

TOLKO TSTRAND™ PRO

OSB PRODUCTS

OSB FLOORING SPECIFICATION & INSTALLATION GUIDE

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T-STRAND OSB FLOORING SPECIFICATION & INSTALLATION GUIDE

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Tolko T-STRAND Pro Oriented Strand Board (OSB) is a wood structural panel manufactured from wood strands of Canadian Aspen pine, with strands treated with zinc borate preservative treatment, and a combination of waxes, resin and synthetic adhesives. This gives the Tolko OSB its moisture resistance and provides a high degree of durability for the built environment. The Tolko T-STRAND Pro OSB Structural Panels are a true and trusted building solution for residential and commercial buildings.

The following information is a guidance document for installation of T-STRAND OSB that can be followed unless otherwise specified by a suitably qualified professional or engineer.

Orientated Strand Board

Orientated Strand Board (OSB) is composed and made up of compressed strands arranged in layers oriented at right angles to one another that are bonded together with a permanent bond adhesive. The orientation of strand layers achieves the same advantages of cross-laminated veneers in plywood to create a strong, stiff structural panel. Wood products are generally stronger along the grain (long direction), therefore having cross-lamination can distribute wood's natural strength in both directions of the panels.

With over three decades of manufacturing and use in Canada and the wider North American continent, OSB is engineered for strength and design for a variety of applications and uses in residential or commercial projects.

OSB panels that bear the APA-Engineered Wood Association trademark are manufactured under APA's rigorous quality assurance program that is recognised by U.S & Canadian building codes and IBC (International Building Code). Each panel is performance rated, which means the panels meet the performance requirements necessary for its end-use application, giving a common baseline for manufacturing and conformity to performance standards regardless of manufacturing methods.

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1.0 | Tolko Oriented Strand Board

1.1 | What is Tolko T-STRAND OSB Flooring

Made from Canadian Aspen wood fibre with moisture-resistant adhesives and zinc borate treatment for added protection against insect hazard, Tolko T-STRAND OSB provides a solid wood-based flooring solution for timber buildings.

APA-rated T-STRAND OSB Sheathing products offers performance, durability and value for an engineered wood product that provides a structural solution suitable for residential and commercial buildings.

1.2 | Tolko OSB Panel Product

Wall bracing elements longer than those tested shall have their bracing capacity determined by multiplying the tested bracing rating per meter by the length of the element.

Adjustment of bracing capacity of walls of different heights and walls with sloping top plates can be obtained by the methods stipulated in NZS3604 under 8.3.1.4.

Table 1: Tolko OSB Metric Dimensions

Description	Density	Thickness	Width	Length
Tolko T-Strand T&G Flooring OSB	600-650kg/ m3	18.3mm	1200mm	2400mm & 3600mm

Features

- **Moisture resistance edge sealant:** factory applied maroon edge seal protects from moisture penetration
- **Indoor air quality:** contains no added urea-formaldehyde resin (NAUF)
- **Zinc borate treatment:** for protection against insect hazard
- **Warranty*:** 50-year transferrable warranty for delamination

*for specific details on warranty inclusions and limitations see Tolko OSB Warranty, always follow the storage and installation instructions.

1.3 | Advantages of OSB Flooring

Orientated strand board is a widely used, versatile structural wood panel that has been utilised as a flooring substrate material for over three decades in North America. OSB is an engineered wood panel that shares many of the strength and performance characteristics of plywood. Relative to their strength, OSB panels are light in weight and easy to handle and install. As a natural wood product and proven performer, Tolko OSB offers a cost-effective solution for buildings where structural characteristics are important for your modern high performing buildings.

