor to any existing Verification Methods and, so, will have no impact on DTS Solutions or solutions using the existing Verification Methods.**

Rationale for Quantification



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ABCB

NCC 2022 Public Comment Draft
Supporting information

H1D8 Glazing

- (2) Performance Requirement H1P1 is satisfied for glazed assemblies in an external wall if they are—
- (a) designed and manufactured in accordance with AS 2047; or 
 - (b) installed such that they—
 - (i) comply with Part 8.2 of the ABCB Housing Provisions; and
 - (ii) are in buildings with geometric limits set out in AS 4055 clause 1.2; and
 - (iii) are located in an area with a design wind speed of not more than N3.



D3D19 Openings in Barriers

- (1) Except where allowed by (2), openings in a *required* barrier must not allow a 125 mm sphere to pass through.
- (2) In a *fire-isolated stairway*, *fire-isolated ramp* or other area used primarily for emergency purposes, or in Class 7 (other than *carparks*) or Class 8 buildings, openings in a *required* barrier—
 - (a) must not allow a 300 mm sphere to pass through; or
 - (b) where rails are used—
 - (i) a 150 mm sphere must not be able to pass through the opening between the nosing line of the stair treads and the rail or between the rail and the floor of the landing, balcony or the like; and
 - (ii) the opening between rails must not be more than 460 mm.
- (3) The requirements of (2) cannot be applied to external stairways, ~~or~~ external ramps, or fire-isolated stairways or fire-isolated ramps serving Class 9b early childhood centres.
- (4) For a barrier provided under (1), the maximum 125 mm barrier opening for a stairway, such as a non *fire-isolated stairway*, is measured above the nosing line of the stair treads.
- (5) Where a barrier is fixed to the face of a landing, balcony, deck or the like, the opening between the barrier and the face must not permit a 40 mm sphere to pass through.

D3D19 Openings in Barriers



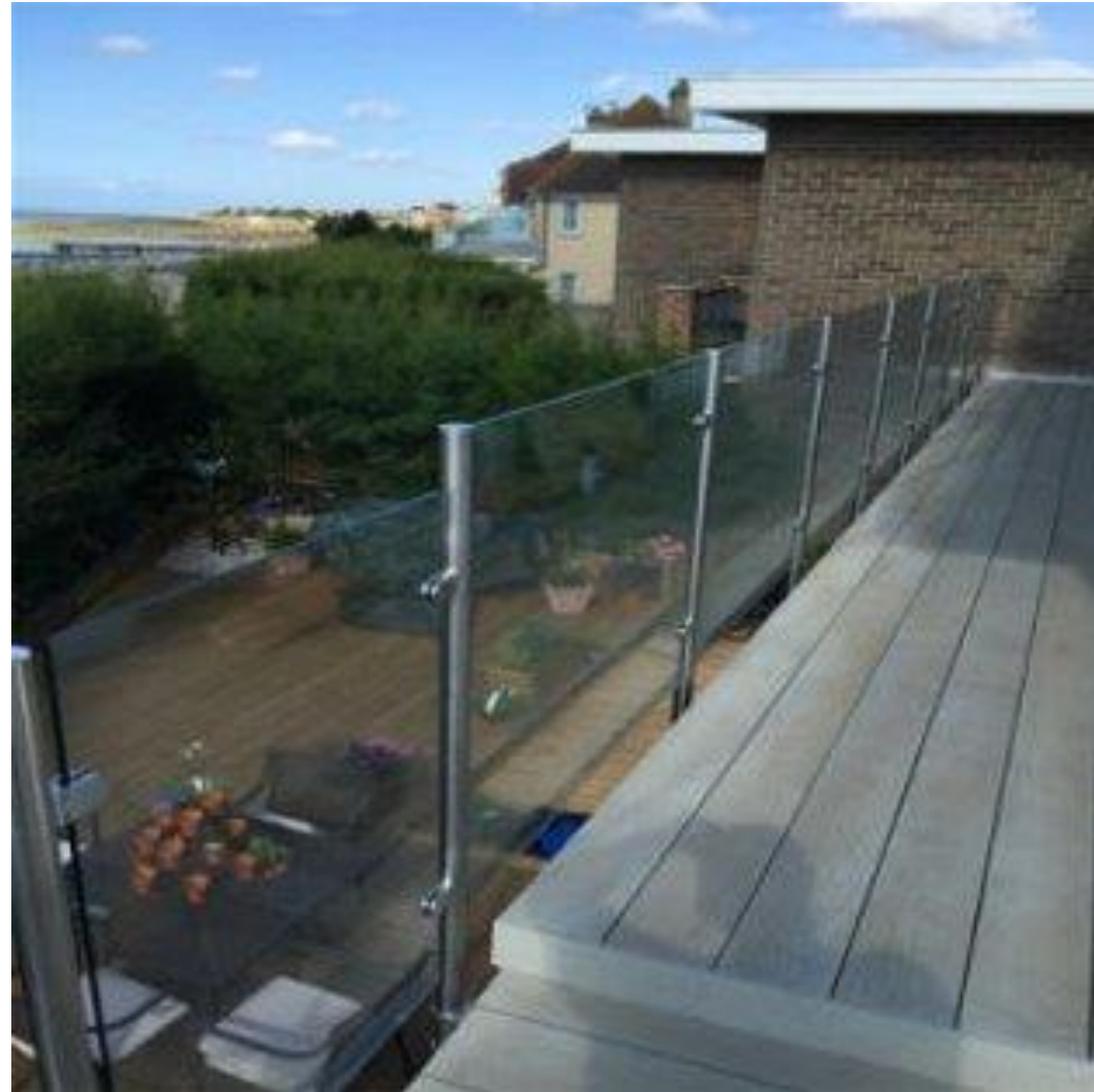
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D3D19 Openings in Barriers



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Part 8.3 Housing Provisions

Table 8.2.3e3.3c: Glass thickness for wind class not exceeding N3: **ordinary monolithic** annealed glass (mm)

Edge (mm)	300	450	600	750	900	1050	1200	1350	1500	1650
300	3	3	3	3	3	3	3	3	3	3
450	3	3	3	3	3	3	3	3	3	3
600	3	3	3	3	3	3	3	3	4	4
750	3	3	3	3	3	3	4	4	4	4
900	3	3	3	3	3	4	4	4	4	4
1050	3	3	3	3	4	4	4	4	45	45
1200	3	3	3	4	4	4	4	45	45	45
1350	3	3	3	4	4	4	45	45	45	5
1500	3	3	4	4	4	45	45	45	55	56
1650	3	3	4	4	4	45	45	56	56	56
1800	3	3	4	4	4	45	45	56	56	56
1950	3	4	4	4	45	45	5	56	56	56
2100	3	4	4	45	45	45	56	56	56	68
2250	3	4	4	45	45	45	56	56	58	68
2400	3	4	4	45	45	45	56	56	68	68
2550	3	4	4	45	5	5	56	56	68	68
2700	3	4	4	45	56	56	56	58	68	68



Part 8.4 Housing Provisions

Table 8.3-24.2: Maximum areas of glazing material for framed glass doors, framed glass side panels and other framed glazed panels

Type of glass	Minimum nominal thickness (mm)		
Patterned or clear ordinary <u>monolithic</u> annealed glass	5		
Patterned or clear ordinary <u>monolithic</u> annealed glass	6		
Grade A toughened and toughened	3	1	
Grade A toughened and toughened laminated safety glass	4	2	
Grade A toughened and toughened laminated safety glass	5	3	
Grade A toughened and toughened laminated safety glass	6	4	
Grade A laminated safety glass	5.38	2.2	
Grade A laminated safety glass	6.38	3	
Grade A laminated safety glass	8.38	5	

PouyaAbtahi 7:01 PM Reply X

1. need to add: wholly or partially within 1200 mm from floor or ground level as per 1288 requirement and figure 8.4.2 in page 476/732

Post

PouyaAbtahi 7:02 PM Reply X

2. 2 or 2.2 m2?

Post



Part 8.4 Housing Provisions

8.3.3 4.3 Door side panels

[2019: 3.6.4.2]



- (1) All framed glass (except leadlight panels) in side panels with their nearest vertical sight line less than 300 mm from the nearest edge of the doorway opening must be Grade A safety glazing material in accordance with ~~Table 8.3.2~~ Table 8.4.2 and ~~Figure 8.3.2~~ Figure 8.4.2, except that—
- (a) where the lowest visible sight line is less than 1.2 m ~~or more a~~ ordinary monolithic annealed glass with a minimum thickness of 5 ~~Table 8.3.3~~ Table 8.4.3 may be used; or

PouyaAbtahi 7:08 PM Reply X

6. add: wholly or partially within 1200 mm from floor or ground level

Post

ished floor level,
~~accordance with~~



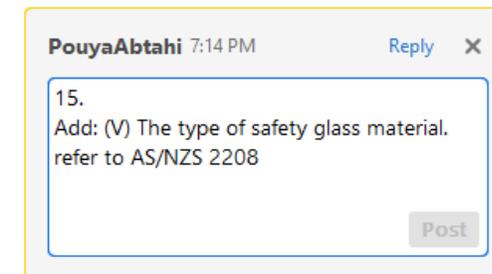
Part 8.4 Housing Provisions

8.4.8 Identification of safety glass

[New for 2022]

All safety glazing material in Tables 8.4.2 and 8.4.6 installed in accordance with this Part must comply with the following:

- (a) Safety glass must be marked in the form of either permanent etching or a label that cannot be reused once removed.
- (b) The permanent etching or label must state the following information:
 - (i) The Standard to which the safety glass has been tested.
 - (ii) Registered name of the manufacturer or supplier.
 - (iii) Grade of the safety glass.
 - (iv) Nominal thickness of the safety glass.





Window and Door Installation

8.2.2 Installation of windows

[New for 2022]

Windows must be installed in accordance with the following:

- (a) Window assemblies are to be fixed in accordance with 8.2.3 and 8.2.4.
- (b) Structural building loads must not be transferred to the window assembly.
- (c) A minimum 10 mm gap must be provided between the top of the window assembly and any loadbearing framing or masonry wall element.
- (d) The requirements of (c) may be increased where necessary to allow for frame settlement over wide openings.
- (e) Gaps between the window assembly and the adjoining walls, sills or heads must be sealed with a flexible material to prevent the ingress of water.
- (f) Packing, if provided between each window assembly and the frame, must be—
 - (i) located along each side and bottom; and
 - (ii) fixed to ensure the sides and bottom of the window assembly remain straight; and
 - (iii) clear of any flashing material.
- (g) Where aluminium sills may come into contact with masonry, they must be separated to prevent corrosion.
- (h) Window assemblies must be flashed in accordance with 8.2.5.

