BAMBOO EXTERIOR PANEL AND SCREEN
TECHNICAL GUIDE

GREEZU

2019-Jan

1. TECHNICAL DATA

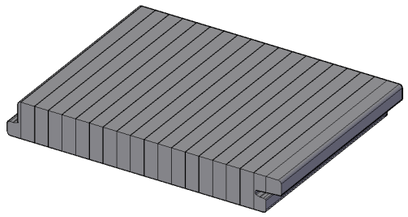
1.1 Construction

a) Surface finish: Oil

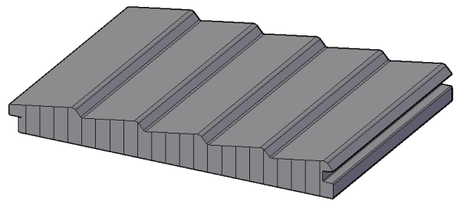
b) Main structure

- Vertical: Bamboo strips are stood vertically on their narrowest edge and then laminated side to side. The effect is a lined, almost uniform look to the surface of the finished floor plank.

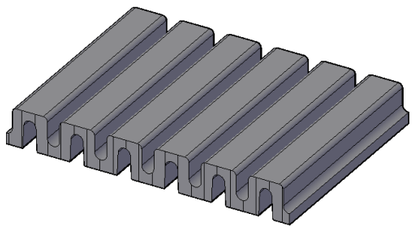
1.2 Products and dimensions:



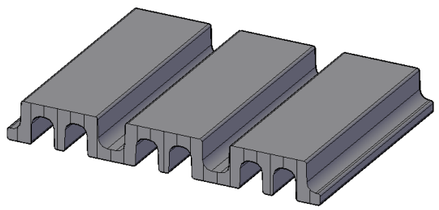
WEP-2 (5800 / 2900 X 135 X 18 mm)



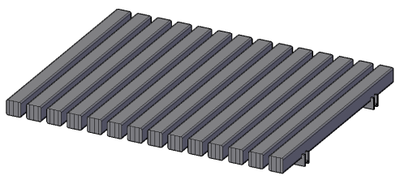
WEP-5 (5800 / 2900 X 135 X 15 mm)



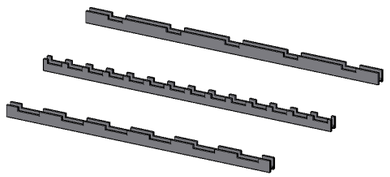
WEP18-5 (5800 / 2900 X 138 X 18 mm)



WEP35-12 (5800 / 2900 X 135 X 15 mm)



Screen



Aluminum Support frame

1.3 Surface finish

All of our bamboo decking is applied with WOCA decking Exterior Oil in the factory. WOCA is a Danish company specialising in environmentally friendly wood care.

Exterior Oil is to be used outdoor for basic treatment and maintenance of new and previously oiled wood surfaces such as decks, garden furniture, cladding etc. The special water-based composition of oil components ensures that the product is water-dilutable and friendly to the environment. The oil enhances the natural colour and grain of bamboo. Exterior Oil Natural is recommended to enhance the natural colour structure of the bamboo. For rejuvenating of old bamboo surfaces, the pigmented oils are ideal as they recreate the original colour of the wood. A change of colour of the deck is also possible by applying e.g. the grey, anthracite or black oil.

2. PERFORMANCE SPECIFICATIONS

1 DENSITY

Test Standard: BS EN 323:1993 Wood-based panels - Determination of density
Mean Value | Density: 606 kg/m^3

2 BONDING QUALITY

Test Method: BS 1088 - 2:2003 Marine plywood – Part 2: Determination of bonding quality using the knife test
Glueline average & Overall average: 10

Bond Quality Scale accroding with BS 1088 - 2:2003
Estimated wood-failure, %: 96 to 100 | **Bond quality value:** 10

Test Standard: EN 314 - 1:2004 Plywood-Bonding quality-Part 1:Test methods
EN 314 - 2:1993 Plywood-Bonding quality-Part 2:Requirements
Bonding Classes: Class 3: non covered exterior

Result:
Immersion for 24 h in water at (20±3) °C
Mean Value | fv_2.43 N/mm^2, w_100%