- No special tools
- Easy to cut and handle
- Lighter in weight compared to other sheet material products made from gypsum or fibre cement boards of the same or similar thickness
- Cost-effective engineered wood panel
- No harmful arsenic impregnated preservative treatments
- Flexibility to use with other New Zealand Building Code compliant materials and products
- New Zealand based technical support

2.0 | Design Considerations & Compliance

2.1 | Structure

Tolko T-STRAND OSB (oriented strand board) wood panel product is manufactured in Canada with the in-plant manufacturing standards approved by the North American APA (The Engineered Wood Association) being the mark of quality for product conformity and manufacturing.

T-STRAND OSB Flooring is suitable for use as a structural wood panel within structural systems as designed and specified by suitably qualified professionals and engineers. This includes the use of the OSB panels being suitable as a wood-based panel as a flooring substrate for floor systems designed for loads not exceeding 3 kPa floor loadings, that will contribute to compliance with the New Zealand Building Code (NZBC) in respect of B1 Structure and NZS3604 Timber Framed Buildings.

2.2 | Durability

Tolko OSB is manufactured with the combination of wood flakes, adhesive, wax and zinc borate for decay and insect resistance. This means the OSB is manufactured to adhere with the requirements of the NZBC Clause B2 Durability as a treated engineered wood product.

OSB durability performance is a function of proper specification and application. When the T-STRAND OSB product is specified and used in accordance with good building design, proper architectural detailing, best building practices and treated to the required treatment levels as prescribed in AS/NZS1604.1, the OSB will form part of the Acceptable Solution complying with the requirements of the NZBC (B2/AS1).

Tolko OSB panels will continue to contribute to the relevant performance requirements of the New Zealand Building Code for 50 years (or other statutory time frames as specified by the specifier of the project) provided that the specific design parameters of the project are met.

2.3 | Preservative Treatment

Tolko T-STRAND OSB Flooring is treated with zinc borate (ZB) for decay and insect resistance to a retention level equivalent to that specified as Hazard Class H2S in accordance with AS/NZS1604.1:2021.

The ZB treatment is mixed in with the strands, adhesives and wax prior to pressing of the panel to provide consistent protection throughout the entire board. There is no requirement to treat the boards before installation or to reapply treatment after the panel has been trimmed to size.

H2 preservative treatment levels as noted in AS/NZS1604 is suitable for "inside, above ground, protected from wetting".

T-STRAND OSB with ZB conforms with AWPA Use Category 1 (UC1) and Category 2 (UC2). APA Product Report PR-N216 confirms that ZB treated T-STRAND OSB meets the performance requirements of PS-2. The preservative brand for Tolko ZB treated OSB is noted as 245 08 H2S P.

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2.4 | Dimensional Stability

All wood-based products absorb moisture from or give up moisture to the environment, until the wood product such as an OSB panel reaches a moisture content in equilibrium with their surroundings. This results in swelling or shrinking of the wood. Structural OSB panels have good dimensional stability due to the tendency of individual strands to swell or shrink crosswise that is greatly restricted by the adjacent strands. Detailing and construction must allow for the natural expansion and contraction of engineered wood products such as OSB in its environment with the seasonal moisture cycling and conditions experienced during the panel's life. Panels will expand or shrink with changes in moisture content.

Dimensional change can occur when there is elevated moisture in the installed panels during the construction phase, which can be partially restrained by fasteners and the timber framing.

Providing adequate ventilation and minimizing the effects of moisture by using recommended panel joint spacing, adequate fastening and the temporary protection or the installation of a compliant building underlay, will prevent and mitigate any undue buckling or waviness and any further moisture uptake.

2.5 | Adhesive Bonding

Tolko OSB products use a moisture resistant adhesive that meets Exposure 1 bond classifications with the use of a diphenylmethane diisocyanate (MDI) that is chemically reacted into stable bonds during pressing with the manufacturing process. Cured adhesive makes the OSB highly durable and stable after manufacture resulting in low formaldehyde emission. Which testing has shown formaldehyde emission levels in wood structural panels are no higher than the levels found naturally in the environment.

The average emission level of Tolko T-STRAND OSB Flooring panels are 0.20 mg/per litre, with no individual sample above 0.30 mg/litre.

