REGALBOARD

DECKING INSTALLATION GUIDE

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www.eva-last.com

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Contents

Introduction

Thank you for choosing an Eva-last® decking product. This guide aims to provide the essential information needed to successfully install a RegalBoard deck. It is assumed, however, that the user of this document has a basic understanding of deck building practices and pertinent building codes. Compliance with the requirements captured herein must be met for full warranty coverage.

RegalBoard is an innovative building material moulded from natural wood, offering the aesthetic appeal of wood with the benefits of ultra-low maintenance. Unlike natural wood, RegalBoard requires no costly staining, sealing, or varnishing. This makes it an ideal choice for exterior applications where durability and ease of care are essential.

1. Critical installation points

This summary of critical installation points in no way replaces the full RegalBoard Installation Guide which is available for download on **www.eva-last.com**. It is recommended that you download and familiarise yourself with the full installation guide

Substructure:

- Plan your substructure to align with the intended deck layout and ensure support of the boards along all cut edges.
- Use double joists at all butts joins so that both board edges are fully supported.
- Use noggins between joists where breaker boards are used. The spans between noggins must not be greater than the maximum centre-to-centre span of the applicable deck board profile.
- Ensure the substructure members are appropriately sized for the requisite spans.
- Ensure the installation thereof is sound and level. Ensure suitable connections are utilised between members and between the substructure and the applicable substrate. Consult an appropriately qualified professional wherever necessary.
- Use appropriate spans. This will depend on regional legislative requirements. Most regions require the satisfaction of both ultimate and serviceability conditions.
- Spans may need to be adjusted for stair spans, snow loads , or diagonal board laying patterns

The table below summarises typical achievable spans (excluding stair applications and/or snow loads, please refer to the appropriate section for more information regarding these scenarios) of various profiles for the conditions outlined above and in **Section 4.1**. The profile's moment of inertia and elastic section modulus is also captured for convenience. Profile availability may differ per region, please refer to www.eva-last.com or contact your local distributor for more information. For additional information please refer to the Regalboard Technical Data Sheet (TDS).

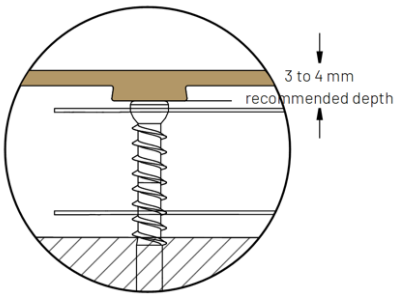
Profile details				Maximum span (Metric – mm)						
				US approach		Eurocode (and similar) approach				
						Residential (2 kPa)		Commercial (4 kPa)		EN 15334
Profile code	Profile shape	Moment of inertia, Ix (mm⁴)	Elastic sectional modulus, Sx (mm³)	Ultimate	Serviceability	Ultimate	Serviceability	Ultimate	Serviceability	
STZQJAZ03 175 x 22 (7 x 0.87")	Square edge profile	153 939 (0.37)	14 032 (0.86)	450		450		450		300

Note:

- The full end-use adjustment factor was used.
- The duration of load and creep was not included in the analyses.
- The calculation for spans is based on the lesser of a factor of safety of 2.5 for the average test results and 2.1 for the minimum test results.
- Serviceability span assessment is based on a deflection limit of L/180 and often dictates.
- A conservative gap of 5 mm between boards was assumed.

Fastening:

- Use the RegalBoard specialised composite deck screws. For best results, screw through the embedment groove to assist in hiding the screw head under the cap. The manufacturer cannot guarantee a successful install using other decking screws which could then affect your warranty.
- For best results use the gap spacer and fastener alignment tool, to help maintain the correct depth.
- It is recommended that a water-soluble lubricant like Glycerine or Glycol are used on the fasteners before installation, wipe off any excess lubricant, and perform a patch test to check for staining before installation.
- When inserting the screws, ensure the screw heads are 3mm to 4mm below the surface. As you fasten, you will feel a noticeable change in resistance due to the different densities of the core material and the surface capping.



- Use a minimum of two fasteners to top fix at every joist. Increase the fastener quantity to 3 or reduce the span should two fasteners do not suffice.
- Maintain a fastening distance of between 24 mm (0.95") (minimum) and 20 mm (0.788") (maximum) from the end of the board.
- When top fixing decking boards, ensure edge distance aligns with the embedment groove of the board, typically for deck boards this is of 24 mm (0.95") and for fascia its 25.5 mm (1.0") from the edge.
- When possible, use the decking gap spacer to create an automatic 3.0mm
- Do not over-tighten any fasteners. The torque setting of your driver must be less than 30 % of the maximum allowable.

Ripping:

- When ripping boards, attempt to provide two embedment grooves at, to maintain the hidden aesthetic, to that purpose do not rip solid groove boards narrower than 110 mm to maintain hidden aesthetics.
- Bear in mind when ripping that there are embedment grooves positioned at either edge and in the centre of the board when ripping attempt to have at least 2 embedment grooves or split the different in width between two boards.
- Ripping may expose the Glass Fibre reinforcement sheet, cut slowly and with a sharp blade.

Expansion:

- RegalBoard can expand and contract up to similar rates experienced with typical wood-plastic composite materials.
- To allow for an appropriate expansion gap per board, multiply the length of the board (**L**) by 0.04 (0.000022) and by the difference between the installation temperature and the possible maximum temperature of the boards (Change in Temp.):

  Change in board length = **L** x 0.04 x Change in Temp.

  Example: Change in board length = 5.45m x 0.04 x (36 - 18) | (18' x 0.000022 x (96.8 – 64.4))
  Change in board length = 3.924mm | (0.155")
  Expansion gap = 3.924mm / 2 | (0.270" / 2)
  Expansion gap = 1.962 mm (0.078") (either end of the board)

  Please refer to the Section 3.5.1 for more information on this topic.

- Use the same method to estimate maximum gap size (when boards are fully contracted) to ensure this is suitable for the project.
- Where the expected temperature range is high consider using lighter coloured deck boards to reduce the required expansion gap.
- To further reduce the expansion gap, boards can be cut to shorter lengths.
- Breaker boards can be used between boards that are installed end-to-end to assist in controlling expansion and contraction.
- Use boarder boards around the perimeter of an installation to further assist in controlling expansion and contraction.
- If the expansion and contraction is not managed appropriately, the warranty may be affected.

Environmental and Material Exposure Risks

- **Excessive and unusual heat sources** - Eva-Last products are designed for typical exterior installations but are not covered under warranty for damage caused by excessive heat, including as a result of concentrated sunlight reflected from Low-E glass or other reflective surfaces, which can damage the product's surface, cause immoderate movement, and affect its flexural properties both in the short and long term. If the intended site could result in such exposure, consult the Low-E glass manufacturer for solutions to reduce the reflection/concentration from such surfaces and resultant impacts before installation. Consider using screens, glass treatments/layers, or obstructions, such as vegetation, to block/diffuse sunlight (before and/or after reflection) to help mitigate impact of such scenarios.
- **Incompatible materials** - Avoid contact between deck surfaces and materials that may negatively affect the product—such as those containing plasticisers, including soft plastics, rubbers, foams, and synthetic composites. This includes, but is not limited to, items like garden hoses, rubber mats, plastic tarps, inflatable products, and protective coverings. These materials may cause staining, discolouration, or surface degradation. Consult the product's Technical Data Sheet (TDS) and relevant chemical compatibility data to assess potential risks. Users are responsible for confirming material suitability under actual use conditions.
- **Wind and acoustic consideration** - Account for environmental factors such as wind uplift and sound transmission. Proper board orientation, secure fastening methods, and strategic use of screens or vegetation can help mitigate wind loads and reduce acoustic impact on the deck and surrounding area.

2. Pre-installation

2.1 Standards

Legislation may differ between jurisdictions. Before installing any Eva-Last® product, ensure that the application is rational and complies with the local regulations and building codes. Wherever necessary, consult a suitably qualified professional. Be sure to comply with material manufacturer specifications. Where manufacturer's specifications and building codes differ, revert to the building code requirements. Check that your choice of product is suitable for its intended application. For further product specification and information visit www.eva-last.com.

2.2 Safety

Refer to the applicable Material Safety Data Sheet (MSDS) for additional information. Please do not hesitate to contact Eva-Last® should you require any additional assistance.

Please see Appendix D for a Safe Work Procedures (SWP) when working with RegalBoard and other glass fibre-reinforced products.

Always wear appropriate Personal Protective Equipment (PPE) for the various activities involved in installing a decking system. This includes, but is not limited to, equipment such as safety glasses, helmets (where necessary), gloves, and boots, masks when cutting or similar, and harness systems when working at heights or similar, as dictated by the local occupational health and safety legislation.

- Ensure to comply with the local occupational health and safety legislation.
- Cutting (and similar processing activities) of RegalBoard can produce fine particulate matter that contains glass fibres. As a result, ensure to:
    - Work in well-ventilated areas.
    - Use tools with vacuum attachments.
    - Avoid contact where possible with dust that contains glass fibres as the material may cause skin and eye irritation.
    - Wear safety goggles that provide an adequate seal around the eyes when disposing and processing the material, particularly during cutting.
    - Wear gloves, long sleeved shirts, long trousers, and/or overalls during disposal and processing of the material, particularly during cutting. Where possible or necessary, seal shirt and trouser cuffs.
    - Wear suitable masks when disposing and processing the material, particularly during cutting. Use masks with adequate seals around the nose and mouth. Use mask with respirators and appropriate filters, especially if regularly exposed to dust of this nature.
    - After exposure to dust of this nature, wash with soap and running water. In addition, wash any equipment and clothing separately.
    - Do not rub affected areas that feel irritated. Instead, wash these areas with soap and running water. Contact an appropriate medical professional for further advice and/or when experiencing any symptoms related to exposure.
    - Clean workspace thoroughly. Wet-wipe, mop, or vacuum surfaces. Do not dry sweep as this can disperse the dust. Use of drop sheets may assist.
    - Do not eat, drink, or smoke when using this product. Always wash hands after handling the product.
    - Store and dispose of off-cuts, dust, and/or contaminated materials appropriately.

- Cut boards may have sharp edges (particularly mitered cuts).
- Inform any parties necessary of the above when handling and installing this material, in the vicinity where this is required, or as users of the installed product.

2.3 Storage and handling

Note the following:

- Individual boards are lighter than typical wood-plastic composites (WPC) and can be more easily handled. Boards are, however, bundled for convenience which can be heavy. Take care when lifting, placing on to, or removing from raised pallets. More than one person may be required for lifting depending on the length of the boards and the number of boards. Ensure the mass handled does not exceed safe limits as defined by applicable local legislation.
- When handling lengths of boards greater than 4 m (13 ft), ensure both ends are lifted simultaneously and evenly. Hold the boards 1 m (3ft) from each end to provide better control.
- Handle the boards carefully. Dropping the boards (and all high impact loads in general) can result in damage to the profiles.
- During transportation use corner protectors where strapping is required.
- All components should be stored completely under cover.
- When storing boards, a pallet or flat surface should be used to support the full length of each component.
- All components should be securely stored.
- No component should sit in water or similar.
- Avoid over-stacking and/or eccentric stacking.
- Keep boards strapped until they are needed for installation.
- Avoid cutting boards until they are needed for installation.

