

Flooring System

DESIGN AND
INSTALLATION
GUIDE

50MM
62MM
75MM

EDITION: JANUARY 2024



NASAHI[®]
building smarter



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About Nasahi®

FOR THE PAST 20 YEARS NASAHI® HAVE BEEN ONE OF THE WORLD'S LARGEST PRODUCERS OF INNOVATIVE, HIGH QUALITY AAC MATERIALS.

We have become a world leader in the production of revolutionary building materials by investing over AUD\$60 million in the most technologically advanced processes in the industry. Our production facility has the capacity of 700,000 m³ of AAC products per year, selling within China and exporting to Japan, Singapore, Malaysia, Vietnam, Philippines, UAE, Maldives, Russia, Angola, Australia, New Zealand etc. Our reputation for consistently producing high quality products is exceptional.

The Nasahi® range of building systems are regularly tested in Australia by NATA accredited laboratories. They are carefully engineered to comply with the requirements of the Building Code of Australia, and to remain at the cutting edge of product innovation.

Nasahi®'s in-house engineers provide project specific guidance, assisting with custom projects and bringing your ideas to life.

With warehouses located in every state of Australia, Nasahi® can easily meet demands and quickly deliver to site.

Our ISO 9001 and JIS A 5416 manufacturing processes are audited annually by independent authorities. This ensures that we meet the needs of our customers and other stakeholders while complying with statutory and regulatory requirements.

By *Building Smarter* we provide a guarantee you can trust.

Autoclaved Aerated Concrete (AAC)

AUTOCLAVED AERATED CONCRETE IS A LIGHTWEIGHT PRE-CAST CONCRETE BUILDING MATERIAL THAT PROVIDES EXCELLENT STRUCTURAL, THERMAL, FIRE, TERMITE AND MOULD-RESISTANCE.

AAC is manufactured from cement, sand, lime and water; it is aerated by adding an expanding agent to the mix. The mix is poured into a large mould and allowed to rise. These large soft blocks are sliced into the required panel sizes and are then cured in a steam pressure autoclave for up to 12 hours.

The result is a concrete panel filled with small, finely dispersed air bubbles, which is both strong and lightweight.

Embedded corrosion protected steel mesh inside the panels provide excellent strength when installed as internal walls or over a load bearing timber or steel frame.

Panels are supplied in a standard width of 600mm and a length of 2200mm and can easily be cut to size allowing fast and strong installation.

Nasahi® Panels are designed to provide a superior flooring substrate solution with the feel of concrete at a significantly reduced cost.

Excellent airborne noise transmission properties result in a quieter, more comfortable home for your family.

Manufactured from lightweight, reinforced, autoclaved aerated concrete, Nasahi® Panels have a Design (Working) Density of 590 kg/m³ and a Dry Density of 525 kg/m³ making them highly resistant to chipping and damage during delivery and handling.

Table 1 - Panel Weights (2200x600mm panel)

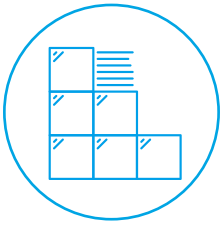
Thickness	50mm	62mm	75mm
Working Panel weight (590kg/m ³ at 12.4% moisture content)	39kg	48kg	58kg

Nasahi® AAC Panels can also be used for External Walls, Party Walls and Fences (see other Nasahi® Design Manuals for these applications.)





Advantages of Nasahi®



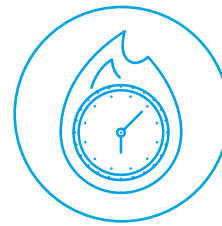
QUICK INSTALLATION

3 qualified tradespeople can easily install 50m² of Nasahi® Panel per day, making it significantly faster and less labour intensive than traditional masonry



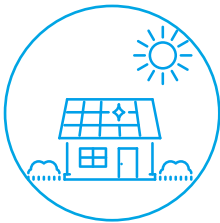
TRANSPORTABLE

Panels are flat packed in packs of up to 20 improving transportability to and around site.



FIRE RESISTANT

Nasahi® Panels are non-combustible and are compliant as a Flooring system in all Australian Regions. Nasahi® Panels have been rigorously tested and will provide an FRL of up to 120/120/120 from above and below.



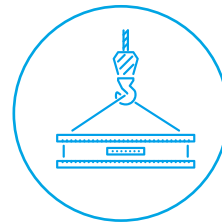
THERMAL COMFORT

Nasahi® Systems achieve high thermal ratings and meet the NCC Energy Efficiency requirements for Australian Climate Zones.



QUIET

The Nasahi® Panel's unique aerated construction provides the thermal performance of a lightweight system while delivering excellent acoustic performance like a dense masonry product.



LIGHTWEIGHT AND STRONG

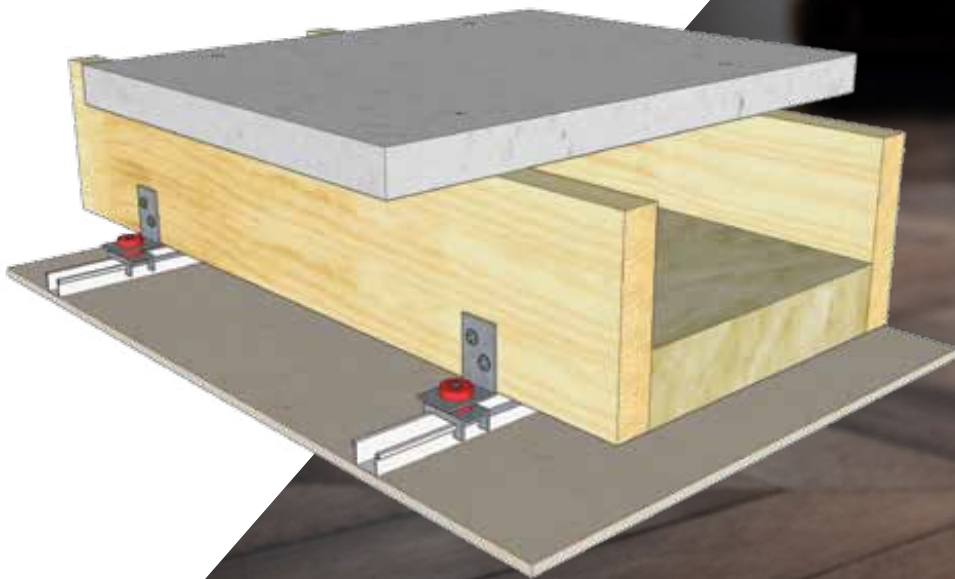
Nasahi® Panels weigh less than standard concrete masonry, making it convenient, lightweight, and easy to work with. Strength is provided by corrosion protected internal steel reinforcing mesh.

Nasahi® Flooring System

THE NASAHI® FLOORING SYSTEMS DETAILED IN THIS GUIDE ARE SUITABLE FOR RESIDENTIAL, AND LOW-RISE MULTI-RESIDENTIAL APPLICATIONS. PANELS CAN BE INSTALLED DIRECTLY ONTO TIMBER OR STEEL STRUCTURAL JOISTS.

This design and installation guide specifies design principles for the Nasahi® flooring system that comply with the Performance requirements of the NCC at the time of writing. The designer must check the adequacy of the building solution for compliance with the appropriate authority.

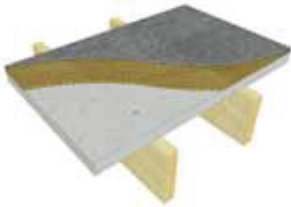
Nasahi® Panels are not suitable for use on stairs and landings. If you require advice selecting a solution for these applications please contact Nasahi®.



Common Flooring Types

COMMON FLOORING ARRANGEMENTS USED WITH NASAHI® FLOORING SYSTEM:

CARPET OR VINYL



50 or 62mm Panel

- Carpet or Vinyl
- Medium Duty Underlay
- Min 3.2mm Masonite Panel
- Nasahi® Panel

75mm Panel

- Carpet or Vinyl
- Medium Duty Underlay
- Nasahi® Panel

Note: Masonite panel is not required for 75mm AAC flooring.

FLOORBOARDS



50, 62 and 75mm Panel

- Floorboards
- Underlay suitable for concrete floors (moisture barrier, 3mm foam thickness)
- Nasahi® Panel

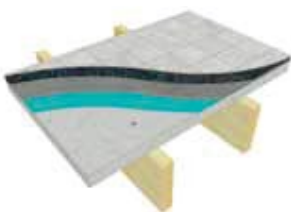
SOLID TIMBER FLOORING



50, 62 and 75mm Panel

- Timber Flooring
- Ply Sheeting or Timber Batten
- Nasahi® Panel

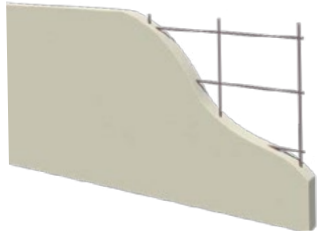
TILES



50, 62 and 75mm Panel

- Tiles
- Flexible Tile Adhesive
- Waterproof Membrane (Wet Areas Only)
- 5mm Thick Rubber Underlay
- Cement Screed
- Nasahi® Panel

Flooring System Components



NASAHI® PANELS

Nasahi® Panels are manufactured from autoclaved aerated concrete (AAC), embedded with coated steel reinforcing mesh, in a standard width of 600mm and a length of either 1800mm and 2200mm.

THICKNESS	50MM	62MM	75MM
Dry Panel weight (525kg/m ³)	36kg	46mm	55kg
Working Panel weight (590kg/m ³)	39kg	48kg	59kg

APPROVED CEILING SYSTEMS

The underside of upper storey floors must be lined with a ceiling system that provides project specific noise reduction and fire resistance level. If you require advice selecting a ceiling system please contact Nasahi®.

Note: For all fire rated applications, USG Boral fire rated plasterboard must be installed in accordance with manufacturers specifications.

PANEL FASTENERS

Panel fasteners must penetrate through the face of the panel and into the floor joists by a minimum 30mm for timber joists or 15mm for metal joists.



Timber Frames

Bugle Batten Head Type 17,
14-10 Class 3 Screws



Steel Frames

Hex Head Self-Drilling 14-10,
Class 3 Screws

Note: In accordance with AS 3566.2 Class 3 fasteners must be used for moderate and mild exposure environment. Class 4 for severe marine further than 100m from breaking surf, marine and industrial exposure environments. Class 4 stainless steel for severe marine exposure environments within 100m of breaking surf.



CONSTRUCTION ADHESIVE

A bead of AAC compatible construction adhesive must be applied between the top of the joists and the Nasahi® Panels. Where two panels butt joint on a joist, adhesive must cover both panel edges as shown in the details.

PANEL ADHESIVE

AAC compatible adhesive is used to glue and seal panel joints, for minor patching and filling screw heads.



ANTI-CORROSION TOUCH-UP PAINT

If Nasahi® Panels are cut to size, all exposed reinforcing steel must be treated with Nasahi® Corrosion Protection Touch-up Paint in accordance with the instructions on the container.

