



Apex[™]

DECK INSTALLATION GUIDELINES





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1. Introduction

Thank you for choosing Fortress® decking. In these guidelines we aim to assist you in successfully completing an installation that will last as long as the Fortress decking products themselves.

- The purpose of this guide is to help you adhere to all Fortress warranty specifications and create a durable, long-lasting installation.
- Please note the limitations of this guide:
 - This guide is intended only for Fortress single level square decks.
 - The person using these guidelines should already have a basic understanding of deck building practices.
 - Decks must be built in accordance with federal and local building codes.

Please bear in mind that decks of varying shapes may require different calculations and techniques. Please do not hesitate to contact Fortress should you need any technical assistance at any stage of your build.



2. Pre-installation

STANDARDS

Legislation may differ between jurisdictions. Before installing any Fortress Building Products, ensure that the application complies with the local building codes. Wherever necessary, consult a suitably qualified professional. Be sure to comply with material manufacturer specifications. Where manufacturers 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.FortressBP.com

SAFETY

- Always wear appropriate personal protection equipment (PPE). Comply with the local occupational health and safety legislation.
- Refer to the applicable Material Safety Data Sheet (MSDS).
- Cutting Apex™ produces fine particulate matter.
 - Work in well-ventilated areas.
 - Wear dust masks during cutting, drilling and cleaning.
 - Clean up saw-dust by vacuuming or wetting the area down and sweeping.
 - Always wear safety goggles whilst cutting and/or installation.
- Cut boards may have sharp edges (particularly mitered cuts).
 - Wear gloves when working with boards.

STORAGE & HANDLING

- Boards are however bundled for convenience and can, as a result, be heavy. Take care when lifting, placing 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 within a bundle. Ensure the mass handled does not exceed safe limits as defined by applicable local legislation.
- When handling lengths of boards greater than 12', ensure both ends are lifted simultaneously and evenly. Lift the boards 3' 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.

PLAN

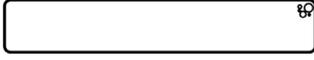
- Assess the site environment and ensure the product is suitable for the intended application.
- Classify the corrosion category, loading class, and any other property that will influence the selection of product.
- Determine appropriate spans for the selected profile. This will depend on the application and the loading class for the region. Suggested spans are provided for typical residential scenarios.
- An appropriately qualified professional must be consulted whenever necessary to ensure the product, this document and the intended application complies with all applicable legislation for that region.
- Develop a maintenance plan to ensure the longevity of the system. This should consider drainage, corrosion and vegetation under and around the deck.

SITE PREPARATION

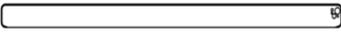
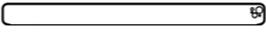
- Ensure adequate drainage below the deck footprint. Prevent pooling water and/or erosion.
- Remove vegetation from the deck footprint and place an appropriate geotextile to prevent regrowth.

3. Deck profile specification

The Apex™ range was developed to provide a lightweight alternative to the Fortress Deck cellulose-polymer range. The foamed mineral-polymer core has improved water absorption and fire resistance behavior. The innovative double layer polymer coat provides a unique texture and aesthetic characteristic as well as improved slip resistance.

Description	Profile width (in.)	Profile height (in.)	Typical length (in.)	Weight per Foot (lbs./ft.)	Recommended spans (in.)
 Grooved deck board single-sided	5.5	0.944	144 192 240	1.57	16
 Square edge deck board single-sided	5.5	0.944	240	1.65	16

4. Fascia profile specifications

Description	Profile width (in.)	Profile height (in.)	Typical length (in.)	Weight per Foot (lbs./ft.)	Recommended spans (in.)*
 Fascia board single-sided	11.7	0.65	144	2.06	16
 Fascia board single-sided	7.25	0.55	144	1.45	16

*Spans are based on boards in a vertical orientation.

