

# Strandfloor®

Technical Manual



strandfloor®

Edition 9.0 08.21

Laminex™  
NEW ZEALAND

# Strandfloor®

# Technical manual

Edition 9 – August 2021

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# 1 Scope and interpretation

## 1.1 Compliance

Strandfloor® and StrandfloorH3.1® have CodeMark Product Certificates.

Strandfloor® has two BRANZ Appraisals - Strandfloor® No. 676 (2016), and StrandfloorH3.1® No. 677 (2016).

The CodeMark Certificates and BRANZ Appraisals cover the use of both product options within the scope of the New Zealand Building Code.



The valid appraisal's and Codemark certificates can be found on the BRANZ website – [www.branz.co.nz](http://www.branz.co.nz)

Strandfloor® and StrandfloorH3.1® will meet the following provisions of the New Zealand Building Code:

- o Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4 for loads arising from self-weight, imposed gravity loads arising from use, earthquake, wind and impact [i.e. B1.3.3 (a), (b), (f), (h), and (j)].
- o Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years, and B2.3.1 (b) 15 years.
- o Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1.

StrandfloorH3.1® meets the criteria specified in NZS 3602 - Table 1C.3 - Note 7. NZS 3602 being an Acceptable Solution to meet the requirement of the New Zealand Building Code – Clause B2 Durability.

## 1.2 Scope

The Strandfloor® information in this manual has been specifically designed in accordance with AS/NZS 1170 to comply with the appropriate design loadings for domestic and commercial buildings.

Strandfloor® panels are suitable for timber framed buildings within the scope of NZS 3604, clause 1.1.2 and those uses specifically designed within this manual.

Tables 1.1 and 1.2 together with figures 1.1 and 1.2 in NZS 3604 may be used to determine the scope.

## 1.3 Interpretation

Interpretation shall be as detailed in NZS 3604, clause 1.2.

### 1.3.1 NZS 3604 Commentary

Interpretation shall be as detailed in NZS 3604, clause 1.2. In particular, the words “shall” or “must” identifies a mandatory requirement for compliance with NZS 3604. The word “should” refers to practices which are advised or recommended. Clauses prefixed by “C” and printed in italic type (such as these) are intended as comments on the corresponding mandatory clauses.

## 1.4 Definitions

Definitions are those given in NZS 3604, clause 1.3.

## 1.5 Make sure your information is up to date

When specifying or installing Laminex New Zealand™ product, ensure you have the current technical manual. If you are not sure you do, or you need more information, visit [laminex.co.nz](http://laminex.co.nz) or call Laminex New Zealand™ on 0800 303 606.

# 2 General product description

## 2.1 Strandfloor® material

High-density wood based panels are manufactured for Laminex New Zealand™, primarily for use as flooring, under the trade mark Strandfloor®.

Panels are produced by pressing strands of wood together under heat and pressure.

## 2.2 Identification

All panels are ink marked on the underside with the product identification and a 5 digit manufacturing traceability number. StrandfloorH3.1® panels also have the NZ Timber Preservation Council registration number, the type of treatment and the Hazard Class included.

All panels will have a label on the upper face.

Strandfloor® Tongue & Groove has a white polypropylene tongue. StrandfloorH3.1® Tongue & Groove has a green polypropylene tongue.

## 2.3 Uses

Strandfloor® can be used:

- o As pre-laid or post-laid flooring over traditional timber floor joists, engineered timber (“I” joists) or steel joist supports in single or double layer applications.
- o As floor diaphragms for the transfer of wind and earthquake loads within the scope of NZS3604.
- o As floor diaphragms using Specific Engineer Design (SED) for transfer of wind and seismic loads. (refer section 5.2)
- o As an overlay to concrete floor slabs or wooden floors.
- o For general stair construction\*.
- o For shelving and packaging\*.
- o As carcass members for cabinetry\*.
- o StrandfloorH3.1® Substrate for profiled metal roofing and asphalt shingles (refer to Strandsarking® technical information for installation details)\*.

\* Uses not assessed by BRANZ.

## 2.4 Strandfloor® types

Four particular types are marketed, each having their own qualities and unique uses.



### 2.4.1 Strandfloor® Square Edge

- o Strandfloor® Square Edge consists of 20mm nominally thick high density reconstituted wood panels.
- o Panels are finished with a square edge.
- o This is a general purpose product intended for all uses.
- o Square edge panels shall always be used when it is intended to clear finish the floor. \* (refer to C2.4.1 at bottom of page)



### 2.4.2 Strandfloor® Tongue & Groove

- o Strandfloor® Tongue & Groove consists of 20mm nominally thick high density reconstituted wood panels, specifically marketed as flooring.
- o It is identical to Strandfloor® Square Edge in its manufacture but has the addition of a polypropylene white tongue to one long edge, and a groove to the other.
- o When correctly installed this gives the required shear strength and eliminates the need for timber nogs.
- o There is a range of three panel sizes particularly designed for common joists centres.



### 2.4.3 StrandfloorH3.1® Square Edge

- o StrandfloorH3.1® Square Edge consists of 20mm nominally thick high density reconstituted wood panels, specifically marketed for use in wet areas
- o The improved resin composition meets the H3.1 treatment requirements, with the added benefit of a 50% increase in exposure time.
- o The added properties are ideal for floors with joists at maximum centres – i.e. 600mm.



### 2.4.4 StrandfloorH3.1® Tongue & Groove

- o StrandfloorH3.1® Tongue & Groove consists of 20mm nominally thick high density reconstituted wood panels, specifically marketed for uses in wet areas.
- o It is identical to StrandfloorH3.1® Square Edge but has the addition of a polypropylene green tongue to one long edge and a groove to the other.
- o When correctly installed this gives the required shear strength and eliminates the need for timber nogs (except in wet areas – refer to section 6.2.7 installation).

**C2.4.1** This is to ensure that timber nogs are used to support edges – if Tongue & Groove product is used, cracking of surface coatings may eventuate due to slight differential movement.

**C2.4.3** Refer section 4 – Durability.

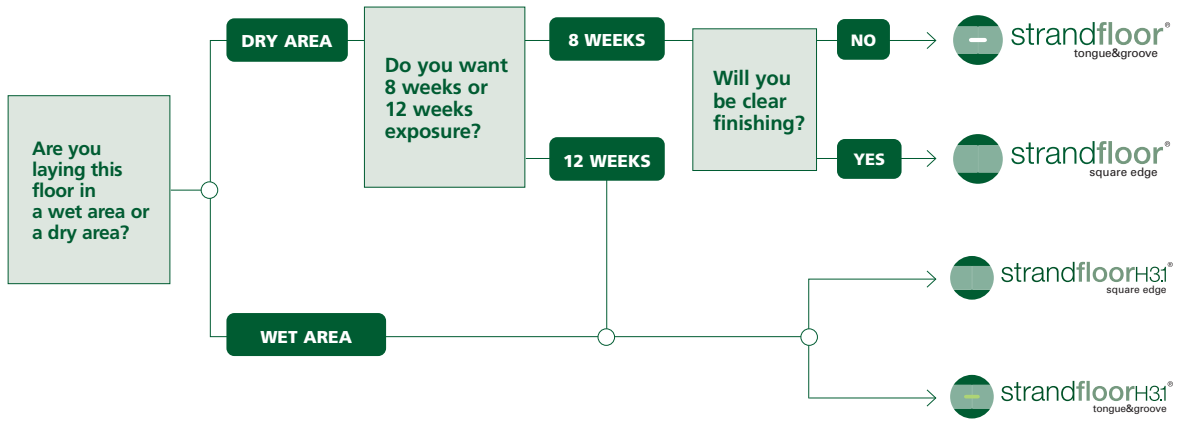
**C2.4.4** Refer section 4 – Durability.



## 2.5 Flooring guide

Figure 2.1. is a helpful guide when determining which product suits a particular application. Other considerations may be necessary but the flow chart is a good first step.

Figure 2.1



# 3 Material properties

## 3.1 Description

Strandfloor® panels are manufactured from strands of radiata pine which impart a range of colour tones within each panel.

The wood strands are bonded together with a pMDI resin which is applied to each individual wood strand prior to the pressing of the panels. A wax emulsion is added at this stage to impart additional moisture resistance to the strands.

A water based fungicide and insecticide is applied to each individual strand to provide protection throughout the panel that meets the H3.1 treatment classification.

The long edges of the tongue and groove Strandfloor® panels are factory grooved and fitted on one side with a polypropylene tongue

## 3.2 Panel dimensions

Table 3.1 gives panel dimensions for all products.

Table 3.1

Panel dimensions			
	Panel sizes mm	Weight (kg) per m2	Weight (kg) per panel
Square Edge	3600 x 2400 x 20	13.6	117.5*
	3600 x 1200 x 20	13.6	58.8
	2400 x 1200 x 20	13.6	39.2
Tongue&Groove	3600 x 1200 x 20	13.6	58.8
	3600 x 800 x 20	13.6	39.2*
	2400 x 1200 x 20	13.6	39.2
H3.1 Square Edge	3600 x 2400 x 20	13.6	117.5*
	3600 x 1200 x 20	13.6	58.8
	2400 x 1200 x 20	13.6	39.2
H3.1 Tongue&Groove	3600 x 1200 x 20	13.6	58.8
	3600 x 800 x 20	13.6	39.2*
	2400 x 1200 x 20	13.6	39.2

## 3.3 Panel tolerances

Table 3.2 gives panel tolerances for all products (ex factory).

Table 3.2

Panel tolerances	
Length	+/- 1.5mm
Width	+/- 1.5mm
Thickness	+/- 0.2mm
Panel edge straightness	1mm/metre maximum deviation from the line
Panel squareness	The difference between the measured diagonals is no greater than 0.5mm/metre

\* Made to order.

### 3.4 Physical properties

Strandfloor® Square Edge, Strandfloor® Tongue & Groove, StrandfloorH3.1® Square Edge and StrandfloorH3.1® Tongue & Groove are manufactured to meet or exceed the requirements of AS/NZS 1860.1.2017 Specifications for particleboard flooring. Strandfloor® & StrandfloorH3.1® average values well exceed the minimum / maximum AS/NZS 1860.1.2017 Class 1 flooring specifications.