Installation



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Figure 8.2.2 (explanatory): Guidance for the installation of windows and positioning of relevant fixing points

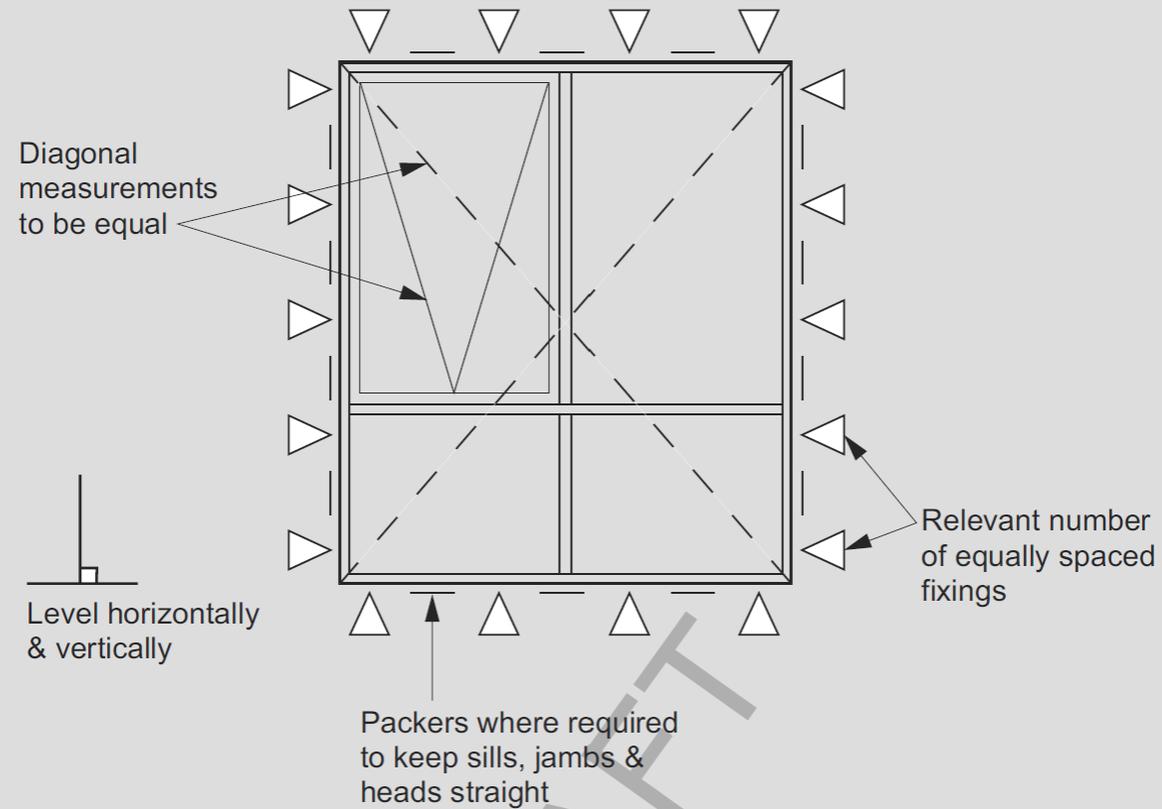


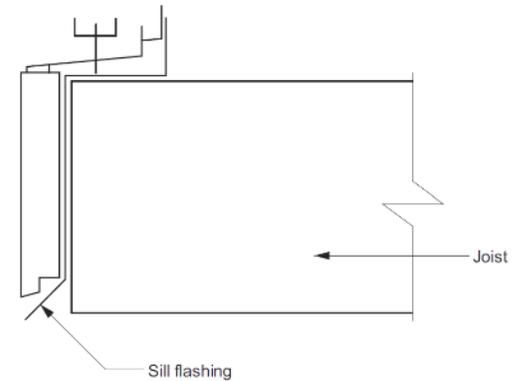
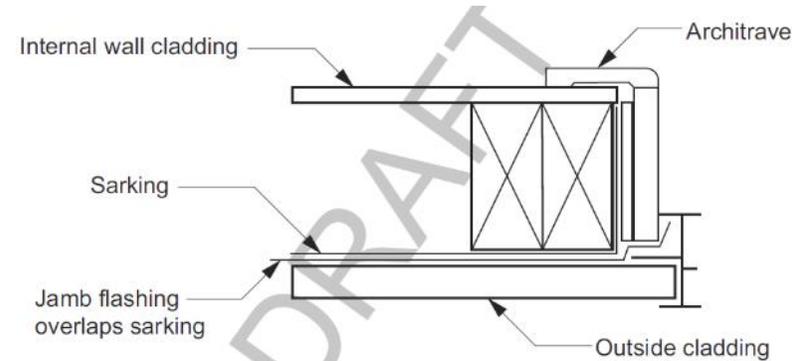
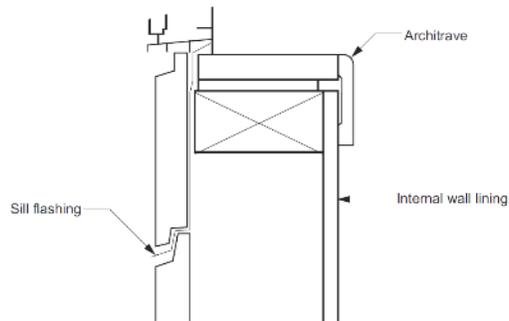
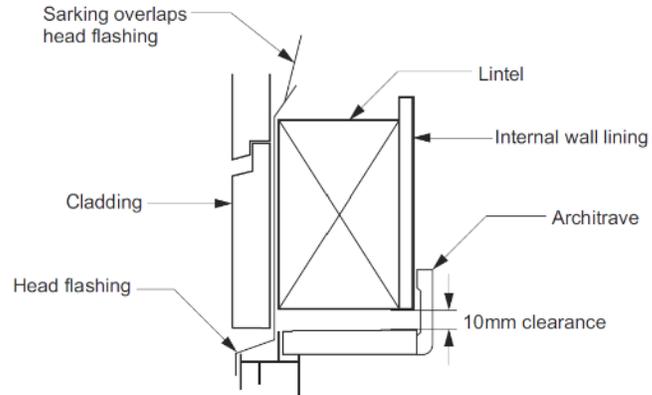
Figure Notes:

Fixings to be in accordance with 8.2.4.

Window Flashing - Clad

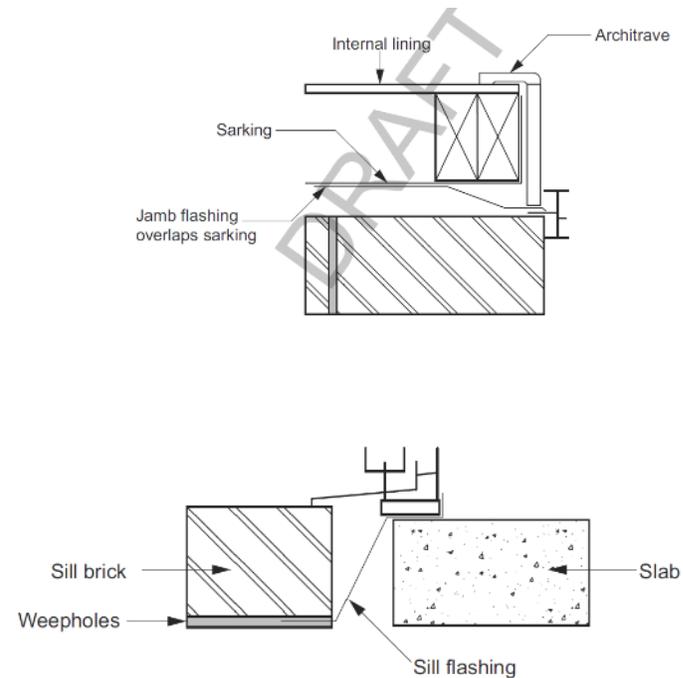
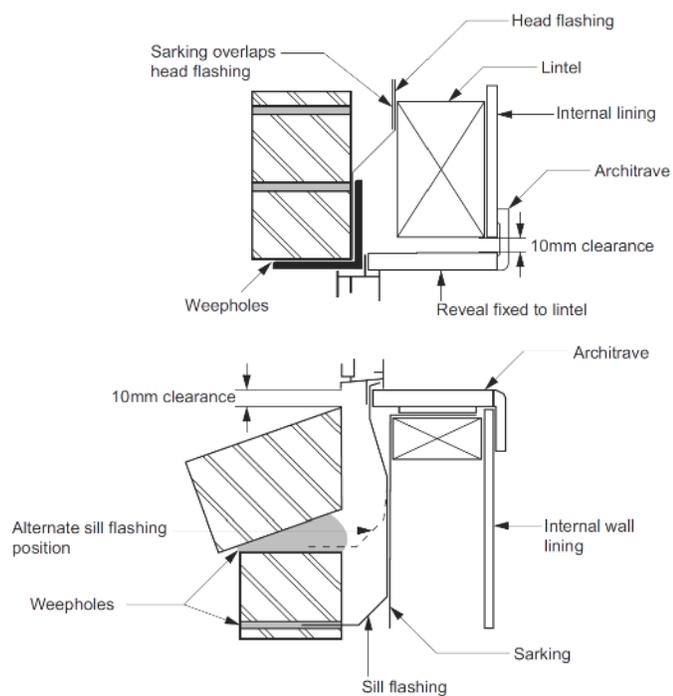