Immersion for 4 h in boiling water, then drying in the ventilated drying oven for 16 h to 20 h at (60±3) °C, then immersion in boiling water for 4 h, followed by cooling in water at (20±3) °C for at least 1 h.
Mean Value | fv_2.40 N/mm^2, w_100%

Immersion for (72±1) h in boiling water, followed by cooling in water at (20±3) °C for at least 1 h.
Mean Value | fv_2.40 N/mm^2, w_100%

Mean shear strength (fv) N/mm^2	Mean apparent cohesive wood failure (w) %
0.2 ≤ fv < 0.4	≥ 80
0.4 ≤ fv < 0.6	≥ 60
0.6 ≤ fv < 1.	≥ 40
1.0 ≤ fv	no requirement

3 WATER ABSORPTION RATE

Test Standard: BS EN 318:2002 Wood based panels - Determination of dimensional changes associated with changes in relative humidity

Change in length
$\delta l_{65,85}$ (Using set 1 results) | = (l_{85} - l_{65})/l_{65}*1000 2.4 mm/m
$\delta l_{65,35}$ (Using set 2 results) | = (l_{30} - l_{65})/l_{65}*1000 -2.6 mm/m

Change in thickness
$\delta t_{65,85}$ (Using set 1 results) | = (t_{85} - t_{65})/t_{65}*1000 6.4 mm/m
$\delta t_{65,35}$ (Using set 2 results) | = (t_{30} - t_{65})/t_{65}*1000 -7.0 mm/m

4 SCREW RETENTIVITY RATE

Test Standard: BS EN 13446:2002 Wood-based panels - Determination of withdrawal capacity of fasteners

Edge withdrawal - Long side
Mean Value | Withdrawal parameter (f): 31 N/mm^2

Edge withdrawal - Short side
Mean Value | Withdrawal parameter (f): 36 N/mm^2

Surface withdrawal
Mean Value | Withdrawal parameter (f): 44 N/mm^2

5 HARDNESS TEST

Test Standard: ISO 2039 - 2:1987 Plastics – Determination of hardness – Part 2: Rockwell hardness
Mean Value | HRR 55

6 BENDING STRENGTH

Test Standard: EN 310:1993 Wood-based panels-Determination of modulus of elasticity in bending and of bending strength

Modulus of elasticity
Mean Value | 7.70*10^3 N/mm^2

Bending strength
Mean Value | 96 N/mm^2

7 HEAT EXPANSION DIMENSINOSTABILITY DATA

Test Standard: EASTM E831 - 14
Result:
Temperature(°C): -20 ~ 80 | Test Result (10^{-6}K^{-1}): 7

8 SLIP RESISTANCE

Test Standard: BS EN 13036 - 4:2011 Road and airfield surface characteristics
Test methods - Part 4: Method for measurement of slip/skid resistance of a surface - The pendulum test

Result:
Length direction
Mean Value | Pendulum Test Value(PTV): 89

Width direction
Mean Value | Pendulum Test Value(PTV): 110

9 FORMALDEHYDE

Test Standard: EN 717 - 1:2004 Wood-based panels – Determination of formaldehyde release – Part 1: Formaldehyde emission by the chamber method

Result:

Test No.	Test Parameter	Unit	RL	Result
	Formaldehyde emission	mg/m^3	0.04	n.d.

mg/m^3 = milligram per cubic meter | n.d.= not detected | RL= Reporing Limit

3. STORAGE

Bamboo panel need to be stored on a flat and even surface at all times. Surfaces such as dirt and grass are not recommended as they can move over time and potentially cause warping or distortion. Always remember to keep panel dry until you are able to start installation.

4. CALCULATION OF MATERIAL

To calculate the amount of material required, the total surface area should be accurately measured. As a basic guide, the area should be increased by 5% to cover losses and trimming. However, this percentage may vary depending on the area to be covered and the installation pattern.

5. VENTILATION & DRAINAGE

Exterior panel CANNOT be directly installed on a flat surface, which must be installed on a substructure so there is adequate and unobstructed air flow to prevent excessive water absorption. The installation surface must be firm, in addition to having suitable water drainage.