MASONITE PANEL

Minimum 3.2mm thick Masonite Panel must be installed over the Nasahi® Panels when using Carpet or Vinyl floor covering. The Masonite panels are only required for 50 and 62mm panels, it is not required for the 75mm thick panels.



Design Detail Considerations

FRAMING

The Nasahi® Flooring System is specified with both a maximum span, and a recommended span.

The maximum span is the structural limit of the panel when subjected to the specified loads.

The recommended span is the span that will minimise panel cutting.

Panel spans are outlined in Table 3. This ensures panel joints are located at the centreline of joists.

Joists must be designed for the intended design loads in accordance with local framing codes for timber or steel structures. The panel must have a minimum end bearing of 30mm on the floor joist, however if using the minimum allowable floor joist width of 45mm then the panel must land in the centre of the floor joist otherwise back blocking is required as per Detail 1.2.

Panel loads must be evenly distributed across all floor joists. Self-weight of panels as outlined in Table 2 on Page 16 must be taken into consideration when designing load-bearing frames.

CONTROL JOINTS

Control joints must be provided to relieve the stresses resulting from differential movement between the panel and other building elements. A 10mm gap should be left between panels and filled with a backing rod and appropriate flexible sealant (fire rated where required).

Control joints must be installed:

- At eccentrically loaded floor locations
- Changes in joist orientation (Detail 3.3) on Page 38
- Where panel joints are located over bearers/support walls (Detail 3.4) on Page 38
- Control joints no more than 8M centers
- Control joints should extend the full length of the AAC flooring system area.

CONCENTRATED LOADS

Where concentrated loads including load-bearing or bracing walls will be installed onto the Nasahi® flooring system, additional back blocking is required as shown in Detail 1.2 on Page 35. Loading should be kept below the maximum allowable deflections specified in Table 5 on Page 16.

APPROVED CEILING SYSTEMS

The underside of upper floors must be lined with a ceiling system that provides project specific noise reduction and fire resistance level. If you require advice selecting a ceiling system please contact Nasahi® or refer to Pages 19 & 20 for the allowed fire rated ceiling system and corresponding acoustic values.

TIMBER & STEEL LOAD-BEARING JOISTS

Joists, bearers and other structural components must be designed in accordance with local codes to ensure structural stability for the design application.

DURABILITY

AAC panels exposed to environments other than internal environments e.g. sub-floor spaces, should be protected by coatings that are water resistant, vapour permeable and able to bridge cracks.



PENETRATIONS

Any duct, soil, waste or water pipe penetrating the system or housed within the system is to be acoustically treated to maintain compliance with the requirements of National Construction Code NCC 2022; F7P1 for a Class 2, 3 building; and, F7P3 for a Class 9c building.

For penetrations greater than 80mm in diameter refer to Detail 5.2 on page 40. A 10mm gap must be created around the service to allow for differential movement between the panel and the service. Any gaps must be filled with backing rod and an appropriate flexible sealant.

Where fire resistance levels are specified, fire rated sealant and a fire rated penetration collar may need to be installed around the service and penetration. Nasahi® recommends confirming penetrations through floors with a fire engineer. Where multiple penetrations through the same panel are required, they must be located in-line, parallel to the long edge of the panel. Where multiple penetrations in a panel cause a reduction in panel strength additional structural support joists may be required.

Notes:

1. The use of fire collars must be supported by fire collar manufacturer's documentation to ensure fire resistance is not compromised.
2. There is no limit to the number of penetrations through a single panel, as long as the structural properties of the panels are not compromised. Penetrations should be installed as per the manufacturer's recommendations.

TERMITES

Nasahi® Panels are resistant to termites; however, termite protection is a mandatory requirement to protect internal building components. Termite protection must be installed in accordance with local codes and NCC requirements taking into account state variations.

System Performance

STRUCTURAL

Nasahi® Flooring Systems should be installed onto load-bearing timber or steel joists the maximum spacing listed in Table 3 below. Other joist spacings can be accommodated by using additional back blocking.

LOADS

The Nasahi® Flooring System has been designed to withstand a maximum uniformly distributed load of 3.0kPa, meeting the NCC requirements for domestic and residential dwellings. For higher loads, please contact Nasahi®.

Table 2 - Panel weights (2200mm x 600mm)

PANEL THICKNESS	50MM	62MM	75MM
Dry Panel weight (525kg/m ³)	36kg	46mm	55kg
Working Panel weight (590kg/m ³)	39kg	48kg	59kg

Note: The Nasahi® Working Panel weight has a density of 590 kg/m³ at 12.4% moisture content.

Table 3 - Maximum and recommended joist spacing for floor loads

PANEL THICKNESS	50MM @ 2.0kPa	62MM @ 2.0kPa	75MM @ 2.0kPa	75MM @ 3.0kPa
Maximum Spacing (mm)	450	450	600	450
Recommended Spacing (mm)	440	440	550	440

Note: For fire applications the maximum spacing between joists must be 450mm.

Table 4 - Design Load Capacities

NASAHI® PANEL THICKNESS	MAXIMUM IMPOSED CONCENTRATED ACTION (E.G. AS/NZS 1170.1 TABLE 3.1)	UDL'S
50mm	1.8 kN	1.5 kPa
62mm	1.8 kN	
75mm	2.5 kN	

Reference Documents:

- 50mm Panel with 2.71kN load capacity: Sharp & Howells, Report No. 20-0158 C.2, Dated 4th August 2021.
- 75mm Panel with 3.80 kN load capacity: Sharp & Howells, Report No. 20-0158 A2.2, Dated 4th August 2021.

ALLOWABLE DEFLECTION

Allowable deflection limits are based on the site joist spacing and applied loads. The Nasahi® Flooring System complies with deflection requirements for residential and multi-residential constructions. For all other applications, it is the responsibility of the system designer to ensure the following deflection limits are not exceeded as outlined in AS/NZS 1170.

Table 5 - Suggested Allowable Panel Deflection Limits (mm)

ALLOWABLE DEFLECTION (MM)	50MM THICK PANEL	62MM THICK PANEL	75MM THICK PANEL
Dead Load (Span/300)	1.5	1.5	2.0
Live Load (Span/360)	1.2	1.2	1.6
Dead Load & Live Load (Span/400)	1.1	1.1	1.5
Dynamic Response (1kN point load)	2.0	2.0	2.0

Note: The designer should select appropriate deflection limits to suit the individual project (e.g., brittle finishes)

ACOUSTIC PERFORMANCE

The Nasahi® Flooring Systems unique aerated construction makes it lightweight, while delivering excellent acoustic performance like a dense masonry product. This results in less foot traffic noise throughout the building and a high quality feeling underfoot.

Nasahi® Flooring systems are capable of achieving $R_w+C_{tr} >50$ and $L_{n,w} <62$ (see Table 9), as described in Renzo Tonin Report TH736-01F02(r8) pursuant to F7P1 for Class 2 & Class 3 building sound transmission requirements for airborne and impact generated sound.

□ Reference: TH736-01F02(R9), Renzo Tonin & Associates, dated 6 Feb 2024.

ENERGY EFFICIENCY

The Nasahi® Flooring Systems achieve energy efficiency levels that comply with all climate zone requirements in the NCC. This exceptional level of performance is due to the Nasahi® Panels unique aeration, which provides very high levels of thermal resistance. The NCC divides Australia into 8 climate zones. Choose the Nasahi® Flooring System that is right for your location. For other system combinations see Table 9 on Page 20.

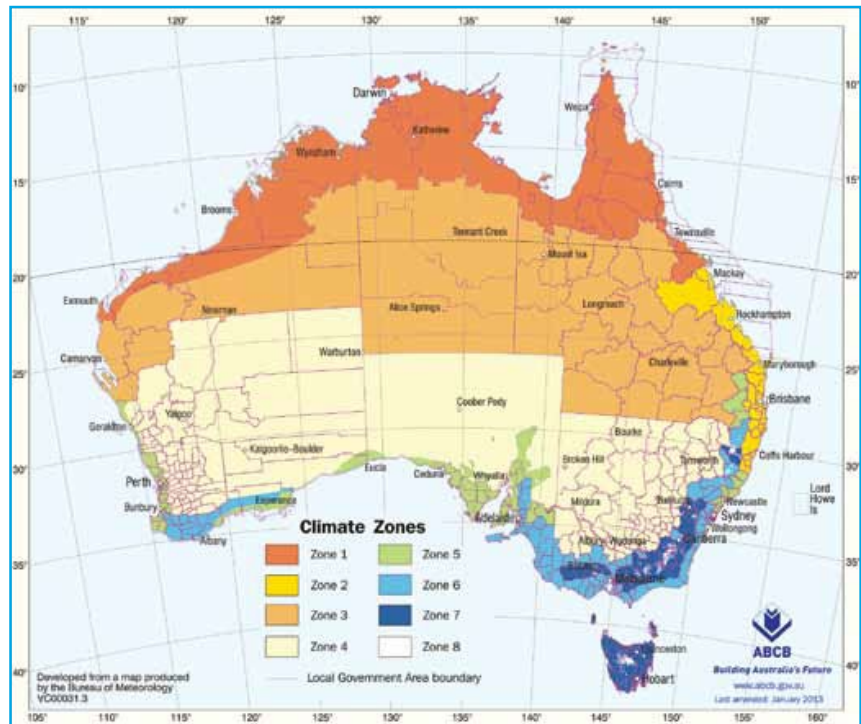


Image sourced from the Australian Building Codes Board (ABCB) www.abcb.gov.au

Table 6 – System Thermal Performance (including thermal bridging to AS/NZS 4859.1:2018)

	Total R-value m ² K/W, (U-value W/m ² K)					
	50MM		62MM		75MM	
	Winter	Summer	Winter	Summer	Winter	Summer
Carpet and Underlay Nasahi® Panel, Timber joists @ 450mm c/c, R1.5 Glasswool Batt, Non-reflective Sarking, Unventilated subfloor, Ground	3.53 (0.28)	3.24 (0.31)	3.62 (0.28)	3.34 (0.30)	3.72 (0.27)	3.44 (0.29)

Note: For advice on other configurations please contact Nasahi®.

Refer to Table 9 on Page 20 for Nasahi® Floor Systems

□ Reference Document: James M Fricker, Thermal Insulation Evaluation Report No. i449a, Dated 27th April 2021.



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FIRE RESISTANCE

The Nasahi® Flooring System complies with all Fire Resistance requirements of the NCC when installed with a USG Boral fire rated ceiling system beneath. The Nasahi® Flooring System can achieve an FRL of up to 120/120/120 from above and below. Nasahi® Panels are inherently non-combustible, and when exposed to fire Nasahi® Panels do not emit toxic gases or vapours.

Table 7 - Fire Resistance Levels of Nasahi floor systems, from below.