Overall, this results in a formaldehyde emission rating of G5 based on ISO12460-4 or Super E0 as defined in AS/NZS 2098.11. The formaldehyde emission level in the G-5 standard is more stringent than the Super E0 of AS/NZS2269.0 which means the APA rated OSB product easily meets the world's leading formaldehyde emissions standards and regulations.

2.6 | Moisture Content

All Tolko T-STRAND OSB Flooring panels with ZB preservative treatment are trademarked with Exposure 1.

Exposure 1 OSB is a bond classification for structural panels suitable for uses not permanently exposed to the weather. Panels classified as Exposure 1 are intended to resist the effects of moisture on structural performance due to active construction.

Wood structural panels trademarked as Exposure 1 are limited to dry service conditions that result in the average moisture content of sawn lumber of less than 16%.

2.7 | Storage and Handling

To ensure optimum performance, APA-rated Tolko OSB must be stored and handled properly.

The OSB panels are recommended to be stored under cover or shelter, stacked flat and be clear of ground and supported at minimum on three to four evenly spaced supports.

Panels should be stored in a well-ventilated area that is away from source of heat, flames or sparks, protected from the weather elements, and not left exposed or in high traffic areas to avoid any mechanical damage.

Where there is risk of humidity, use pieces of timber to weight down the top panel in a stack to reduce warpage from humidity. OSB panels are not to be in direct contact with the ground.

Having tight coverings or a lack of air flow with the OSB stack will prevent air circulation; Which may promote mould or mildew and allow for undue moisture uptake and absorption within the panels.

2.8 | Exposure to the elements

T-STRAND OSB products are Exposure 1 rated and are sealed on all edges with a factory applied coating. OSB panels that are Exposure 1 rated will typically maintain its structural integrity when exposed to the environment with short episodic rain during construction. It is advised to enclose as soon as practicably possible to avoid any unwanted moisture driven uptake and any prolonged weathering that may affect the panel.

Responsibility lies with the builders and the professionals engaged for any damage or exposure caused by improper protection of the OSB panels against weathering, including rain at any stage of the construction process. Exposure to the weather shall be kept to a minimum. Do not leave OSB directly exposed or unprotected to the weather for prolonged periods or no more than 3 months (90 days) from the date of first installation.

Exposed panels must be covered and protected to limit soaking and water pooling and be drained and removed as soon as possible. Temporary protection should only be removed when the risk of rain or further precipitation has passed and where the panels can naturally dry with the environment.

2.9 | Prevention of Fire Occurring

As a wood-based panel product, OSB is considered to be a combustible material.

Separation or protection must be provided to Tolko T-STRAND OSB from heat sources such as stoves, heaters, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 to C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

For specific detailing and further information about the use of a wood-based combustible materials used in buildings refer to the NZBC Clauses C1 – C6 Protection from Fire.

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2.10 | Ground Clearances

At minimum, clearances of 550mm between the surface of the ground level in the sub-floor area and underside of the OSB flooring panel shall be provided to ensure adequate sub-floor ventilation and preventing any undue dampness. This ensures compliance with the NZBC and applicable acceptable solutions for wood-based products with the subfloor structure.

Vapour barriers do not reduce the requirements for minimum ground clearances; therefore, any alternative solutions are outside the scope of the literature and subject to specific design.

2.12 Wet Areas and Tolko OSB

Tolko OSB H2S treated flooring panels can be utilised in interior dry situations (protected from weather or dampness) similar to that of untreated plywood for walls or ceiling linings as noted in NZS 3602.

Where there are situations for wood-based products that are to be used in interior damp situations, the use of H3 products shall be used.

The use of treated H2 Tolko OSB panels in interior damp applications would be subject to specific design, and design consideration in respect of B2 Durability and E3 Internal Moisture.

Where there is risk of panels that are prone to moisture or water splash, suitable protection and impervious coverings or membranes must be used.