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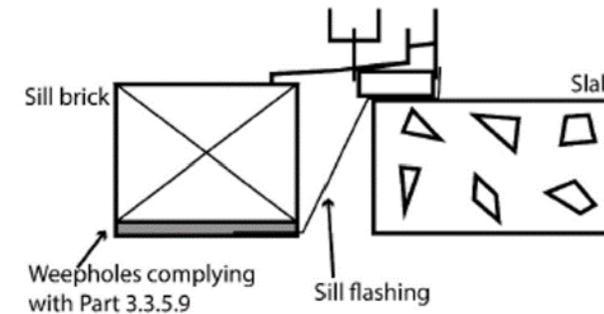
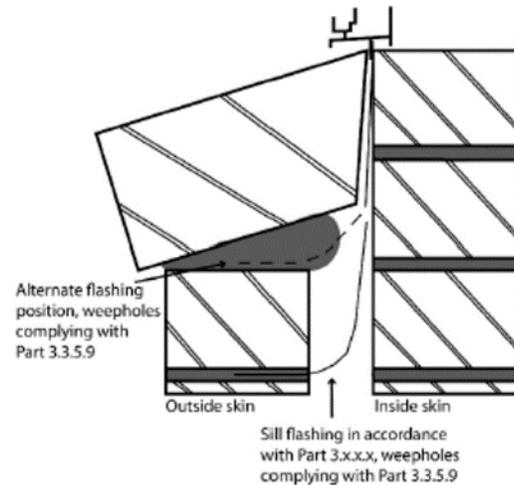
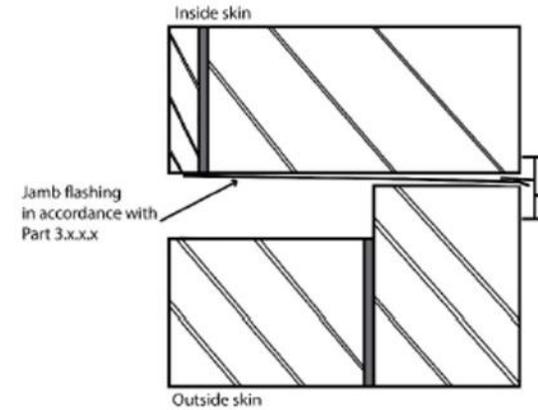
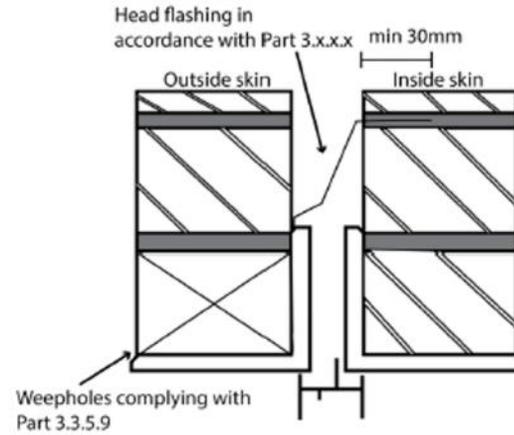
Window Flashing – Brick Veneer



Window Flashing – Double Brick



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Window Fixing - Part 8.2.3



8.2.3 Fixings

[New for 2022]

Fixings used in 8.2.4 must be—

- (a) positioned as evenly as practicable around the window assembly; and
- (b) at a distance from the edge of framing, brick or block masonry that is not less than five times their shaft diameter, and if fitted into—
 - (i) timber or masonry walls, be embedded into the frame to a minimum of ten times the diameter of the fixing; and
 - (ii) lightweight steel frames, be positioned in accordance with NASH Standard Part 2; and
- (c) galvanised plain shank, threaded or equivalent nails or self embedding head or wafer head screws; and
- (d) where the building is located within 200 m of breaking surf—
 - (i) for nails, stainless steel when fixed into timber members; or
 - (ii) in all other cases, hot-dipped galvanised (min. 350 g/m²) nails or hot-dipped galvanised (min. 350 g/m²) selfembedding head or wafer head screws.

Explanatory Information: Edge distance of fixings

The edge distance of fixings can be calculated using the following formula:

$$e \geq 5D$$

Where—

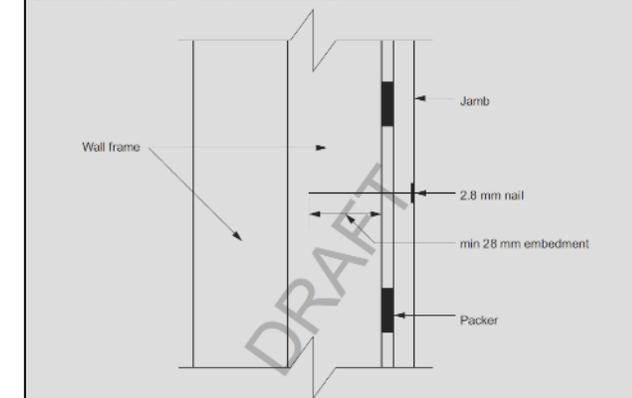
- e = distance from the edge of timber frame or masonry wall member
- D = diameter of main shaft of nail or screw.

For example, for a window using 7 mm masonry screw (anchor) into a masonry wall element:

$$e \geq 5 \times 7 \text{ mm}$$

therefore, _____, as depicted in Explanatory Figure 8.2.3a, where the distance from the edge of the masonry wall element the fixing is being placed into must be at least 35 mm. This distance can be from either of the edges of the masonry wall element to suit the width of the window assembly frame.

Figure 8.2.3b (explanatory): Example of window using 2.8 mm nails into a timber frame





Window Fixing – Part 8.2.4

Table 8.2.4d: Number of fixings for wind class N2 with 2.8 mm diameter nails into timber frames

Height (mm)	Width (mm)										
	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
600	4	4	4	4	4	6	6	6	8	8	8
900	4	4	4	6	6	8	8	10	10	12	12
1200	4	4	6	8	8	10	10	12	14	14	16
1500	4	6	8	8	10	12	14	14	16	18	20
1800	4	6	8	10	12	14	16	18	20	22	24
2100	6	8	10	12	14	16	18	20	22	24	26
2400	6	8	10	12	14	18	20	24	26	28	30
2700	6	10	12	14	18	20	24	26	28	32	34
3000	8	10	14	16	20	22	26	28	32	36	38

Table Notes:

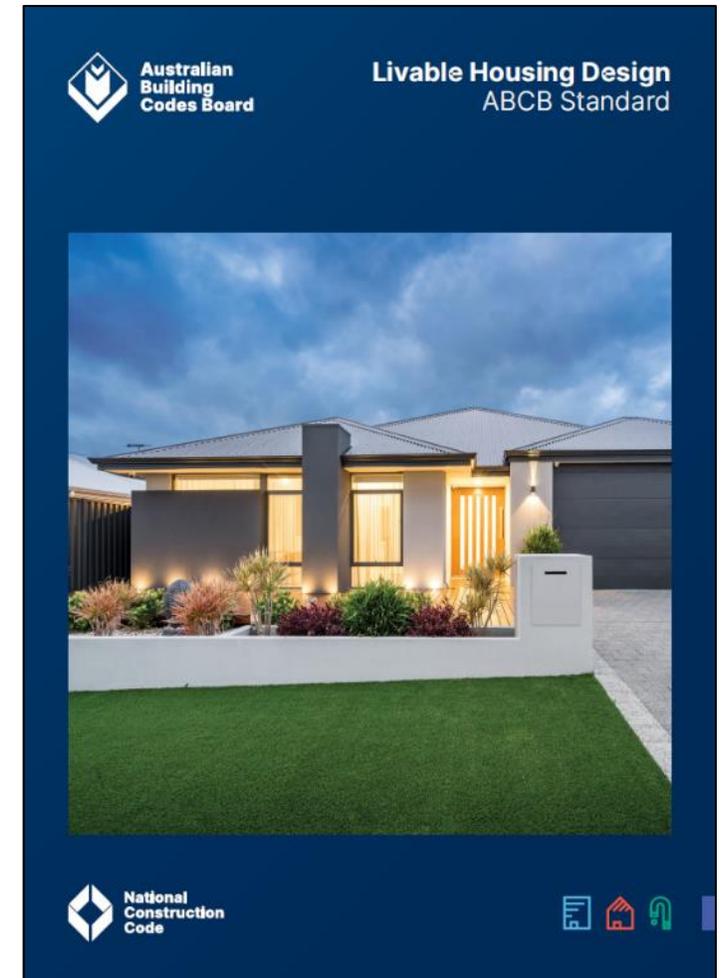
Where the entire window is more than 1200 mm away from any corner of the building, the number of fixings may be reduced by 40%.

Livable Housing Design - Accessibility



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- At least 1 assessable (no-step) pathway into a residence
- Minimum widths for doorways
- Handle heights
- Changes hallways, bathrooms, etc



C2D10 – Non-combustible Building Elements

[2019: C1.9]

- (1) In a building *required* to be of Type A or B construction, the following building elements and their components must be *non-combustible*:
 - (a) *External walls* and *common walls*, including all components incorporated in them including the facade covering, framing and insulation.
 - (b) The flooring and floor framing of lift pits.
 - (c) *Non-loadbearing internal walls* where they are *required* to be *fire-resisting*.



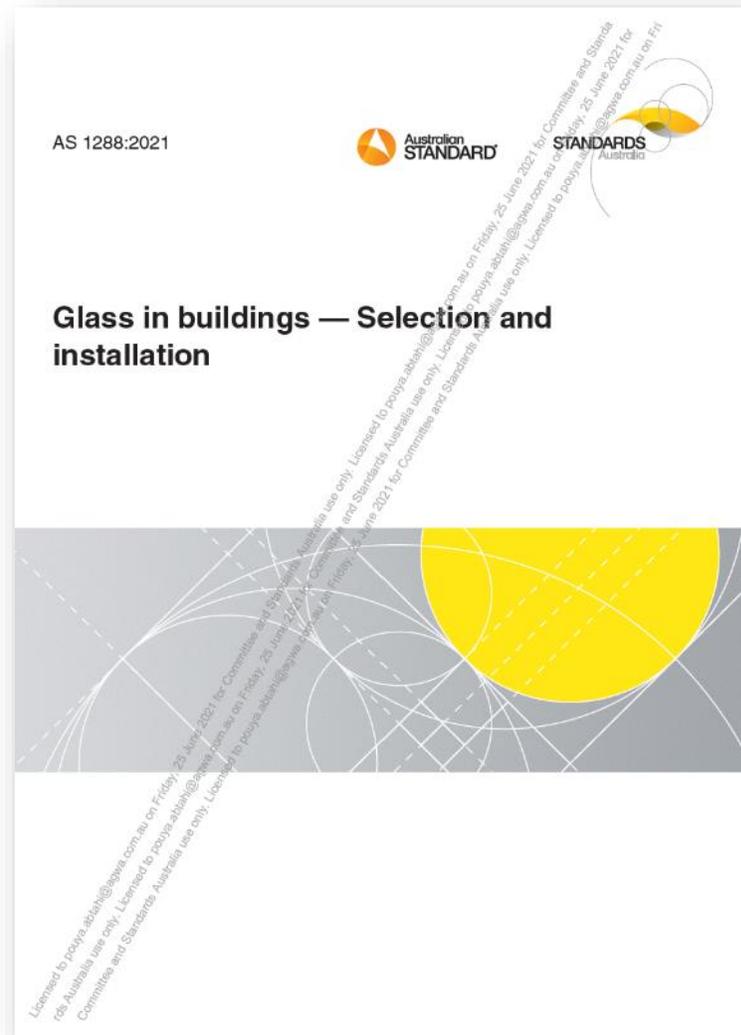
Excluded Materials

- (4) The requirements of (1) and (2) do not apply to the following:
- (a) Gaskets.
 - (b) Caulking.
 - (c) Sealants.
 - (d) Termite management systems.
 - (e) Glass, including laminated glass, and associated adhesives, including tapes.
 - (f) Thermal breaks associated with glazing systems.
 - (g) Damp-proof courses.
 - (h) Compressible foams, polystyrene fillers and backer rods associated with articulation joints no wider than 50 mm.
 - (i) Isolated—
 - (i) construction packers and shims, such as those used for levelling window frames at fixing points; or
 - (ii) blocking for fixing fixtures such as handrails; or
 - (iii) fixings such as screws, anchors, wall plugs and nails; or
 - (iv) acoustic mounts.
 - (j) Waterproofing materials applied to the external face, used below ground level and up to 250 mm above ground level.
 - (k) Joint trims and joint reinforcing tape of a width no greater than 50 mm.
 - (l) Weather sealing materials, applied to gaps no wider than 50 mm, used within and between concrete tilt panels.
 - (m) Wall ties and other masonry components complying with AS 2699 Part 1 and Part 3 as appropriate, and associated with masonry wall construction.
 - (n) A material entirely composed of—
 - (i) concrete; or
 - (ii) steel; or
 - (iii) masonry; or
 - (iv) aluminium.
 - (o) Reinforcing bars and associated minor elements that are wholly or predominately encased in concrete or grout.
 - (p) Autoclaved aerated concrete.
 - (q) Concrete and terracotta roof tiles.
 - (r) A paint, lacquer or a similar finish or coating, other than nitro-cellulose lacquer where—
 - (i) the average thickness of any layer of the finish system does not exceed 1.5 mm; and
 - (ii) the total finish system thickness does not exceed 2 mm.