Table 3.3 Strandfloor® Square Edge & Strandfloor® Tongue & Groove

Property	Units	Manufacturing mean	AS/NZS min/max
Bending Strength (MoR)	MPa	23.1	17
Modulus of elasticity (MoE)	MPa	3525	2650
Internal bond strength (IB)	MPa	0.681	0.5
24-hour thickness swell	%	6.9	14

(Based on Juken 2018 manufacturing mean data)

Table 3.4 StrandfloorH3.1® Square Edge & StrandfloorH3.1® Tongue & Groove

Property	Units	Manufacturing mean	AS/NZS min/max
Bending Strength (MoR)	MPa	25.5	19
Modulus of elasticity (MoE)	MPa	3681	2750
Internal bond strength (IB)	MPa	0.927	0.55
24-hour thickness swell	%	5	8

(Based on Juken 2018 manufacturing mean data)

### 3.5 Acoustic properties

Product	Thickness	STC Value (dB)	IIC Value (dB)
Strandsarking®	16.3mm	27	N/A
Strandfloor®	20mm	24	13
Strandboard®	12mm	25	N/A
Strandboard®	9mm	25	N/A

(Tested by UoA acoustics lab - not assessed by BRANZ)

### 3.6 Flooring characteristic properties

Product	Property	Parallel	Perpendicular
Strandfloor®	Shear strength	7.2 Mpa	6.45 MPa

(Tested in accordance with AS/NZS 2269.1 using log normal method of AS/NZS 4063.2)

# 4 Durability

## 4.1 Producer statement

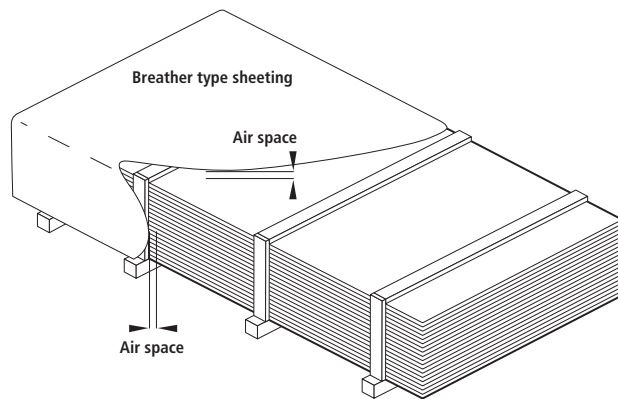
When stored, handled, installed and maintained in accordance with this document, Strandfloor® panels will meet: **The durability performance requirements of NZBC B2.3.1 (a) for 50 years.**

The specifications, details and methods described herein shall be strictly observed to avoid building code non-compliance.

Laminex New Zealand™ will not be liable to any person if the conditions as to storage, handling, installation and maintenance of Strandfloor® panels as outlined within this document are not complied with.

StrandfloorH3.1® Square Edge and StrandfloorH3.1® Tongue & Groove panels have been treated to resist attack by insects such as borer.

Figure 4.1



## 4.2 BRANZ product assessments

Strandfloor® has two CodeMark Product Certificates and two BRANZ Appraisals. The current versions of the CodeMark Certificates and BRANZ Appraisals are published on the BRANZ website [www.branz.co.nz](http://www.branz.co.nz)

The CodeMark Certificate and BRANZ Appraisals confirm that: Strandfloor® panels will have a life of at least 50 years.

## 4.3 Durability conditions

The following conditions shall be met; otherwise the durability of Strandfloor® will be compromised.

### 4.3.1 Handling and storage

- o Panels shall be stored and handled so as to minimise surface and edge damage.
- o Wherever possible panels shall be stored inside under cover. Outside storage shall be for short periods only. Panels shall not be stacked on wet concrete floors.
- o The panels shall be flat stacked clear of the ground, on evenly placed, full width, level bearers. Bearers shall be of uniform thickness and shall extend across the full width of the stack. (refer figure 4.1)
- o When stored in external situations, panels shall be protected from the weather. A breather-type cover shall be used, supported clear of the top and sides of the panels using battens to allow air to circulate freely around the pack. (refer figure 4.1)
- o Check panels for defects before installation.

#### 4.3.2 Weathering

- o Strandfloor® Square Edge and Strandfloor® Tongue & Groove shall not be exposed to weathering for more than eight weeks.
- o StrandfloorH3.1® Square Edge and StrandfloorH3.1® Tongue & Groove shall not be exposed to weathering for more than 12 weeks.
- o Panel properties may be affected by moisture saturation and/or exposure to sub-zero temperatures.
- o During the exposed period, do not allow water to pond on the surface. Remove water by sweeping and forming small holes adjacent to plate lines. Do not directly cover panels with sheeting or apply liquid sealers to any surface. Panels should weather in their raw condition to allow release of absorbed moisture.

#### 4.3.3 Wet areas

- o In “wet areas” panels shall be protected with a suitable wet area membrane or an integrally waterproof sheet material. – Section 9: Finishing – 9.3 Wet areas.

#### 4.3.4 Heat

- o Panels shall be separated from fuel burning appliances, flues and chimneys in accordance with NZBC Section C – AS/1.
- o Panels shall not be subjected to temperatures exceeding 50°C for a prolonged period.

#### 4.3.5 Prohibited uses

- o Panels shall not be used in covered exterior situations with no weather protection e.g. open verandas.
- o Once installed and in use, panels shall not be subjected to conditions that will allow the continuing moisture content to be above 16%
- o Panels shall not be used as a substrate for decking membranes

#### 4.3.6 Defects

- o Before installation please check panels for defects.

**C4.3.2** The “weather exposed” period includes the time that the panels are in an exposed condition when being transported or stored on site without covering. Panels will respond to changes in humidity and moisture content. Some grain raising may result. Loss of stiffness and strength can occur if panels are exposed to sub-zero conditions whilst saturated – i.e. ski lodges. If the exposure period cannot be met, then panels shall be post laid (once the structure is enclosed). Alternatively, sheet covering may be used providing it is indirect and adequate air space is maintained (“tent” effect).

**C4.3.3** A “wet area” is any area within a building supplied with water from a water supply system, e.g. kitchens, bathrooms, toilets, shower rooms, laundries, changing rooms, ensuites, etc.

**C4.3.4** Over floor and under floor type heating systems may be used with Strandfloor® products providing the operating temperature does not exceed 35°C and the panel moisture content is less than 16%. The heating system manufacturer must be consulted prior to installation.

# 5 Floor design

## 5.1 Non-specific design

The use engineered timber flooring joists such as LVL, I-Beam or Pozi -STRUTS with a moisture content less than 15% is strongly recommended, and will provide the following benefits;

### 5.1.1 Joist selection

Ranges of joists are now available, in solid timber, engineered timber (“I” joists) and steel. Each has its particular advantages and preferences.

The use of solid timber or “I” joists, with a moisture content of less than 15%, is strongly recommended and will provide the following benefits:

- o Post construction shrinkage and distortion will be minimised, limiting fastener noise and nail popping.
- o Deflection will be limited as dry timber is stronger and stiffer.
- o In all cases joists are lighter and easier to handle – particularly with “I” joists.

In some cases it is hard to avoid the use of “wet” timber due to the treatment requirements of NZS 3602. If this is the case care should be taken to select straight and undistorted material or consideration given to post laying of panels.

### 5.1.2 Domestic buildings

In domestic housing applications, joist support centres up to 600mm are acceptable for all Strandfloor® products, in line with Table 1.2 of NZS 3604.

- o If a more rigid floor is required reduce support centres to 450mm or less.
- o For large floors, over 25m long, consider post laying or allow for expansion.
- o Ensure that adequate ventilation is provided in sub-floor areas (see 5.3.1).
- o When clear finish/coating is the required finish surface use only Square Edge panels. \* (Refer C5.1.2b)
- o Additional panel support will be required for high point loads such as pianos, billiard tables etc.

**C5.1.2a** See section 7 – 7.4. Large floors.

**C5.1.2b** This is to ensure that timber nogs are used to support edges – if Tongue & Groove product is used, cracking of surface coatings may eventuate due to slight differential movement.

### 5.1.3 All other buildings

In all non-domestic building applications (i.e. residential, institutional, educational and other buildings)

- o Joist spacings shall not exceed 600mm centres.
- o The kPa loadings, from Table 1.2 of NZS 3604, shall not be exceeded without specific design.
- o Special attention shall be given at the design stage to the effects of concentrated loadings, such as high density foot traffic, storage racks, hand trolley point loads etc.
- o Where a double layer floor system is used, joists can be spaced up to 600mm support centres for all products.
- o Adequate cross flow ventilation shall be provided in all subfloor areas.
- o Where large areas of Strandfloor® are laid e.g. gymnasiums, community halls, institutional type dwellings, farm buildings etc., it is important to ensure that careful consideration is given to the cross flow effect of sub-floor ventilation and allowance is made for panel expansion.
- o Post laying is always the better option for large floors, particularly where clear finishing.

### 5.1.4 Structural diaphragms

All Strandfloor® products can be used for structural diaphragms. Design requirements for diaphragms to resist wind or seismic loads are given in NZS 3604.

- o Strandfloor® Square Edge complies if fixed in accordance with this manual.
- o Strandfloor® Tongue & Groove complies if fixed in accordance with this manual and joist centres do not exceed 450mm.
- o Refer to 5.2.3 Specific Engineer Design for structural diaphragms outside scope of NZS 3604

For floor diaphragms complying with NZS 4229 – Concrete Masonry Buildings Not Requiring Specific Engineering Design – Strandfloor® Square Edge shall be used. Details shall be in accordance with NZS 4229.

**C5.1.3** Residential, institutional, educational and other buildings as described in NZS 3604: clause 1.1.2 (e), (ii) - (v)

**C5.1.4** See section 7 – Installation, for special fixing details.

## 5.2 Specific design, commercial and industrial use

The following information has been specifically designed for Strandfloor® products. All calculation is based on the requirements and methods detailed in AS/NZS 1170.

Reference to Table 3.1 of this standard will give the requirements for particular activities, which can then be aligned with these tables.

This information is by no means exhaustive but covers the common commercial and industrial situations that may occur outside the scope of NZS 3604 and the majority of those within AS/NZS 1170.

All other situations require individual specific design.

### 5.2.1 Uniformly distributed actions (UDL)

Table 5.1 gives safe uniformly distributed actions for Strandfloor®.

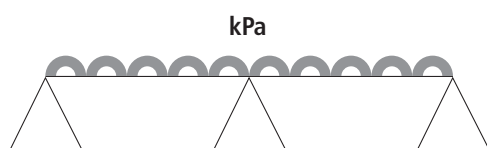


Table 5.1

Strandfloor®	
Span up to 600mm	
Single layer	5kPa
Double layer	10kPa

### 5.2.2 Concentrated actions

Table 5.2 gives safe concentrated actions for Strandfloor®.