2.4 Planning and site preparation

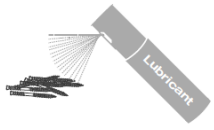
- Consult an appropriately qualified professional whenever necessary to ensure the product, this document and the intended application complies with all applicable legislation for that region.
- Assess the environment of the site and ensure the product is suitable for the intended application.
- Identify aspects such as the corrosion category, loading class, etc. of the site and project that may influence the selection of the products or the application thereof.
- Determine appropriate spans for the selected material technology and profile. This will depend on the application as well as the loading class as defined by the local legislation. Suggested spans are provided for typical residential scenarios (refer to Section 4).
- Develop a maintenance plan to ensure the longevity of the system. This should consider aspects such as drainage, corrosion, vegetation growth, cleaning, etc.
    - With respect to drainage, ensure pooling water and/or erosion below and around the deck footprint is prevented.
    - With respect to corrosion, ensure any exposed metals are coated whilst accessible. In areas of high corrosion classes, add additional coating layers and regularly check for signs of corrosion.
    - With respect to vegetation below the deck footprint, ensure all vegetation has been removed prior to installing the deck. Install a suitable geotextile or plastic membrane to prevent further regrowth. Ensure the geotextile/membrane is fixed in place and protected from weathering.
- Decking at certain heights will require railing. Refer to the local legislation, or consult a suitably qualified professional, for guidance as to at what height this is required at and the railing requirements thereof.

3. Cutting and fastening

3.1 Fastening Installation process

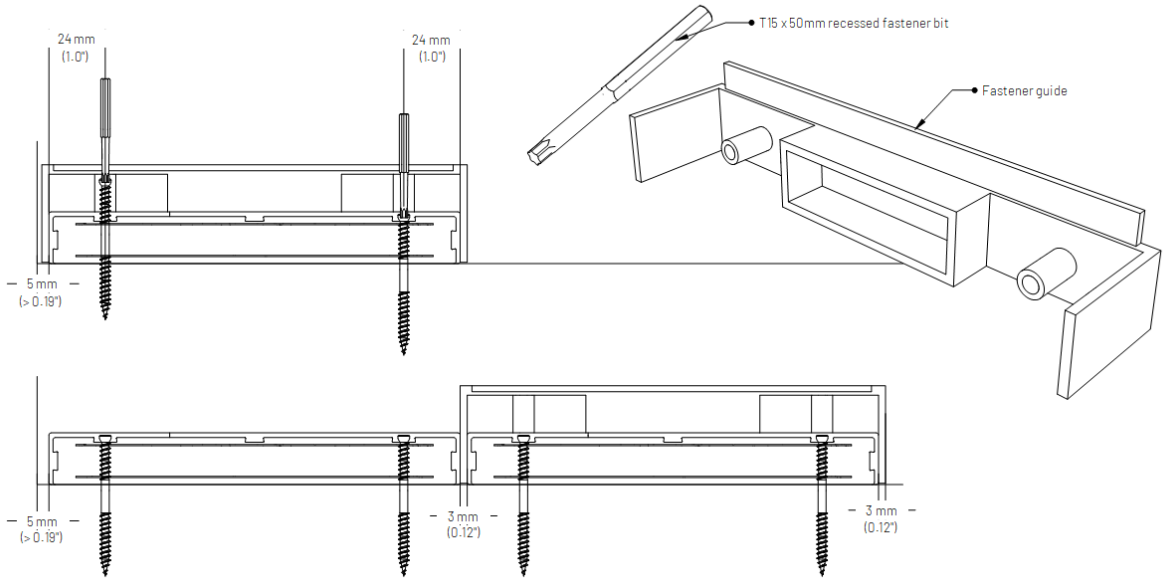
3.1.1. Before starting, it is recommended to lubricate the screws to reduce friction and heat. You can use glycerine or glycol as the lubricant. Make sure to test the lubricant on a small, inconspicuous area of the decking, or an offcut to ensure it does not stain the surface.

Tip: After lubricating, wipe off any excess lubricant from the screwing point.

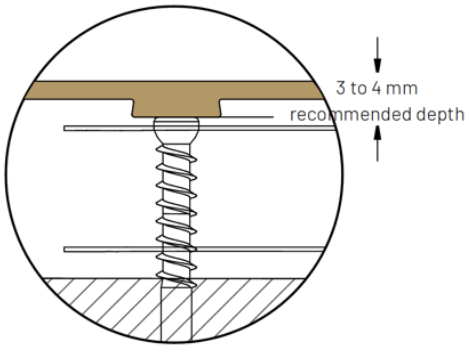


3.1.2 Attach your first board using our specialized composite deck screws. For best results, use the gap spacer and screw through the embedment groove to ensure proper alignment and assist in hiding the screw head under the cap.

3.1.3 Leave 3mm gaps between boards, and a 5mm wall gap between the board and any walls or obstacles to allow for expansion between the building and the board and ensure good drainage and ventilation.



When inserting the screws, ensure the screw heads are 3mm to 4mm below the surface. As you fasten, you will feel a noticeable change in resistance due to the different densities of the core material and the surface capping. Using our gap spacer can help maintain the correct depth.



3.1.4 Install the second board, maintaining a 3mm gap or greater between each board.

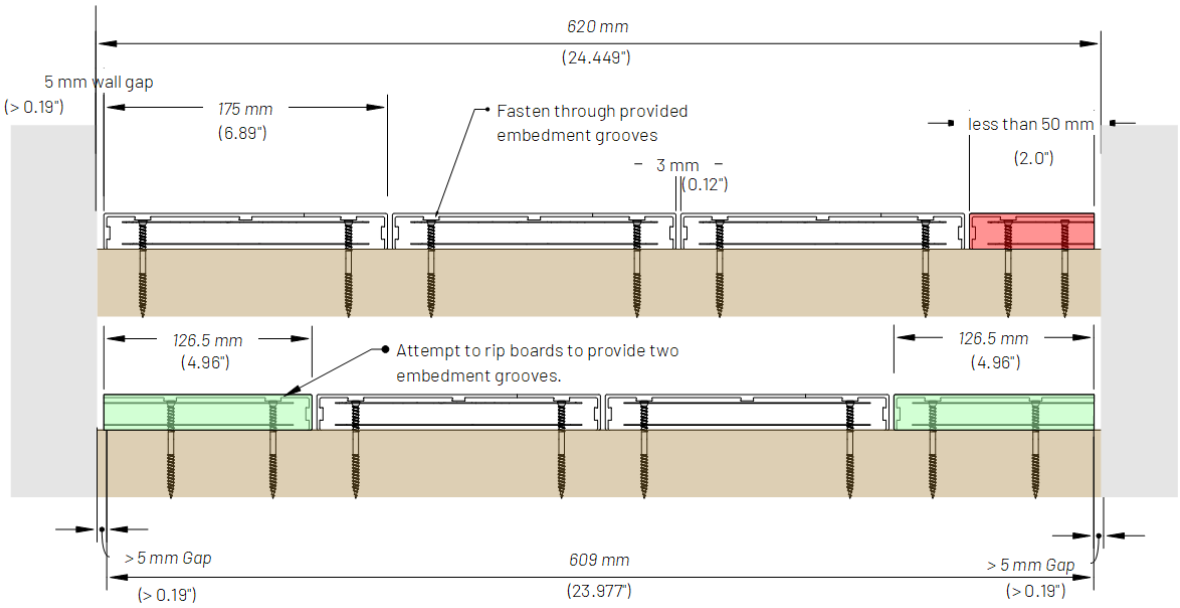
3.2 Cross cutting

- Please ensure that the appropriate PPE and safety precautions are adhered to whilst cutting composite material.
- Use a fine toothed, carbide tipped blade to cut composite material.
- Use an 80-tooth or finer, 260 mm (10") diameter, cross-cut blade.
- RegalBoard boards are provided as factory cut. Ends should be trimmed to carpentry cut.
- Boards can be mitred, angles less than 30° are to be avoided. Be sure to account for the additional length required in the joins when doing so.

3.3 Ripping

- For best results when ripping composite boards use a table saw or ripping jig.
- Cutting boards will expose the core of the board. Plan the board layout/install appropriately to limit the visibility of these edges so as not to negatively impact the aesthetics of the install.
- Do not rip deck boards thinner than 111 mm (4.4”) to ensure that there are always 2 embedment grooves or 50 mm (2.0”) if compromising the hidden aesthetic if the boards are
- In the case where it would be necessary to cut a board to less than 50 mm (2.0”) wide, rip both the first and last board of the deck footprint to balance the required widths instead. Refer to below infographic for guidance.

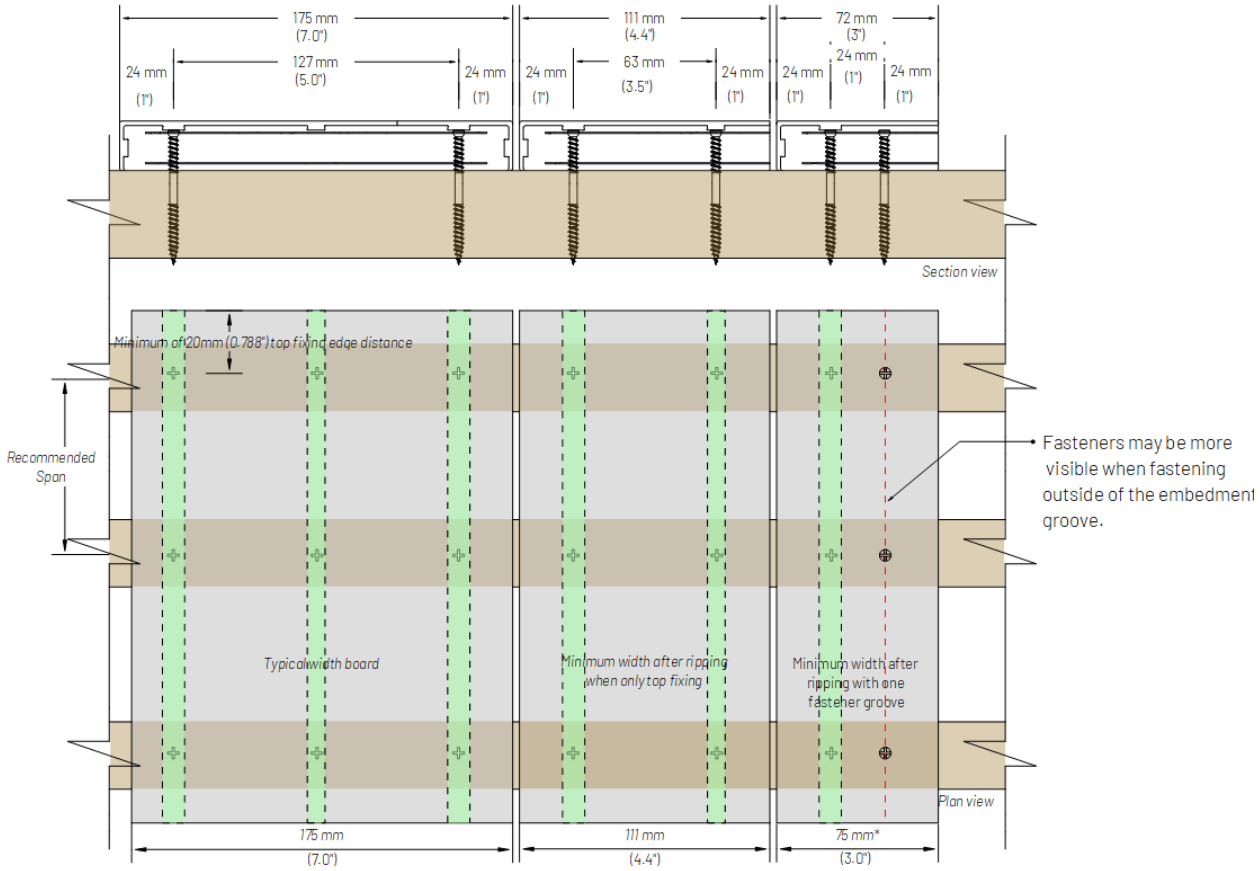
The following illustration outlines typical installation principles for ripping a deck board, which can be used for boards of any size. By following the above principles, you can ensure a successful installation.