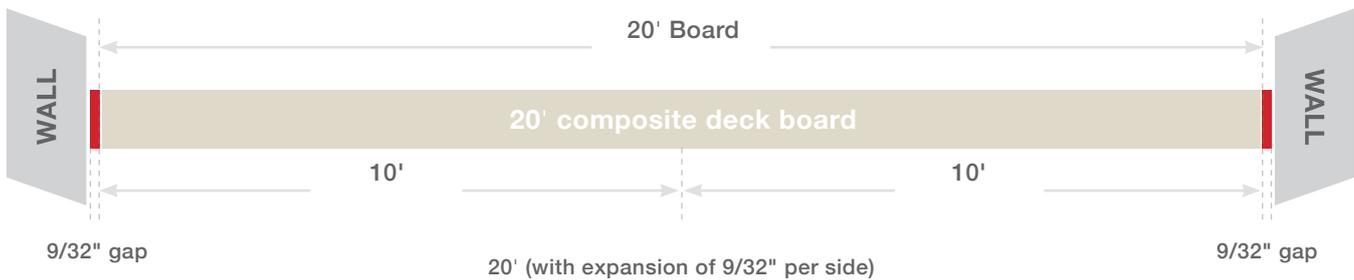
5. Expansion and contraction

The extrusion process Fortress Deck employs utilizes incredibly high pressures but low rates, resulting in products that are generally more dense than wood. The PVC component of the material make-up is susceptible to slightly greater expansion and contraction than traditional wood. This is partially mitigated by the intersection of bamboo fibers and mineral particles present throughout a product's profile.

The total change in length will depend on the total change in temperature and the length of the profile. The total change in length of a 20' profile over a temperature change of 50°F will be (on average) approximately ¼". Compared to wood, Fortress PVC experience more expansion and contraction. Timber is typically more susceptible to irregular activity, such as twisting, and larger deformation due to moisture absorption. Fortress Deck products have an absorption rate of less than 0.2 % and the movement of PVC is more uniform. As a result, Fortress Deck profiles will remain more true to their form.

The directional movement of PVC is easily accounted for during installation. The anticipated change in length can be accommodated for using expansion gaps at either end, or at both ends depending on the intended design, by employing the Hulk hidden fastener system. To optimize the size of the expansion gaps, the maximum expected temperature range - in relation to the installed ambient temperature - should be calculated and the corresponding change in length calculated.

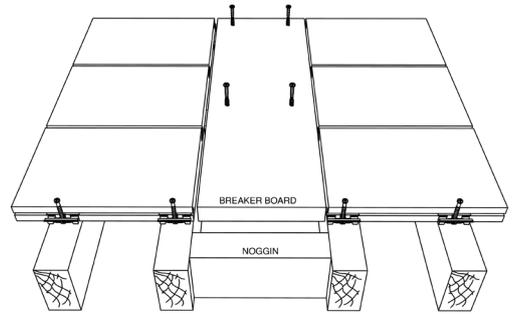
Estimated expansion allowance between 2 fixed points in a cooler climate.



In cooler climates Apex™ boards expand at approximately 9/32" per 10' of composite deck board. When leaving an expansion gap for each board one should compare the current installation temperature (ambient) to what is a common maximum or minimum temperature for that site. If you are installing at 06:00 in the morning in the middle of winter it will be close to the minimum temperature the board will experience, as a result the board will be the 'shortest' it will ever be at installation. As the temperature rises the board will expand. When its get to the peak temperature in the middle of summer the board will have moved to the 'longest' it will ever be. The difference between the longest and shortest positions of the board dictate the required size of the expansion gap. But the starting position of the expansion gap will depend on the starting temperature or installation temperature. Therefore, boards installed closer to the minimum site temperature will have to have a relatively larger starting expansion gap. Boards installed closer to the maximum site temperature will have to have a relatively smaller starting expansion gap as the boards will 'shrink' as the temperature decreases.

Breaker or Border boards (boards laid at 90° to the rest of the deck) can be used to create a border around the deck and this will aid in controlling expansion resulting in better. Blocking will need to be used to support the breaker board.