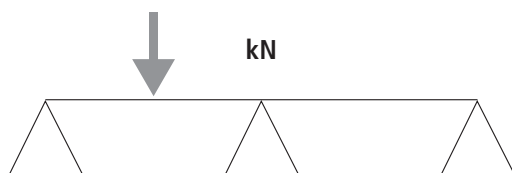


Table 5.2

Strandfloor®					
Support centres	400mm	450mm	500mm	550mm	600mm
Single layer	4kN	3.2kN	3kN	2.1kN	1.8kN
Double layer	8kN	6.4kN	5kN	4.2kN	3.6kN

### 5.2.3 Specific design SED structural diaphragms

In New Zealand, the specification of ceiling or floor diaphragms does not always require specific structural engineering input. NZS 3604 sets out the construction requirements for light timber framed buildings that do not require specific design by structural engineers.

When the diaphragm geometry does not fall within the scope of NZS3604 the designer will have to size the diaphragm and its fixings in accordance with NZS3603:1993 Timber structures standards. The tables below provide the Strandfloor® structural shear modulus of rigidity and other strength properties for use in SED diaphragm design.

**C5.2.1** Refer section 7 – Installation, for double layer fixing details.



Table 5.2a

Strandfloor® Average Shear Modulus Characteristic Properties				
Product		Shear Modulus (GPa)	Shear Modulus (MPa)	Shear Strength (MPa)
Strandfloor Statistics	Across Average	1.50	1500	8.73
	Along Average	1.47	1470	8.43
	All Specimens Average	1.49	1490	8.58
	All Specimens Coefficient of variation	10.2%	10.20%	

Testing was undertaken at an independent facility. Testing was in accordance with ISO 46572:2008, for determining shear modulus in panel products using method B.

Table 5.2b

Strandfloor® Characteristic Properties		
Property	Parallel	Perpendicular
Modulus of Elasticity	4336 MPa	4367 MPa
Bending Strength	19.67 MPa	19.5MPa
Tension Strength	13.76 MPa	14.45 MPa
Compression Strength	13.47 MPa	10.39 MPa

Results are based on testing of 30 panels in accordance with AS/NZS 2269.1 and analysis using the log normal method of AS/NZS 4063.2 - (Testing undertaken by Juken NZ at EWPAA)

Laminex New Zealand™ engaged Blueprint Consulting Engineers (BCE) to carry out structural investigations and analysis on the use of Strandfloor® and Strandsarking® as structural diaphragms outside the scope of NZS3604:2011 Timber-framed buildings and provide input on the technical data required to undertake specific engineering design (SED) calculations in accordance with NZS3603:1993 Timber structures standards.

Shear modulus tests on both the Strandfloor® and Strandsarking® undertaken by Laminex New Zealand™, succeed to qualify both Strandfloor® and Strandsarking® as flooring that can be used for structural applications.

Testing was undertaken at an independent testing laboratory and in accordance with ISO 46572:2008 for determining shear modulus in panel products using method B.

Please refer to laminex.co.nz for the Blueprint Consulting Engineers Report P18-099 RPT.

#### 5.2.4 Fasteners – SED structural diaphragms

Laminex New Zealand™ commissioned independent fastener connection testing and professional desk top design report of Strandfloor® and Strandboard® panels for the use of shear transfer.

The testing was commissioned to provide characteristic strength values to be used for design as well as provisions for reduced edge distances for panel splices. The testing was also commissioned to provide a range of fastener types for fixing Strandfloor® SED diaphragms. This included staples for panelised / off site manufacturing

The test results provide characteristic strength values to be used in design and allow for a comparison between tested and calculated strength values when assessed with DZ NZS AS 1720.1, the draft version of the New Zealand Timber Design Standard.

Provisions for the determination of the fastener deformation or stiffness is provided. The report will be updated once the standard will be published. Copies of the full test and design reports can be obtained on request from Laminex New Zealand™.

Refer to Table 7.2 Fastener types, page 24 -Section 7.5 Fixing, for a list fasteners that can be used to fix Strandfloor® to SG8 framing timber, LVL8 and engineered timber I-Beam joists.

The fasteners allow for fixing of Strandfloor® in Specific Design Engineer diaphragm and shear wall design applications.

## 5.3 Sub-floor ventilation

Sub-floor ventilation must be provided to all platform floors suspended above the ground to ensure the ongoing moisture content of the Strandfloor® remains at or below 16%.

The following information shall be regarded as the minimum ventilation levels required. Failure to control moisture in the Strandfloor® could result in a non-performance which Laminex New Zealand™ will not be responsible for.

### 5.3.1 Opening requirement

This requirement shall be met by the provision of evenly distributed openings in the foundation wall, at a rate of no less than 3500mm<sup>2</sup> for every m<sup>2</sup> of floor area. The openings shall be as near as possible to the underside of the plates and bearers and be positioned to allow effective cross flow.

Either one, or a combination of the following methods, may be used to construct ventilation openings:

- o Continuous gaps, at least 20mm wide between baseboards, around the building perimeter.
- o Perimeter wall ventilators with sufficient net open area spaced regularly, commencing 750mm from the wall corner and at intervals of no greater than 1.8m.
- o A 50mm gap between the wall plates and a boundary joist at the ends of cantilevered floor joists and the wall plate and joist, where the bearer is cantilevered.
- o Other regularly spaced openings that will provide adequate ventilation.

It is important to ensure that party walls, internal foundations, attached terraces, or any other impediment, do not obstruct the subfloor ventilation airflow, and that:

- o No point of the ground is more than 7.5m from a ventilation opening, or
- o The subfloor ventilation rate is greater than 10 air changes per hour for wet sites, or five air changes per hour for dry sites.

### 5.3.2 Vapour barriers

Where a sub-floor space cannot be adequately ventilated, the ground under a suspended floor shall be covered with a vapour barrier having a vapour flow resistance of no less than 50MN s/g, and a thickness of no less than 0.25mm. Refer figure 5.3.

Even with a vapour barrier, ventilation openings shall still be provided, but the net open area may be reduced to no less than 700mm<sup>2</sup> for every m<sup>2</sup> of floor area and be located to provide air cross flow in the subfloor space.

The vapour barrier shall be installed in a way that ensures:

- o It covers the total ground area.
- o Adjacent sheets are lapped no less than 75mm and laps are intermittently taped.
- o The ground is shaped to prevent water accumulation on the vapour barrier.
- o Water drains to the exterior.
- o It is securely held in place by bricks, large stones or a similar method.

Where floor area designs still do not meet the above criteria, consideration should be given to the use of mechanical draft ventilation systems that create a subfloor ventilation rate greater than 10 air changes per hour for wet sites, or five air changes per hour for dry sites.

It is essential that all ventilation openings remain unrestricted and that vegetation is not allowed to cause obstructions over the life of the building.

**C5.3.1** All requirements in accordance with NZBC – E2/AS1 and NZS 3604.

**C5.3.2** It is strongly recommended that vapour barriers be installed regardless of the situation. Great advantages can be gained in the reduction of sub-floor moisture content for very little cost.

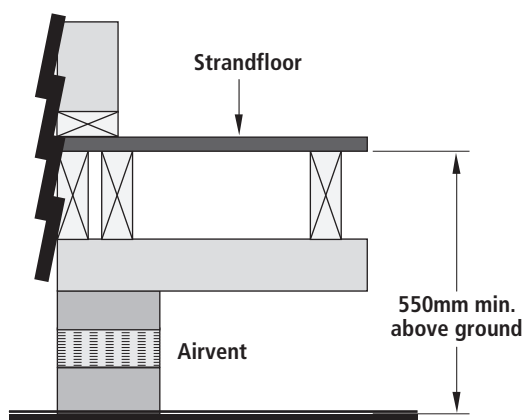
## 5.4 Ground clearance

A minimum clearance of 550mm between the surface of the ground beneath the building and the underside of the flooring panels shall be provided in order to give adequate sub-floor air capacity and to provide access for inspection of the sub-floor structure.

The clearance of 550mm may not be reduced, even when vapour barriers are installed. Vapour barriers only allow the reduction in the ventilation requirement not the clearance dimension.

For ground clearance detail, see Figure 5.3.

Figure 5.3



## 5.5 Fire ratings

Strandfloor® can be used as flooring in detached dwellings that have no specific fire resistance rating requirements under the NZBC (purpose group SH).

For other types of occupancy, product use depends on the number of stories, the number of full and intermediate floors involved and whether the building is sprinkled etc.

For the purpose of compliance with clause C3.4(b) of the NZBC, Strandfloor® products have been assigned a critical radiant flux value of 2.2 kW/m<sup>2</sup>.

## 5.6 Insulation

While Strandfloor® panels used to form an on-ground platform floor will contribute toward the building performance index of the building envelope, additional insulation material will be needed to achieve the thermal insulation requirements as detailed in NZBC H1.3.2. For the purposes of calculation the R-value of 20mm Strandfloor® panels shall be taken as 0.17 m<sup>2</sup>K/W

When fitting any insulation it is important to ensure the material that is chosen is installed in accordance with the insulation manufacturers' instructions. It is also critical to ensure that control of moisture in the sub-floor space is maintained as the efficiency of some insulation materials may be affected by elevated moisture levels.

## 5.7 Supporting timber

The moisture content of the support system at the time of laying and fixing the flooring panels can affect the performance of the total floor system. As wet framing dries it will shrink. This can reduce the effectiveness of the fixing, allowing movement of panels resulting in floor squeaking and nail-head rise under vinyl flooring.

The use of kiln dried timber or "I" joists is therefore recommended.

Herringbone strutting in lieu of solid blocking will reduce the likelihood of a noisy floor. End nailing of solid blocks often result in squeaking and is hard to rectify once the structure is closed in.

**C5.6a** Refer NZBC C/VMZ appendix B - Table B1

**C5.6b** Refer 5.3 Sub-floor ventilation

# 6 Specification clauses

## 6.1 General

The clauses listed below are those recommended to be used when specifying Strandfloor® products for all building uses as covered by NZS 3604 1.1.2 (e).

It will be necessary to edit those particular sections that apply to the specific project documentation.

## 6.2 Recommended clauses

### 6.2.1 Documents referred to

Documents referred to in this section are:

- o AS/NZS 1859 Reconstituted wood-based panels - Specifications Part 1: Particleboard.
- o AS/NZS 1860 Particleboard flooring,1860.1: Specifications.
- o NZS 3604 Timber framed buildings.