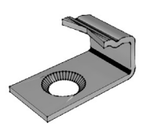
6. BAMBOO EXTERIOR WALL PANEL INSTALLATION GUIDELINE

6.1 The receiving wall (Backing)

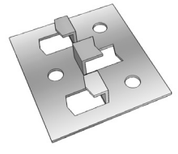
- In general, receiving surface should be clean and free from any loose material or debris. They should be completely dry and structurally capable of supporting the aggregate panel weight.
- It is a must to have a substructure between the concrete wall and bamboo panels for ventilation purpose. Metal studs or wood batten can be used. The battens studs / batten must be installed perpendicular to the direction of the panel installation.
- To make sure the joist spacing of the stud / batten not wider than 450 mm between two joists and ensure that is completely levelled before installing any panel.
- To make sure correct screw is selected, depending on the type of batten used. Screws for metal and wooden is different.

6.2 Installation of WEP-2

- 2 types of clip are used for installation
- Clip 1: For fixing the first and last row of panels in lengthwise.
- Clip 2: For connecting between panels.

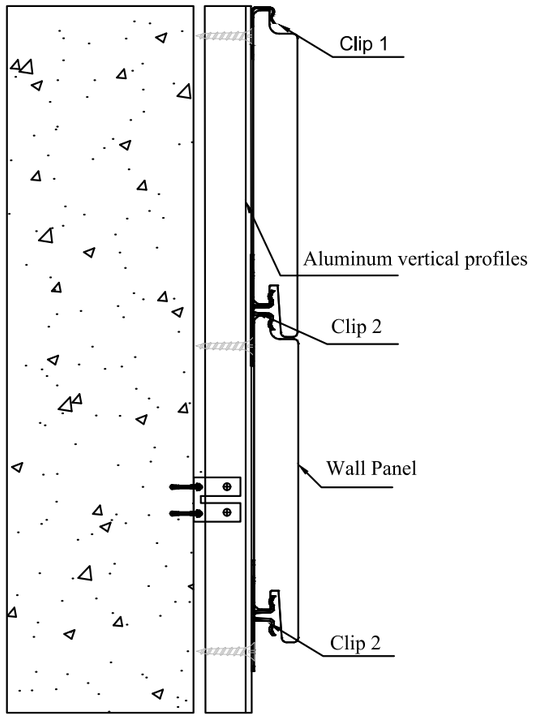


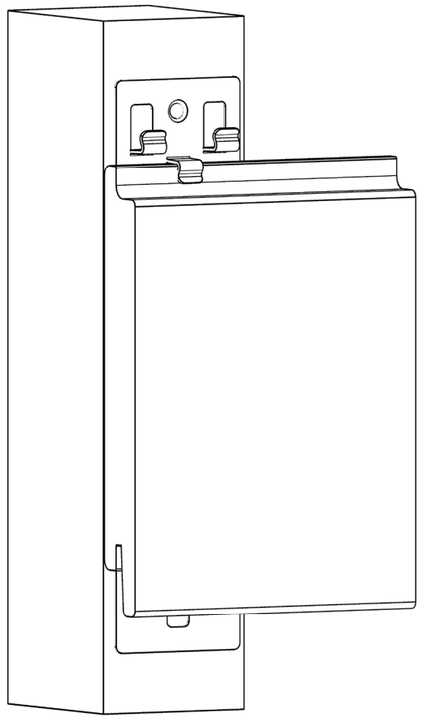
CLIP 1



CLIP 2

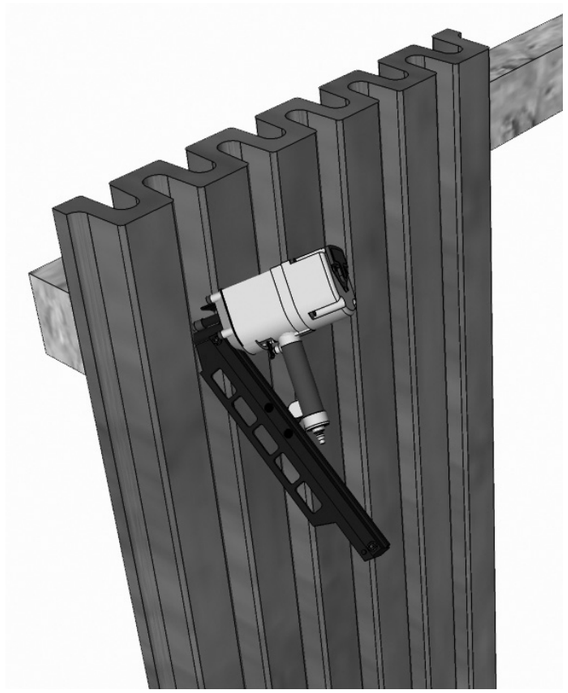
- It is very important that minimum 8 mm gaps are kept next to all walls and other fixed elements. This is done by placing 8 mm spacers around the vertical walls.
- Lay a few rows together before full installation to confirm your layout plan on the floor, and arrange them to balance out the color and grain pattern.
- Position the first panels in a straight row along the wall. To use a spirit level or cross laser to mark a straight line on the wall as a guide before positioning the panels. Place temporary wedges to ensure gap is kept for contraction / expansion.