3.3 Top Fixing

- When top fixing boards, fasten the boards through the embedment groove
- When top fixing boards, adjacent screws should be at least 24 mm (1.0”) apart.
- Fasten at every joist and use a minimum of two fasteners per joist to board connection.
- Pre-drill composite in temperatures below 5°C (41°F), pre-drilling hole sizes should be equal to the minor diameter of the screw.
- Do not use nails to fasten RegalBoard boards.
- Use high quality fasteners suitable for the life span of the deck and the atmospheric conditions of the site. Consider the corrosion category of the site relative to the corrosion protection offered by the fastener. Consult with a suitably qualified professional where necessary. Feel free to also contact a member of Eva-Last® for further assistance.
- A drill with adjustable torque settings is recommended. Set the torque settings to less than 30 % of the maximum allowable torque of the driver. Do not use an impact driver.
- **Do not over drive the screw.**

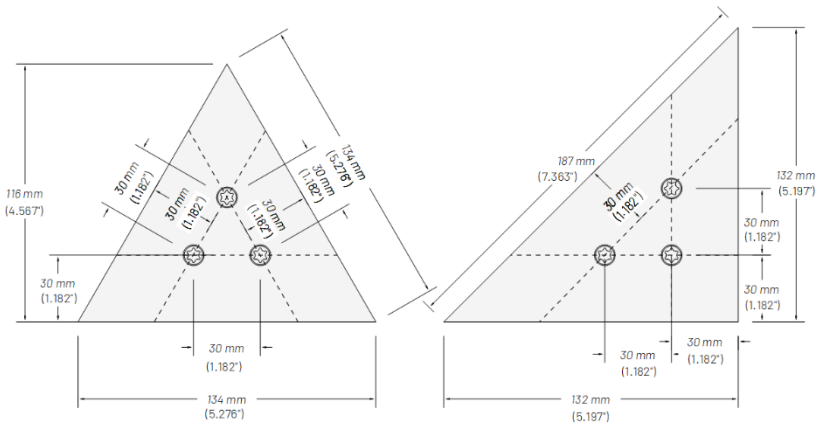
The following illustrations outline typical fastening principles for a top fixing application on the minimum ripped profile size as related to the recommended fastening edge distances, which can be implemented for profiles of any size.



3.4 Cutting and fastening triangular pieces.

- Where deck boards are cut to odd shapes, additional fasteners may be required.
- All three edges of a triangular piece should be supported. All three corners of a triangular piece should be fastened.
- Spacing between fasteners should be at least 30 mm (1.182") apart and must maintain 30 mm (1.182") from any edge.
- Geometry of triangular pieces are limited by the fastening and edge distance. Below infographics provide an indication of minimum allowable sizes of different theoretical triangular pieces.

The following illustrations outline typical fastening principles for small triangular deck pieces, which can be used for profiles of any size.



3.6 Cutting length

Before boards are laid, the final cut length of a board must take into consideration the possible changes in length of the board due to thermal expansion and contraction. Appropriate expansion gaps must always be maintained between boards and/or between boards and other obstacles for full warranty coverage.

3.5.1 Fundamentals of expansion and contraction

- The expansion, and contraction, of a board is influenced by:
  - The material of the board,
  - The length of the board, and
  - The change in temperature the board experiences relative to the temperature of the board at installation.
- The linear coefficient of expansion for the Products material technology is up to 33.4 x 10-6 mm/m/°C (0.0000185 "/"/°F). This means that a board of this material can expand, and contract rounded up to 0.04 millimetres per meter length (0.000022" inches per inch length), per degree change in temperature.
- To estimate an appropriate expansion gap (ΔL) per board, multiply the length of the board (L) by a coefficient of 0.04 (0.000022) (***α***) and by the maximum difference in temperature between the installation temperature and the possible temperature of the boards (ΔT):

  $$\Delta L = L \times \alpha \times \Delta T$$

- The temperature change of the board will be influenced by the colour of the board. Darker board colours will result in board temperatures higher than the ambient temperature of the site.
- A summary matrix of expansion gaps for different temperature and length conditions is captured in Appendix C for convenience.

3.6.1 Steps to determining expansion and contraction gaps

1. **Research the site temperature extremes.**
   a. Find the record high and low temperatures for the site. Weather forecast websites usually provide historical data for specific areas, which helps indicate the most extreme temperatures the deck will experience.
2. **Account for sunlight exposure.**
   a. Boards exposed to direct sunlight can often be 25 to 30°C (77 to 86°F) hotter than the air temperature.
   b. Add a buffer. A good rule of thumb is to use the difference between the installation temperature and the maximum site temperature as:
   Temperature buffer = (Maximum site temperature – Ambient temperature)
   c. Adjust the buffer for excessive exposure to account for reflective surfaces or extreme UV conditions.
3. **Determine Change in temperature.**
   a. Expansion gap temperature = Maximum site temperature – Ambient temperature + Buffer
   b. Contraction gap temperature = Ambient temperature – Minimum site temperature
4. **Calculate the Expansion and contraction.**
   a. Use a linear coefficient of expansion to estimate board movement. For RegalBoard, this coefficient is +– 0.034 mm/m/°C. The formula to calculate the
   Required gap size = Length of the board in meters (inches) x 0.045 mm/m/°C or (0.0252 in/in/°F) x change in temperature

Alternatively use this table to find the expected gap size based on temperature change. Multiply the gap size per meter by the length of your board in meters to get the required gap size. Remember to add the buffer.

Gap size per meter of board per temperature change (gap size (mm) /m/°C) *												
Temperature change (°C)	5	10	15	20	25	30	35	40	45	50	55	60
Gap size per meter (mm)	0.2	0.4	0.5	0.7	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0
Temperature change (°F)	41	50	59	68	77	86	95	104	113	122	131	140
Gap size per foot (in)*	0.002	0.004	0.006	0.008	0.01	0.012	0.014	0.016	0.018	0.020	0022	0024

*When using the table to determine imperial units add 32° to F to adjust the temperature scale.

3.5.4 Example for Bloemfontein South Africa

- **Board Length:** 5 meters or 16.4 feet
- **Ambient installation temperature at time of installation:** 22°C (71.6°F)
- **Maximum temperature:** 58°C (40°C Record high + (40-22)) °C buffer) or 136°F (118.4°F + (118.4-71.6)) °F buffer)
- **Minimum temperature:** 14 °F (As it is unlikely the deck will be used below freezing temperatures and the aesthetic impact of the gaps will be minimal the lower temperature can be adjusted to 0°C. (32°F))

Temperature change example

- Max temperature change: 58°C - 22°C = 36°C
- Min temperature change: 22°C - (0°C) = 22°C

Calculation example using the expansion formula

- Total required gap size: 5m x 0.034 x 36°C = 6.12mm
- Potential gap increase: 5m x 0.034 x 22°C = 3.74mm
- Max potential gap possible: 6.12 + 3.74 = 9.86mm

Temperature change example for direct conversion (IMPERIAL)

- Max temperature change: 136°F - 71.6°F = 64.4°C

Calculation example using the expansion formula (IMPERIAL)

- Total required gap size: 196.85" x 0.0000185 x 64.4°F = 0.24"
- Potential gap increase: 196.85" x 0.0000185 x 39.6°F = 0.14"

Calculation example from table

Max temperature change: 36°C - 40°C (round up)

- Gap size per meter: 1.4mm (from table)
- Total Gap size: 1.4mm/m x 5m = 7mm

Min temperature change: 22°C - (0°C) = 22°C - 25°C

- length change per meter: 0.9mm (from table)
- Min temperature change: 0.9mm/m x 5m = 4.5mm

Max potential gap possible: 7 + 4.5 = 11.5mm

Calculation example from table (IMPERIAL)

Max temperature change: 96.8°F - 104°F (round up)

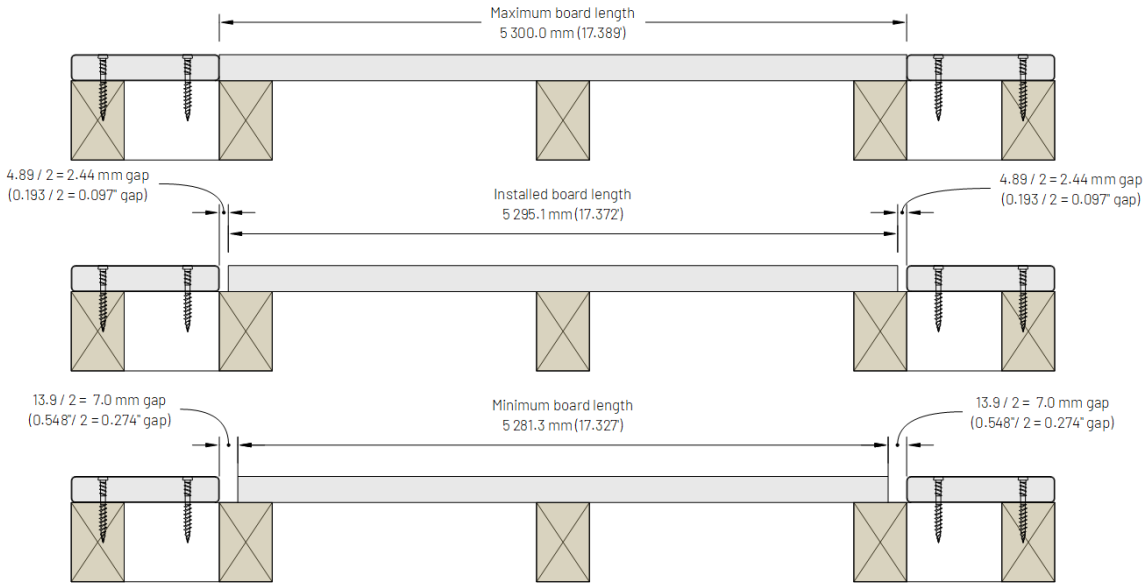
- Max temperature change: 0.016" (from table)
- Min temperature change: 0.016" x 16.4ft = 0.26 inch

Min temperature change: 71.6°F - 77°F (round up)

- length change per meter: 0.01" (from table)
- Min temperature change: 0.01 in/ft x 16.4 ft = 0163"

Max potential gap possible: 0.263 + 0.164 = 0.424"

*When using the table to determine imperial units add 32° to F to adjust the temperature scale.



3.5.5 Implementing expansion gaps on site.

- Allow boards to acclimatise on site before installation to ensure uniform expansion.
- If the calculated maximum potential gap is gap sizes are larger than desired, the boards can be cut to shorter lengths to reduce the expansion gap. You may need to adjust the structural layout, accordingly, as detailed in **section 4.0**.
- Use boarders and breaker boards to create line breaks between boards, allowing them to be cut to the same length. This approach ensures that the expansion of acclimatized boards is more uniform and manageable than in a staggered pattern of different lengths.
    - If the boards are laid in an accessible straight line, the board edges can be cut after laying, though this is considered an advanced technique, and care must be taken not to damage the structure.
- When cutting the boards to length, remember to account for the final length needed to allow for expansion gaps based on the temperature at time of installation.
- When laying the boards, leave the expansion gap between the boards as calculated. You may need to adjust the gap size if the temperatures vary over the course of the installation.
    - Shims and spacers matching the required gap size can be used to automatically create the gaps.
    - Remember to leave a gap between the building and the deck

4. Planning and installation

4.1 Substructure planning and installation

Below are guidelines to consider during the planning and installation of deck substructure:

- Ensure the substructure members are appropriately sized for the requisite spans. Ensure the installation thereof is sound and level. Ensure suitable connections are utilised between members and between the substructure and the applicable substrate. Consult an appropriately qualified professional wherever necessary.
- The US typically requires the satisfaction of a 100 psf (4.79 kPa) load with a factor of safety of 2.5 for ultimate conditions and a serviceability limit of the span/180. The failure load of a deck board is adjusted by a factor to account for the degradation of material performance due to long-term weathering, etc.
- Most other regions that Eva-Last typically distribute to have adopted some form of the Eurocodes. This designates different classifications of imposed load dependent on the intended application. There are relatively minor differences between the loads for these designations per region. As a result, to simplify the information presented herein, these loads have been broadly grouped into two typical classes and a common load of each class adopted for the assessment of the Eva-Last decking products:
- Residential application: imposed load of 2 kPa, and
- Commercial application: imposed load of 4 kPa.