Strandfloor® has two BRANZ appraisals – Strandfloor® – No. 676 (2016) and StrandfloorH3.1® - No. 677 (2016). – The current versions of these are published on the BRANZ website – [www.branz.co.nz](http://www.branz.co.nz).

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

### 6.2.2 Manufacturers documents

Confirm current status of documentation held:

- o By visiting Laminex New Zealand™ website – [www.laminex.co.nz](http://www.laminex.co.nz).
- o Or call Laminex New Zealand™ customer services department – **0800 303 606**.

### 6.2.3 Materials

- o Strandfloor® Square Edge
- o Strandfloor® Tongue & Groove
- o StrandfloorH3.1® Square Edge
- o StrandfloorH3.1® Tongue & Groove

### 6.2.4 Components

- o NAILS – 60mm annular grooved gun nails or annular grooved particleboard nails.
- o SCREWS – (for timber joists) – 45mm x 8g (minimum size) self drilling screws.
- o ADHESIVE – Elastomeric construction or polyurethane paste adhesive (in continuous beads).
- o SCREWS – (for steel joists) – 45mm x 10g Tek self drilling screws corrosion resistant. (Outside the scope of the CodeMark Certification).

**C6.2.2** It is important to ensure that all on-site personnel have access to up to date information. Products are not used in isolation, but as part of a process. Particular details of handling, storage, installation, finishing and protection, can vary from what is considered the norm.

**C6.2.3** Select the appropriate material by referring to Section 2 – Product description and Section 5 – Floor design.

**C6.2.4** Select the appropriate component by referring to Section 7 – Installation.

**C6.2.5** All fasteners shall be corrosion resistant. Fastener sizes given in 6.2.4 shall be minimum dimensions.

**C6.2.6** Refer Section 4 – Durability.

### 6.2.5 On-site conditions

Take delivery of and accept packets of Strandfloor®, dry and undamaged. Reject all damaged material. Store on a level, firm base, well ventilated and completely protected from weather and damage, all as manufacturers requirements. Check panels for defects before installing.

Avoid distortion and contact with damaging substances. Protect edges and surfaces from damage. Use a sufficient number of people to lift and lay sheets with ease.

Do not commence work until the substrate is plumb and level, in true alignment and to the Strandfloor® manufacturer's requirements.

### 6.2.6 Application

- o Adhesive fastening – Use construction adhesive to joists in conjunction with mechanical fixing. Apply adhesive in a continuous 5mm bead to all floor joists. For Tongue & Groove panels, apply a 2mm bead of construction adhesive to the top of the tongue prior to insertion into the groove. Remove excess adhesive. Apply adhesive in a continuous 5mm bead to all floor joists and between sheets ends and edges (Square Edge panels) where they butt together.
- o Nail fixing – Nail panel ends (and panel edges for Square Edge) at 150mm centres 10mm from the edge. Nail intermediates at maximum 200mm, with all nails slightly skewed except for corner vertical nails. Where Tongue & Groove material is used, nails shall be 15mm from the edge to avoid tongue damage.
- o Screw fixing – Screw panel ends (and panel edges for Square Edge panels) at 150mm centres 10mm from the edge. Screw intermediate support at maximum 200mm. For Tongue & Groove panels, locate screws 15mm from the edge to avoid tongue damage. Pre-drill the panel for screw fixing.

### 6.2.7 Installation

#### Laying of Strandfloor® Tongue & Groove

- o Programme work for minimal exposure to weather and lay sheets across the joists in a staggered pattern.
- o Panels to span at least three joists.
- o Lay panels with brand name down.
- o Allow 8mm minimum clearance between panel edges and fixed objects including columns and bottom plates.
- o Provide continuous edge support at building perimeter.
- o Provide continuous tongue and groove edge support (nogs) in wet areas or where rigid floor finishes (ceramic tiles) are used (refer section 2.4.4). Nogs maybe omitted where a suitable tile and slate underlay is used. Joins on tile & slate underlay shall not coincide with flooring panel joins.
- o All fixings to finish flush with surface at time of fixing. Tighten fixings; punch nails and tighten screws just prior to sanding.
- o Close butt edges and ends of panels. Do not cramp.
- o Do not allow water to remain ponded on the floor surface – remove as soon as possible.
- o Do not cover panels with polythene or apply liquid sealers, while exposed to weathering.

**C6.2.6a** In general terms nailing with adhesive is the recommended method as it allows control throughout the installation process.

**C6.2.6b** Refer to Section 7 – Installation – for double nailing requirements for diaphragm floors.

**C6.2.7** Select the appropriate clauses regarding installation of Strandfloor® Square Edge or Tongue & Groove.

**Laying of Strandfloor® Square Edge**

- o Programme work for minimal exposure to weather and lay sheets across the joists in a staggered pattern.
- o Panels to span at least three joists.
- o Lay panels with brand name down.
- o Allow 8mm minimum clearance between panel edges and fixed objects including columns and bottom plates.
- o Provide continuous edge support at perimeter and at panel edges with solid blocking minimum ex 100mm x 50mm.
- o All fixings to finish flush with surface at time of fixing. Tighten fixings; punch nails and tighten screws just prior to sanding.
- o Close butt edges and ends of panels. Do not cramp.
- o Do not allow water to remain ponded on the floor surface – remove as soon as possible.
- o Do not cover panels with polythene or apply liquid sealers, while exposed to weathering.

**6.2.8 Completion**

- o Leave work to the standard required by following procedures.
- o Remove all debris, unused materials and elements from the site.

**6.2.9 Surface finish**

- o Carpet and wet area membrane – Single cut with a drum or belt sander – 60 to 100 grit.
- o Sheet vinyl – Single cut with a drum or belt sander – 60 to 100 grit. Installation of vinyl floor covering requires the application of a flexible or sheet underlayment. Refer to vinyl manufacturers technical installation data.
- o Clear coating – 1st cut with a drum sander – 60 to 80 grit.  
2nd cut with a disc sander – 100 grit.  
3rd cut with disc sander – 120 to 150 grit.
- o Follow coating manufacturer's instructions.

**C6.2.9**

Refer also Section 9 – Finishing. Clear coating is not suitable for wet areas. Clear coating or covering the board with an impervious layer should not be carried out if Strandfloor® is above 15% moisture content.

# 7 Installation

## 7.1 General

The following information applies to all Strandfloor® products.

- o Continuous support shall be provided at the building perimeter.
- o Lay ink marked face to joists – (side with label should face up).
- o Panels shall be close butted together without being placed under pressure by mechanical cramping.
- o Panels shall be staggered when used as a diaphragm and it is recommended that staggering is used for general use.
- o Each panel shall span at least two floor joist spacings (i.e. supported over three consecutive joists) except where part panels provide the necessary infill at the building edge.
- o A minimum of 8mm clearance shall be made between edges and any fixed object e.g. bottom plates, masonry walls, abutting concrete floors, structural columns etc. This is to accommodate linear expansion that may occur during the weather exposure period and eliminate moisture transfer from concrete to Strandfloor®.
- o To stop permanent staining do not leave materials (scaffolding, nails, etc.) on panels during wet conditions and avoid spills of cement, paint, tea, etc.
- o If adhesive is being used apply a continuous 5mm bead to the top of the joists (and nogs if used) just prior to each sheet being positioned and fixed in place. Also apply a 5mm bead between sheet ends and edges (Square Edge panels) as installation proceeds.

## 7.2 Strandfloor® Square Edge

The following information applies to Strandfloor® Square Edge panels only.

- o Support shall be provided to all panel edges and ends by way of joists and nogs/dwangs.
- o All supporting timber shall be a minimum of ex 100 x 50.
- o For joist spacings of 400mm or 600mm, panels can be laid with, or across the joists. (refer figure 7.1 and 7.2)
- o For joist spacings of 450mm panels shall be laid across the joists. (refer figure 7.2)

When Square Edge panels are to be clear finished, ensure panel sizes, types and batches are not mixed.

Figure 7.1

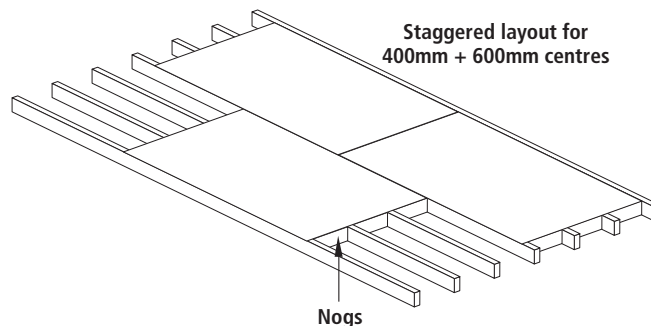
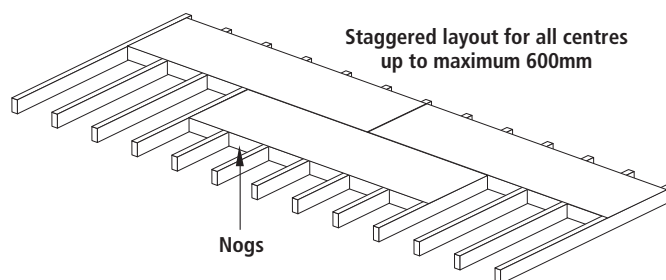


Figure 7.2



**C7.1** Where a part panel is necessary, consideration should be given to the specific location and potential loads. If the area is likely to carry regular foot traffic or heavy concentrated loads, consideration should be given to installing nogs/dwangs at centres matching the joist spacings.

**C7.2** This will ensure that shading between panels does not occur – five digit number on underside of panel is a batch number.

## 7.3 Strandfloor® Tongue & Groove

The following information applies to all Strandfloor® Tongue & Groove panels.

- o Panels shall always be laid across the joists. (Refer figure 7.2 for panel orientation).
- o Lay the first row with the brand name down and the tongue aligned to the perimeter of the floor. (refer figure 7.3)
- o Ends of sheets should be close butted and centred over joists.
- o Check the grooved edge, for straightness, with a string line.
- o Fix panels with only sufficient fastenings to avoid movement – this will stop any distortion of the grooved edge prior to further installation.
- o Allow for a stagger of at least one joist space and position the first sheet of the second row, with the tongue adjacent to the groove of the first row.
- o If adhesive is to be used, apply a thin bead along the top of each tongue, before insertion into the groove.
- o Lay a blocking piece (an off-cut of minimum ex 150 x 50 timber 1.4m long) across the joists, in the centre of the panel, on the grooved edge.
- o Stand on the blocking piece and strike with a heavy hammer to drive the panel tongue into the groove of the first row.
- o It will assist if a second person can stand on the joint between the two rows.
- o Fix, as before and continue the process to complete the second row – the first row can now be fully fixed.
- o Subsequent rows are similarly installed to complete the floor.