- Pre-drill into the batten then fix the clip 1 into the joist. Then take your first board and push it into the clip 1. The first board must be straight and well be secured.
- Slot the clip 2 into the longitudinal machined edge of the first board and then fix the clip 2 into the batten with screws. Place next board into position against the clip 2. Repeat the previous step until the last board. Use the clip 1 to finish the last board.
- Apply oil on the end sides and cross cut board ends to ensure cut area is being protected with oil.



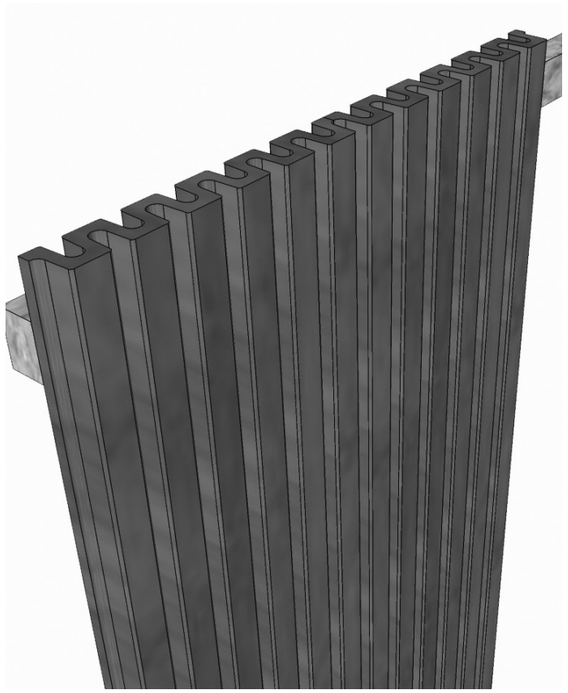


6.3. Installation of WEP-18-5 and 35-12

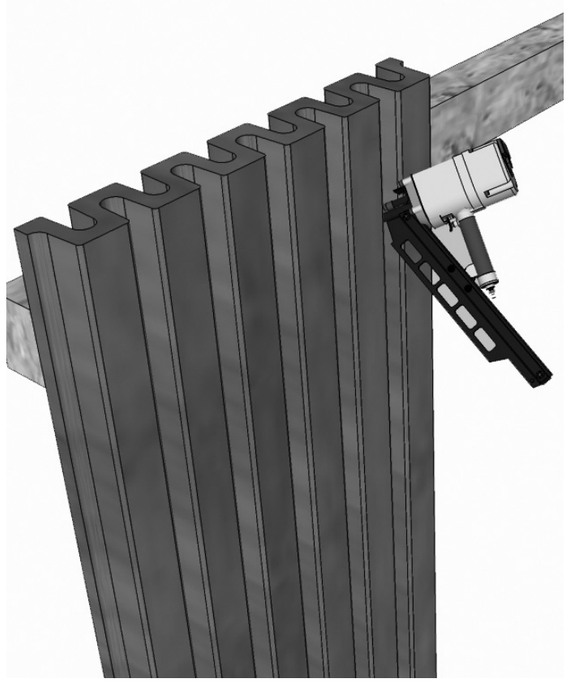
- To get the receiving wall ready according to the Section 6.1.
- To make sure the joist spacing of the stud / batten not wider than 450 mm between two joists and ensure that is completely levelled before installing any panel.
- It is very important that minimum 8 mm gaps are kept next to all walls and other fixed elements.
- Position the first panel in a straight row along the wall. To use a spirit level or cross laser to mark a straight line on the wall as a guide before positioning the panels. Place temporary wedges to ensure gap is kept for contraction / expansion. To secure the panel by blind nailing from the surface (the groove position).
- To make sure at least two blind nails fixed securely to the batten and the panel must be fixed to every batten.
- When the first panel is secured, place the second panel next to it.
- To repeat the previous steps of installing the first panel.
- Apply oil on the end sides and cross cut board ends to ensure cut area is being protected with oil.
- To reminded that the stainless steel nail should be used.