2.13 | Design Responsibility

Design specification and responsibility rests with the building owner and the building professionals that they engage. The specifier of the project must ensure that correct detailing, good design and compatible building materials are used that are appropriate for use, and that additional detailing may be required for specific design or any areas that fall outside the scope and specification of this literature.

Specification and Installation

T-STRAND OSB Flooring has been designed and manufactured for applications as a flooring panel and will meet the requirements of a wood-based substrate in accordance with NZS3604:2011.

3.0 | General Installation Information

3.1 | Installation Skill Level Requirement

All design and building work must be carried out in accordance with the information provided in this guide, or as specified and detailed by a suitably qualified, competent and experienced professional tradesperson conversant with Tolko orientated strand board. Where the work involves Restricted Building Work (RBW), the works must be completed by, or under the supervision of a Licensed Building Practitioner (LBP) with the relevant License Class.

3.2 | Health and Safety

Always take necessary steps to ensure your safety, and the safety of others. Refer to WorkSafe for further guidance on health and safety - https://www.worksafe.govt.nz/

- Wear protective safety glasses or non-fogging goggles when working with OSB.
- P1 or P2 face respirator or equivalent should be worn when there is a potential to be exposed to wood dust.
- Control wood dust when machining, cutting or drilling OSB with the use of mechanical extraction or natural ventilation.
- Work gloves should be worn when handling OSB to avoid skin irritation.
- Wash hands and any skin contact areas with mild soap and water.

3.3 | Working Best Practise

When handling and installing OSB, always use safe and best working practices. No special tools or equipment is required when working and cutting the OSB.

Cutting Sheets – Making Cuts to Tolko OSB Panels

- T-STRAND Pro OSB panels can be cut using any circular-saw or hand-saw tool. For the cleanest cuts use a fine tooth saw blade.
- Use a firm, flat solid surface or sawhorse when cutting OSB.
- When using a saw, it is recommended to clamp a straight edge as a guide or a suitable track long enough for the saw tool to run along or with the dimension of the panel. Run the saw implement along the straight edge or track to make a precision cut.

Holes & Penetrations – Making Holes and Penetrations to Tolko OSB Panels

- Mark the centre of the hole or the penetration on the panel
- Pre-drill a pilot hole as a guide.
- Cut or drill the hole to the appropriate diameter with a hole saw fitted to a drill
- Where holes are irregular or larger than the appropriate diameter hole saw, drill a series of smaller holes around the perimeter of the hole, and then cut using a jig-saw tool or a smaller fine-tooth saw to remove the waste piece from the panel.

4.0 | Flooring Installation

4.1 | Pre-Installation Requirements

Tolko T-STRAND Pro OSB panels must be protected from weather where possible to prevent and reduce any surface mould and any undesirable moisture uptake during the construction phase.

4.2 | Timber Framing

When installed to timber buildings, timber framing and sizes must comply with NZS3604 (or specific design in accordance with NZS3603 Timber structures standard or AS/NZS 1170). This includes the selection of timber, being verified kiln dried structural grade radiata pine, minimum stress grade to SG8 with a maximum moisture content of 18% and treated to the required treatment levels as prescribed in NZS3602 Timber and Wood-based Products for Use in Building.

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4.3 | Blocking

The tongue and groove joint down the length of the OSB panel makes for easy joining of the structural panels over joists which means timber support or blocking is not required unless otherwise specified by the specifier or by way of specific design by an engineer.

4.4 | OSB Sheet Layout

Ensure panels are laid perpendicular to the supporting timber members or joists in a staggered pattern.

Ensure there is at minimum at least two spans or three framing members supporting the OSB. If it is not possible to support the OSB panels, sheet edges must be supported with timber framing or blocking.

- Avoid single spans between framing supports.
- Sheets must be fully supported by framing and not exceed the maximum 600mm centres.
- Allow for a 3-4mm expansion gap between sheets as good practise. This allows for the expansion and contraction of the panel.