Profile details				Maximum span (Metric – mm)						
				US approach		Eurocode (and similar) approach				
						Residential (2 kPa)		Commercial (4 kPa)		EN 15334
Profile code	Profile shape	Moment of inertia, Ix (mm⁴)	Elastic sectional modulus, Sx (mm³)	Ultimate	Serviceability	Ultimate	Serviceability	Ultimate	Serviceability	
STZQ-JAZ03 175 x 22 (7 x 0.87″)	Square edge profile	153 939 (0.37)	14 032 (0.86)	450		450		450		300

Note:

- The full end-use adjustment factor was used.
- The duration of load and creep was not included in the analyses.
- The calculation for spans is based on the lesser of a factor of safety of 2.5 for the average test results and 2.1 for the minimum test results.
- Serviceability span assessment is based on a deflection limit of L/180 and often dictates.
- A conservative gap of 5 mm between boards was assumed.

4.4 Span adjustments for Diagonal laying patterns

Where boards are not installed perpendicularly to joists, the joist spacing must be modified to ensure that the board spans do not exceed that specified for the applicable profile. This can be calculated as follows

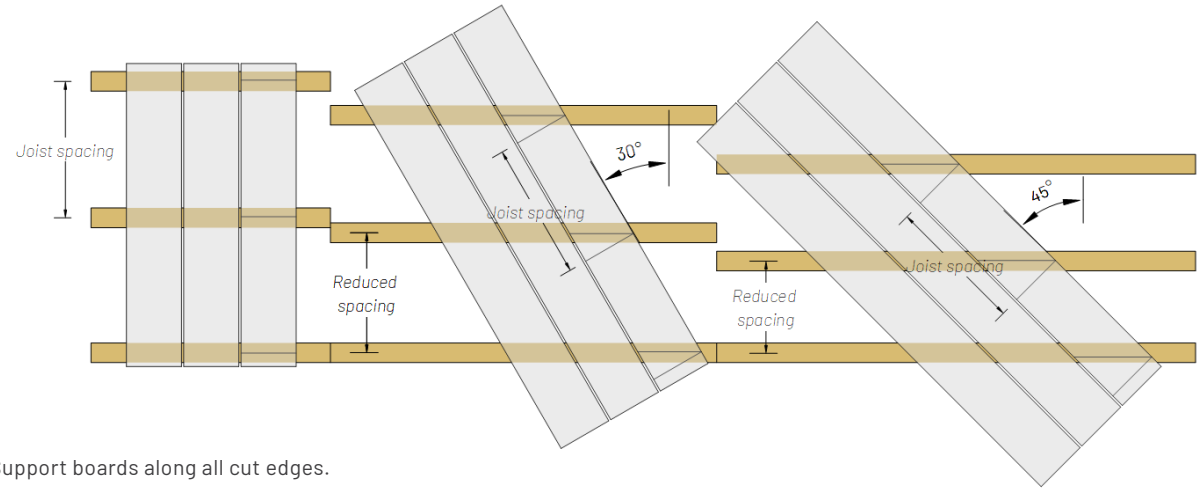
- Adjusted Span = Original Span ×cos(ø)
- Where:
    - Adjusted Span refers to the new (reduced) perpendicular distance between the joists.
    - Original Span refers to the intended/unadjusted span of the actual deck board. This span is in principle maintained by adjusting the span.
    - øis the intended angle (in degrees) of the board direction relative to the joist layout. As the figure below indicates, it is specifically the angle from the previous (perpendicular) board position to the new intended board position.

      Example: Adjusted Span = 457 mm x cos 45° or 18″ x cos 45°
      = 318.2 mm or 12.7″

The below table provides a quick summary of typical spans at common angles:

Typical spans millimetres (inches)	Reduced span at different board angles	
	30 °	45°
600 mm (24")	519.6 mm (20.5")	424 mm (16.7)
550 mm (22 ")	485 mm (21.8 ")	395 mm (15.56 ")
500 mm (20")	439 mm (17.3 ")	359 mm (14.1 ")
450 mm (18 ")	396 mm (15.4 ")	323 mm (12.7 ")
400 mm (16 ")	351 mm (13.8 ")	287.4 mm (11.3 ")
300 mm (12 ")	264 mm (10.3 ")	215 mm (8.5 ")

The following illustration outlines the basic principles of adjusted spans in relation to the original joist span and example board angles.



- Support boards along all cut edges.
- Use double joists at all butts joins so that both board edges are fully supported.
- Use noggins between joists where breaker boards are used. The spans between noggins must not be greater than the maximum centre-to-centre span of RegalBoard.
- Do not overhang boards by more than 20 mm (0.788") from a support edge, or 10 mm over a fascia profile
- Allow for clearance between the ground and deck, and between the deck and other potential obstructions, such as doors opening out over the deck.
- Allow for drainage and water control. Consult a suitably qualified professional if required.
- Allow for railing where necessary. Consult a suitably qualified professional if required.

4.2 Deck clearances and ventilation

- Provide a minimum of 38 mm (1.5") clearance between the underside of the deck boards and the substrate. Ensure the substrate, substructure and any adjacent materials are suitable for these conditions.
- Ensure at least 50% ventilation/airflow, especially in confined or low-clearance areas. Ensure the substrate, substructure and any adjacent materials are suitable for these conditions.
- Ensure the installation allows for adequate drainage.
- Consult local building codes for any specific deck clearance or ventilation requirements related to the application.
- Ensure that the installation allows for maintenance, pest control, etc.

4.3 Decking planning and installation

Below are guidelines to consider during the planning and installation of decking:

- The layout of a deck is often dictated by existing geometrical constraints on site. Best practice involves optimisation between the standard dimensions and constraints of the deck boards supplied with the desired aesthetics of the layout.
- Attempt to keep layouts symmetrical. As a result, where it is necessary to rip boards, rip both the first and last board of the deck footprint equally to balance the required widths. Where possible, avoid ripping boards at all.
- Use breaker boards and boarder boards to provide an aesthetically pleasing finish whilst assisting in controlling expansion and contraction.
- Use multiple combinations of shorter boards with breaker boards to balance long runs against expansion and contraction limitations.
- Butt joints can be installed so they align or are staggered. Both options have advantages and limitations with respect to aesthetics and installation practicality.
- Consider the orientation of the boards relative to typical foot traffic direction as well as the site layout. Typical approaches are to install deck boards parallel with the longest dimension of the site layout. In areas where better slip resistance is required, most composite textures have better slip resistance with the boards orientated perpendicular to common foot traffic direction. In general, RegalBoard deck boards have good slip resistance characteristics in all board orientations (please refer to the RegalBoard TDS for further information). Additionally, consider the length of the available space in relation to the lengths and widths of the boards available. In some cases, certain orientations can be very efficient from a material perspective. Finally, consider existing obstructions and their straightness, it is easier to cut board ends than it is to rip along board lengths to match uneven surfaces such as poorly built walls, flower beds, etc.

4.4 Decking planning process

Below is a brief set of steps to assist with optimising a layout so that the site and environmental influences, client requirements, and material impacts are taken into consideration.

1. **Layout and environment:** Determine site layout/footprint and establish any critical environmental parameters that may influence the installation or performance of the installation. Aspects to consider include extreme temperature ranges, high corrosion classes, large catchment areas, steep slopes, etc.

2. **Optimisation:** Optimise deck layout relative to the site layout and the deck board dimensions. Incorporate allowances for the established critical environmental aspects in Step 1. Cater for additional factors that may influence the layout such as expansion and contraction, preferred aesthetics, foot traffic, existing obstructions, clearances, railing, etc. This step may take several iterations. Establish the primary board orientation first, then incorporate supporting elements, such as breaker boards, perimeter boards, etc., where necessary. Once finalised, the quantity of deck boards can be determined.

3. **Substructure, fasteners and ancillaries:** With a layout finalised, the substructure can be outlined based on the required supports and spans. Aspects such as supports for railing, pergolas, etc. must be allowed for at this stage. Once established, the deck board and substructure layout will allow the type and number of fasteners required to be calculated. Ancillary items, such as railing, pergola, etc. parts, can then be quantified.

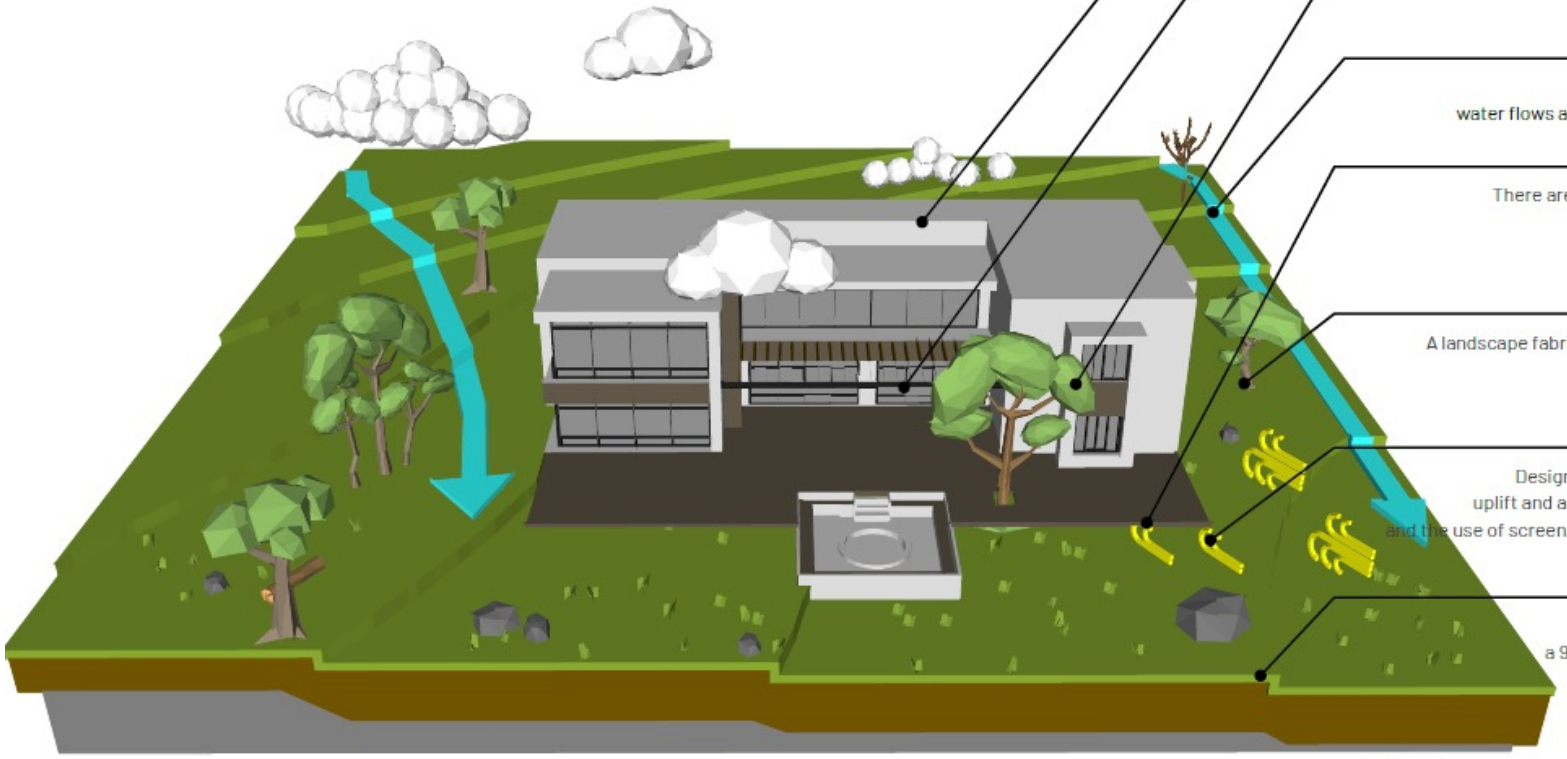
Below is an example that lays out the implementation of the steps suggested above. The same example deck discussed in **Section 3** is incorporated.