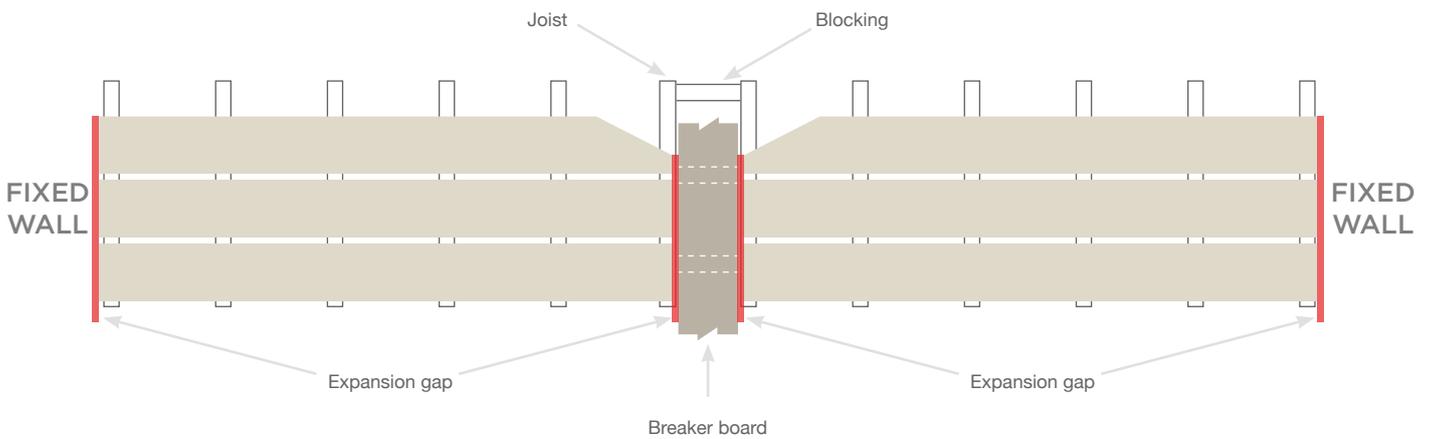
The breaker board will need to be top fixed or surface mounted to the Blocking.



Expansion gap design is application dependent:

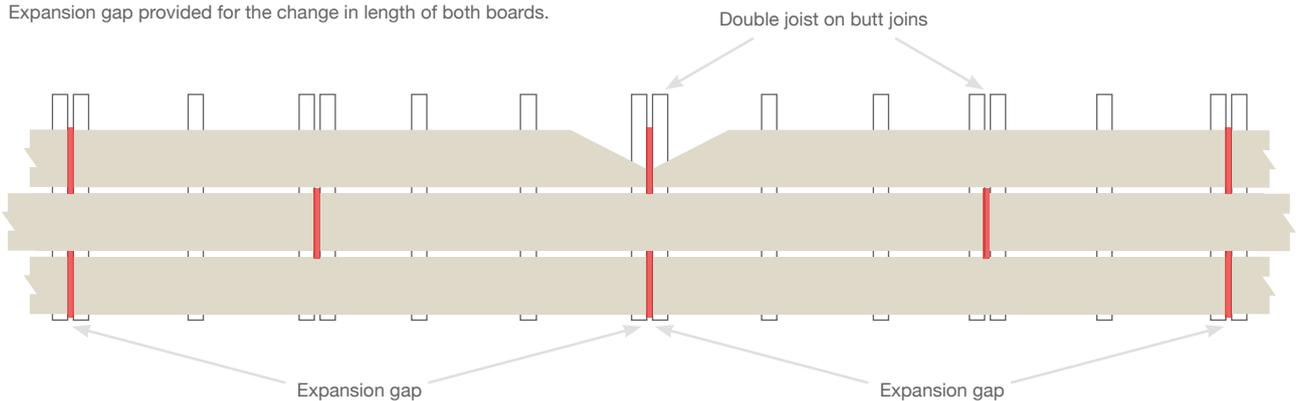
Typical installations will have breaker boards or perimeter boards between each longitudinally-placed board. The expansion gap in these cases will be as has been calculated above, depending on the climate and original length of board.