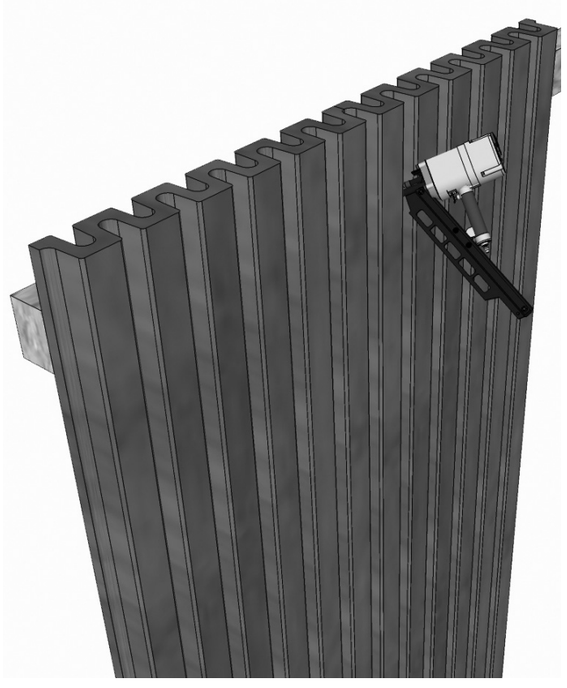
STEP 1
Secure the first panel by blind nailing to the batten



STEP 3
Place the 2nd panel next to the first panel



STEP 2
To make sure at least 2 nails fixed on the batten



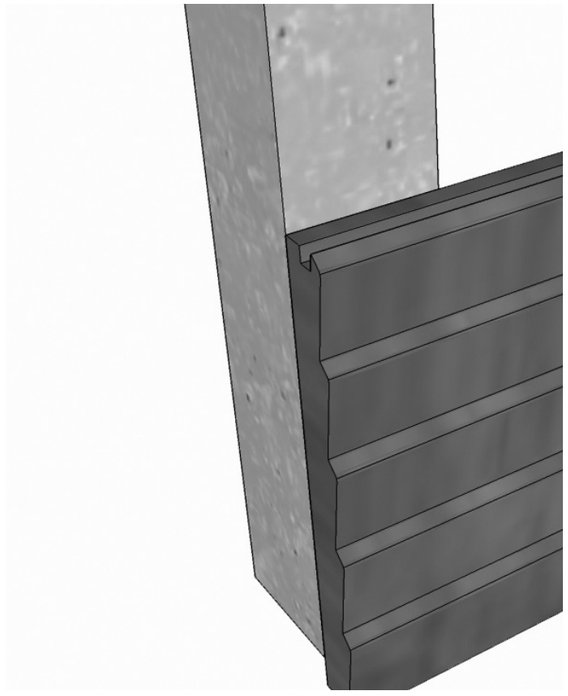
STEP 4
Secure the 2nd panel as previous steps