LOCATION AND MACRO ENVIRONMENTS

Bloemfontien is located on the southern edge of the South African highveld with record temperatures ranging between **40 °C and -10 °C (104 °F and 14°F)**, while falling under a typical **C3 Class (moderate) atmospheric corrosion category** with low salinity and only moderate pollution.

SITE ASSESSMENT OF THE MICRO ENVIRONMENT

A site assessment provided more specific details surrounding the building site and its environment.



PROPERTY TYPE
Residential.

EXCESSIVE AND UNUSUAL HEAT SOURCES
Excessive heat from reflective surfaces or similar can cause product distortion or surface damage. Use shading elements like screens or vegetation, or consult glass manufacturers for mitigation strategies.

EXISTING FEATURES
An existing recessed Fire pit 450 mm (18") drop .

HYDROLOGICAL
The deck requires no further intervention as water flows away from the deck to natural water catchment areas

UTILITIES
There are no utilities running across the footprint of the deck.

VEGETATION
A landscape fabric or plastic sheet should be applied beneath the deck to prevent vegetative growth beneath the deck.

WIND AND ACCOUSTIC CONSIDERATIONS
Design for environmental factors like wind, which can affect uplift and acoustic behavior. Proper fastening, board orientation, and the use of screens or vegetation can help reduce wind-induced effects.

TOPOGRAPHICAL
The ground has 2° slope resulting in a 900 mm (36") drop from the final required floor height.

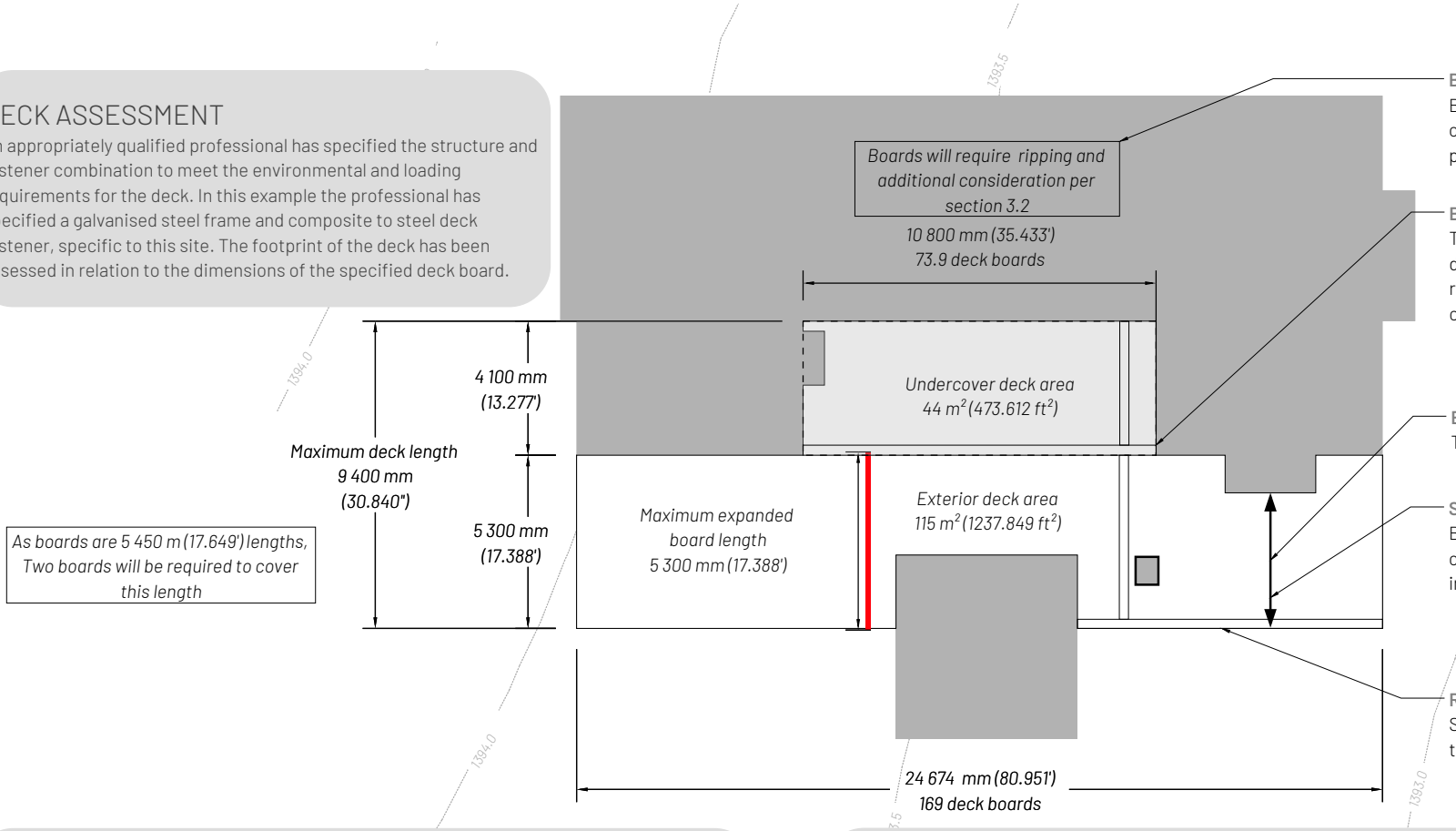
CUSTOMER PREFERENCES

The client has specified profile **in the Brass brown** colour, with the boards running perpendicularly away from the building.

Board
Square edge profile
Colour
Brass brown

DECK ASSESSMENT

An appropriately qualified professional has specified the structure and fastener combination to meet the environmental and loading requirements for the deck. In this example the professional has specified a galvanised steel frame and composite to steel deck fastener, specific to this site. The footprint of the deck has been assessed in relation to the dimensions of the specified deck board.



BOARD WIDTHS AND GAPS

Before laying boards, consider the cover width of a deck board (board width plus fastener gap), particularly in enclosed areas .

BREAKER BOARD AND BOARD LENGTH

The deck is 9 400 mm (30.840') long while deck boards are a maximum of 5 450 mm (17.649'), requiring a join at some point. A breaker board can be used to control expansion gaps.

BOARD DIRECTION

The laying direction has been specified.

SLIP RESISTANCE

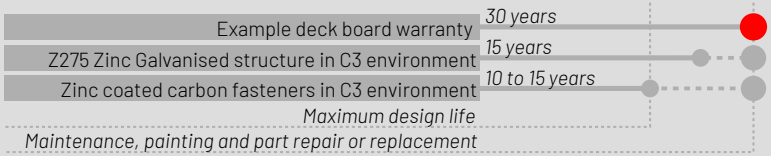
Board laying direction and finish have an impact on slip resistance. See the TDS for Slip resistance information.

RIM BOARDS

Starter boards and breaker boards can be used to finish and hide the deck edge.

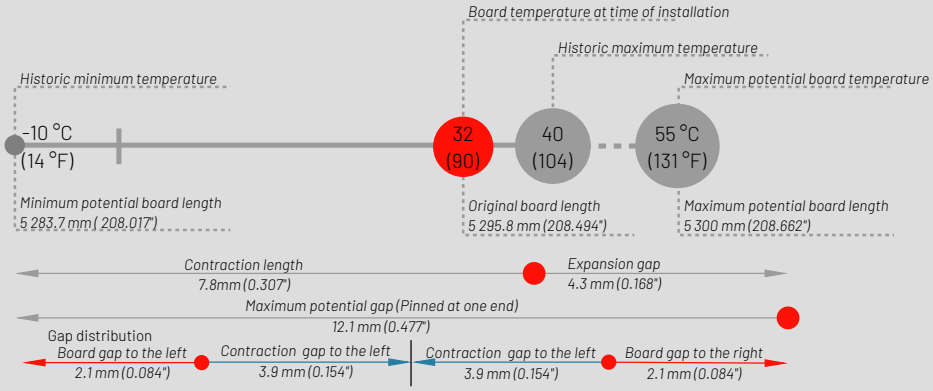
LIFESPAN DESIGN

The design life of a deck system requires balancing the lifespans of the individual components, to the part with the lowest life span. The system life expectancy can be extended with proactive maintenance, painting, and replacing parts once the part expires.



EXPANSION GAP CALCULATION

The final cut length of a board must take into consideration the possible changes in length of the board due to thermal expansion and contraction. The below infographic provides a summary of the example provided in section 3.5.2. as applied to the above deck example.