4.5 | Fastening and Fixing Pattern

At minimum, OSB flooring panels are to be fastened around the edges, and ends of the sheet (perimeter) at 150mm centres, and within the panel (body of sheet) at 300mm centres on the intermediate timber framed supports with the selected fasteners.

- All fasteners as standard must be at minimum no less than 12mm from the square edges.
- At the tongue and groove joint, fixings to be supporting framing members must be fastened minimum 15mm from the tongue and groove edges.

4.6 | Construction Adhesives

As best practice, the use of mechanical fasteners and construction adhesives for flooring substrates is recommended to avoid any unnecessary squeaks, buckles and nail-popping. Using elastomeric adhesive to the joint and supporting framing members will provide a strong bond and will allow for any movement, vibration and thermal expansion of the OSB.

Application of adhesive to the supporting framing members and to the tongue and groove joint is highly recommended to avoid any unnecessary squeaking and ensuring a suitable bond between panels and the supporting structure.

Available types of construction adhesive suitable for T-STRAND OSB includes;

- Along timber joists - Soudal Soudabond Subfloor,
- Between 'Butt' and 'T & G' joints - Soudal Gorilla Grip 2-Hour Cure, Soudal Gorilla Grip 1-Hour Cure.

Always refer to the construction adhesive manufacturer for further guidance for product and installation methods for construction adhesive. At minimum adhesives should conform to ASTM D3498 or have a relevant appraisal.

- Apply a 10mm continuous bead of adhesive along the timber joists as per the manufacture's recommendations.
- Apply a 5mm continuous bead of adhesive between 'Butt' and 'T & G' joints as per the manufacture's recommendations
- Work from the centre of the OSB panel outwards to develop even glueline pressure.
- Mechanically fix OSB flooring panels as per the fastener and fixing pattern

4.7 | Fasteners

All fasteners used must be corrosion resistant to the appropriate treatment level depending on the intended use, compatibility of materials in contact and the durability time frames as stipulated in NZBC Clause B2 Durability and NZS3604.

At minimum, use full round head (flat head) 60 x 2.8mm hot dip galvanized fasteners or stainless steel (annular grooved) where determined by design or where consideration for specified hazards such as sea spray zones (Zone D) as defined in NZS3604 for durability. Always check correct fastener type is verified prior to installation.

Table 2: Fasteners

Fixing Type	Minimum Fastener Length for 18.2mm OSB
Hand driven Nails in timber framing	60 x 2.8mm nails (full round head / flat head), hot dipped galvanised or better
Power driven Nails in timber framing	ECKO Round Head Strip Nails (OSR-3450R) 60 x 2.87mm hot dipped galvanised or better
Screws in timber framing	10g x 45mm or equivalent countersunk screw
Screws in steel framing	10g x 45mm or equivalent self tapping, self countersinking screw

5.0 | Care and Maintenance Guidance

5.1 | General Maintenance

T-STRAND Pro OSB will not normally require maintenance with good building design and proper architectural detailing.

However, there may be some form of maintenance during its serviceable life depending on the specified design, detailed project requirements and the intended use. Should the OSB panel be damaged during its serviceable life, it would be recommended to replace the panel to ensure the serviceable life requirements are met, and the specified durability and panel integrity is maintained.

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6.0 | References

NZS3602:2003 Timber and Wood-based Products for Use in Building

NZS3604:2011 Timber-framed buildings

NZS3640:2003 Chemical Preservation of Round and Sawn Timber

AS/NZS1604.1:2021 Preservative-treated wood-based products

APA – Building a better home

APA – PS2-18 Performance Standard for Wood Structural Panels

APA – Technical Note Minimising Buckling of Wood Structural Panels

APA – OSB Performance Rated Panels

APA – Panel Design Specification

New Zealand Building Code

- B1 Structure
- B2 Durability

WorkSafe – Mahi Haumaru Aotearoa – Health and Safety

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