Figure 7.3

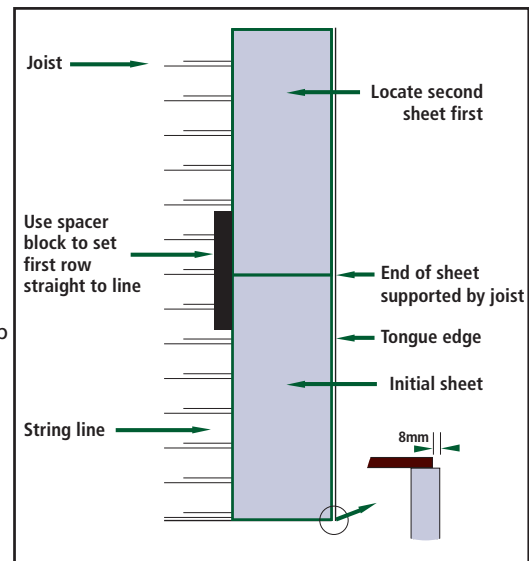


Table 7.1 gives an indication of the quantity of fixings required for Strandfloor® panels. Extra fixings may be required for diaphragm floors. C/A equals construction adhesive cartridges (375ml). Refer 7.6 Diaphragm floors.

Table 7.1

Fixing quantities Tongue & Groove panels						
Panel size (mm)	3600 x 1200		3600 x 800		2400 x 1200	
Joist centres	Nails (number)	C/A (cartridge)	Nails (number)	C/A (cartridge)	Nails (number)	C/A (cartridge)
600mm	53	0.6	37	0.4	39	0.4
450mm	67	0.7	47	0.5	N/A	N/A
400mm	74	0.8	52	0.5	53	0.5

Fixing quantities Square Edge panels						
Panel size (mm)	3600 x 2400		3600 x 1200		2400 x 1200	
Joist centres	Nails (number)	C/A (cartridge)	Nails (number)	C/A (cartridge)	Nails (number)	C/A (cartridge)
600mm	135	1.5	89	1	63	0.7
450mm	157	1.7	99	1.1	N/A	N/A
400mm	168	1.9	104	1.2	73	0.8

**C7.3a** At this stage the tongue in the first row is redundant and can be removed for use elsewhere, if required.

**C7.3b** Refer 7.6 Diaphragm floors.



## 7.4 Large floors

A large floor is one with a length or width exceeding 25m.

All large floors that are pre-laid (exposed to weather) shall provide for panel expansion.

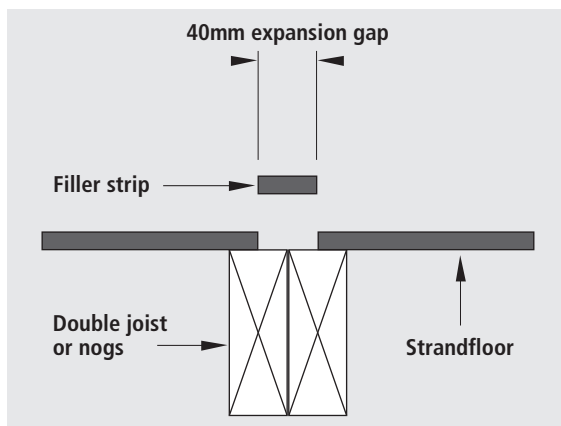
This can be achieved by:

- o Leaving out one row of flooring panels across the building width at centres not exceeding 25m until the structure is completely closed in.
- o Providing a 40mm wide expansion gap under partition lines or other hidden situations, at no greater than 25m intervals. (refer figure 7.4) Insert a filler strip on completion.

All large floors that are post-laid (not exposed to weather) do not require expansion provisions.

It is essential that no exposure of any type occur.

Figure 7.4



## 7.5 Fixing

The type and position of the fastening chosen is important for long-term performance. Incorrectly fixed panels and high moisture content in timber may lead to squeaking floors which can be difficult to remedy at a later date.

Table 7.3. on page 24 gives details of acceptable fastener types. All others, including staples, are unacceptable.

Perimeter fixing shall be 10mm from the panel edges except where long edges have tongues. Increase to 15mm to avoid tongue damage.

**C7.4a** Ensure that the 8mm clearance is maintained around the perimeter and between fixed objects. Where a double joist is not available, use rows of double nogs.

**C7.4b** If floor is to be clear finished ensure all product is from the same batch (check identification numbers on underside of panels).

### 7.5.1 Adhesive

Adhesive is recommended for use in conjunction with mechanical fastening.

Adhesive should be applied in a continuous 5mm bead to all floor joists & nogs if present, and between sheet ends and edges square edge panels). A 2mm bead should be applied along the tongue of the tongue & groove panels as they are laid.

Refer to Table 7.2 for a list of adhesive options.

Table 7.2

Adhesive Options		
Timber Joists	Sika Nailbond Premium	5mm continuous bead to the top of each joist and between sheets at ends and edges, 2mm bead to the top of the tongue.
	Bostik Alpha Grip	
	Gorilla Grip	
	HB Fuller Sturdi Bond	
Steel Joists	Sikaflex 123 MS Bond	
	Gorilla 940FC	
	Gorilla MS Sealant	

Note: Check with adhesive supplier to ensure adhesives not listed are suitable

Table 7.3

Fastener types				
Timber Joists (includes SG8, LVL8 & I-Beams)	Minimum size	Fixing centres mm		SED Diaphragms
Annular Grooved particleboard flooring nails (NZ Nails)	60mm	150	200	✓
Galvanised jolt head nails (NZ Nails)	60mm	150	200	✓
Self drilling screws corrosion resistant (Bremick)	45mm x 8 gauge	150	200	✓
Self drilling Stainless Steel screws (Bremick)	50mm x 10 gauge	150	200	✓
Simpson Strongtie SS Screw	50mm x 10 gauge (SSWSC2BSA10)	150	200	✓
Simpson Strongtie Zinc Screw	50mm x 10 gauge (WSV50SA)	150	200	✓
Beck Scrail SubLok Pro	57mm x 2.8 gauge	150	200	✓
Delfast Shank Nail	50mm x 2.8 gauge	150	200	✓
BeA 16/45 NK HZ Staple	45mm x 10.6 x 1.47	Refer to notes	Refer to notes	✓

Notes: Minimum spacings for BeA 16/45 NK HZ Staple as below:

- o 22mm (along the grain for  $\theta \geq 30^\circ$ )
- o 22 mm (perpendicular to the grain)
- o 30 mm (loaded end grain)
- o 22 mm (unloaded end grain)

**C7.5.1a** The use of a continuous bead of adhesive will result in the joist and panel 'acting as one' which will provide a stiffer platform floor.

**C7.5.1b** The application of adhesive between sheets as they are laid will restrict moisture uptake through the panel edges.

Where available, dimensions of the fasteners and design properties were taken from manufacturer's data. Most fasteners produced or sold in Europe have a Declaration of Performance document, providing all data required for the calculations as set out in chapter 4 of DZ NZS AS 1720.1.

For fasteners where this data was not available, fastener geometries were measured from the fasteners used for testing. The steel properties for some fasteners were not available or were only provided as a range, in these cases conservative assumptions were made as noted.

- o standard nail ultimate tensile strength 700 MPa
- o stainless steel screw ultimate tensile strength 600 MPa

For fasteners which were not tested, or for more advanced designs, an engineer then can refer to both full reports available through Laminex New Zealand™.

### 7.5.2 Nails

Hand-driven nails shall initially be driven flush with the surface. Punching of nails must take place after building is closed in – just prior to sanding. This allows for the moisture content of joists to dry during building construction.

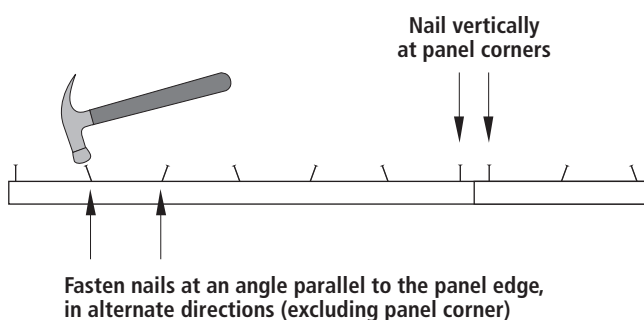
Hand-driven nail fastening usually provides a better finish for clear coatings than power-driven nails.

To improve lateral holding, nails shall be slightly angled and be driven parallel to the sheet edge. (refer figure 7.5)

When using power-driven nails, set the depth adjuster attachment on the power tool to drive nails flush with the surface of the panel. This will allow hand punching to take place just prior to sanding.

The use of the pre-punching mechanism increases the risk of squeaky floors, as any timber shrinkage that occurs as the supports dry out is not taken up later as is the case when the punching process is carried out at sanding and floor finishing stage.

Figure 7.5



### 7.5.3 Screws

For best results when screw fixing Strandfloor® products ensure the panel is in contact with the joist when installing the screw. Drive the head of the screw not more than 2mm below the surface.

**C7.5.2** Hand nailing will generally give the best result as more control can be exercised. The best possible result will be achieved with the proper use of annular grooved hand driven nails used in conjunction with adhesive.

**C7.5.3** Care should be taken when retightening screws, as heads are liable to shear, particularly if rusting has occurred.