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AS 1288-Glass in Buildings



Section 6 – Sloped Overhead Glazing

- Assess and resolve load requirement.
- Include new charts and table.
- Include new DTS guidelines.

Section 7 – Balustrades

- Resolve ambiguity around interlinking handrails
- New test method for glass balustrades
- Informative information in respect to post breakage performance.

Section 6 – Sloped Overhead Glazing



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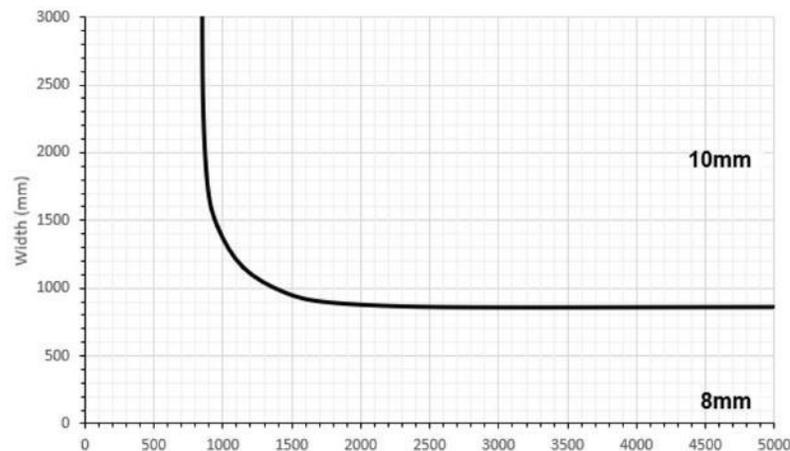
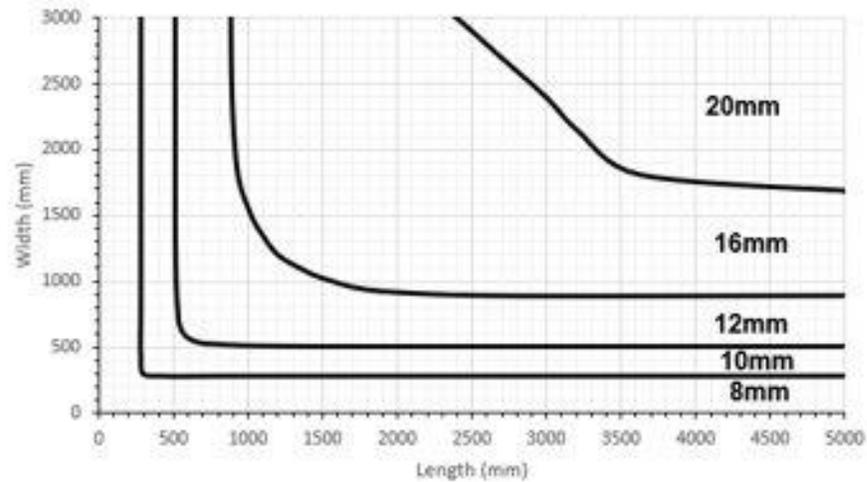
- Three-sided support
- Thicker glass
- 1.8 kN Street awning load removed
- New load area and duration criteria.
- New load force depending on slope of the over head glazing.
- New charts and table to replace the current tables 6.2 to 6.5 of AS1288.
- The maximum spans restricted to 3000 mm.



Section 6 – Sloped Overhead Glazing



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Nominal thickness mm	Max span and design wind pressure				
	AR = 1	AR = 1.25	AR = 1.5	AR = 2	AR = 3
8	300 mm	285 mm	278 mm	282 mm	285 mm
	ULS: ±15 kPa	ULS: ±15 kPa	ULS: ±15 kPa	ULS: ±15 kPa	ULS: ±15 kPa
	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±10 kPa
10	580 mm	535 mm	524 mm	512 mm	507 mm
	ULS: ±15 kPa	ULS: ±15 kPa	ULS: ±15 kPa	ULS: +12.8, -13.3 kPa	ULS: ±15 kPa
	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±10 kPa
12	1200 mm	1090 mm	1014 mm	927 mm	889 mm
	ULS: +11.8, -12.4 kPa	ULS: +11.1, -11.7 kPa	ULS: +8.7, -9.3 kPa	ULS: +7.2, -7.8 kPa	ULS: +7.2, -7.8 kPa
	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±10 kPa
16	2700 mm	2400 mm	2143 mm	1814 mm	1688 mm
	ULS: +4.2, -5 kPa	ULS: +4.2, -5 kPa	ULS: +3.8, -4.6 kPa	ULS: +3.8, -4.6 kPa	ULS: +3.1, -3.0 kPa
	SLS: ±10 kPa	SLS: ±8.9 kPa	SLS: ±5.4 kPa	SLS: ±4.2 kPa	SLS: ±6 kPa

Nominal Thickness (mm)	Max Span and Design Wind Pressures				
	AR=1	AR=1.25	AR=1.5	AR=2	AR=3
8	1150 mm	1035 mm	966 mm	890 mm	856 mm
	ULS: +10.9, -11.3 kPa	ULS: +10.5, -10.9 kPa	ULS: +8.8, -9.2 kPa	ULS: +7, -8.1 kPa	ULS: +6.1, -6.5 kPa
	SLS: ±10 kPa	SLS: ±10 kPa	SLS: ±6.6 kPa	SLS: ±4.3 kPa	SLS: ±5.5 kPa

Section 7 – Balustrades



- New test method for glass balustrades
- Further guidance for structural barriers which protect height more than 1 metre
- Informative guidance on post breakage performance.
- Clarify ambiguity around interlinking handrails

Section 7 – Balustrades



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Section 7 – Balustrades



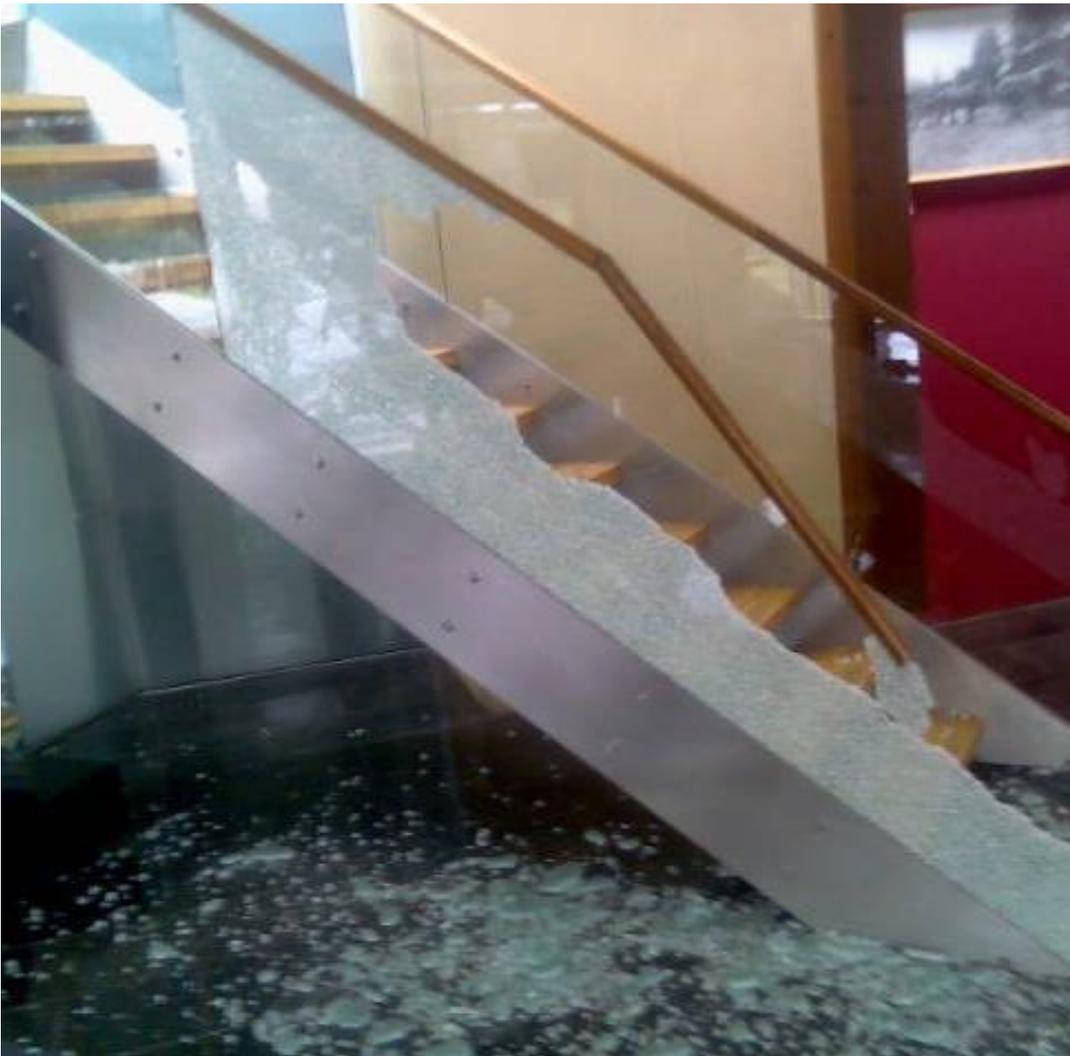
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Section 7 – Balustrades