Single board lengths



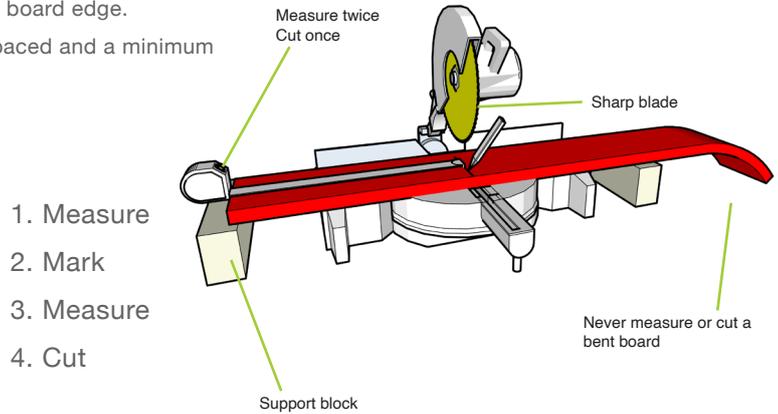
Multiple board lengths placed consecutively

Expansion gap provided for the change in length of both boards.



6. Cutting

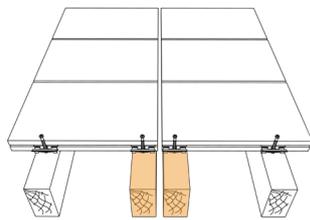
- Use a fine toothed, carbide tipped blade to cut Apex™ material.
- Use an 80-tooth, 10-12" diameter cross-cut, or finer, blade.
- Do not rip boards thinner than 2½". Use a minimum of two fasteners per joist, evenly spaced and a minimum of 1¼" from any board edge.
- Boards can be mitered. Use two fasteners, evenly spaced and a minimum of 1¼" from any edge, per mitered board.
- Do not router Apex™ boards.



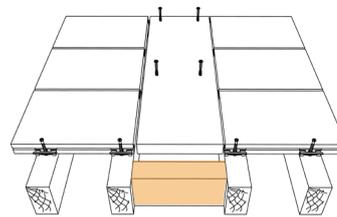
7. Supports and spans

The choice of structural material will effect the life span of a deck. Make certain that local building codes are followed. When installing a deck board, ensure that board ends are supported and securely fastened. Boards should not be allowed to overhang more than 1".

Additional supports are necessary for:

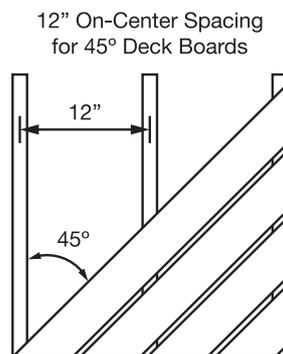
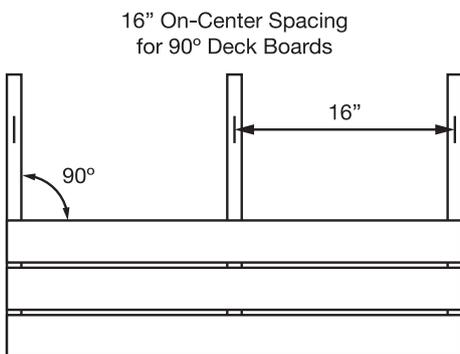


1. Double joists → Butt joints



2. Blocking → Breaker boards

Joist spacing to consider when deck boards at different angles to joists:

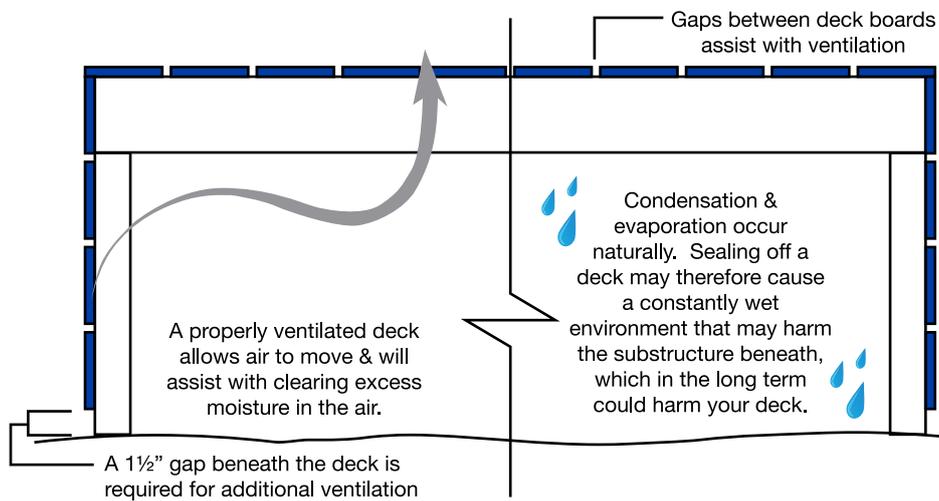


Joist Spacing For Grooved & Square Boards At An Angle			
90°	60°	45°	30°
16"	14"	12"	8"

8. Ventilation diagram

In order to avoid structural problems as a result of rot or corrosion. Attention should be paid to the ventilation of the deck. Deck board gaps, gaps between fascia boards, and ground clearance is vital to ensuring that your deck can breath and last for years to come.

- Leave a minimum ground clearance of 12".
- Ground clearance over concrete of 1½".
- Install a minimum drainage gap of 1½" at the bottom of your deck and do not block off with fascia boards.



9. Fasteners

Fortress Deck has developed a range of fasteners that are specially designed to securely fasten the deck boards to a substructure. The coating employed for our HULK™ fasteners ensure the fixing system supports your deck through out its lifespan.



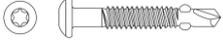
Typical deck fastener used in timber frame application

Fastener type	Standard size	Length (mm)	Material	Pull out resistance (N)*	Note
 Hidden fastener: Clip	N/A		SS 430	N/A	
 Hidden clip fastener: Screw	M4.2	40	C 1022	4 400 to 6 250	
			SS 305	3 900 to 4 500	
 Surface Mount deck screw	M5.0	63	C 1022	7 150 to 9 900	Designed for boards up to 1" thick into wood structures greater than 1½" thick.
			SS 305	5 550 to 6 900	
 Fascia/Trim screw	M5.5	48	10B21	4 550 to 7 150	Designed for boards up to ¾" thick into wood structures greater than 1½" thick.
			SS 316	5 000 to 6 500	

Appropriate fasteners must be employed depending on the expected worst-case loading conditions, the intended application and the conditions present. Particular attention should be paid to the substrate conditions available and the environmental conditions of the site. All applications should adhere to applicable building coads. All wood profiles should be treated appropriately. Regular and proactive maintenance should be employed.

*Pull out resistance range is based on testing with fasteners in ACQ wood (density of 0.67 g/cm³) to Red oak wood (density of 0.72 g/cm³).

Typical deck fastener used in metal frame application

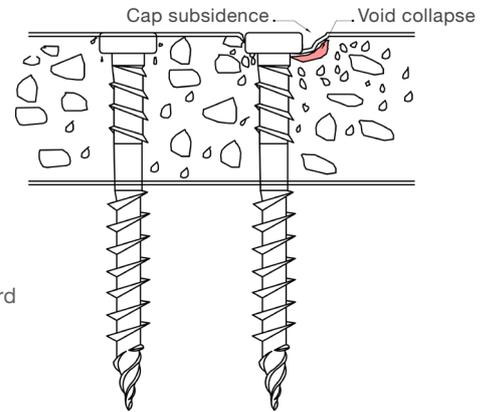
Fastener type	Standard size	Length (mm)	Material	Pull out resistance (N)*	Note
 Hidden fastener(Clip)	N/A		SS 430	N/A	
 Hidden clip fastener	M4.2	40	C 1022	3 850	
			SS 410 H	4 030	
 Surface Mount deck screw	M5.0	45	C 1022	3 470	Designed for boards up to 1" thick into metal structures 19 gauge to 14 gauge thick.
 Fascia/Trim screw	M5.5	35	10B21	5 717	Designed for boards up to 1" thick into metal structures 19 gauge to 14 gauge thick.
			SS 410 H	6 138	