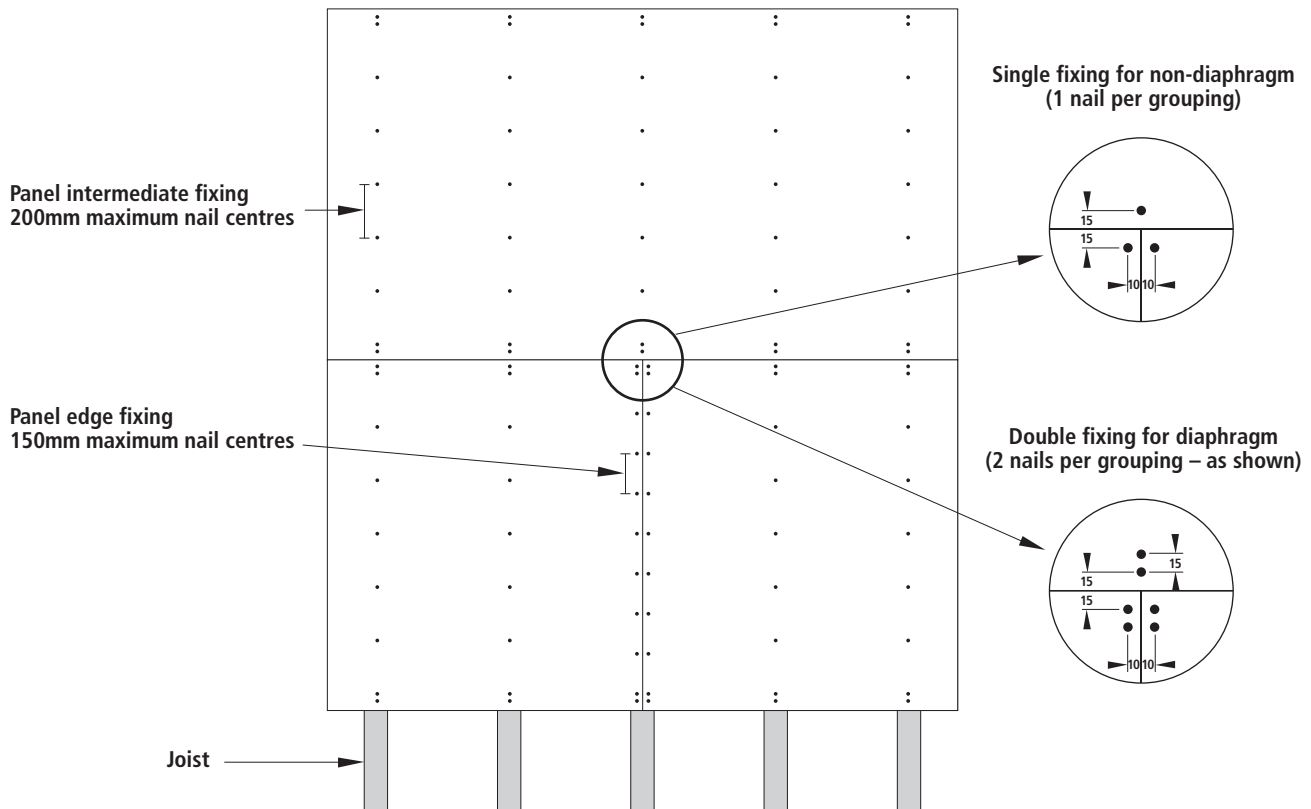
## 7.6 Diaphragm floors

Specific types of fasteners are suitable for fixing diaphragm floors, including screws and hybrid fasteners. Refer to Table 7.3 on page 24 for details of acceptable fastener types.

Square Edge panels - there are no restrictions or additional fixing requirements when using Strandfloor® Square Edge panels to form a diaphragm.

Tongue & Groove panels - When using Strandfloor® Tongue & Groove panels to form a diaphragm, joist spacings must not exceed 450mm centres. In addition to the standard nailing, extra nails, as shown in figure 7.6, are required along the long edge placed 30mm back.

Figure 7.6



## 7.7 Double layer installation

The bottom layer of Strandfloor® shall be laid as for single layer flooring panels.

The top layer shall be laid in a similar pattern with edges of panels offset in each direction from the bottom layer edges.

All panel ends shall be located centrally over joists or blocking to ensure positive fixing and nail length increased to 75mm.

When installing a double layer flooring system, allow for the installation of the second layer after closing in and when all sub-trade work is completed. This will provide a clean unweathered surface for clear finishing.

Moisture content of the first layer must be at 15% or below before the second layer is installed.

## 7.8 Avoiding “squeaking and creaking”

Since the 1960s when reconstituted wood flooring was introduced, the panels have been laid on “green” floor joists.

The drying out of this timber is a major cause of panel movement that can lead to a noisy floor.

Strandfloor® itself does not create noise, but common causes of creaking or squeaking floors are:

- o Poor alignment of the joists bearing surfaces, creating gaps resulting in uneven stress on fixings.
- o Shrinkage as the joists dry out – timber shrinks across the grain, leaving a gap between the underside of the sheet and the top of the joist.
- o Using long span joists which allow the floor to deflect more and creak at the solid blocking fixings.
- o Insufficient and loose strutting or blocking of the joists.
- o Swelling of the Strandfloor® panels exposed to the weather. Swollen edges of the panel may not bear tightly on the joists when they dry. Sanding may level the thickened edge, but this does not rectify the underside. Nails shall therefore be punched and/or screws re-tightened just prior to sanding.
- o Insufficient fixings holding the panels to the support system.
- o Panels not being fully fixed down when laid.
- o Foot traffic in the house working the panels down the shank of the nails onto the top of the joists often leading to squeaking as the nail shafts work in the Strandfloor® panels.
- o Power fastenings being over-driven into the panel core.
- o Hand fixed nailing being punched off at the initial fastening stage with no allowances made for any subsequent movement as drying of materials occurs.
- o Fastenings being positioned too close to the panel edges.

The following good practice will help to avoid a noisy floor:

- o When possible, use dry joists.
- o For new buildings, reduce the joist span or increase joist depth to reduce deflection (prop green long span joists at mid span until they are dry).
- o Consider the use of an engineered floor system.
- o Level the joist tops before laying the flooring panels.
- o Ensure dry solid blocking or herringbone strutting is fitted tightly to stiffen floor in accordance with NZS 3604.
- o If using solid blocking fit as late as possible so that joists are drier and shrinkage will be less.
- o Herringbone strutting is preferred as it can be tightened from the underside after timber is dry and before ceilings are fixed to upper floor joists.
- o Lay flooring panels with staggered joints.
- o Don't cramp flooring panels tightly together.
- o Drive fastenings flush with the top surface of the board at time of laying.
- o Leave punching of nails and/or re-tightening of screws as long as possible.
- o Use adhesive/nail fixing system where possible and completely nail off at time of laying.

# 8 Flooring overlays

## 8.1 General

Laminex New Zealand™ manufactures or distributes a range of panel products suitable for overlaying existing concrete and wooden floors for commercial and domestic requirements.

There is a panel suitable for most flooring overlay applications, including:

- o All Strandfloor® products
- o Lakepine® MDF
- o Strandboard®
- o Trade Essentials® Hardboard

This section is specific to Strandfloor®, for others refer to individual publications.

All other sections of this manual apply equally to this section.

Overlays are only intended for interior use and should not be exposed to weathering. The fixing of overlays should not be carried out until the structure is closed and the substrate is waterproof and dry.

## 8.2 Uses

Overlays can be used for:

- o Refurbishing uneven and damaged tongue and groove wooden floors.
- o Re-leveling damaged and uneven concrete floors in commercial premises prior to laying carpet, vinyl, parquet or floor tiles.
- o Upgrading of school and community halls, gymnasium floors and stages, to meet the requirements for dancing, indoor bowling and other sporting activities.
- o Structural upgrades of wooden flooring in existing commercial buildings.
- o As a substrate for solid timber tongue and groove overlays.

## 8.3 Pre-conditioning

To ensure equilibrium of product, panels should be conditioned (left separated and standing vertically) in the installation location for at least 48 hours, prior to commencing fixing.

## 8.4 Direct floor overlay

Full spread adhesives recommendations\*

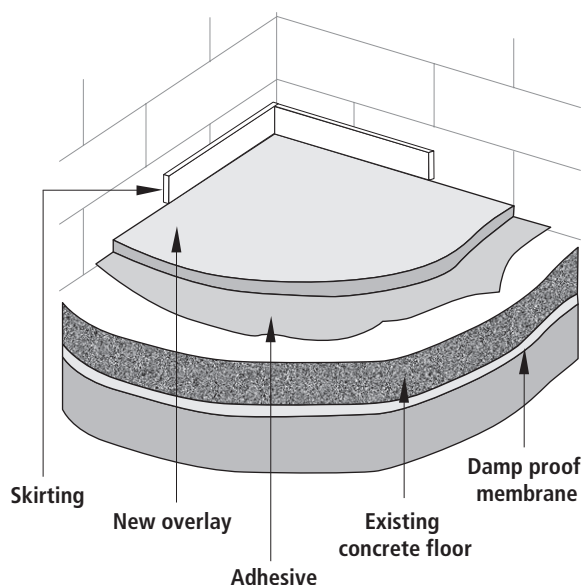
- o Sika Bond T-55 Flooring Adhesive
- o Gorilla MS Flooring Adhesive

*\*refer to adhesive manufacturer's technical literature for application instructions*

All Strandfloor® products may be attached directly to existing concrete or timber floors. (refer figure 8.1)

The use of Strandfloor® Tongue & Groove panels will control long edge differential movement, and improve panel hold down when direct overlaying.

Figure 8.1



#### 8.4.1 Timber substrates

For best results when direct overlaying, use a combined nail/full spread adhesive method. This eliminates any tendency for “drumming” in the new floor. A construction adhesive is recommended and should be applied as a full spread, to the manufacturer’s instructions.

Existing tongue and groove wooden floors shall be refixed and repunched as applicable, and then coarse sanded to provide a flat substrate. Ensure that there are no protruding nails prior to machine sanding.

When overlaying a tongue and groove timber floor, or existing particleboard floor, ensure that the joints in the new panels do not occur directly above parallel joints in the base floor.

All clearances, fastening and finishing detail applies equally where described elsewhere in this manual.

#### 8.4.2 Concrete substrates

For best results when direct overlaying onto concrete, use a full spread adhesive method. This reduces panel movement and “drumming”.

Mechanical fixing of direct overlays on concrete floors should be avoided.

A construction adhesive is recommended and should be applied as a full spread, to the manufacturer’s instructions.

**C8.4.1** Refer section 7 – Installation, for fixing specifications.

**C8.4.2a** Concrete waterproofing additives do not guarantee a dry substrate. A membrane is the only safe solution.

**C8.4.2b** BRANZ Bulletin No. 585 “Site Measurement of Moisture in Timber and Concrete”, describes the whole process and how measurements shall be taken.

Localised defects in the existing floor (i.e. exceeding 5mm undulations per 3m in any direction) shall be matrix filled to a leveled surface as applicable, and high spots ground flat.

The prepared floor surface shall be clean, sound and dust free.

New and old concrete floor slabs shall be dry before laying. As a guide for new concrete, allow one-month drying time per 25mm of floor slab thickness.

There are a number of “rule of thumb” methods to determine if concrete is sufficiently dry to install overlays. The only true method is to measure the relative humidity of the concrete surface, using a flooring hygrometer. (refer figure 8.2)

**The reading shall be below 70% before the laying of Strandfloor® can be considered.**

Substrates shall be free from wax, oil, moisture, grease, dirt and dust or loose material.