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Section 7 – Balustrades



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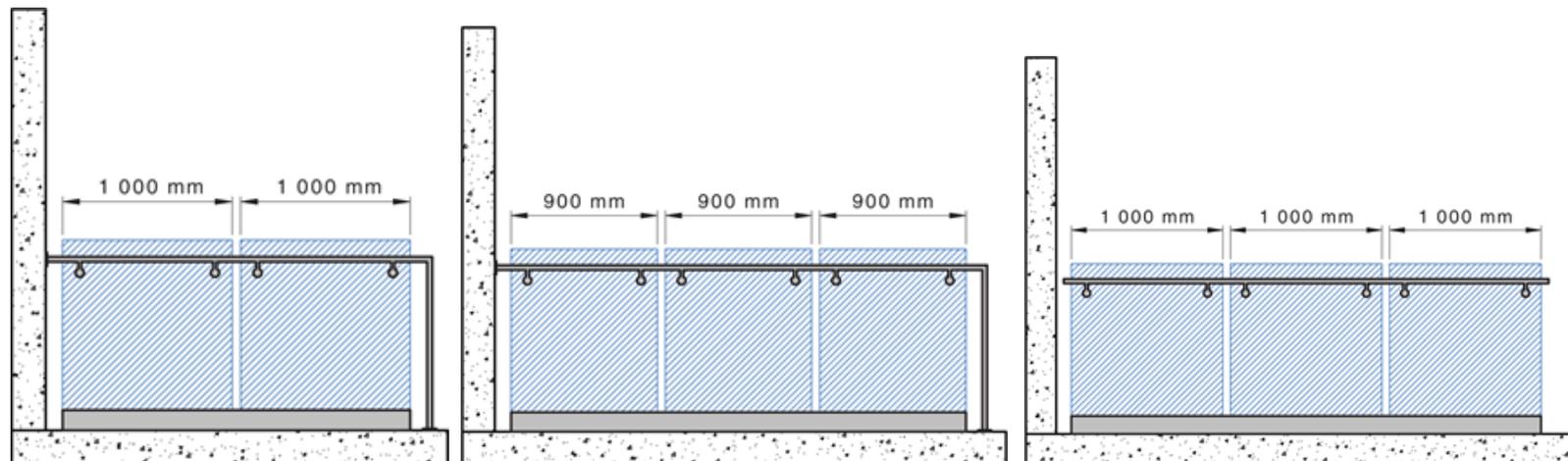
Section 7 – Balustrades



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Structural barriers with Interlinking handrail — Protecting a difference in level more than 1 m

- Monolithic toughened safety glass, laminated heat-strengthened safety glass, or laminated toughened safety
- Minimum 10 mm standard nominal glass thickness



Balustrade Testing

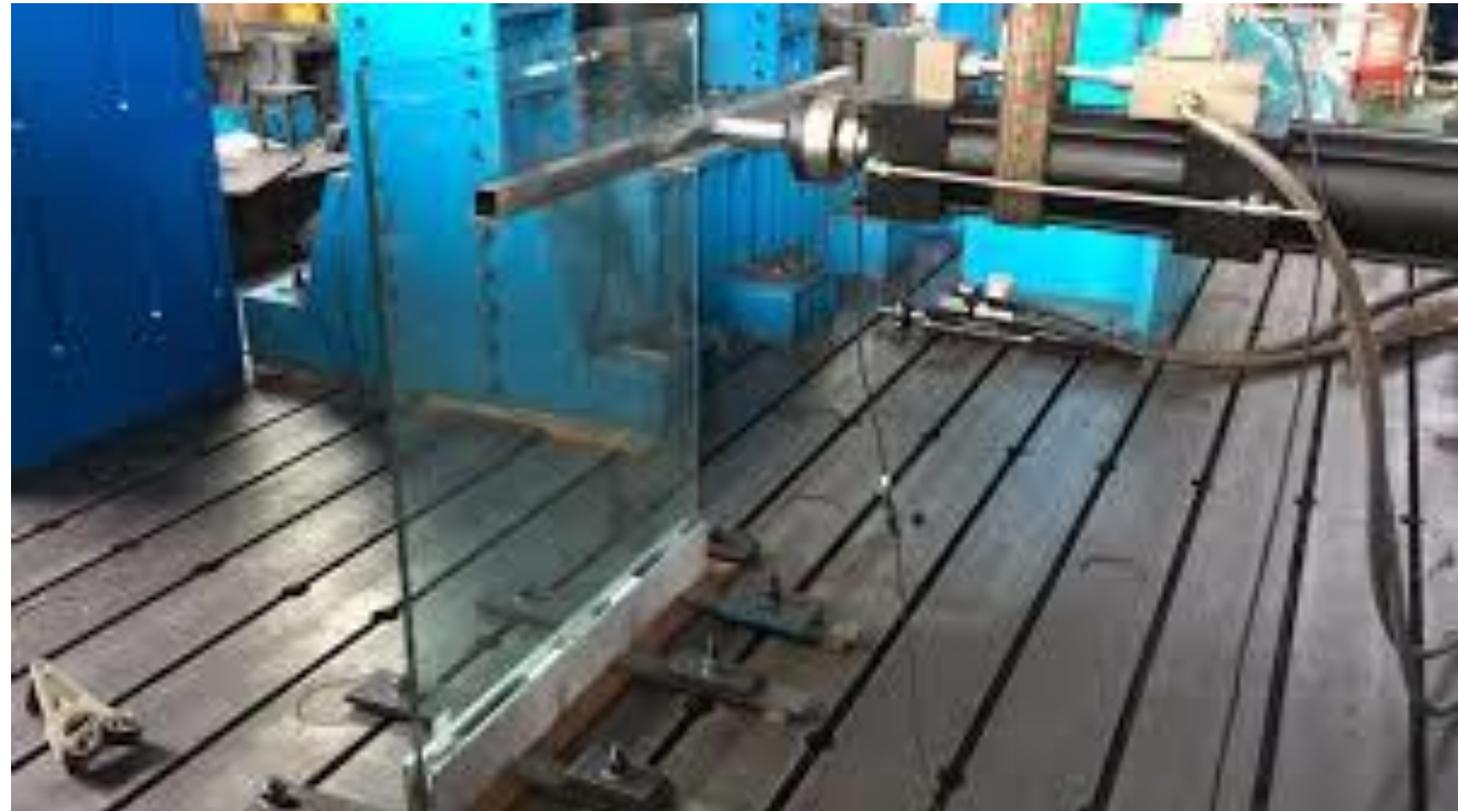


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As a Performance Solution equivalent of Engineering calculation

Proposed new tests include:

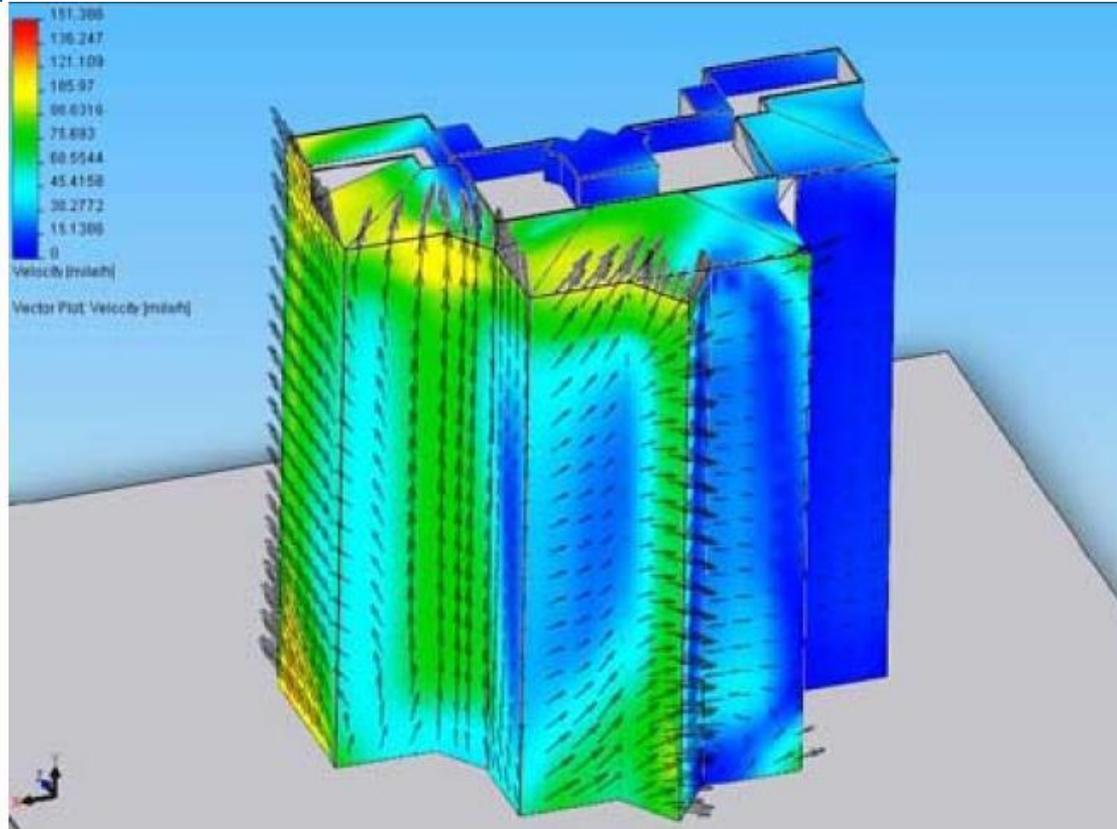
- A Probe test
- Point load test
- Uniform line load test
- Barrier infill uniform load
- Barrier infill point load



Key Issues – Wind Loads and Design



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Key Issues – Wind Loads and Design

DEFINITION OF HOUSING

For the purposes of this standard, Housing is defined as a Class 1 or 10 building as defined by the National Construction Code (NCC) with the following geometric limitations specified in AS 4055.

IMPORTANT NOTE:

Buildings that do not meet these definitions and geometric limitations are either Residential or Commercial buildings meaning N & C ratings do not apply. Wind loads for Residential and Commercial buildings are determined using AS/NZS 1170.2.



Figure 1 The width of the building shall not exceed 16m, and the length shall not exceed 5 times the width.



Figure 2 The distance from ground level to the underside of the eaves shall not exceed 6.0m.



Figure 3 The distance from the ground level to the highest point on the roof shall not

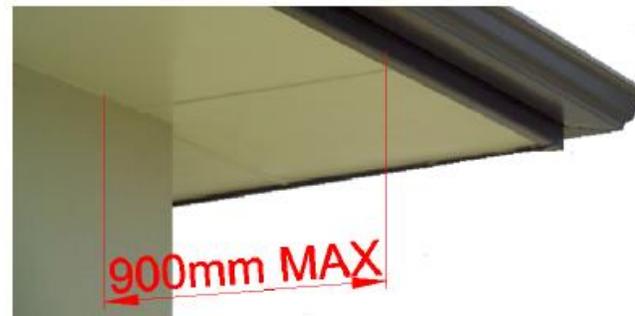


Figure 4 The width of the eaves shall not exceed 900mm.