NASAHI® FLOORING SYSTEM	CONSTRUCTION ARRANGEMENT	FRL FROM BELOW
FXX-T250-03	Nasahi® 50, 62 or 75mm Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 glass Wool Ceiling Batt 13mm USG Boral fire rated plasterboard providing minimum 30min FRL	30/30/30 FPC ¹
FXX-T250-04	Nasahi® 50, 62 or 75mm Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 glass Wool Ceiling Batt 16mm USG Boral fire rated plasterboard providing minimum 30min FRL	30/30/30 RISF ² 30 mins
FXX-T250-05	Nasahi® 50, 62 or 75mm Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 glass Wool Ceiling Batt Two layers of 13mm USG Boral fire rated plasterboard providing minimum 60min combined FRL	60/60/60 RISF 30 mins
FXX-T250-06	Nasahi 50, 62 or 75mm Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 glass Wool Ceiling Batt One layer of 13mm USG Boral fire rated plasterboard and one layer of 16mm USG Boral fire rated plasterboard, providing minimum 60min combined FRL	60/60/60 RISF 30 mins
FXX-T250-07	Nasahi 50, 62 or 75mm Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 glass Wool Ceiling Batt Two layers of 16mm USG Boral fire rated plasterboard, providing minimum 90min combined FRL	90/90/90 RISF 60 mins
FXX-T250-08	Nasahi 50, 62 or 75mm Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 Glass Wool Ceiling Batt Three Layers of 16mm USG Boral fire rated plasterboard, providing minimum 120min combined FRL	120/120/120 RISF 60 mins

¹ Fire protective covering

² Resistance to the incipient spread of fire

Table 8 - Fire Resistance Levels of Nasahi floor systems, from above.

NASAHI® SYSTEM	CONSTRUCTION ARRANGEMENT	PANEL THICKNESS	FRL FROM ABOVE
Nasahi® AAC Panel	440mm, 450mm or 600mm maximum joist spacings.	50mm 62mm 75mm	120/120/120

Reference Document: TC Fire Engineering, Floor Systems - Performance Solution Report No. TCFE0016 V3, Dated 25th February 2022.

Table 9 -
Nasahi® Floor System Performance Levels

NAsahi® SYSTEM	SYSTEM DETAILS	PANEL THICKNESS	ACOUSTIC			FIRE
			AIRBORNE Rw (Ctr)	TILES & 5MM THICK RUBBER UNDERLAY	CARPET & FOAM UNDERLAY	
FXX-T250-01 * OPTION 1	<ul style="list-style-type: none"> Nasahi® Panel 250mm deep timber joist No insulation 10mm standard plasterboard 	50mm	48 (-6)	73 (-7)	46 (-5)	Nil
		62mm	48 (-5)	73 (-6)	46 (-5)	
		75mm	49 (-5)	65 (-2)	43 (-3)	
FXX-T300-02 * OPTION 2	<ul style="list-style-type: none"> Nasahi® Panel 300mm deep timber joist No insulation 10mm standard plasterboard 	50mm	48 (-5)	73 (-6)	46 (-5)	Nil
		62mm	49 (-5)	73 (-5)	46 (-5)	
		75mm	49 (-5)	66 (-1)	42 (-2)	
FXX-T250-03 * OPTION 3	<ul style="list-style-type: none"> Nasahi® Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 Glass Wool Ceiling Batt 13mm USG Boral fire rated plasterboard 	50mm	61 (-4)	60 (-6)	36 (-4)	30/30/30 FPC
		62mm	62 (-5)	59 (-5)	36 (-4)	
		75mm	62 (-4)	52 (-2)	31 (-2)	
FXX-T250-04 * OPTION 5	<ul style="list-style-type: none"> Nasahi® Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 Glass Wool Ceiling Batt 16mm USG Boral fire rated plasterboard 	50mm	61 (-4)	59 (-5)	36 (-4)	30/30/30 RISF 30 mins
		62mm	61 (-3)	59 (-5)	36 (-4)	
		75mm	62 (-4)	52 (-2)	31 (-3)	
FXX-T250-05 * OPTION 7	<ul style="list-style-type: none"> Nasahi® Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 Glass Wool Ceiling Batt Two layers of 13mm USG Boral fire rated plasterboard 	50mm	63 (-3)	59 (-7)	35 (-3)	60/60/60 RISF 30 mins
		62mm	63 (-3)	58 (-6)	35 (-3)	
		75mm	64 (-4)	50 (-1)	30 (-3)	
FXX-T250-06 * OPTION 9	<ul style="list-style-type: none"> Nasahi® Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 Glass Wool Ceiling Batt One layer of 13mm USG Boral fire rated plasterboard One layer of 16mm USG Boral fire rated plasterboard 	50mm	63 (-4)	59 (-7)	35 (-3)	60/60/60 RISF 60 mins
		62mm	63 (-4)	58 (-6)	35 (-3)	
		75mm	63 (-3)	50 (-1)	30 (-3)	
FXX-T250-07 * OPTION 11	<ul style="list-style-type: none"> Nasahi® Panel 250mm deep timber or steel joist with resilient mounts and furring channels. 450mm maximum floor joist spacing R2.5 Glass Wool Ceiling Batt Two layers of 16mm USG Boral fire rated plasterboard 	50mm	62 (-3)	59 (-6)	35 (-4)	90/90/90 RISF 60 mins
		62mm	62 (-3)	59 (-6)	35 (-4)	
		75mm	62 (-3)	51 (-2)	31 (-4)	

FRL: Fire Resistance Level FPC: Fire Protective Covering RISF: Resistance to Incipient Spread of Fire

☐ Reference Documents:

1. Renzo Tonin & Associates, Report No. TH736-01F02 Acoustic Opinion R8, Dated 16th April 2020.
2. TC Fire Engineering, Floor Systems - Performance Solution Report No. TCFE0016 V3, Dated 25th February 2022.

Floor Covering Installation

STANDARD FLOOR COVERINGS MAY BE USED WITH THE NASAHI® FLOORING SYSTEM AS WOULD TYPICALLY BE USED FOR OTHER SUBSTRATES.

PANEL PREPARATION

Nasahi® Panels must be clear of debris and loose particles. All surface damage and screw heads must be patched with Nasahi® Panel Adhesive.

Prior to installation, panels and patches must be dry (<6% moisture content). If panels are not dry then a membrane such as 0.2mm polyethylene sheeting can be placed over the floor.

CARPET	TILES	TIMBER	VINYL
<p>1. If 50 or 62mm thick panels, fix minimum 3.2mm Masonite board to Nasahi® Panels using the fixings outlined in Table 10. Not required for 75mm panels.</p> <p>2. Carpet smooth edge (Gripper) must be installed in accordance with AS/NZS 2445.1 a minimum of 50mm from panel edge.</p> <p>3. Install carpet gripper using only the approved fixings outlined in Table 10, standard gripper fixings are not suitable. Carpet can be installed as per manufacturers instructions for standard flooring.</p>	<p>1. Apply sealer as per manufacturers specifications. Waterproofing membrane must be installed in wet areas and balconies.</p> <p>2. Ensure control joints are installed in the necessary locations. Penetrations through waterproofing membrane must be sealed appropriately.</p>	<p>Floating Floor</p> <p>Install underlay/ backing in accordance with project acoustic specifications. There are no special requirements for floating timberflooring installation.</p> <p>Direct Fix</p> <p>1. Install min. 6mm plywood sheets to Nasahi® Panels using construction adhesive and coarse thread countersunk screws into joists below at max. 600mm centres.</p> <p>2. Fix timber flooring to plywood as per standard installation.</p>	<p>1. Vinyl flooring may be installed either onto a concrete screed, applied in accordance with the manufacturers specifications or onto a Masonite board.</p> <p>2. Fix Masonite board to Nasahi® Panels using the fixings outlined in Table 10.</p> <p>3. Vinyl should be installed to Masonite in accordance with manufacturers specifications.</p>

Note:

1. For Common Flooring Types used with Nasahi® Systems Refer to Page 11 of this manual.

2. For fire applications the maximum spacing between joists must be 450mm.

Table 10 - Approved floor covering fixings

FIXING TYPE	DESCRIPTION
Twist Nails	2.8mm dome head twist nail
Screws	8G Type 17 – Coarse thread Countersinking Screw

Note: Fixings should penetrate a minimum of 40mm into Nasahi® Panels

Flooring System Installation Method

STAGE 1: PREPARATION

1. Supporting structure must be completed prior to installation of the Nasahi® Flooring System. A pre-installation check list is available on our website.

2. The recommended spacing for 1800mm panels is 450 or 600 centres, and for 2200mm panels is 440 centres to minimise on site wastage. Panel thicknesses and loads must comply with the specifications in Table 3 and Table 4 on Page 16. A minimum joist width of 45mm is Recommended.

Note: For fire applications the maximum spacing between joists must be 450mm.

3. Lay the first row of panels so that they are flush with floor joists and ensure the panel has a minimum end bearing of 30mm on the floor joist, however if using the minimum allowable floor joist width of 45mm then the panel must land in the centre of the floor joist otherwise back blocking is required as per Detail 1.2. Start the next row with the piece that was cut from the end of the previous row.

This results in a strong stretcher-bond pattern.

4. If panels overhang joists, install back blocks as shown in Detail 1.2 on Page 35.

STAGE 2: NASAHİ® PANEL INSTALLATION

5. Starting at one corner, apply a bead of construction adhesive to every joist where it contacts the panel.

6. Gently lay the panel down onto the supporting joists.

7. Use a spirit level to ensure that the Nasahi® Panel is level and is flush with the joists.

8. Screw fix through the face of the Nasahi® Panel and into the joist. At least two screws must be installed into each joist. Screws must be a minimum of 50mm in from the panel edge and can be skewed where required.

9. The screw head must penetrate 5–10mm into the panel face. Screw heads are later filled with Nasahi® Adhesive.

STAGE 3: PANEL JOINTS

10. Apply a 2–3mm of Nasahi® Panel Adhesive to the edge of the panel. Install the next panel hard against it, ensuring it is level and joint is fully sealed. Use a trowel to remove excess adhesive.

11. Where panels join, ensure both panels are adhered to the joist with construction adhesive. Optionally fix two screws between the panels as shown in Detail 1.5 on page 36.

12. Continue installation of floor in a stretcher-bond pattern.

13. Penetrations & Services must be sealed in accordance with Detail 5.1 and 5.2 on Page 40.

14. It is recommended that during construction, panels in high traffic areas be covered with a suitable material such as plywood to prevent damage by other trades.

15. Control joints must be provided to relieve the stresses resulting from differential movement between the panel and other building elements. A 10mm gap should be left between panels and filled with a backing rod and appropriate flexible fire rated sealant. They must be installed at eccentrically loaded floor locations, changes in joist orientation, where panel joints are located over beared/ support walls, control joints must not exceed more than 8m centres, and control joints should extend the full length of the AAC Flooring area. Refer to Page 11 of this manual for Common Flooring Types used with Nasahi® Systems.

Upon project completion, the installer must complete a Nasahi® Installation Compliance Certificate and submit to both the builder and Nasahi® for the system to be warranted. The installation compliance certificate can be found under resources on our website www.nasahi.net.au.