Construction joints shall be formed in the overlay to coincide with those in the concrete substrate. Bridging construction joints is not recommended.

Before applying adhesive the floor shall be vacuumed clean and wiped over with a damp mop.

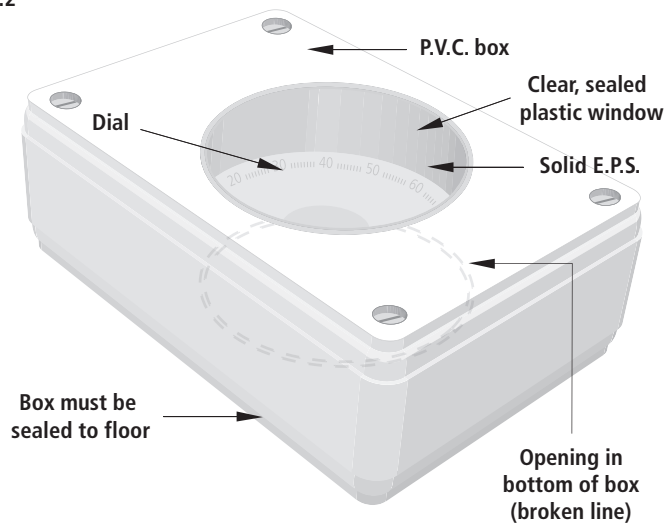
Apply full spread adhesive to the manufacturer’s specifications.

All clearances, fastening and finishing details apply equally where described elsewhere in this manual.

Temporary even pressure (e.g. sandbags) should be laid over the floor area until the adhesive has cured. Pay particular attention to square-edged panel intersections, where it is necessary to eliminate surface differentials.

Prohibit traffic over the new floor until the new adhesive is fully cured as recommended by the adhesive manufacturer.

Figure 8.2



**C8.4.2c** The adhesive shall be full spread. Spot or bead application may lead to “drumming”.



## 8.5 Indirect floor overlay

All Strandfloor® products can be used for indirect overlays, up to spans of 600mm.

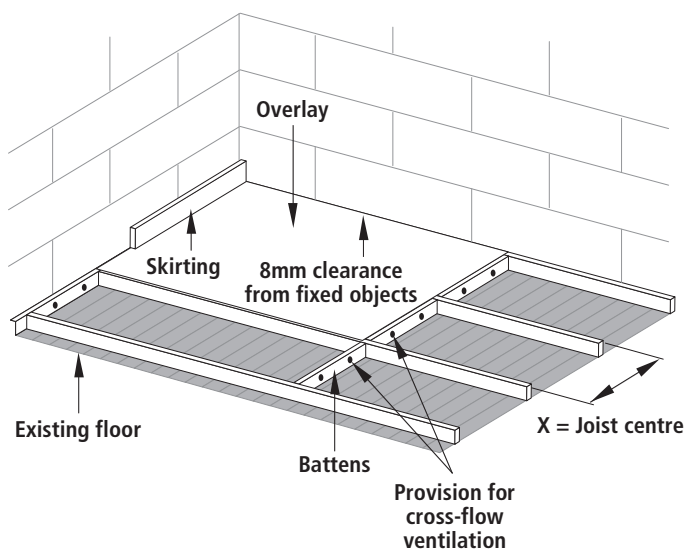
Flooring panels are fastened to timber battens fixed to the existing concrete or timber surface, dependent on end application (Square Edge or Tongue & Groove). (refer figures 8.3 and 8.4)

Indirect overlaying of concrete, with tongue and groove product, allows for services to be installed within the cavity and specialist sprung floors can be accommodated. (refer figure 8.4)

Increased floor stiffness will be achieved when closer support centres are used.

The use of Strandfloor® Tongue & Groove panels will accommodate better cross-flow ventilation.

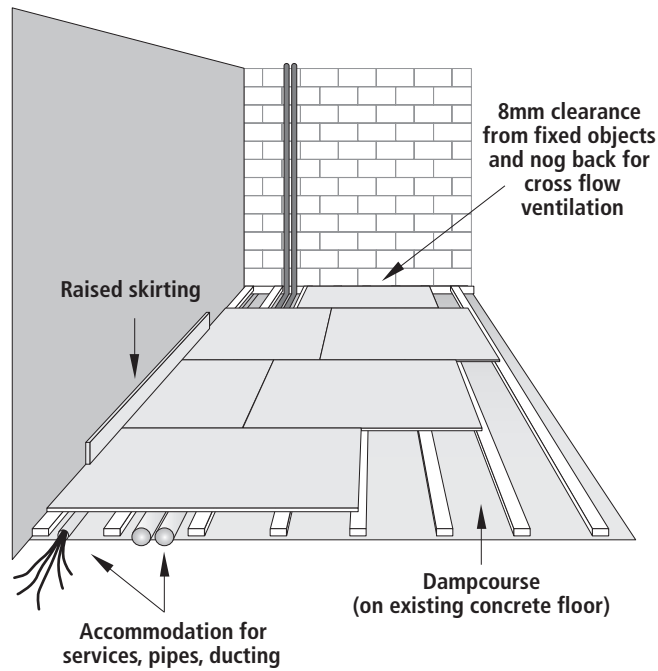
Figure 8.3



**C8.5a** Refer section 5 - Floor design, for all joist spacings.

**C8.5b** BRANZ Bulletin No. 585 "Site Measurement of Moisture in Timber and Concrete", describes the whole process and how measurements shall be taken.

Figure 8.4



Provision shall be made for cross flow air change within the new floor cavity especially when overlaying concrete substrates. (refer figure 8.3)

Where large floor areas are to be installed, effective cross flow ventilation between battens is essential and a surface moisture barrier may be required.

New and old concrete floor slabs shall be dry before laying and the use of a hygrometer is essential.

**The reading shall be below 70% before the laying of Strandfloor® can be considered.**

Ensure battening accommodates any excessive sub-floor undulations and ensure “hold downs” are secure.

Sub-floor framing moisture content shall not exceed 18%.

# 9 Finishing

## 9.1 General preparation

Strandfloor® flooring panels provide an ideal substrate for most types of floor finishes. All floors will require sanding prior to covering or coating.

No Strandfloor® material shall remain in a permanently raw unfinished condition. After the building is completed and before occupation panels shall be finished with floor coverings such as carpet, sheet vinyl, ceramic tiles etc, or a coating system.

Table 9.1

Floor sanding			
Surface finish	Cut	Sander type	Paper grit
Clear coating	First	Drum	60 – 80
	Second	Disc	100
	Third	Disc	120 – 150
Other finishes	Single		60 – 100
(carpet, vinyl, wet area membranes etc.)			

Prior to applying floor finishes nails shall be punched or screws retightened. All panels should be sanded in line with table 9.1

Excessive sanding of Strandfloor® or using too coarse a paper will reduce the thickness of the panel thereby affecting the structural strength of the panel.

## 9.2 Dry areas

The following applies to areas that are not supplied with water from a water supply system:

### 9.2.1 Sheet vinyl and vinyl planking

- o The moisture content of panels shall be checked prior to laying of vinyl. The maximum moisture content shall not exceed 15% especially at panel edges before any finishing takes place. Covering of Strandfloor® with higher moisture content can result in an unsatisfactory visual appearance owing to panel shrinkage as it dries out over a period of time.
- o Carefully sand the entire floor area as required in table 9.1.
- o Prior to the application of sheet vinyl either a flexible floor leveling underlayment for wooden floors, or sheet underlayment as per vinyl suppliers technical data, shall be applied to the surface of the panels. Always refer to the vinyl manufacturers technical data for installation of underlayment.

### 9.2.2 Carpet

- o Carefully sand the entire floor area as required in table 9.1.

**C9.1a** Refer section 11 – Health and safety.

**C9.2.1a** Consider effects of moisture in the structure. Refer to section 5.7 - Supporting timber.

### 9.2.3 Clear finish

- o Where a premium finish is required post laying of the Strandfloor® should be considered
- o When clear coating use only Strandfloor® Square Edge product.
- o Hand-driven nailing will usually give a better finish than power-driven nails.
- o Panel sizes and batch numbers should not be mixed if an overall uniform appearance is desired.
- o Flooring intended for clear finishing shall be kept clean and free from staining, soiling and abrasion.
- o When clear finishing large floor areas, e.g. halls and gymnasiums, etc. post laying of the floor is recommended.
- o **Clear finishing is not suitable in wet areas.**
- o The moisture content of panels shall be checked prior to coating. The maximum moisture content shall not exceed 15% especially at panel edges before any finishing takes place. Coating of Strandfloor® with higher moisture content can result in an unsatisfactory visual appearance owing to panel shrinkage as it dries out over a period of time.
- o Clear coatings should provide protection in normal domestic building applications for a limited period. The clear coating manufacturer's application instructions shall be strictly followed and their requirements for periodic recoating shall be adhered to.

The following sequence is required for clear coating.

- o Ensure floor panels are dry, at or below 15% moisture content.
- o Punch nails just prior to sanding.
- o Fill nail holes with a compatible filler colour matched to the Strandfloor®.
- o Carefully sand the entire floor area as required in table 9.1.
- o Remove dust from the entire floor surface and skirtings by broom and vacuum cleaner.
- o Apply the first coat of polyurethane in accordance with the manufacturer's instructions.
- o Sand and apply further coats as required by coating manufacturer.
- o At all times strictly follow the coating manufacturer's instructions.

### 9.2.4 Sports court markings

It is recommended that painted court markings be carried out prior to clear finishing and follow the requirements of the final coating manufacturer.

**C9.2.3a** This is to ensure that timber nogs are used to support edges – if Tongue & Groove product is used cracking of surface coatings may eventuate due to slight differential movement.

**C9.2.3b** This will ensure that shading between panels does not occur – identification numbers printed on one face of the panels are batch numbers.

**C9.2.3c** Refer definition 9.3 – Wet areas

**C9.2.3d** Best results are achieved when specialist applicators carry out the work. Should any imperfections appear in panel surfaces during coating, cease work and contact the panel supplier or the coating manufacturer.

## 9.3 Wet areas

The long term performance of Strandfloor® will be affected if exposed to moisture for prolonged periods. StrandfloorH3.1® provides additional protection where accidental wetting may occur and therefore is recommended to form the wet area platforms. It is not intended that Strandfloor® products in general get wet once the structure is closed in and water tight. It is therefore essential that protection is provided to the surface in all wet areas.