Figure 5 The roof pitch shall not exceed 35°.

Some facts and figures...

Nationally

- 115 000 housing starts per year
- 110 000 residential apartments per year

That's around 4 MILLION windows annually!



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- According to Choice, 40% of all building defects are due to water penetration from outside

SOURCE: UNSW City Futures Research Centre – Governing the Compact City: The role and effectiveness of strata management, 2012

- “Statistics from Archicentre’s pre-purchase inspections between 2010 and 2015 show that across Australia, 4 per cent of dwellings have a major water problem and 34 per cent have a minor problem which, if not rectified, could develop into a costly defect.”
- The majority of problems relate to waterproofing of balconies or lack of inadequate flashing around windows
- Lets do the maths...

225 000 dwellings per year

Around 4% of new buildings have a problem with “leaking” windows = 9000 per year

70-80% due to installation = 6750 per year

Average rectification cost – let’s say *conservatively* \$3000

This means we potentially have a \$20 million problem!



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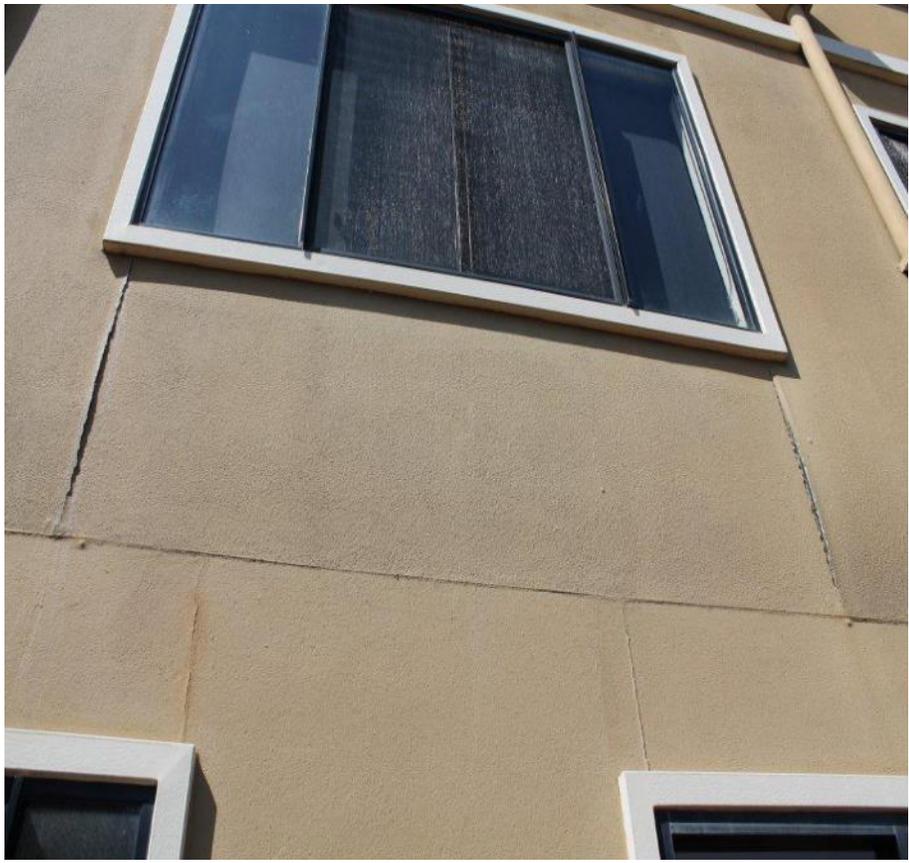


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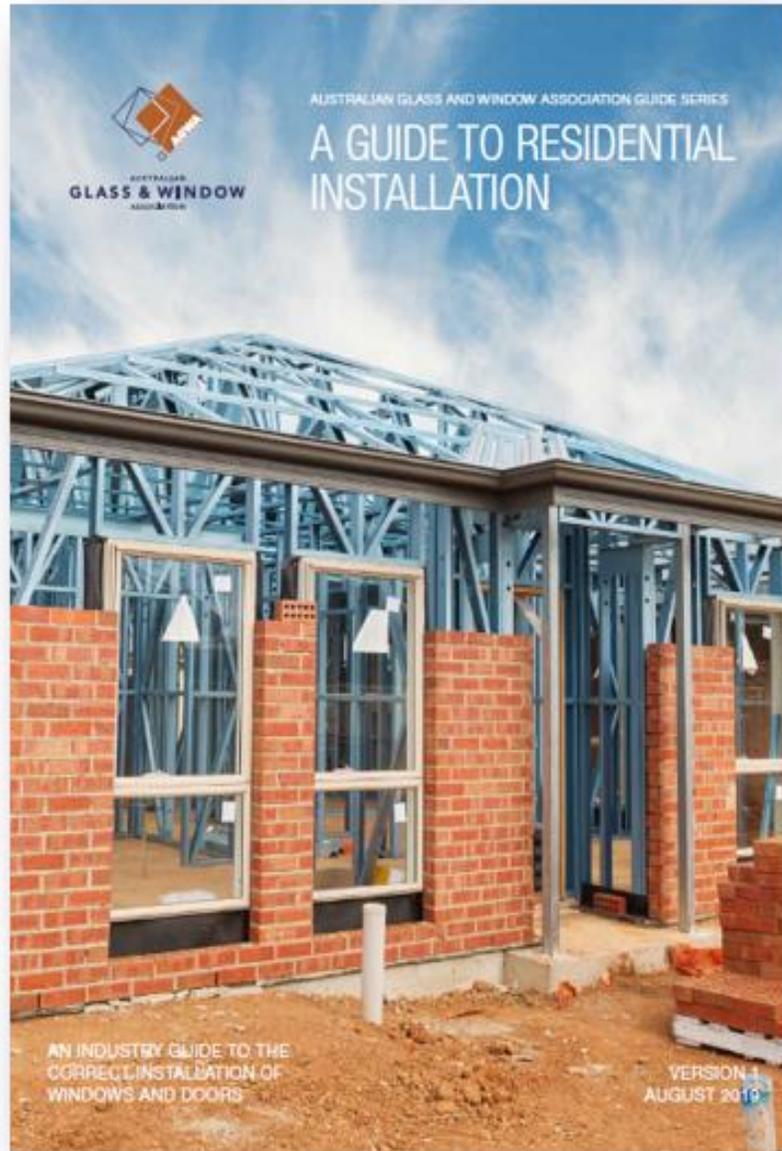
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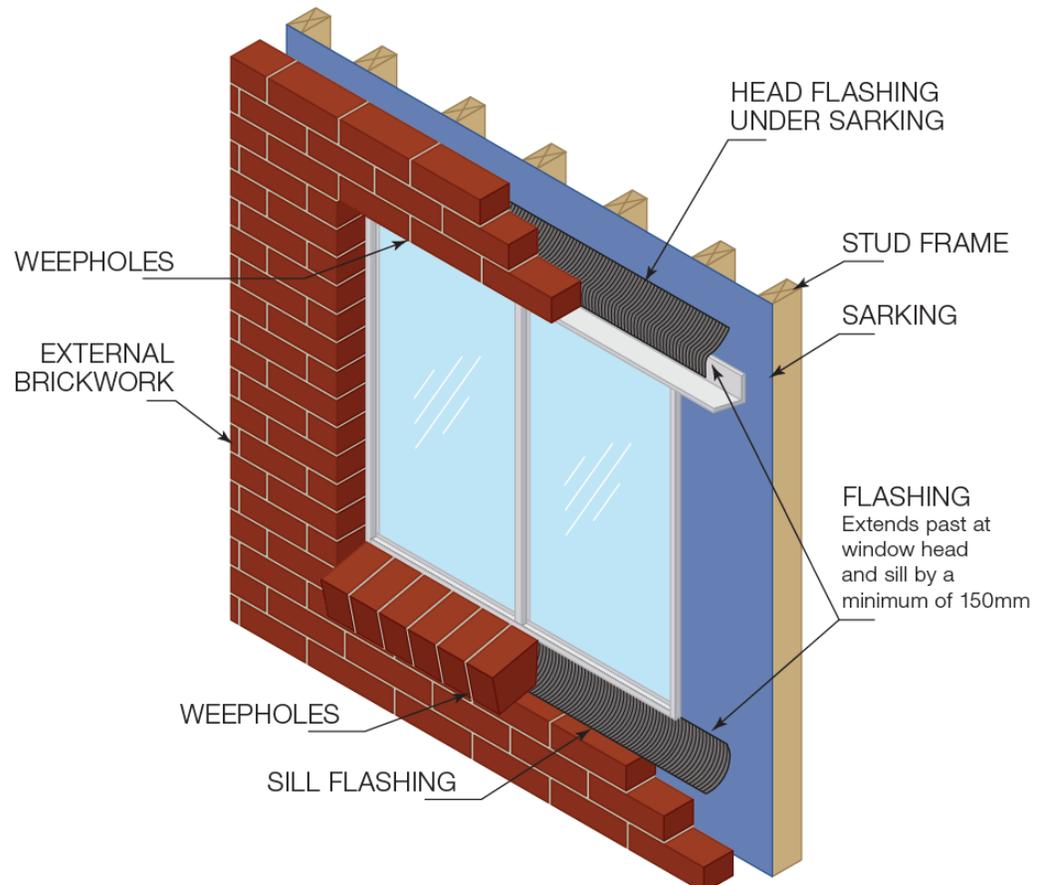