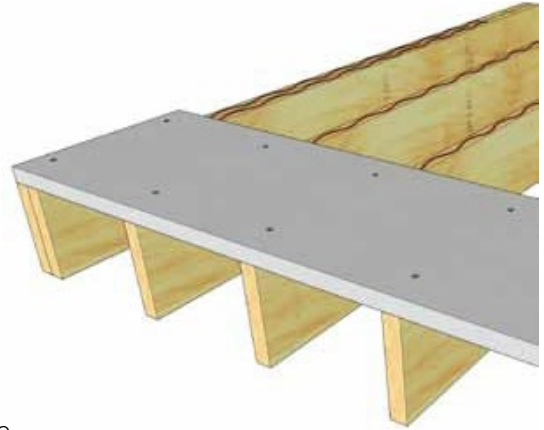
Flooring Installation Sequence

1. PREPARATION

- a. Check that the joist spacing and required loads match the panel thickness in accordance with Table 3 and Table 4 on Page 16.

Note: For fire applications the maximum spacing between joists must be 450mm.

- b. Ensure Nasahi® Panels join on joists and have a minimum end bearing of 30mm on the floor joist, however if using the minimum allowable floor joist width of 45mm then the panel must land in the centre of the floor joist otherwise back blocking is required as per Detail 1.2. Where panels overhang joists, they must be cut to length. ALL exposed steel reinforcement must be treated with Nasahi® Anti-Corrosion Touch Up Paint.
- c. Where panels will overhang joists, install back blocks as shown in Detail 1.2.

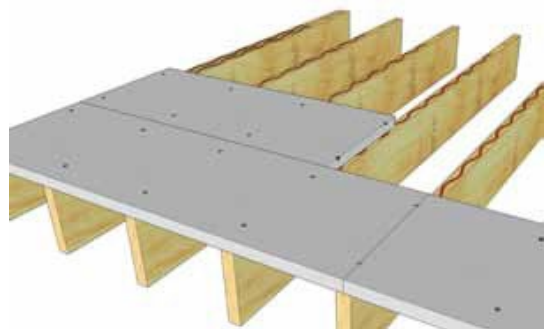


2. PANEL INSTALLATION

- a. Apply a bead of construction adhesive to every joist where it contacts the panel.
- b. Lay panels down onto joists.
- c. Use a spirit level to ensure that panels are level and flush with the joists.

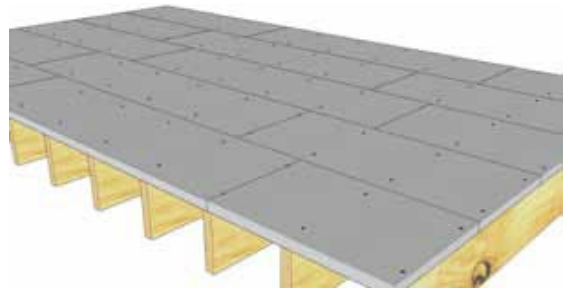
3. PANEL JOINTS

- a. Apply 2–3mm of Nasahi® Panel Adhesive to the edge of the Nasahi® Panel.
- b. Install the next panel hard against it, ensuring it is level and joint is fully sealed. Use a trowel to remove excess adhesive.
- c. Screw fix panels to joists.
- d. Control joints no more than 8M centers
- e. Control joints should extend the full length of the AAC flooring system area.
- f. The panel must have a minimum end bearing of 30mm on the floor joist, however if using the minimum allowable floor joist width of 45mm then the panel must land in the centre of the floor joist otherwise back blocking is required as per Detail 1.2.



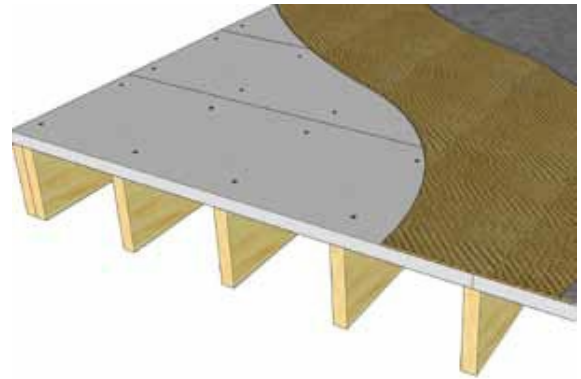
4. CONTINUE INSTALLATION

- a. Rows should be started at alternating ends, so that panels are installed in a stretcher-bond pattern as shown.



5. COMPLETE INSTALLATION

- a. Lay all panels in a stretcher bond pattern until flooring is complete.
- b. Single penetrations in a panel less than 80mm diameter or greater than 80mm diameter shall be detailed in accordance with Details 5.1 & 5.2 on Page 40. Multiple penetrations across the width of a panel require additional back-blocking and fixings across the width of the panel on each side of the penetrations.
- c. Standard flooring may be installed over Nasahi® Panels using the approved fixings outlined in Table 10 on Page 21.










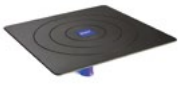
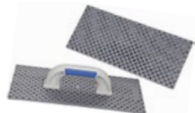
Working with Nasahi® Panels

CUTTING PANELS

NASAHI® PANELS CAN EASILY BE CUT TO THE REQUIRED LENGTH, USING POWER OR HAND TOOLS.

Nasahi® Panels are delivered to site flat packed. The flat packs can be used as a cutting bench for other panels as required. Any reinforcement exposed during cutting must be coated with Nasahi® Corrosion Protection Touch up Paint.

Table 11 - Basic Tools required to Cut and Install NASAHI® Panels

TOOL	USE	
SAW (WITH DIAMOND BLADE)	for cutting panels	
IMPACT DRIVER	for installation of panel fasteners	
DRILL	for drilling penetration holes	
VACUUM	for dust extraction purposes while cutting Nasahi® panels (Class M or H industrial vacuum)	
MIXING DRILL /MIXING BUCKETS	mixing Adhesive and render.	
HAWK AND STEEL TROWEL	for Spreading Adhesive and Rendering	
RASP (SANDING FLOAT)	for Panel sanding where required	

Delivery & Handling

DELIVERY

- Nasahi® Panels are delivered to site in flat packs of up to 20.
- Each pack has a wet mass of approximately 960kg, including packaging.
- Panel packs must only be stacked one pack high and must be properly supported on level ground.
- If packs are to be placed on any type of structure, always consult the project engineer to verify the structural adequacy of the structure.
- Nasahi® Panels should be stored on a level surface and never more than one pack high.

Table 12 - Panel Packs and Weight

ALL PANELS ARE FLAT PACKED		
THICKNESS	NO. OF PANELS	APPROX. WEIGHT PER PACK
50mm	20	960kg
62mm	15	
75mm	13	

MANUAL HANDLING

To reduce the likelihood of damage, handling of Nasahi® Panels around site should be kept to a minimum. When lifting a panel, turn onto its long edge and support the weight by lifting with two people as shown below. Before lifting panels, a manual handling risk assessment must be performed to ensure personal injury risk is minimised. Packs should be unloaded as close as possible to the installation area; however, where this is not possible Nasahi® recommends the use of trolleys and/or other mechanical devices.



DO NOT Carry Nasahi® Panels FLAT



ALWAYS Carry Nasahi® Panels ON EDGE

Health & Safety

HEALTH AND SAFETY

All quarry products, including bricks, concrete and Nasahi® Panels contain Crystalline Silica, or Silica Dust. Prolonged exposure to Silica Dust without the correct PPE can be harmful and potentially cause skin irritation and life-threatening health hazards such as bronchitis, silicosis and lung cancer.

Silica dust is generated when cutting, drilling or moving the panels.

The site should be cleaned of dust regularly and when using power tools these should be fitted with an efficient, well-maintained dust extraction system.

Nasahi® recommends the use of Class M or H industrial vacuum systems for dust extraction. These vacuums suitably capture the dust and also allow for disposal of the waste in a manner to minimise dust exposure.

Nasahi® Panels do not contain any additives that are known to cause health problems; however, because of the risk of exposure to Silica Dust it is recommended that the correct PPE is worn.

The Nasahi® External Wall System Installer is responsible for informing all employees of these Health and Safety requirements under the Occupational Health and Safety Act.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

When working with Nasahi® Panels, it is recommended that the following Australian compliant PPE is worn as a minimum:

- P1 or P2 Dust masks
- Protective glasses / goggles
- Ear Plugs / Ear Muffs – Class 5
- Gloves, long sleeve shirt and long pants
- Protective footwear



HAZARDOUS MATERIALS

For MSDS of all components sold by Nasahi®, please visit our website www.nasahi.net.au.



NCC Compliance



NCC VOLUME ONE

Covers commercial, residential and public buildings defined as Class 2 to 9. Typical examples include multi-family dwellings, commercial and health building.

NCC VOLUME TWO

Covers domestic constructions defined as Class 1 and 10. Typical examples include single-family dwellings, townhouses, houses and garages.

It is the responsibility of the builder to ensure the system is designed in accordance with this installation manual and that all site-specific performance provisions outlined in the relevant sections of the NCC are met.

The Nasahi® Flooring System has been certified to meet the following provisions of the National Construction Code for Volume One and Volume Two for internal applications in accordance with the loads specified in Table 4 for domestic and residential activities.

Note: Nasahi® Panels are not suitable for use on stairs and landings. If you require advice selecting a solution for these applications please contact Nasahi®.

Table 13 - NCC Compliance

	VOLUME ONE	VOLUME TWO
Structural	B1P1 & B1P2	H1P1
Fire	C2D2(2), C2D10, C2D11, C1P1*, C1P2*, C1P4* & C1P8*	H3P1*, 9.3.4*
Acoustic	F7P1, F7P3	-
Energy Efficiency	J4D7	13.2.6*

The Nasahi® CodeMark Certificate can be downloaded from our website.

Note: For Type A and B construction, the non-combustibility of the system is restricted to the Nasahi® Panel only.

* The NCC compliance claims for C1P1, C1P2, C1P4, C1P8, H3P1, 9.3.4 and 13.2.6 are outside of the CodeMark certificate.