Appropriate fasteners must be employed depending on the expected worst-case loading conditions, the intended application and the conditions present. Particular attention should be paid to the substrate conditions available and the environmental conditions of the site. All applications should adhere to applicable building coads. All metals should be appropriately coated. Regular and proactive maintenance should be employed.

*Pull out resistance is based on testing with fasteners into 14 gauge steel plate with a hardness of HV146.

FASTENING

- Do not use nails to fasten Apex™ boards.
- Use high quality fasteners suitable for the life span of the deck and the atmospheric conditions of the site.
- Stainless steel 316 fasteners should be used in environments classified as C5 or higher.
- A drill with adjustable torque settings is recommended.
- Apex™ boards require two fasteners points per joist.
- Fasten 1¼" from any edge of a board.
- Pre-drill in temperatures below 40 F°.
- Pre-drilling hole size should be equal to the smallest diameter of the screw.
- Do not pre-drill wood substructure.
- Pre-drilling metal substructure may influence the effectiveness of the screw wings.
- Pre-drilling can reduce the risk of cap subsidence around the the screw head (caused when voids within the board core collapse as a result of too much downward force when fastening).



BOARD APPLICATION

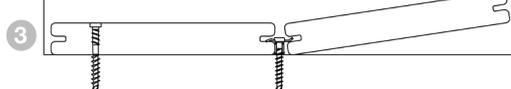
- The installation of Apex™ boards is comparable to that of other composite or timber decking materials.
- Apex™ profiles are not intended for use as structural members.
- Provide ground clearance for adequate ventilation. Improved ventilation can have the added benefit of assisting with expansion and contraction.
- The overhang of boards must be limited to 1¼".
- Leave expansion gaps between boards.
- Reflective surfaces (for example, low-E glass or metallic roofing) may cause unusual UV impact and/or heat build-up on a deck which may cause unexpected results in the Apex™ material. Design your deck to cater for this where possible.
- Use a breaker board between longitudinal boards to assist in controlling expansion and contraction. This approach has the added benefit of creating a neat aesthetic. See Installation guide for further details.
- Breaker boards must be supported by joists and blocking.
- Where breaker boards cannot be used, double joists must be used to support the butt joint. Use a minimum of two fasteners per joist, evenly spaced and a minimum of 1¼" from any board edge.
- Stagger butt joints so that they do not all align on the same joist. This limits unsightly repetition of expansion gaps.

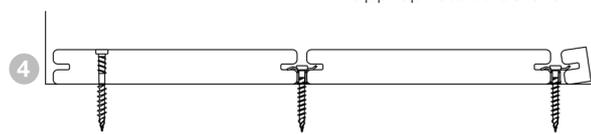
10. Deck installation

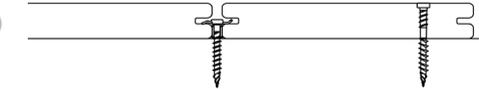
Installation using a grooved deck board: When you install your first board, it is necessary to fasten the first board firmly to the structure, before using hidden fasteners.