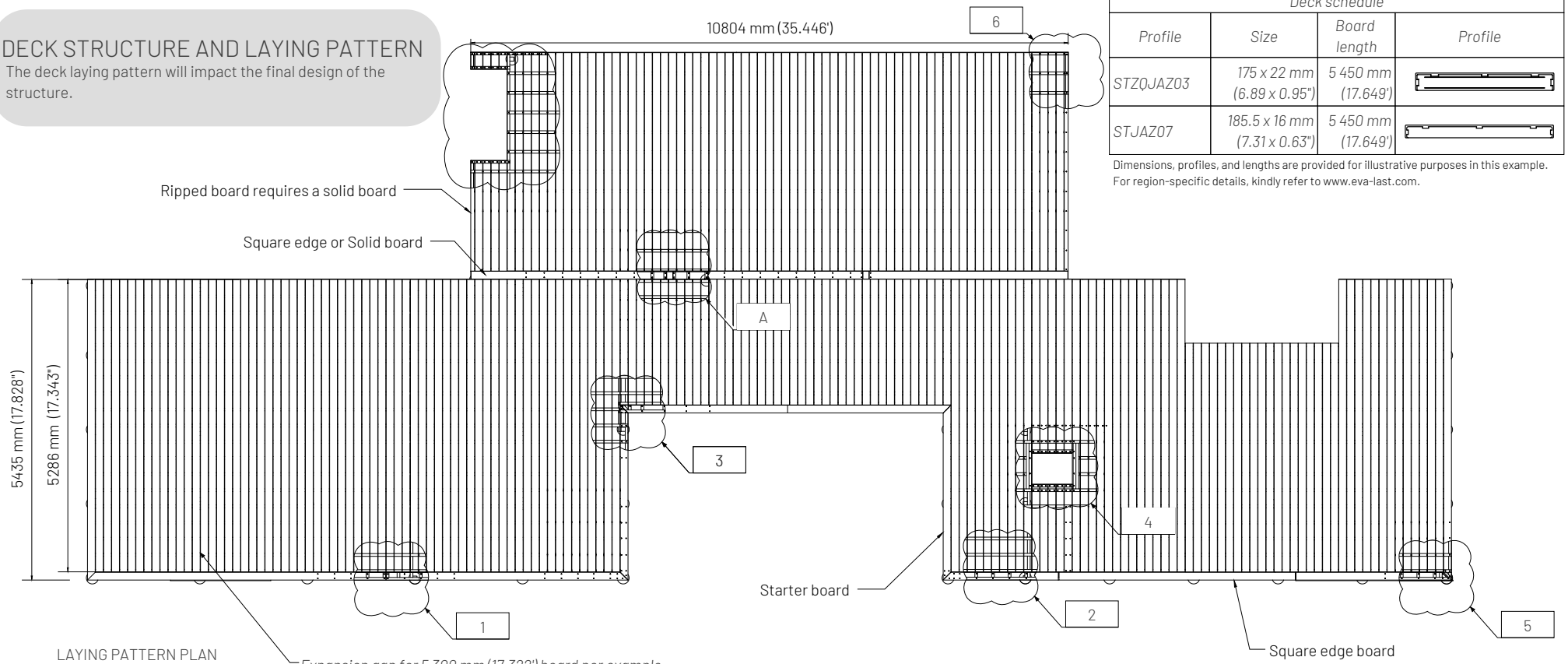


DECK STRUCTURE AND LAYING PATTERN

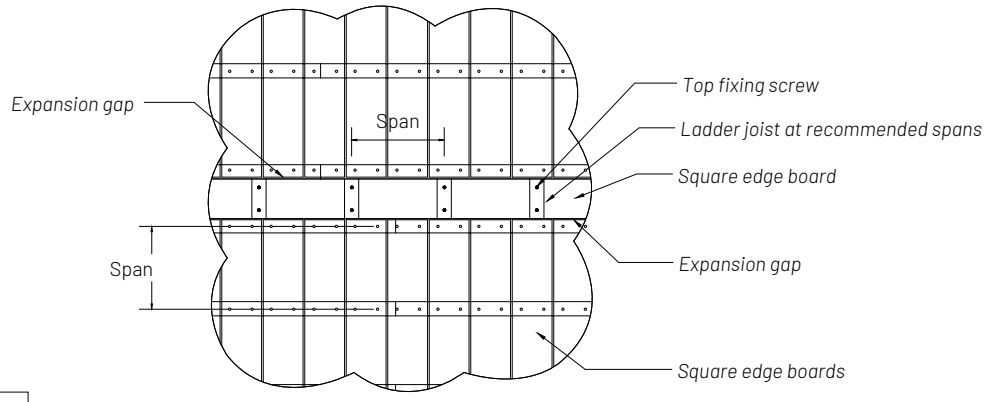
The deck laying pattern will impact the final design of the structure.

Deck schedule			
Profile	*Size*	*Board length*	*Profile*
STZ0JAZ03	*175 x 22 mm (6.89 x 0.95")*	*5 450 mm (17.649')*	
STJAZ07	*185.5 x 16 mm (7.31 x 0.63")*	*5 450 mm (17.649')*	

Dimensions, profiles, and lengths are provided for illustrative purposes in this example.
For region-specific details, kindly refer to www.eva-last.com.



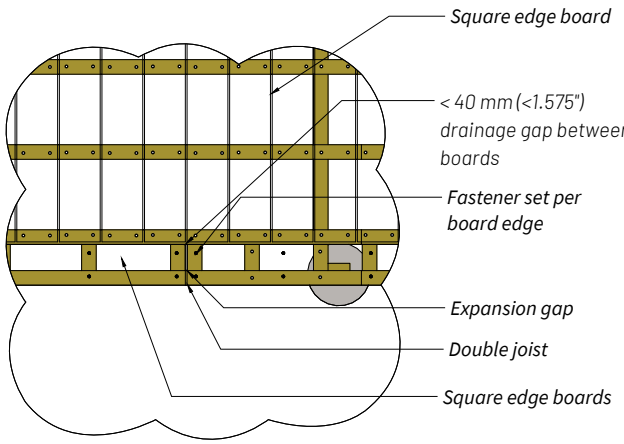
LAYING PATTERN PLAN



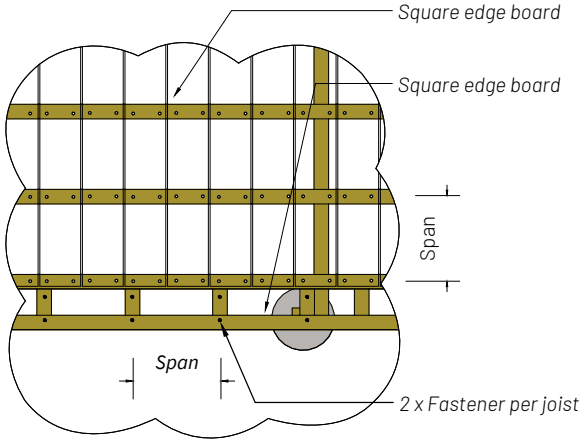
A Breaker board detail

Example -
Determine ripped board sizes before installation -
10 804 mm / (140 board width + 6 mm gap) = 74.0 boards
74 boards x 146 mm= 10 804 mm
10 804 - 10 804 = 0 mm
Aesthetic requirement require that boards align.
Therefore split the boards 73 mm ripped grooved board either side .

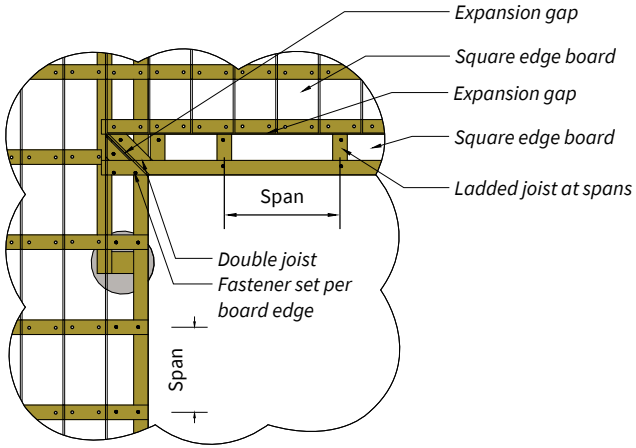
Example -
Determine ripped board sizes before installation -
35.446' / (5.512" board width + 0.237" gap) = 74.0 boards
74 boards x 5.748' = 35.446'
35.446 - 35.446= 0"
Aesthetic requirement require that boards align.
Therefore split the boards 2.874" ripped grooved board either side .



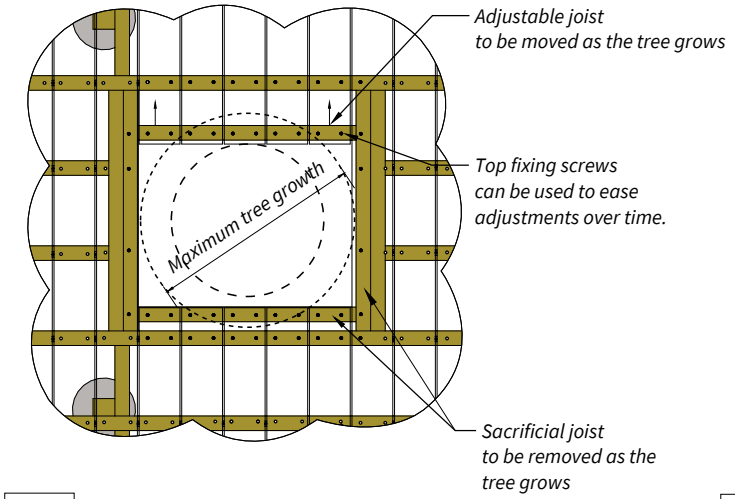
1 **Double joist on abutting boards**



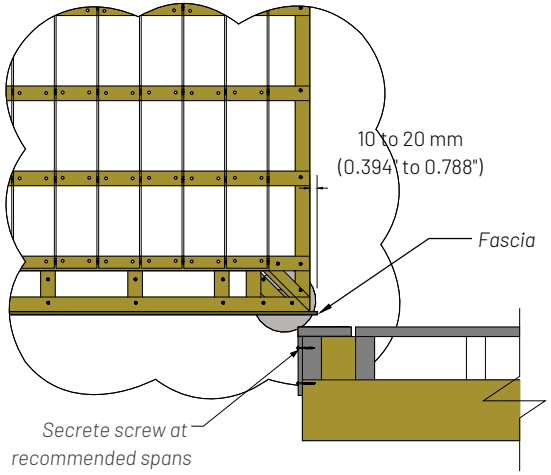
2 **Ladder joist for breaker boards**



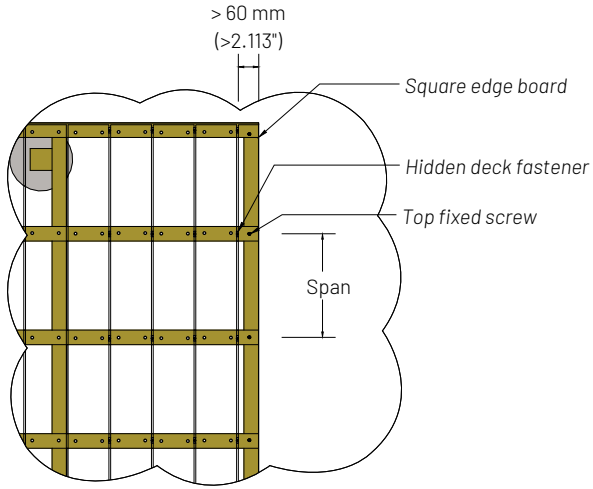
3 **Mitre join detail on breaker boards**



4 **Board support around a tree**



5 **Trim detail**



6 **Ripped board detail**

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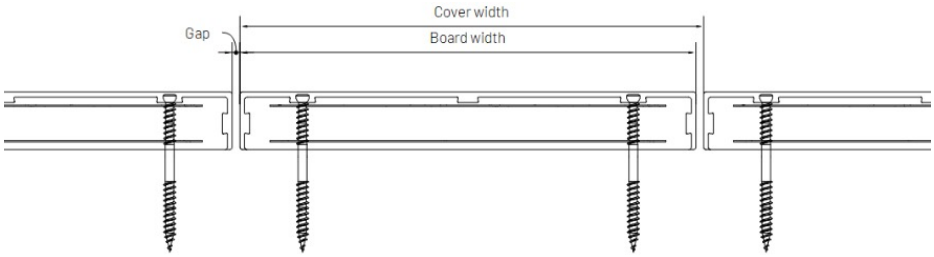
Appendix A

RegalBoard Profile Family

A.1 RegalBoard profile family

The following table is a summary of the currently available profiles, please see **Appendix A** for profile drawings.



Profile ID	Application type	Board width (mm) (inch)	Thickness (mm) (inch)	Mass per meter (kg/m) (lb/ft)	Cover width (1) (mm) (inch)	Coverage (2) (m/m^2) (ft/ft^2)	Coverage mass (3) (kg/m^2) (lb/ft^2)
STZQJAZ03D25	Square edge profile	175 (6.89)	24 (0.95)	3.8 (2.5)	179 (7.0)	5.6 (1.69)	21.1 (4.3)
STZQJAZ03	Square edge profile	175 (6.89)	22 (0.87)	3.5 (2.3)	179 (7.0)	5.6 (1.72)	19.3 (3.9)
STJAZ07	Fascia board	185.5 (7.31)	16 (0.63)	3.5 (2.3)	180 (7.1)	5.3 (1.63)	14.2 (2.9)
STJAZ08	Bull nose edge profile	48 (1.89)	22 (0.87)	0.9 (0.6)	N/A	N/A	N/A
STZQJAZ11	Square edge bull nose profile	150 (5.91)	22 (0.87)	2.9 (2.0)	154 (6.1)	6.5 (2.00)	19.1 (3.9)
STZQJAZ09	Cladding profile	179 (7.05)	15.5 (0.62)	1.9 (1.3)	183 (7.2)	5.5 (1.68)	10.4 (2.13)

(1) Coverage width = Board width + an assumed typical gap of 6 mm.