Appendix



MATERIAL PROPERTIES

Appendix Table 1 - Material Properties

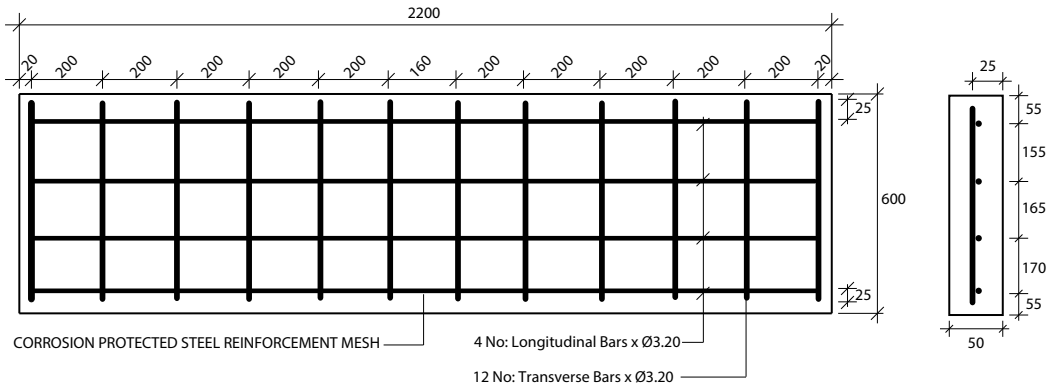
PROPERTY	STANDARD	VALUE	UNITS
Panel Thickness d		50, 62 & 75	mm
Panel Width w		600	mm
Panel Length L		2200mm	
Panel edge profile		Square Edge	
AAC Dry Density, ρ	AS 5146.2 Appendix C	525	kg/m ³
AAC Density for design, ρd	AS 5146.2	590	kg/m ³
AAC Density for transport and lifting, ρ_{tran}	AS 5146.2	775	kg/m ³
AAC Characteristic Compressive Strength, f_{ck}	AS 5146.2 Appendix D	3.1	MPa
AAC Characteristic Flexural Strength, f_{ut}	AS 5146.2 Appendix E	0.50	MPa
Reinforcing yield stress	AS 4671	>500	MPa
Reinforcing tensile strength	AS 4671	>600	MPa
Reinforcing weld strength	AS 4671	>0.5 of force at yield of a longitudinal bar	
Design Serviceability Limit State Deflection Limit, max	AS 5146.1	SPAN/250	
Youngs Modulus (E)	AS5146.2:2018	1800	MPa

Note:

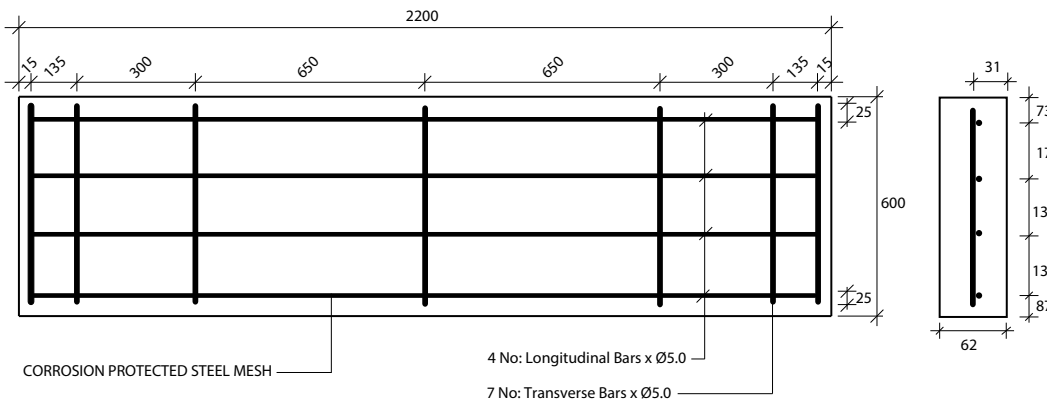
1. Dry density is achieved by oven drying specimens so that the moisture content is close to 0%.
2. A design density of 590kg/m³ has been calculated using a 12.4% moisture content.

PANEL REINFORCING LAYOUT

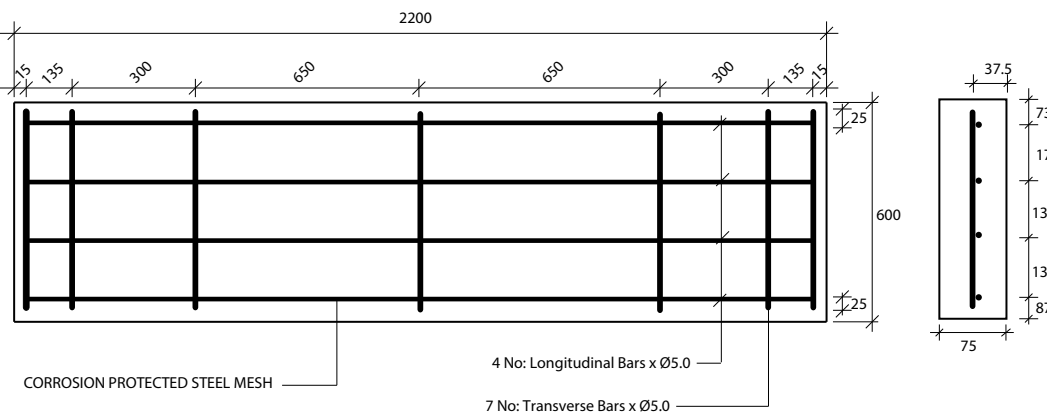
50MM THICK PANEL (50 X 600 X 2200)



62MM THICK PANEL (62 X 600 X 2200)

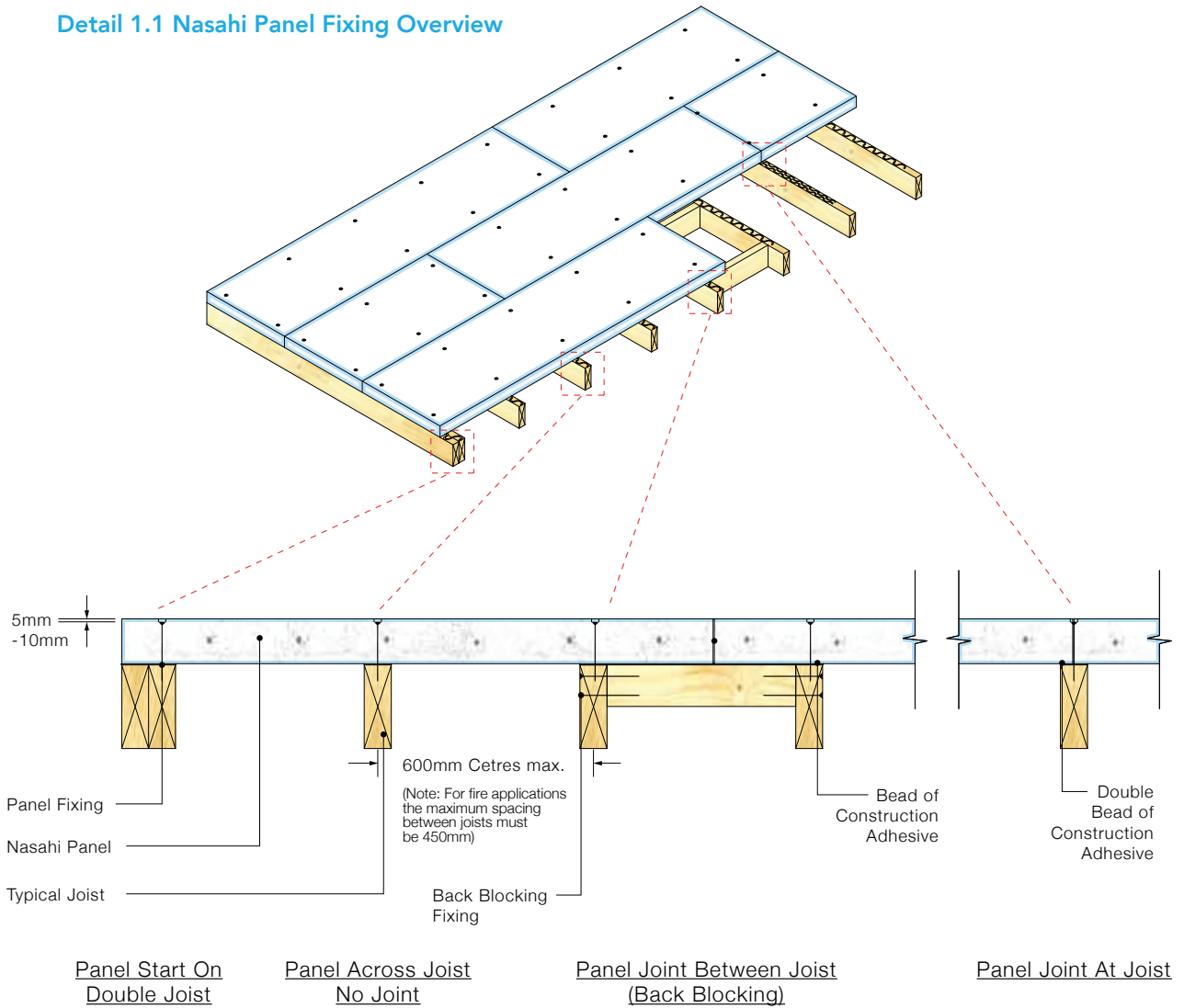


75MM THICK PANEL (75 X 600 X 2200)

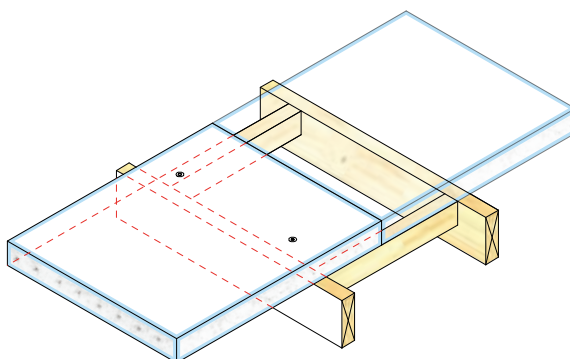
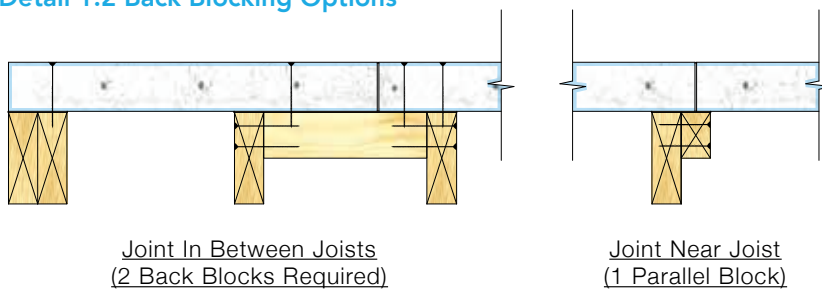