6.4. Installation of WEP-5

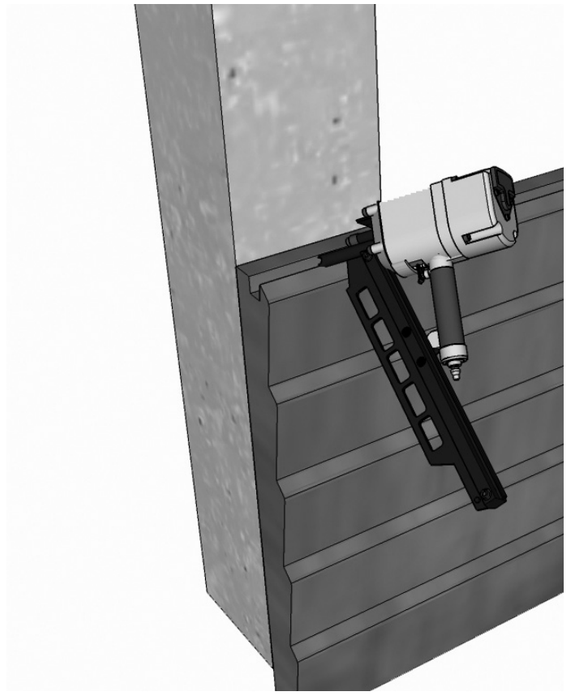
- To get the receiving wall ready according to the Section 6.1.
- To make sure the joist spacing of the stud / batten not wider than 450 mm between two joists and ensure that is completely levelled before installing any panel.
- It is very important that minimum 8 mm gaps are kept next to all walls and other fixed elements.
- Lay a few rows together before full installation to confirm your layout plan on the floor, and arrange them to balance out the color and grain pattern.
- Position the first panel in a straight row along the wall. To use a spirit level or cross laser to mark a straight line on the wall as a guide before positioning the panels. Place temporary wedges to ensure gap is kept for contraction / expansion.
- Cut the tongue side off the length of the plank. To secure the panel by nailing directly into the groove at a 45 degree angle. In addition, to apply nail on the surface of the panel in order to secure the panel.
- Carefully monitor nailer pressure to ensure that the nail head enter the batten.
- When the first panel is secured, place the second panel above it.
- To repeat the previous steps of installing the first panel.
- Apply oil on the end sides and cross cut board ends to ensure cut area is being protected with oil.
- To reminded that the stainless steel nail should be used.

6.4. Installation of screen

- To get the receiving wall ready according to the Section 6.1.
- To make sure the joist spacing of the stud / batten not wider than 450 mm between two joists and ensure that is completely levelled before installing any panel.
- Position the first set of screen in a straight row along the wall. To use a spirit level or cross laser to mark a straight line on the wall as a guide before positioning the panels.
- Use screws to fix the screen to the batten through the aluminum baking.
- When the first set of screen secured, place the second set next to it.
- To repeat the previous steps of installation to finish.