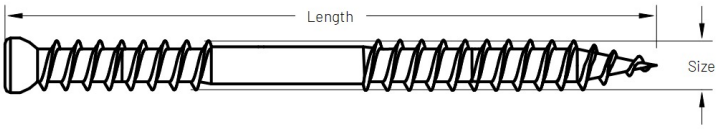
(2) Coverage = 1000/Coverage width

(3) Coverage = Coverage x mass per meter.

(4) Mass = Density at 0.90 x Sectional area

Screws

The following table is a summary of the currently available profiles, please see **Appendix A** for profile drawings.



Profile ID	Size	Length (mm)	Material	Accessories	
STFM3040	M3.0	40	SS305	Torx 15 Bit And Fastener/gap guide	For thinner cladding profiles.
STM4340	M4.3	40	SS 304		SS304 designed for boards of 20 to 27mm thickness into timber structure greater than 25mm thick.
STM4360	M4.3	60			SS304 designed for boards of 20 to 27mm thickness into timber structure greater than 40mm thick.

Appendix B

Assemblies

Profile properties

Compatible profiles

STZQJAZ03D25 - Square edge profile 176 x 24
STZAJAZ03 - Square edge profile 175 x 22

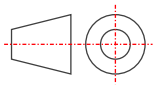
Drawing title

Typical assembly detail

File name

2024-06-20 - IG Infographic

File details



Drawing number	01
Date	June 25, 2024
Page	1 of 2
Scale	NTS

Unless otherwise specified all dimensions are in millimeters.

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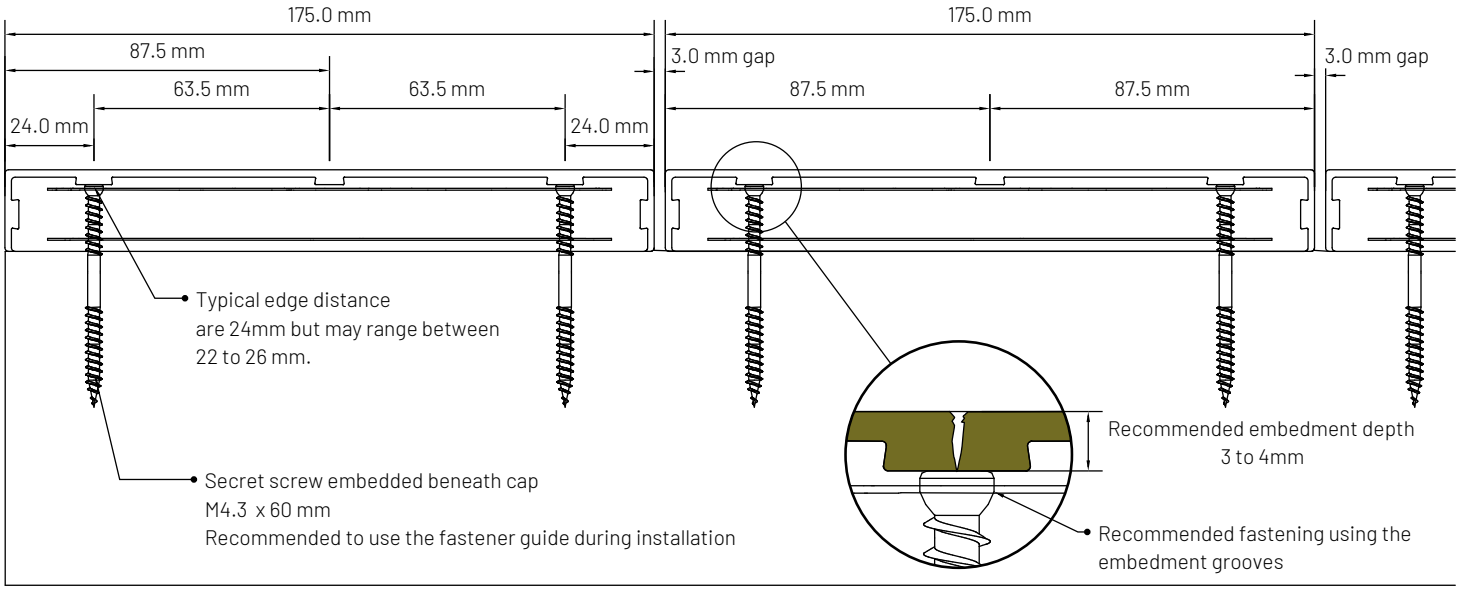
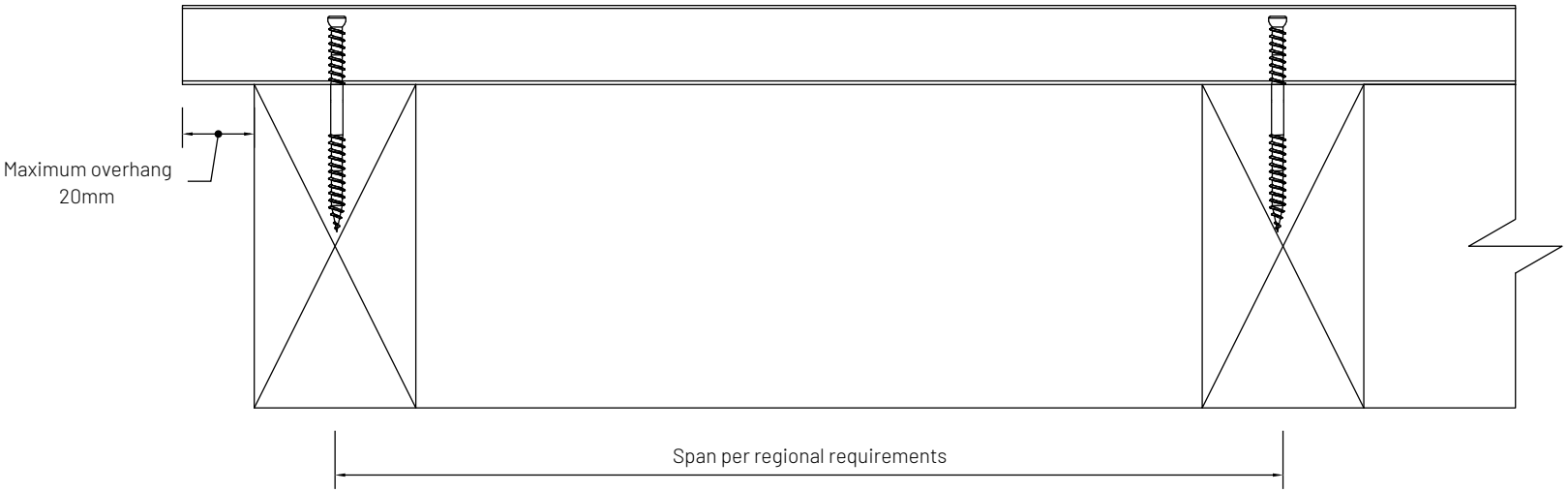
REGALBOARD



A P1 Typical installation with secret screws - Front view

Scale: 1:2



B P1 Typical installation with secret screws - Side view

Scale: 1:2

Profile properties

Compatible profiles

Breaker and edge boards
STZQJAZ03D25 - Square edge profile 176 x 24
STZAJAZ03 - Square edge profile 175 x 22
STJQJAZ11 - Bull nose square edge profile - 150 x 22*
*Not compatible with hand tool

Fascia applications -
STJAZ07 - Fascia board 185.5 x 16*
*Not compatible with hand tool

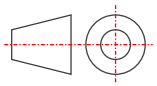
Drawing title

Edge finish assemblies

File name

2024-06-20 - IG Infographic

File details



Drawing number	01
Date	June 25, 2024
Page	2 of 2
Scale	NTS

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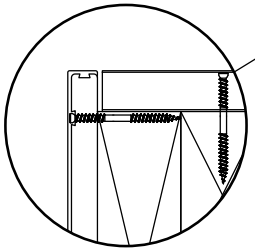
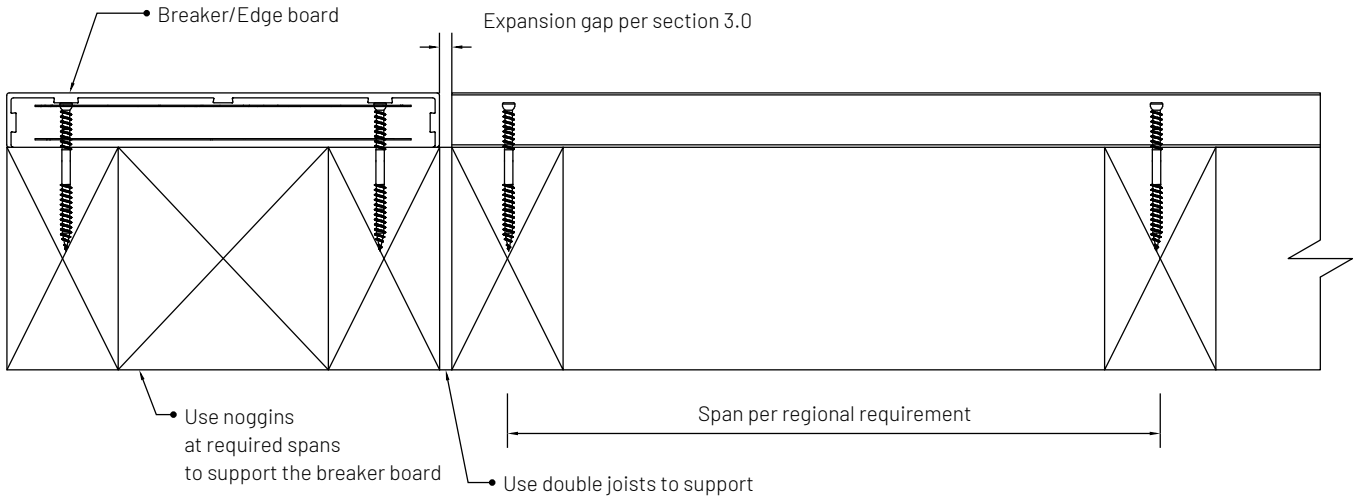
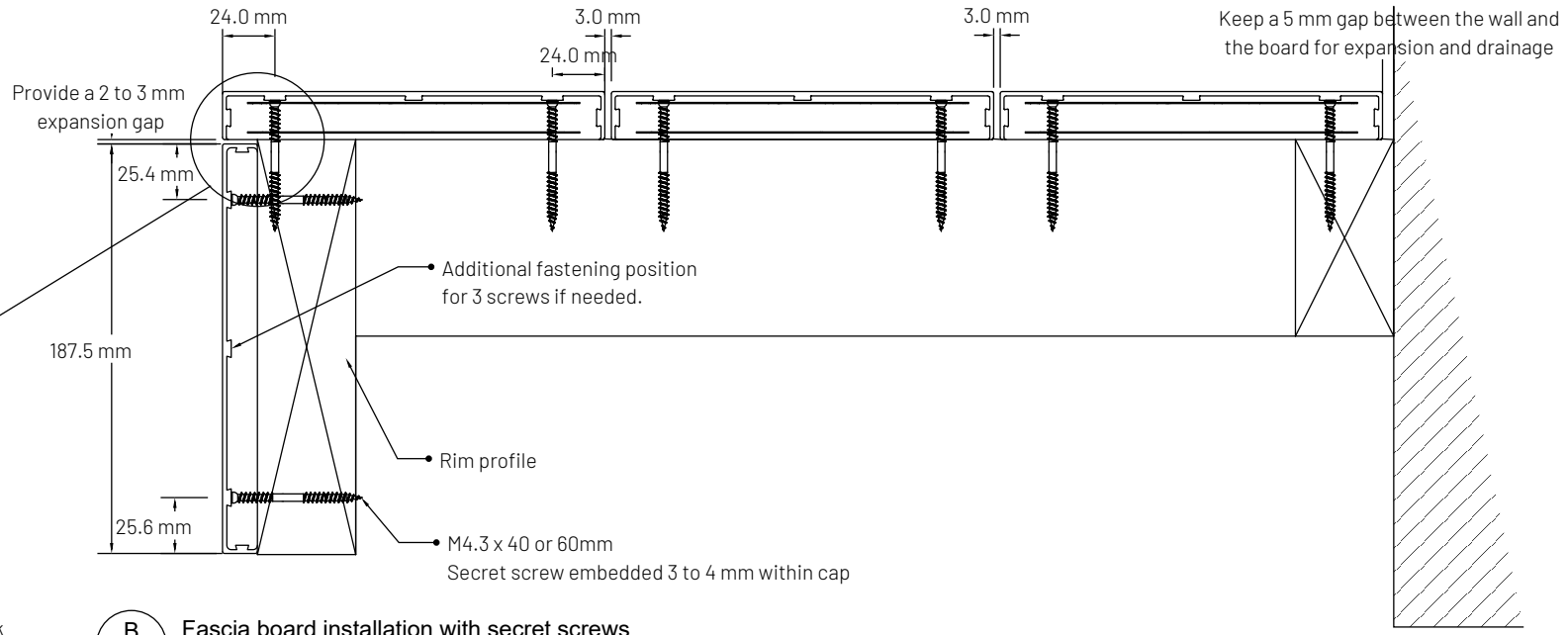
REGALBOARD