DETAILED DRAWINGS

Detail 1.1 Nasahi Panel Fixing Overview

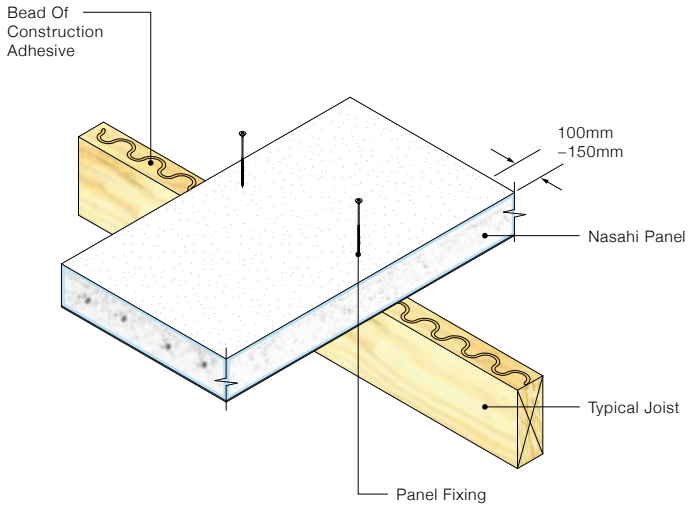


Detail 1.2 Back Blocking Options

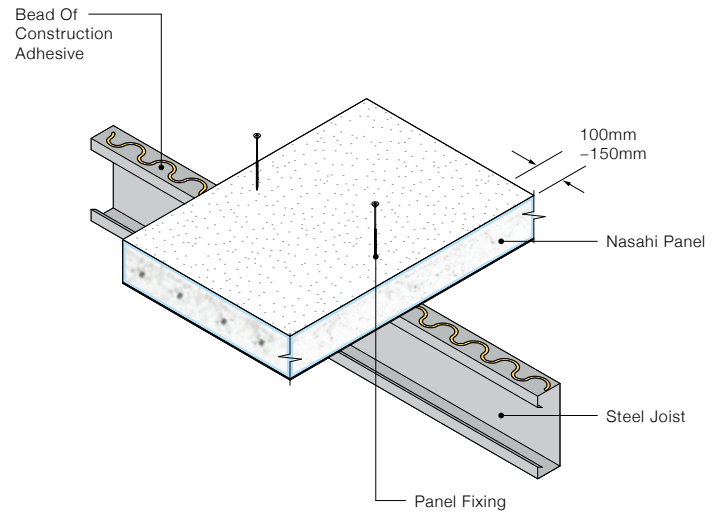


* Back Blocks Must Support Panel Corners

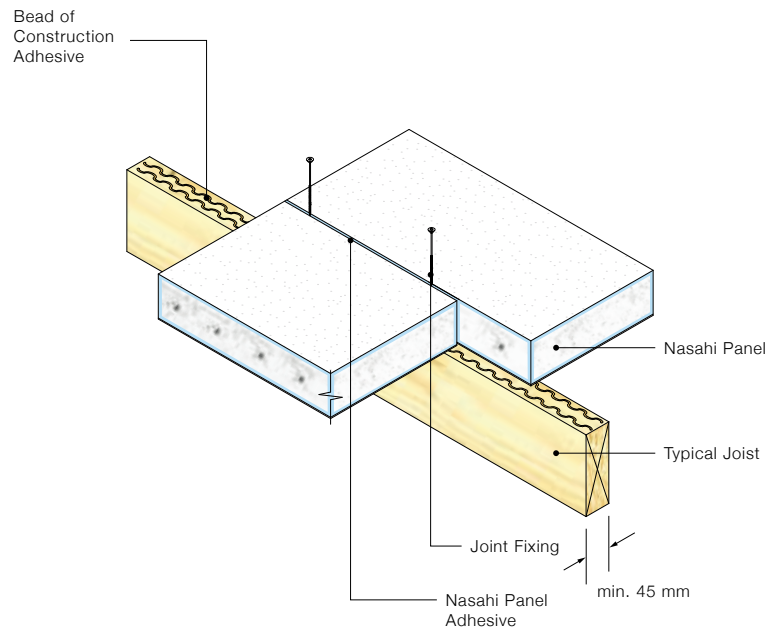
DETAILED DRAWINGS



Detail 1.3 Mid Panel Fixing Timber Joist



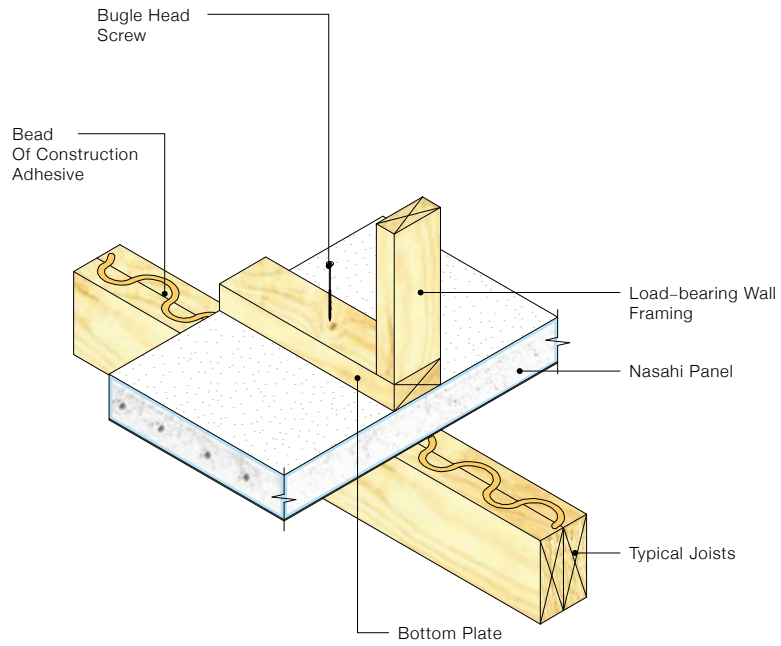
Detail 1.4 Mid Panel Fixing Steel Joist



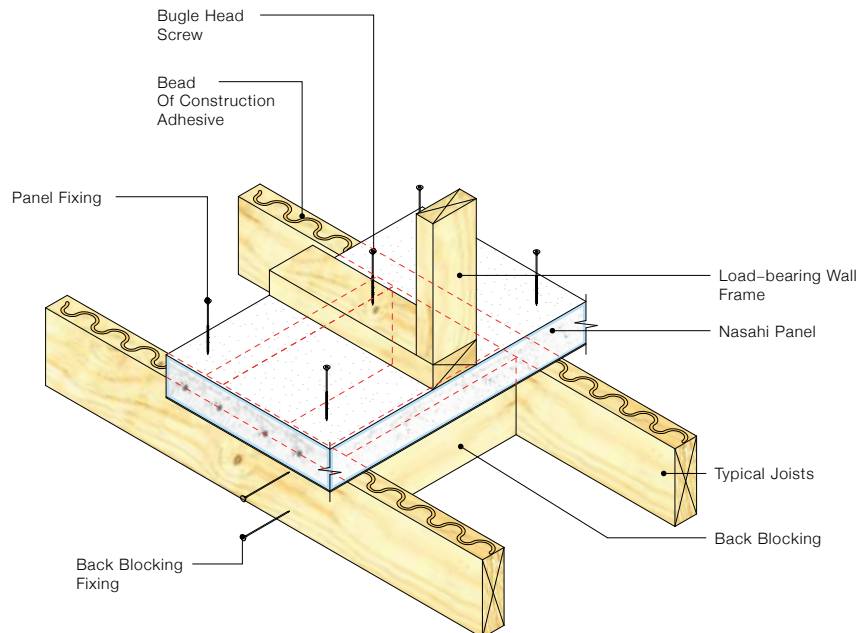
Detail 1.5 Panel Joint on Joists

Note: The panel must have a minimum end bearing of 30mm on the floor joist, however if using the minimum allowable floor joist width of 45mm then the panel must land in the centre of the floor joist otherwise back blocking is required as per Detail 1.2.

DETAILED DRAWINGS



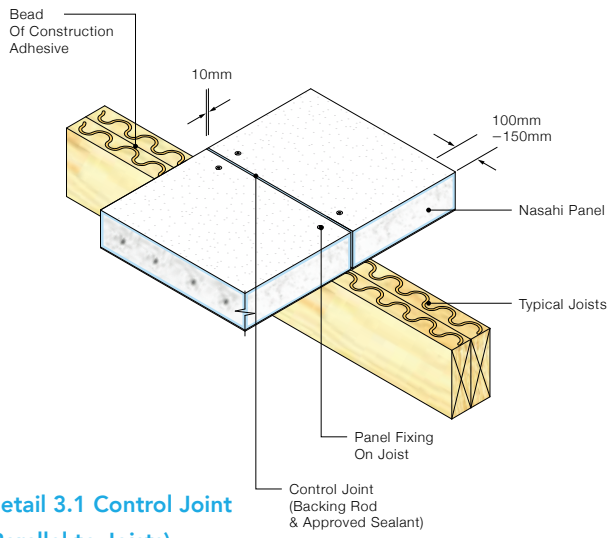
**Detail 2.1 Load Bearing Wall Option 1:
Floor Joist Under Loadbearing Wall**



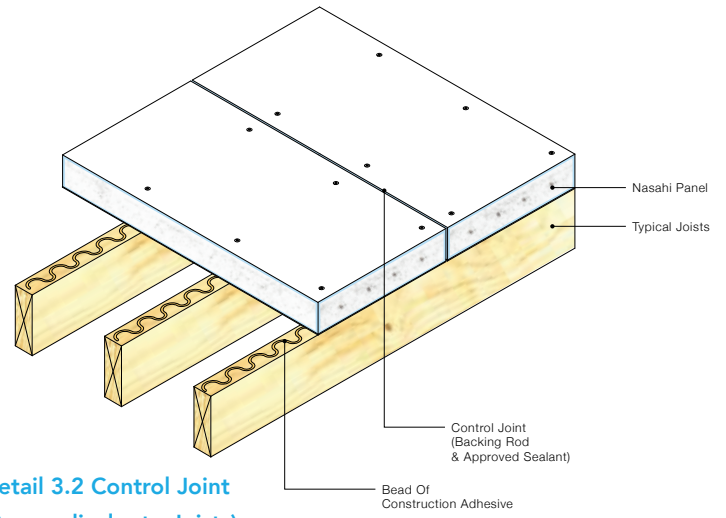
**Detail 2.2 Load Bearing Wall Option 2:
Back Blocking Under Loadbearing Wall**

Note: Minimum two back blocks per panel, check with project engineer for maximum panel loads.