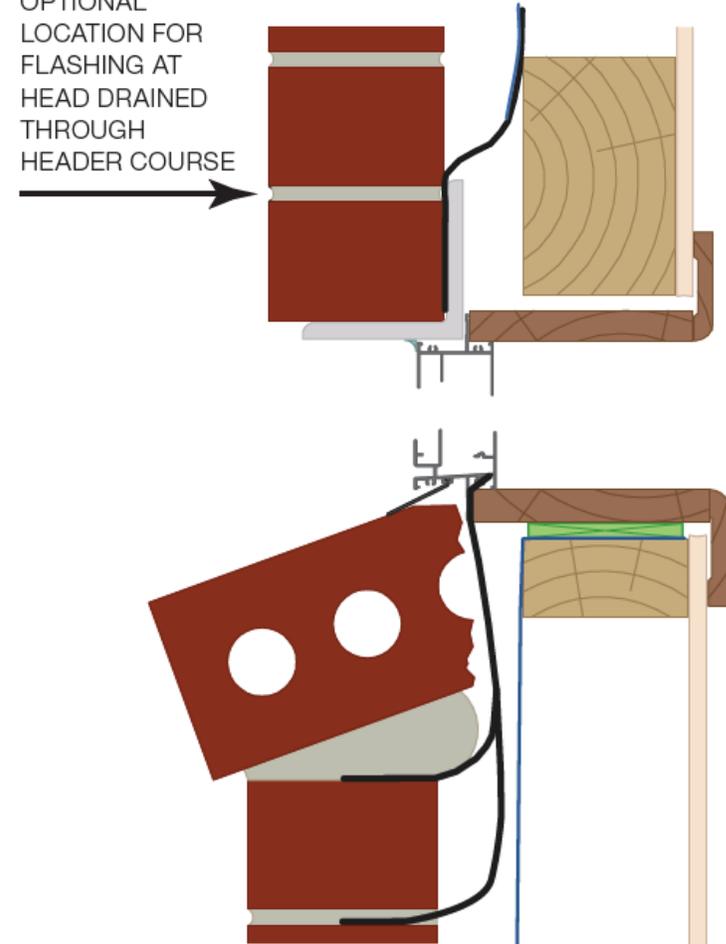
Masonry Veneer



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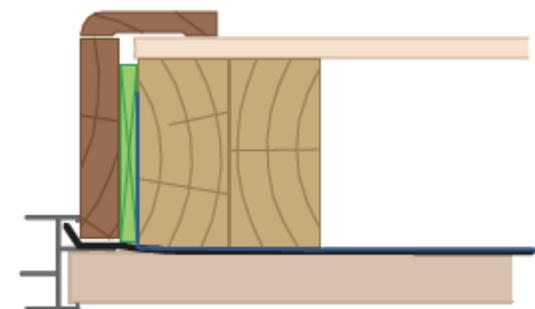
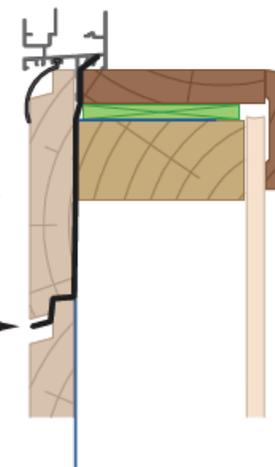
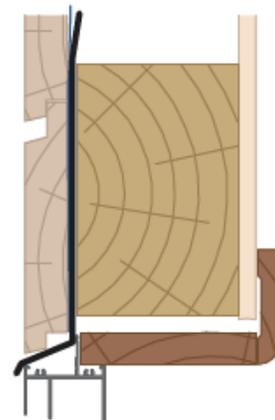
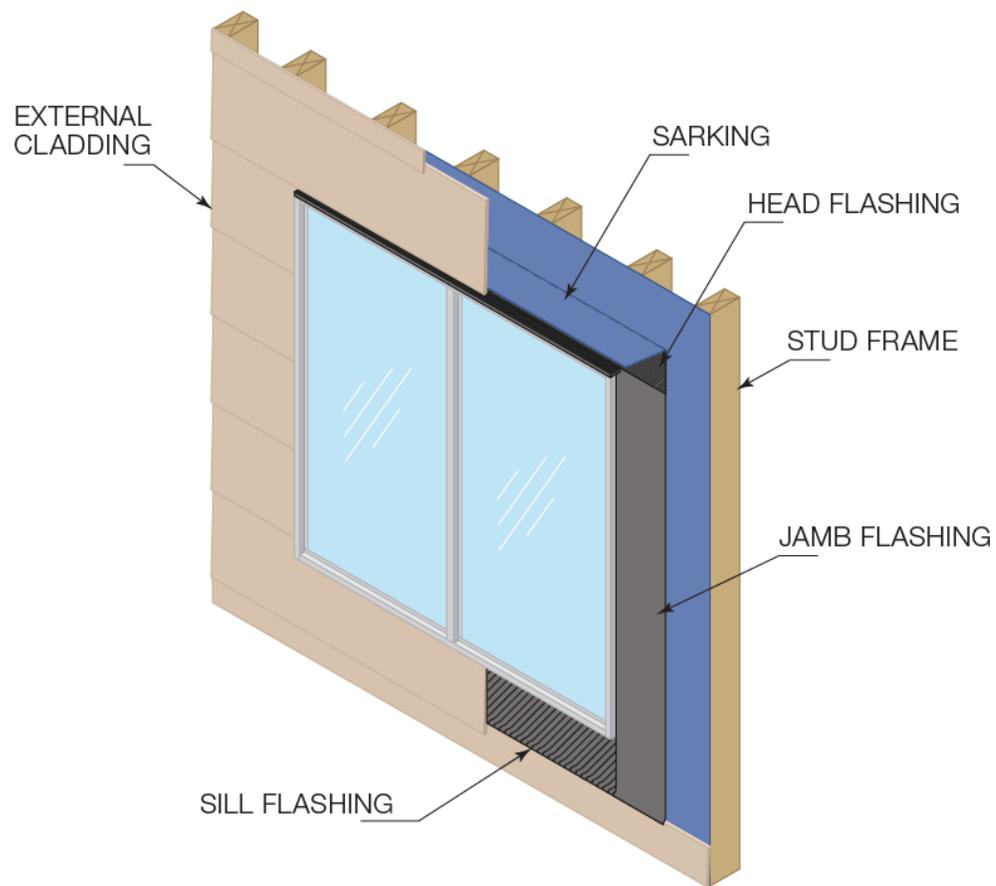


OPTIONAL
LOCATION FOR
FLASHING AT
HEAD DRAINED
THROUGH
HEADER COURSE

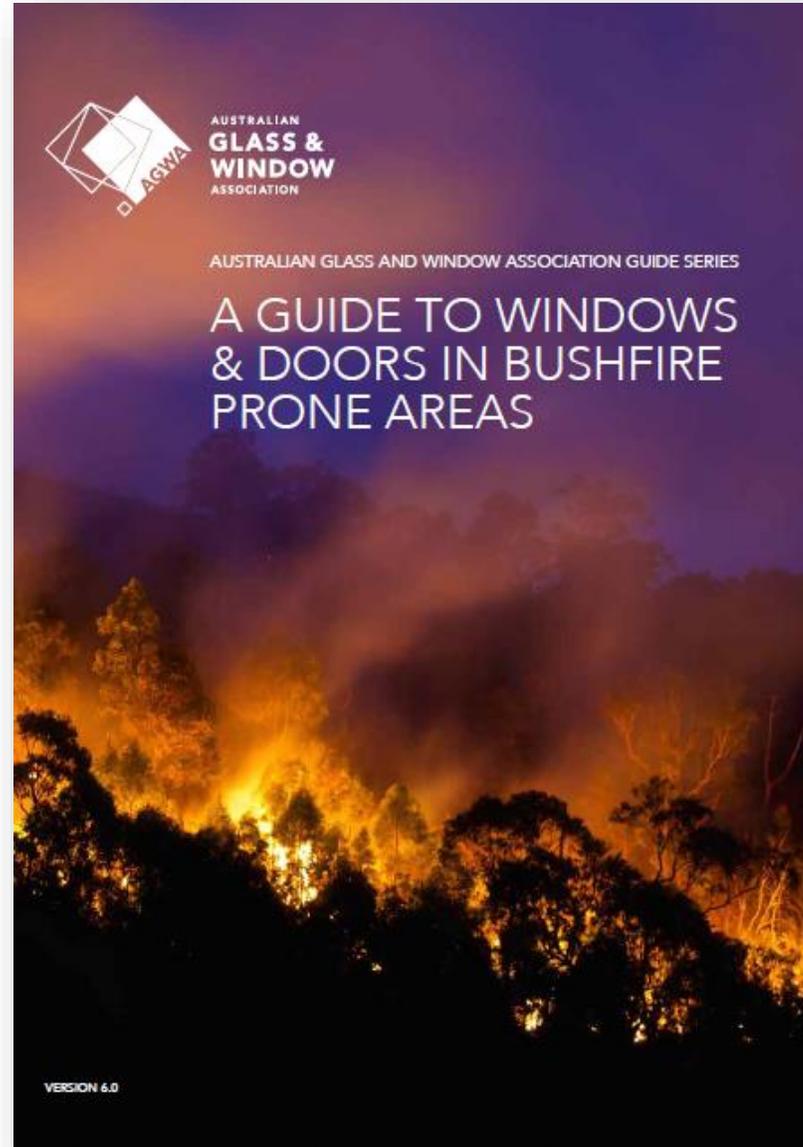
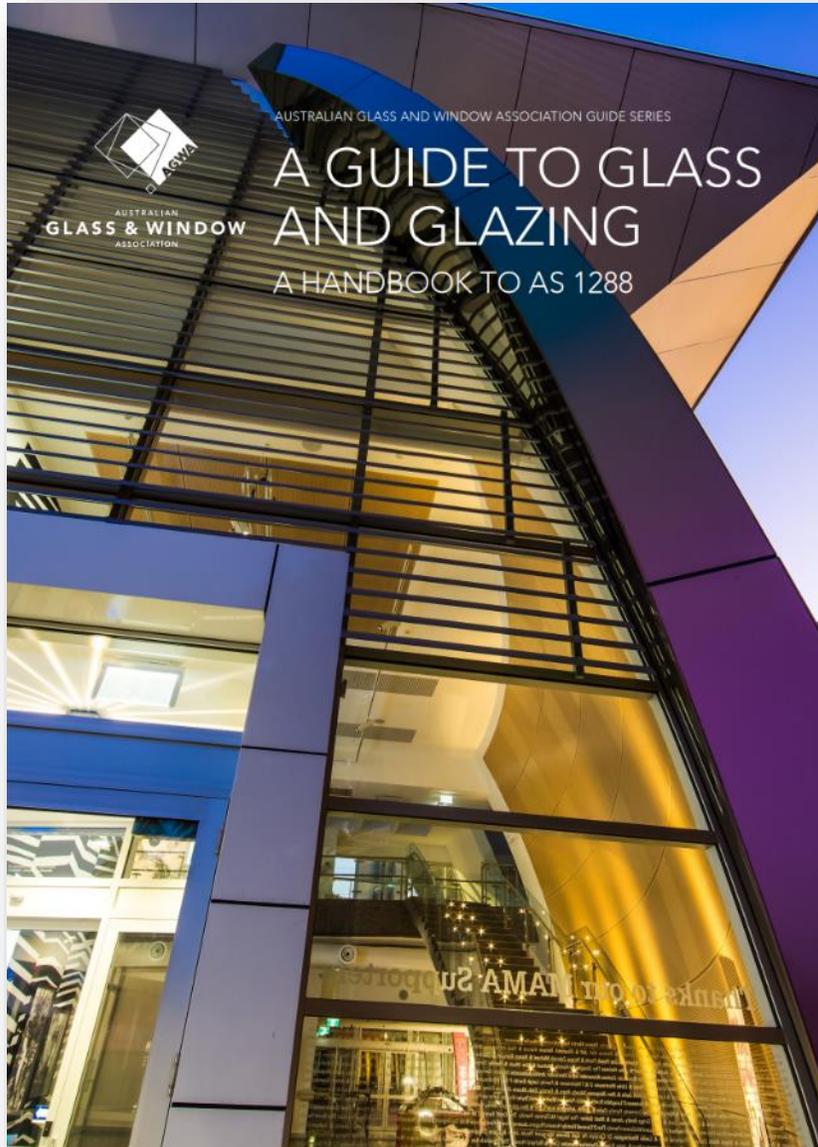