Installing a fascia in front of the board edges is not recommended. Use breaker boards to frame around the deck where possible.



A P2 **Breaker board installation with secret screws**
Scale: 1:3



B P2 **Fascia board installation with secret screws**
Scale: 1:3

Appendix C

Summary of Expansion gaps

Expansion coefficients

In **Section 3**, material length changes in direct proportion to temperature changes. The table below, provided for information and convenience, displays common materials' expansion coefficients.

Material	Expansion coefficient (mm/mm/°C)	Expansion coefficient (inch/inch/°F)
RegalBoard (HDPE)	40.1×10^{-6}	22.3×10^{-6}
Altitude (HDPE)	40.1×10^{-6}	22.3×10^{-6}
Eva-tech (HDPE)	45.3×10^{-6}	25.2×10^{-6}
Apex (PVC)	70.0×10^{-6}	38.9×10^{-6}
Apex Plus (PVC + GFR)	33.4×10^{-6}	18.5×10^{-6}
Pioneer (PVC + GFR + PMMA Cap)	33.4×10^{-6}	18.5×10^{-6}
RegalBoard (PVC + GFR + PU Cap)	38.7×10^{-6}	21.5×10^{-6}
Lifespan (Aluminium)	24.0×10^{-6}	13.3×10^{-6}
Galvanised steel	12.5×10^{-6}	6.9×10^{-6}

RegalBoard

Summary matrix of estimated expansion gaps (to the nearest 0.5 mm) for RegalBoard material technology at different board lengths and different increases in board temperature relative to the installation temperature.

Coefficient	Required expansion gap (mm) estimate per increase in temperature relative to the installation temperature (°C)												
0.000041	**1**	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**
Board length (m)	**°C**	**°C**	**°C**	**°C**	**°C**	**°C**	**°C**	**°C**	**°C**	**°C**	**°C**	**°C**	**°C**
1.0 m	0.00	0.25	0.50	0.50	0.75	1.00	1.25	1.50	1.75	1.75	2.00	2.25	2.50
2.0 m	0.00	0.50	0.75	1.25	1.75	2.00	2.50	2.75	3.25	3.75	4.00	4.50	5.00
3.0 m	0.00	0.50	1.25	1.75	2.50	3.00	3.75	4.25	5.00	5.50	6.25	6.75	7.50
4.0 m	0.25	0.75	1.75	2.50	3.25	4.00	5.00	5.75	6.50	7.50	8.25	9.00	9.75
5.0 m	0.25	1.00	2.00	3.00	4.00	5.25	6.25	7.25	8.25	9.25	10.25	11.25	12.25

Below is a summary matrix of estimated expansion gaps per material technology, converted to inches using a conversion factor of 0.556 from mm/mm/°C. These values are rounded to three decimal places and are calculated for various board lengths and different temperature increases relative to the installation temperature

Coefficient	Required expansion gap (inches) estimate per increase in temperature relative to the installation temperature (°F)												
0.000022	**34**	**41**	**50**	**59**	**68**	**77**	**86**	**95**	**104**	**113**	**122**	**131**	**140**
Board length (ft)	**°F**	**°F**	**°F**	**°F**	**°F**	**°F**	**°F**	**°F**	**°F**	**°F**	**°F**	**°F**	**°F**
1.0 ft	0.000	0.000	0.000	0.010	0.010	0.010	0.010	0.020	0.020	0.020	0.020	0.030	0.030
3.0 ft	0.000	0.010	0.010	0.020	0.030	0.040	0.040	0.050	0.060	0.069	0.069	0.079	0.089
6.0 ft	0.000	0.010	0.030	0.040	0.060	0.069	0.089	0.099	0.119	0.128	0.148	0.158	0.178
9.0 ft	0.000	0.020	0.040	0.069	0.089	0.109	0.128	0.158	0.178	0.197	0.217	0.247	0.266
12.0 ft	0.010	0.030	0.060	0.089	0.119	0.148	0.178	0.207	0.237	0.266	0.296	0.325	0.355

Appendix D

Safe works procedures

GLASS FIBRE REINFORCED AND/OR CELLULOSE MATERIALS RANGES

SAFE WORK PROCEDURE (SWP)

SWP JOB TITLE OR TASK: GLASS FIBRE REINFORCED AND CELLULOSE MATERIAL RANGES		DATE: JANUARY 2023
Potential Hazards	**Personal Protective Equipment**	**Training required**
Hazardous Substances	Safety Glasses	MSDS
Dust ans fiber particles	Respiratory Protection	Health and Safety Induction
Flying particles	Overalls	First Aid
Unsafe use of equipment	Gloves	Health and Safety Induction
Unsafe use of tools	Other (as per installer`s risk assessment)	Other (as per Installers risk assessment)
Incompetent operators/workers		

Note: Properly installed, the Glass Fiber Reinforced Material Range are not considered to pose a health risk. It is only during installation, or when these materials are disturbed or broken (e.g. during renovations) that you need to be concerned.

1. The material contains glass fibre reinforcement, cellulose fibres, and other potentially hazardous substances. When the final product is processed (cutting mainly), fine dust is released. Installers are obligated to inform their employees, subcontractors, any other parties on-site, and the client of the potential risks when handling and installing this material.
2. Installers must provide appropriate personal protective equipment to help employees protect themselves from glass fibre and dust exposure. Safety glasses or goggles will prevent the fibres from entering the eyes.
3. Selecting the right clothes can help minimise contact with the fibres, reducing the risk for irritation and injury. Workers should wear pants and long-sleeve shirts when working with this material. The fabric will prevent glass fibre dust from irritating the skin and reduce the risk of fibres becoming embedded in the skin. Keep your employer's dress code in mind when selecting the clothing you will wear when handling glass fibre. You can use duct tape to close the gap at the end of long sleeves and trousers.
4. Wearing gloves reduces skin contact with the glass fibre and may prevent irritation.
5. Workers regularly exposed to this type of dust should wear masks with respirators, which contain filters that prevent dust and other particles from entering the mouth and respiratory system. Masks that cover the nose and mouth can prevent workers from inhaling or swallowing the fibres.
6. Fumes from resins and other substances used in this product and installation should be avoided as much as possible because they may cause respiratory problems such as tight chest, shortness of breath, and wheezing. Other possible symptoms may include eye and nose irritation, headache, dizziness, and nausea.
7. Do not rub your skin or eyes if they feel itchy or irritated.
8. After working, wash with soap and running water (a shower is best). Wash your work clothes separately. Separate working clothes from town clothes. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.
9. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking, and when leaving work. Do not eat, drink, or smoke when using this product. Always wash hands after handling the product.
10. Keep your workspace clean, and wet-wipe or mop surfaces after working. Vacuuming is also good, but do not sweep – this spreads dust around. Vacuum attachments for cutting equipment should be utilised to mitigate risk.
11. Keep glass fibre and wood dust materials properly stored and dispose of any scrap.
12. Material Safety Data Sheets (MSDS) of all materials to be used must be made available at the workplace.
13. You should seek prompt medical advice, ideally from an occupational physician or specialist, if you experience any symptoms related to exposure to any of the products and substances mentioned above.
14. Installers must ensure compliance with their country`s Health and Safety obligations and laws.
15. The client is obligated to inform anyone necessary of the potential risk when handling and installing this material.
16. Omissions from the above responsibilities do not relieve the employer from any of these or other obligations and do not transfer any risk to the product supplier.

Received by: _____ Signature: _____ Date: _____

Appendix E

Troubleshooting

Common complaints	Typical issues	Potential solution
Deck is bouncy or springy.	Inappropriate spans.	Reduce spans and/or provide additional supports.
Deck boards sag between joists.	Inappropriate spans.	Reduce spans and/or provide additional supports.
Deck board ends lift or tent.	Inappropriate fastening distance from edge of the board and/or overhang.	Fasten board down closer to the board edge. Ensure board support and substructure are adequate. Ensure appropriate overhang distance.
Expansion gap is too large.	The installed gap did not consider potential minimum board temperatures for the site.	Refit using appropriate expansion gaps. Make use of shorter boards and/or breaker boards.
Ends of the deck boards are no longer even.	Boards were not left to acclimatise before installation and/or boards were installed at different temperatures without allowing for this.	Now that the boards have acclimatised, cut the boards to the same lengths. Ensure this is done at a consistent temperature to avoid similar problems in the future.
Boards 'tent' at butt joints.	Inappropriate expansion gaps.	Calculate correct expansion gap for site and cut board ends to satisfy. Make use of breaker boards and similar where possible.
Board end sags under load.	Inappropriate board overhang.	Ensure board end is adequately supported within 20 mm of board end.
Screws snapping.	Inappropriate number of fasteners per board and/or over-tightening/over-torquing of screws and/or incorrect fastener utilised for the application.	Ensure appropriate fastener is used. Ensure two fasteners (hidden clips or top fixings) are used at every joist. Ensure appropriate torque settings are utilised.
Boards are cracking at board edges in vicinity of top-fixing screws.	Inappropriate fastening edge distance and/or pre-drilling.	Replace board and ensure top fixing to edge distances are correct. Pre-drill in low-temperature installations.
'Mushrooming' occurring at top-fixings.	Over-tightening/over-torquing of screws and/or high deck board temperatures during installation.	Ensure appropriate torque settings are utilised. Avoid installations at particularly high site temperatures. Pre-drill the fastening holes.
Stands of glass fibre of visible after cutting	Blades used to cut the board are not sharp or fast enough	Trim the strands with a sharp blade and dispose of the strands in accordance with health and safety requirements.
Screws are visible in the embedment groove	Screws have not been fastened down enough	Come back and fasten more. A colour matching filler paint is available should the head still be visible.
The cap is peeling off around the screws	Excessive cleaning or water pressure on high pressure hose is too high or too close.	A colour matching filler paint is available should the head still be visible.