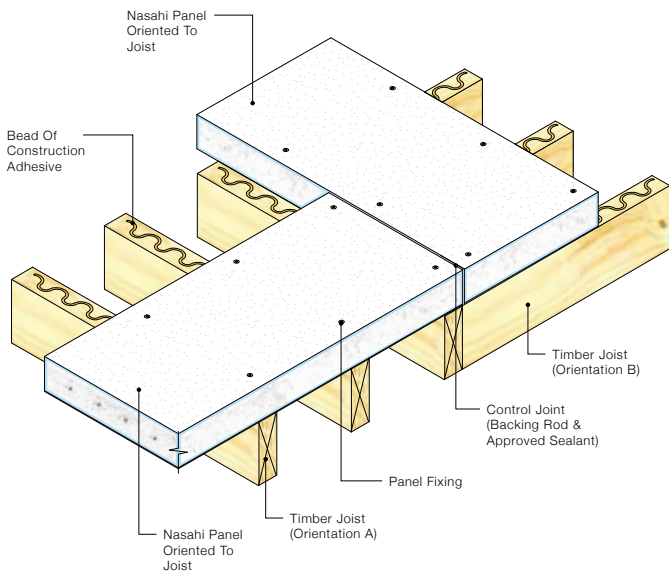
DETAILED DRAWINGS



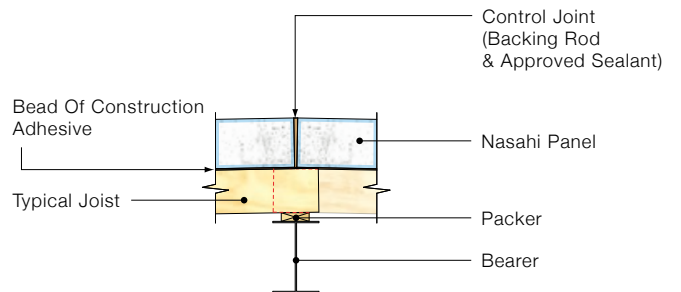
Detail 3.1 Control Joint (Parallel to Joists)



Detail 3.2 Control Joint (Perpendicular to Joists)

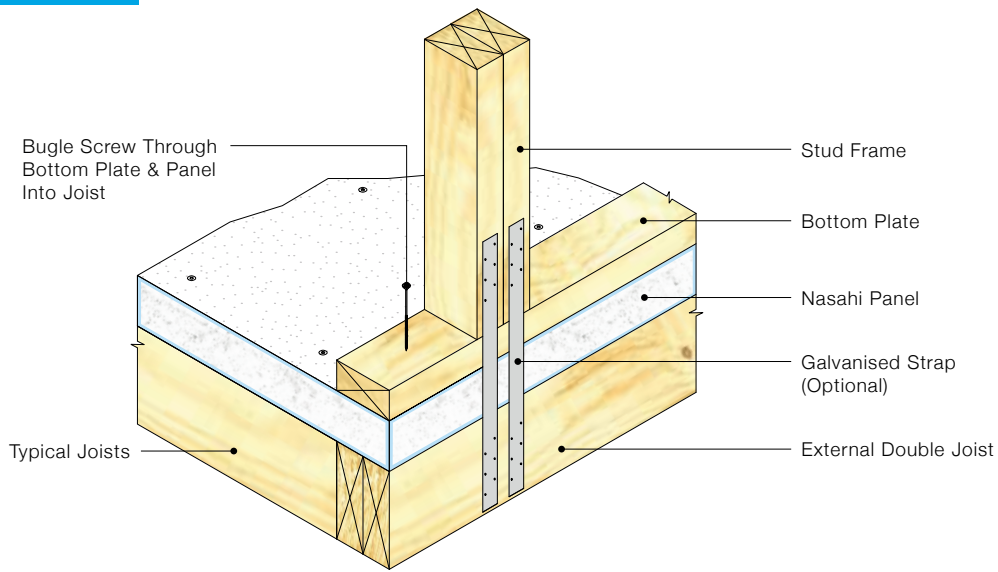


Detail 3.3 Control Joint at Change of Joist Direction



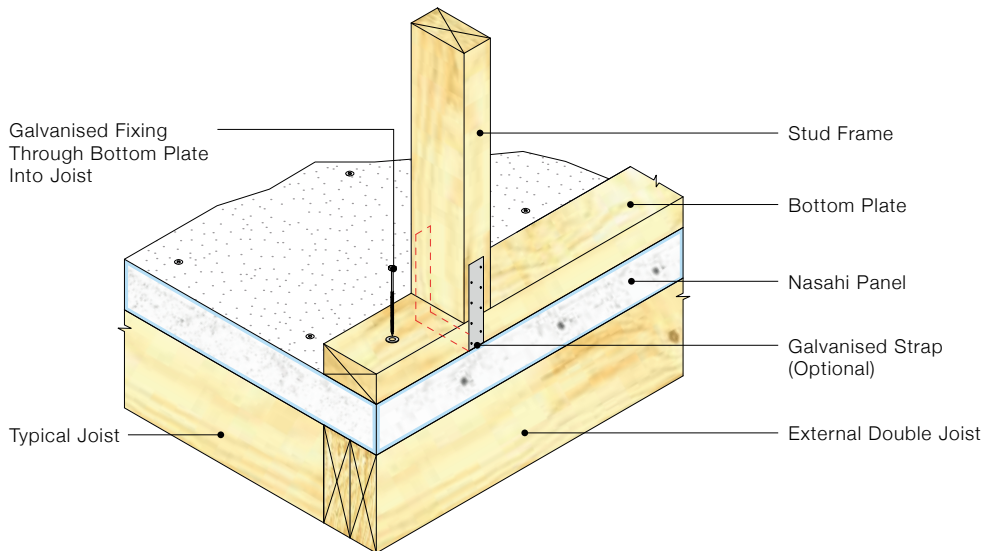
Detail 3.4 Control Joint Over Bearer / Support Wall

DETAILED DRAWINGS



Detail 4.1 External Wall Frame Fixing

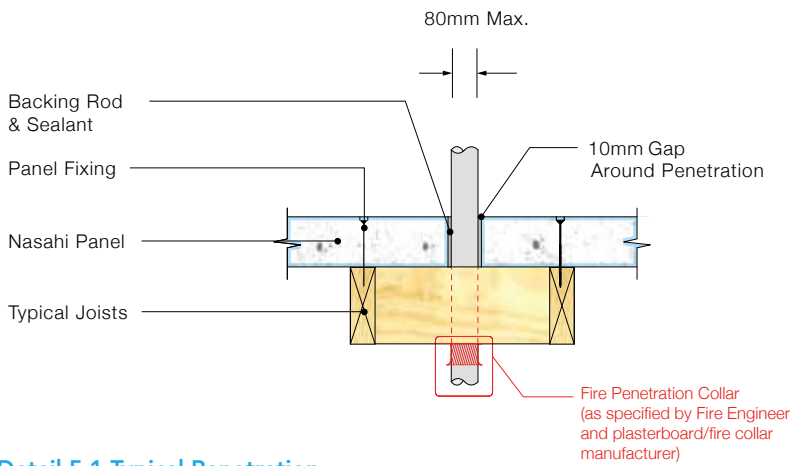
- **Load-bearing** Walls Must Be Supported By Joist Under Panel. Check With Project Engineer For Maximum Panel Loads.



Detail 4.2 External Wall Frame Fixing (Bolt Fixing)

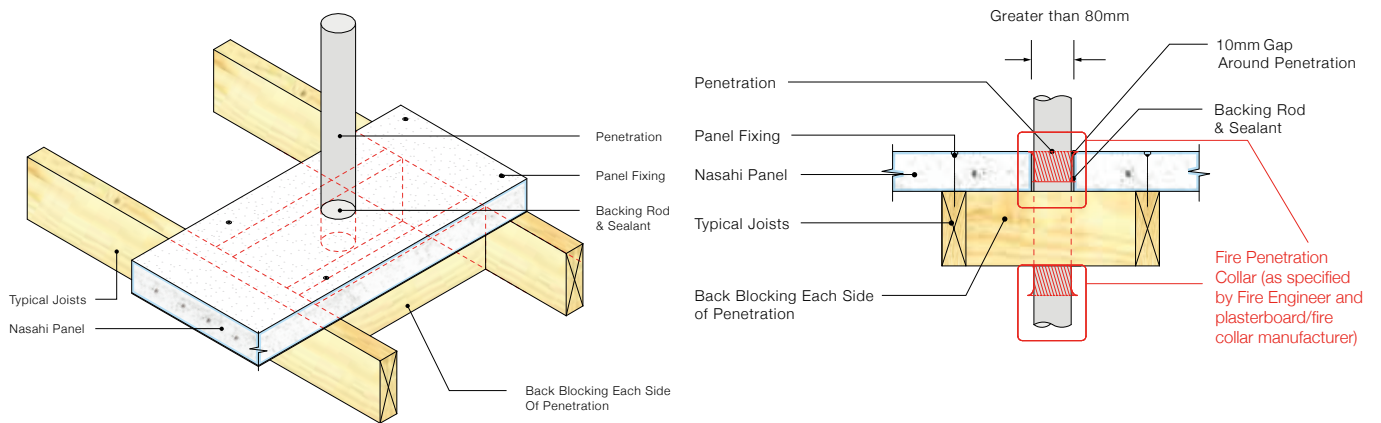
- **Load-bearing** Walls Must Be Supported By Joist Under Panel. Check With Project Engineer For Maximum Panel Loads.

DETAILED DRAWINGS

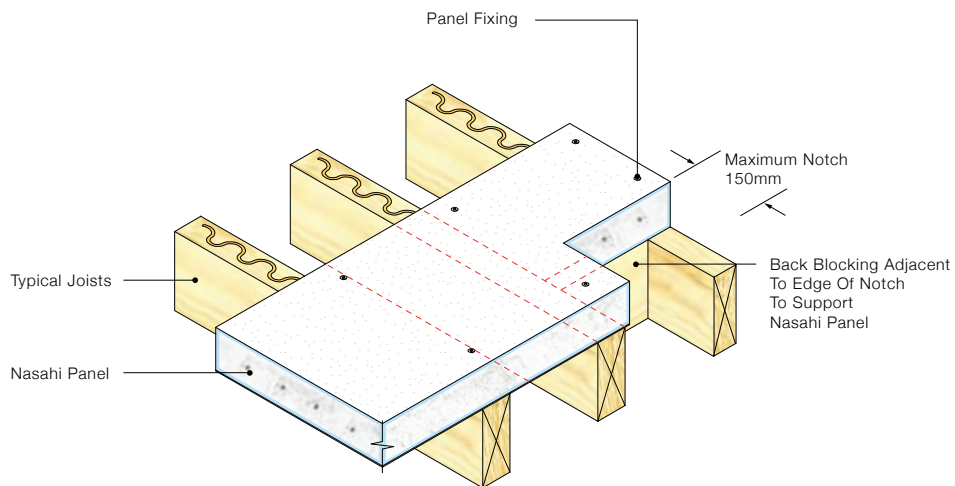


Note: For Details 5.1 & 5.2 a fire collar should be installed at the fire line, which is the layers of fire rated plasterboard in this instance. Collars should be installed in accordance with the manufacturer's recommendations to ensure fire resistance is not compromised.