### 9.3.1 Definition

A wet area is any area within a building supplied with water from a water supply system, e.g. kitchens, bathrooms, toilets, shower rooms, laundries, changing rooms, en-suites etc.

### 9.3.2 Impervious surface finish

In wet areas, Strandfloor® panels shall be covered with a floor covering or finish that is impervious (i.e. does not allow the passage of moisture).

While Acceptable Solution E3/AS1 provides a list of impervious surface finishes that meet the requirements of the NZBC, Laminex New Zealand™ believe that the laying of an appropriate (1) wet area membrane in accordance with the Code of Practice for Internal Wet Area Membranes prior to the installation of any decorative surface, is best practice to ensure the Strandfloor® will remain dry for the life of the structure.

The installation of an appropriate wet area membrane shall be in accordance with the manufacturers' recommendations. As with the vinyl covering, the membrane shall be returned up the wall at least 75mm. Where appropriate, the membrane shall be returned up the vertical front face of any fixture. If not appropriate, the membrane shall continue under the fixture and return up the wall at the room perimeter.

It is strongly recommended that floor drains be installed wherever possible to control the affect of any accidental flood. Critical areas for the inclusion of a floor drain include: under dish washers, in laundries and where spa baths are installed.

Care must be taken to ensure all pipes and penetrations through the vinyl or wet area membrane are fully sealed to eliminate any seepage through to the Strandfloor®. The inclusion of an appropriate wet area membrane will allow for most decorative floor finishes to be considered as the finished surface of Strandfloor®. This includes but not limited to ceramic and stone tiles, strip timber, planked vinyl, vinyl tiles, carpet, cork tiles, laminate flooring and sheet vinyl that is not coved or finished with heat welded joints.

Where alternative coverings are laid over an appropriate wet area membrane, compatibility between the two products must be checked. At no time must the decorative surface material compromise (puncture) the wet area membrane.

Maintenance recommendations as prescribed by the vinyl or wet area membrane manufacturers must be adhered to.

The particular clause – 9.2.1. Sheet vinyl – applies equally to “wet areas”.

Please note: As with other floor coverings the moisture content of the Strandfloor® must not exceed 15%, especially at sheet edges, at the time the vinyl or wet area membrane is installed.

#### Impervious coatings (polyurethane/paint)

While historically polyurethane coatings have been an acceptable finish for reconstituted wood flooring panels, Laminex New Zealand™ believe these finishes do not provide the necessary medium or long term protection to ensure all requirements of the NZBC are met. Therefore they are not acceptable finishes on Strandfloor® or any other material which is fixed directly to the Strandfloor® substrate in wet areas.

(1) An appropriate wet area membrane is one that complies with AS/NZS 4858 or which carries a current BRANZ Appraisal (see BRANZ web site [www.branz.co.nz](http://www.branz.co.nz) for the current list of appraised wet area membranes).

# 10 Maintenance

## 10.1 Ongoing maintenance

The occupier or owner, throughout the life of the building, shall maintain the following specific areas.

### 10.1.1 Floor coverings

- o Floor coverings in wet areas, shall be maintained to ensure water cannot penetrate through to the Strandfloor®. To ensure long-term performance of the flooring, the surface protection system shall be repaired at any sign of damage.
- o Other floor coverings and coatings shall be maintained to ensure the Strandfloor® surface is protected.
- o Floor wastes shall remain unobstructed and drain to the outside of the building.

### 10.1.2 Sub-floor space

- o The sub-floor space shall continue to receive ventilation throughout the life of the building.
- o Air vents in the foundation enclosure perimeter of the building shall not be obstructed by shrubs and gardens, etc. or any building extensions including decks. Building extensions shall allow for the continued compliance with sub-floor ventilation requirements.
- o Vapour barriers required to provide adequate moisture control in the sub-floor areas shall be maintained in an effective condition.
- o Clothes drier vents or steam vents shall not be allowed to exit into the sub-floor space. All relief valves or overflow pipes shall discharge outside of the building.

## 10.2 General precautions

- o Strandfloor® shall not be re-exposed to weather during renovations or extensions.
- o Where heavy floor loads are intended such as iron-framed pianos or billiard tables, etc. professional engineering advice should be sought to avoid undesired deflection or surface failure.

## 10.3 Accidental flooding

- o In any area where accidental flooding may occur, such as where water holding whiteware appliances are installed, a floor waste is recommended.
- o If for any reason flooding should occur, care shall be taken to ensure that the panels can dry out quickly. Removal of carpets or other loose laid floor coverings may be necessary and the slitting of the under floor foil, to ensure water is not trapped in the drape, may also be required.
- o It is essential that air be allowed to circulate around the panels and the replacement of floor coverings etc. shall not be considered until the Strandfloor® is below 16% moisture content.

If required, Laminex New Zealand™ will test samples to verify continued fitness for use.

# 11 Health and safety

## 11.1 Working conditions

Health and safety precautions shall be taken when working with wood panel products.

- o Occupational exposure to wood dust from any timber has been classified as hazardous. Wood dust is classed as a known carcinogenic to humans and its inhalation over many years increases the risk of nasal cancers. Similar exposure to uncontrolled wood dust can lead to allergic reactions such as dermatitis, asthma or chronic eye, nose and throat irritation in some people. Common symptoms of wood dust irritation are nasal discharge, dry or sore nose/throat, blocked, bleeding or itchy nose, sneezing, catarrh or coughing.
- o Work areas shall be well ventilated and kept clean.
- o Strandfloor® has been manufactured with polymeric diphenylmethane diisocyanate (pMDI) as a resin. This remains in the finished board in the form of polyurea or polyurethane. Evidence suggests that this causes no health effects in the normal population.
- o The resin used to manufacture Strandfloor® is non-formaldehyde based. Despite that, low levels of formaldehyde gas naturally present in the wood may be released from the product under some conditions. Formaldehyde is classified as a known carcinogen. However, in well ventilated areas the concentration of formaldehyde is unlikely to exceed the World Health Organisation Standard of 0.1 ppm for the general environment. The product is classified as Super E Zero (SE0) when tested in accordance with AS/NZS 4266.1: 2017 Formaldehyde Emission - Desiccator Method, similar classification as solid untreated wood.
- o Sawing, sanding and machining equipment shall be fitted with dust extractors to ensure that dust levels are kept within standards laid down by Occupational Health and Safety New Zealand, Worksafe Australia or the specific country of use. If not, a dust mask conforming with AS/NZS 1715 and AS/NZS 1716 and eye protection conforming with AS/NZS 1337 shall be worn.
- o Offcuts, shavings and dust shall be disposed of in a manner that avoids the generation of dust and in accordance with the requirements of local waste authorities.
- o In end use applications all product surfaces exposed to occupied space shall be sealed. In end use applications all product surfaces exposed to occupied space shall be sealed.

## 11.2 Safe working practices

- o Never use a power saw in a poorly ventilated area.
- o Always use M class extractor unit as a minimum.
- o Always use an approved sharp sawblade when cutting wood panels.
- o Always follow tool manufacturers' safety recommendations.
- o Always wear an approved properly-fitted approved dust mask (P1 or P2).

## 11.3 Formaldehyde

### 11.3.1 Control

When installed, emission levels can be controlled by room ventilation and covering of the surface. The surface shall be sealed or covered with a coating system or alternatively, with a floor covering such as foam-backed carpet, carpet with rubber underlay, sheet vinyl or ceramic tiles.

Sealing or covering of the surface shall be carried out before the building is occupied.

When it is anticipated that the building may be closed for long periods of time, "trickle" ventilators shall be provided.

### 11.3.2 Formaldehyde facts

Formaldehyde is a clear, naturally occurring gas, which is given off by plants, animals and human beings as part of the normal life process.

Formaldehyde is used in a wide range of consumer products and scientific and industrial processes. Formaldehyde is biodegradable, being destroyed by exposure to the atmosphere and by biological processes in soil and water, plants, animals and human beings.

Because some people can react to low levels of formaldehyde exposure, all possible sources of emissions in homes should be checked.

Among the factors which can lead to a build-up of formaldehyde levels in some homes are:

- o Unsealed or uncovered reconstituted wood flooring.
- o Unpainted or unsealed reconstituted wood products such as door jambs, scotias and skirting boards, doors and plywood.
- o Unpainted or unsealed furniture made out of reconstituted wood products like cupboards, chests of drawers and kitchen and laundry units.
- o Thermal backed curtaining and upholstery.
- o LPG-Fuelled heaters and cookers (unflued).
- o Cooking with hot oil.
- o Cigarette smoke.

### 11.3.3 Risks

Formaldehyde is a natural gas, which will break down when exposed to the atmosphere, but in confined spaces this dissipation is slower.

Formaldehyde is irritating to the nose and throat, eyes and skin. Some people are hypersensitive to formaldehyde and experience allergic reactions resembling asthma. They also experience runny noses and skin reactions.

### 11.3.4 Detecting formaldehyde

Air-borne formaldehyde is detectable by smell at about 0.3 – 0.4 parts per million (ppm) and at this level may cause mild eye irritation for some people.

At 0.5 ppm some people notice a mild effect in the throat. At 1.0 ppm and over, watering of the eye begins. At 10.0 ppm, intolerable irritant effects on the nose and throat are felt.

**C11.3.4** See Section 3 - Material properties for information about Strandfloor® formaldehyde emission levels.



# 12 Product warranty

## 12.1 Strandfloor® warranty information

Laminex New Zealand™ (a division of Fletcher Building Products Limited) (“Distributor”) confirms the terms and conditions of the Strandfloor® 50 Year Limited Warranty (the Warranty”) in respect of the Strandfloor® supplied by the distributor to you.

When stored, handled, installed and maintained in accordance with the Strandfloor® Technical Manual that is current at the time of installation, Strandfloor® will meet the durability requirements of the New Zealand Building Code (NZBC) B2.3.1(a) and has a serviceable life of at least 50 years.

Laminex New Zealand™ will not be liable to any persons if the conditions as to storage, handling and installation and maintenance of Strandfloor® panels as outlined within the Strandfloor® Technical Manual are not complied with. It is the obligation of the installer of the Strandfloor® to convey this information to the relevant owner / occupant.

If you have any questions, or in the unlikely event of a problem with Strandfloor®, please contact Laminex New Zealand™ Customer Services. Contact details are at the bottom of this page.

Strandfloor® Technical information is available from Strandfloor® stockists. Refer to website for warranty. For more information visit [laminex.co.nz](http://laminex.co.nz) or call 0800 303 606.





VISIT US

**[laminex.co.nz](https://laminex.co.nz)**

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