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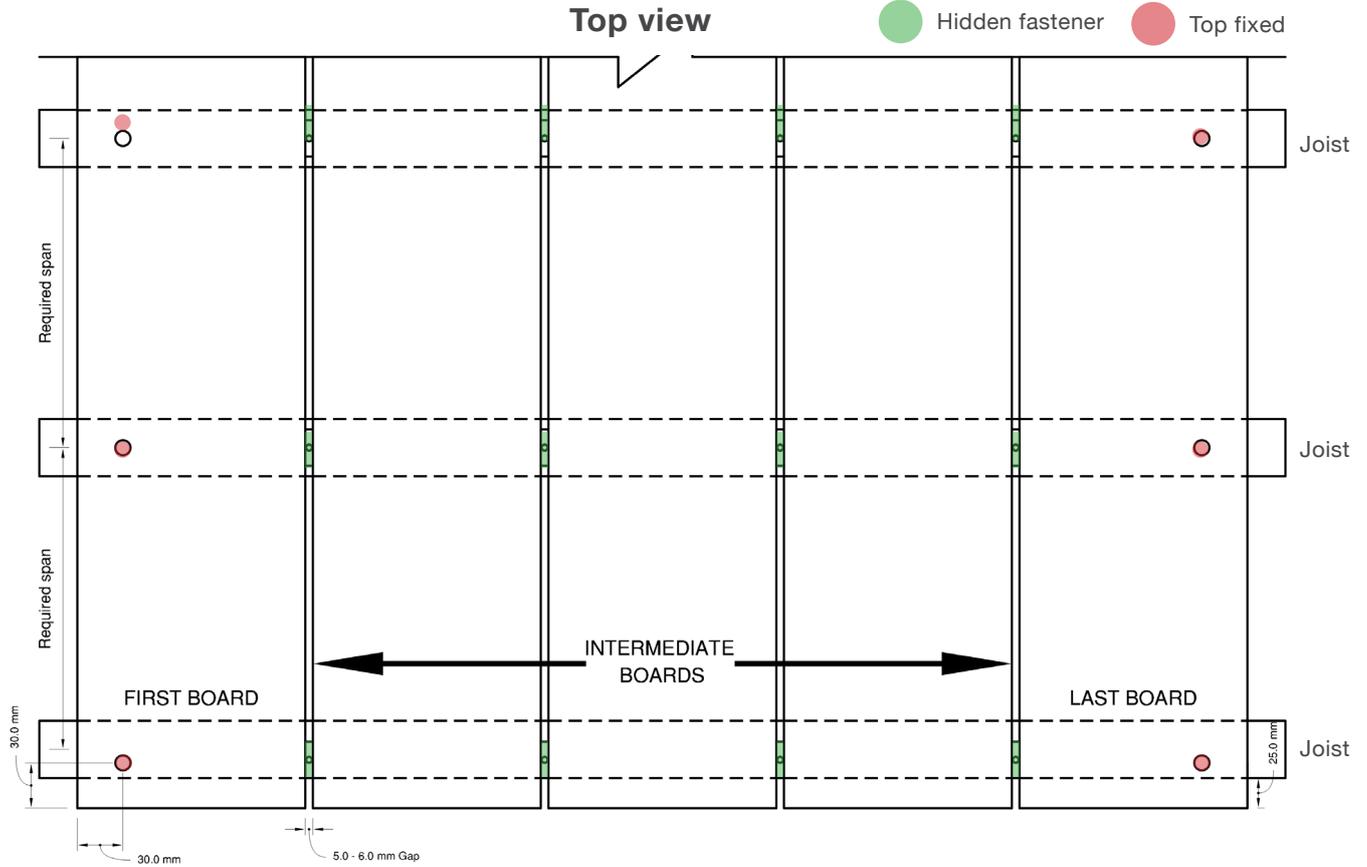
1. Top fix your first board using a composite deck screw.
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2. Insert a hidden fastener into the groove of the deck board and fasten it into the appropriate structure.
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3. Insert the next board, at an angle. Engaging it with the previous hidden fastener and pressing down.
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4. Insert and fix the next line of hidden fasteners. Clip the subsequent board into the hidden fastener. Repeat this step until the second-to-last board.
- 

5. Top fix the last board with a composite deck screw.



Minimum of 1¼" to any edge.

Maximum overhang of 1".

Note: Pre-drilling may be required when top fixing.



12. Disclaimers and Copyright

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