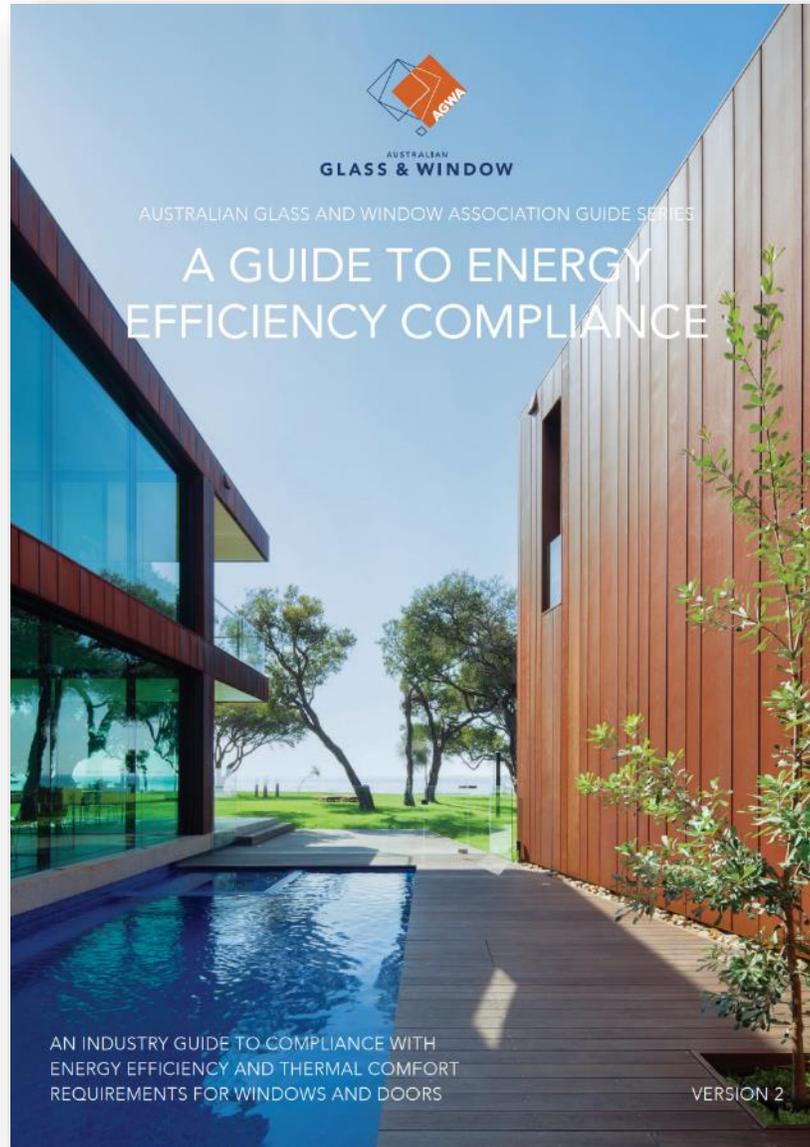
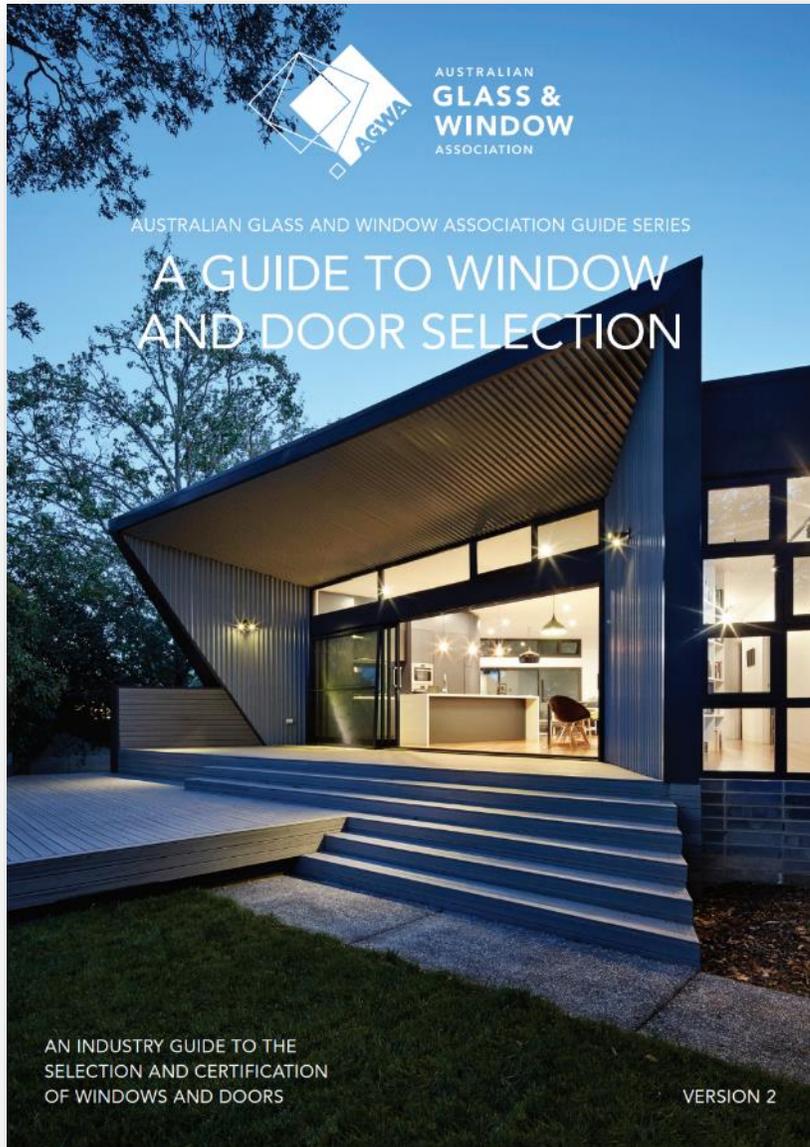


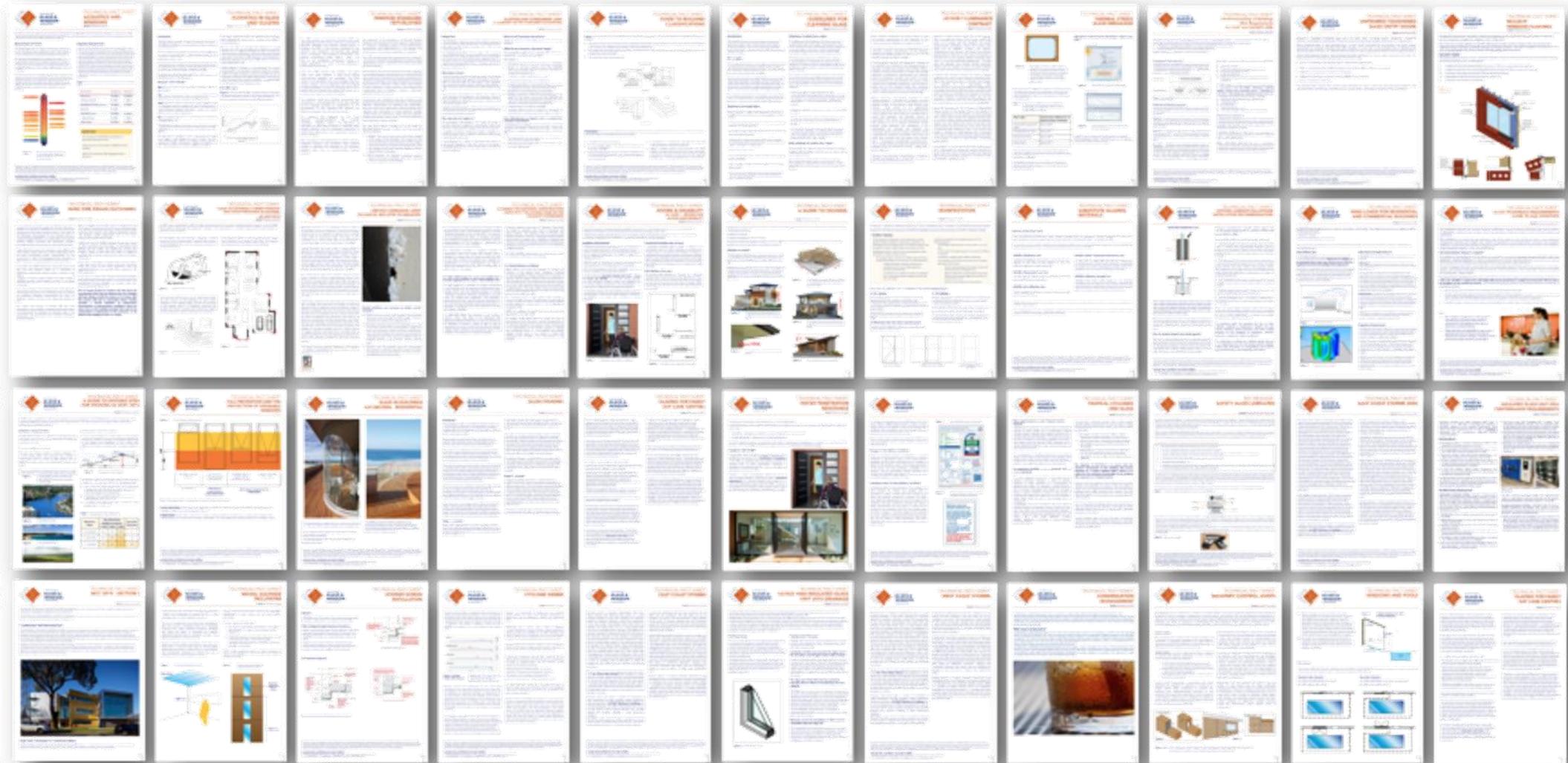
Timber and Composite Cladding











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NATA Accreditation



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- The Australian Glass and Window Association is a NATA Accredited Inspection Agency
- Accredited Company Program in accordance with AS/ISO 17020
- To provide members with the means to independently demonstrate product performance and compliance with relevant Australian Standards.

AGWA Accredited!

A large badge with a white left half and a dark blue right half. The white section contains the AGWA logo and the text 'AUSTRALIAN GLASS & WINDOW ASSOCIATION'. The dark blue section contains the text 'ACCREDITED COMPANY' in large, white, bold, sans-serif capital letters.

**ACCREDITED
COMPANY**

Thank You