Detail 5.1 Typical Penetration (Smaller than 80mm)

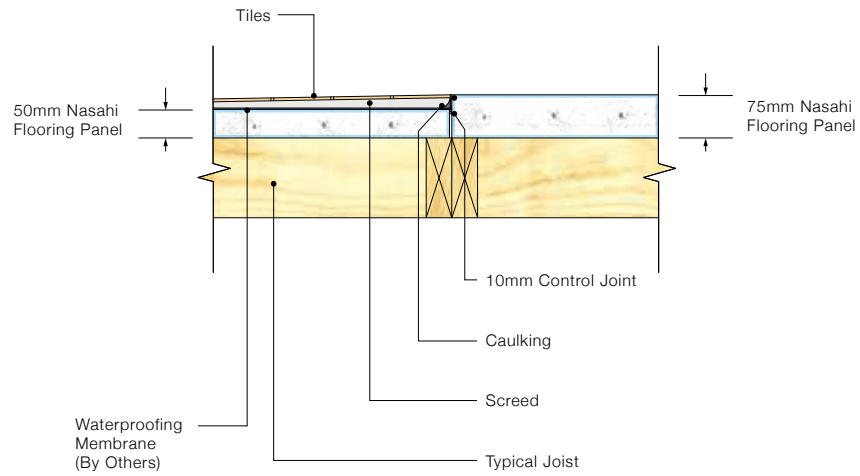


Detail 5.2 Typical Penetration (Back Blocking)

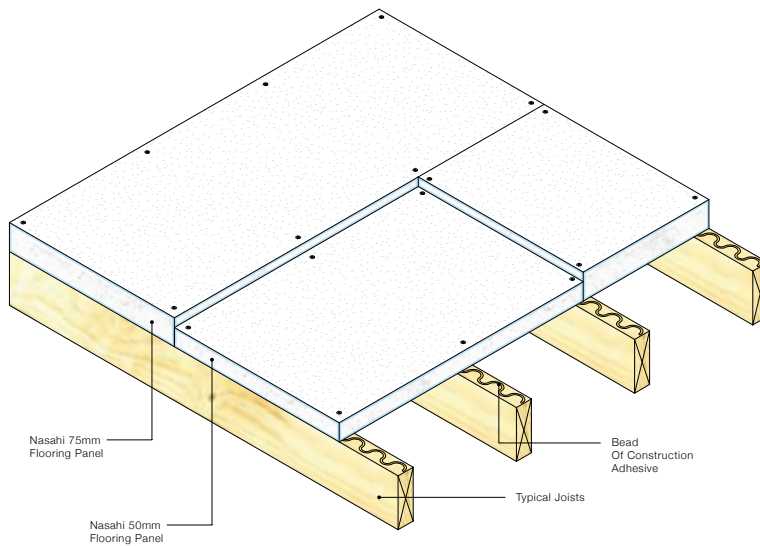


Detail 5.3 Support Detail for Corning Notching

DETAILED DRAWINGS

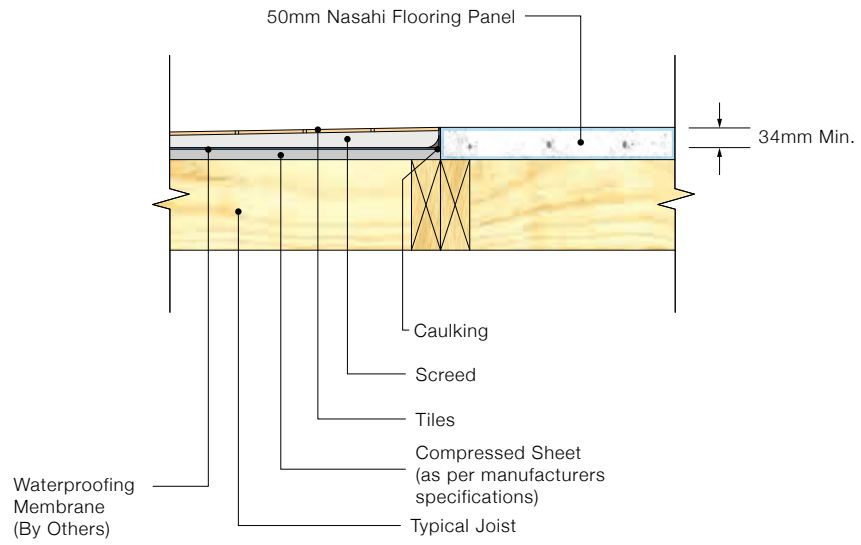


Detail 6.1a Shower Recess (75mm to 50mm)

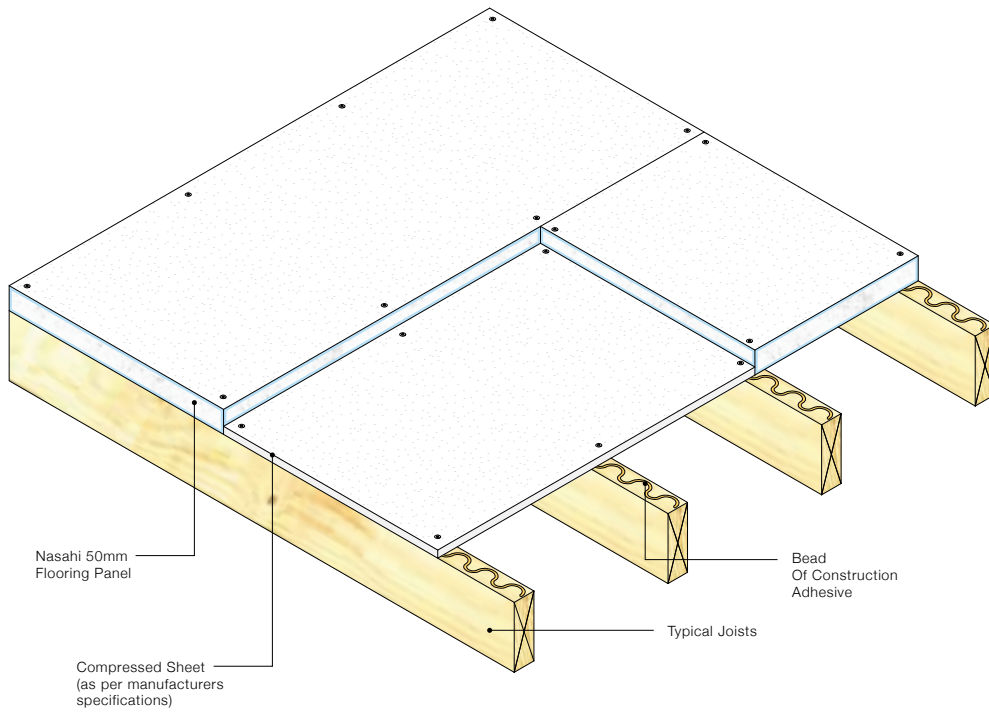


Detail 6.1b Shower Recess Panel Layout (75mm Panel)

DETAILED DRAWINGS

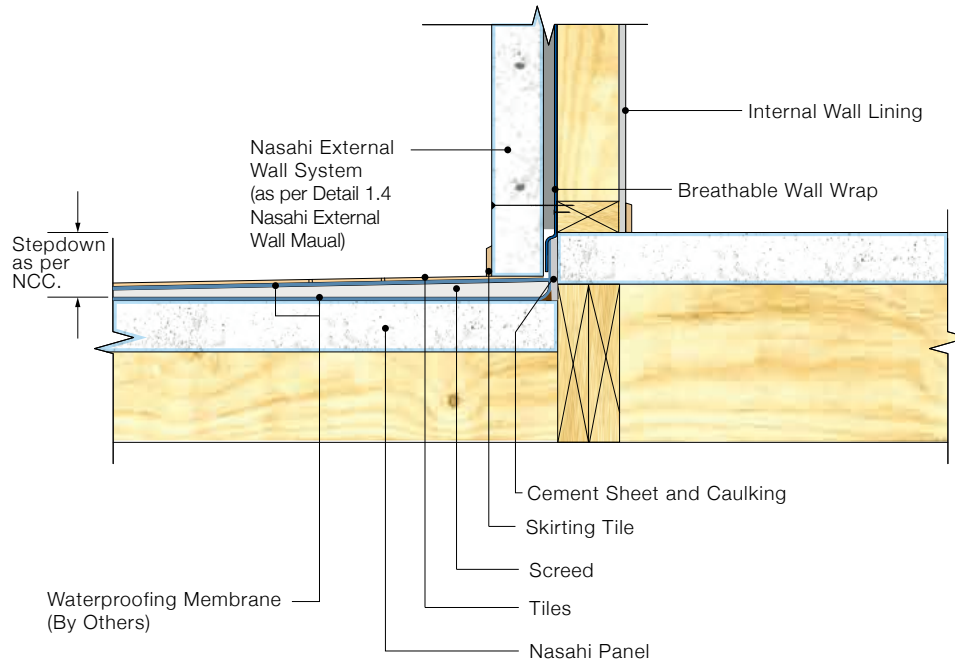


Detail 6.2a Shower Recess (50mm)



Detail 6.2b Shower Recess Panel Layout (50mm Panel)

DETAILED DRAWINGS



Detail 7.1 Balcony Flooring (Timber Framing)

Note: On balconies if a 2mm cannot be provided between top of tile then weep holes at 1200 centres must be installed.

Guarantee

NASAHI® GUARANTEE THE PRODUCTS MANUFACTURED BY US AND THE SYSTEMS DESCRIBED IN NASAHI® LITERATURE FOR 7 YEARS, SUBJECT TO THE TERMS AND CONDITIONS OF THE NASAHI® GUARANTEE WHICH CAN BE FOUND ON OUR WEBSITE. NASAHI® DOES NOT GUARANTEE COMPONENTS, PRODUCTS OR SERVICES, SUCH AS INSTALLATION, SUPPLIED BY OTHERS. NASAHI® RECOMMENDS THAT ONLY PRODUCTS, COMPONENTS AND SYSTEMS RECOMMENDED BY IT BE USED.

Nasahi® Approved Coating Systems used with the Nasahi® External Wall System must be guaranteed by the coating manufacturer and meet the minimum performance requirements specified by Nasahi®. It must have been prepared and installed in accordance with the manufacturers written instructions and technical specifications.

Only projects for which a completed Nasahi® Installation Compliance Certificate has been received will be eligible for the Nasahi® guarantee. Blank certificates are available from our website.

This guarantee applies to the performance of the system for the uses outlined in this Installation guide and excludes liability for consequential damage or losses in connection with defective cladding, other than those imposed by legislation.

WARRANTY

The Nasahi® Panel, when installed in accordance with this guide, are warranted for a minimum of 15 years (from date of purchase) to be free from any defects subject to the conditions and exclusions set out in the Nasahi® Warranty Document available on our website.

Nasahi® Panels are warranted to not materially degrade, corrode or break down during the Term of this warranty (Nasahi® Warranty Document).

This exceeds the 7-year requirement outlined in the NCC and the relevant Australian Standards.

DISCLAIMER

The information presented within this Installation guide is provided in good faith and to the best of our knowledge and is accurate at the time of preparation. The provision of this information should not be interpreted as a recommendation to use any of our products in violation of patent rights or in breach of statutes or regulations. Users are advised to make their own determination as to the suitability of this information in relation to their particular project and circumstances. As the information contained within this Installation guide may be applied under conditions beyond our control, no responsibility can be accepted by Nasahi®, or its staff for any losses or damage caused by any person acting or refraining from action as a result of misuse of this information.

AAC Building Products Pty Ltd T/A NASAHI® reserves the right to alter or update inclusive information from time to time without notice.



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