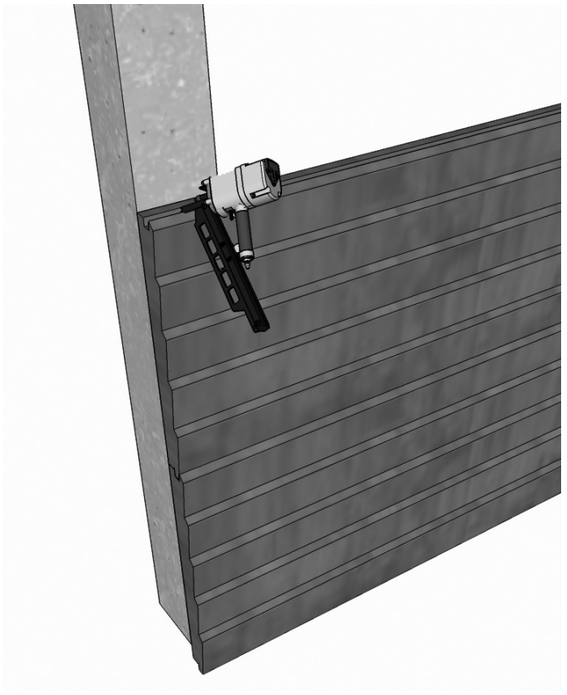


STEP 1
Cut the tongue side and position well



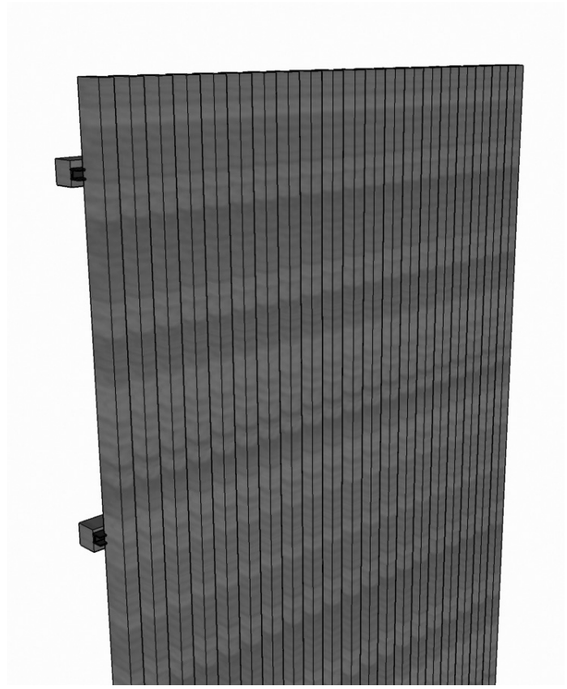
STEP 2
Use blind nail to secure the panel

STEP 3
Place the second panel above the first panel

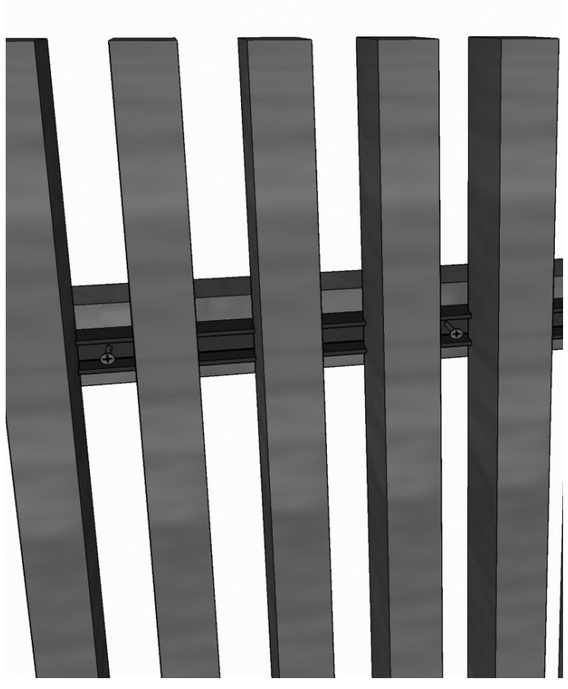


STEP 4
Use blind nail to secure the panel

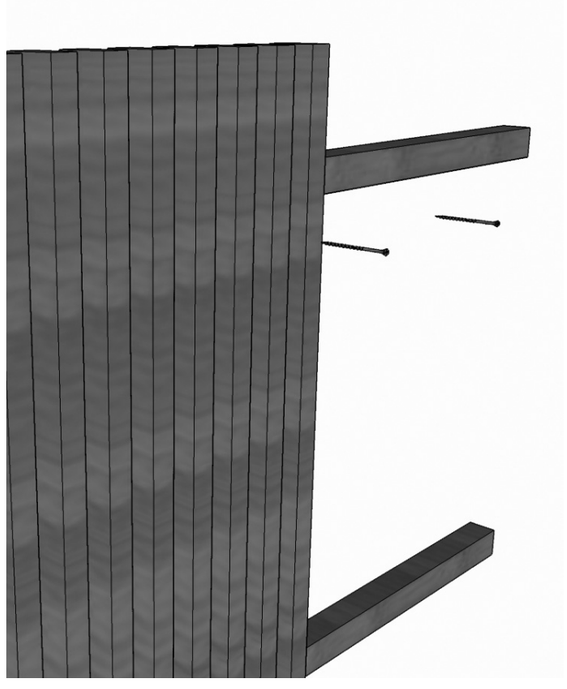
STEP 1
Position the first set of screen



STEP 3
Place the second set of panel



STEP 2
Use screw to fix the screen to batten



STEP 4
Use screw to fix the screen same as step 2

7. Decking maintenance guideline

Maintaining a bamboo panel is not as complicated, as many assume. It only requires the work to be done right from the start. In that way, the durability of the paenl is considerably prolonged and no do-overs are required.

The surface of panel gets weather beaten over time. The surface turns grey and cracks, and eventually, it becomes slippery and unprotected from dirt and green growth. Especially green growth can hold moisture, which is damaging to the bamboo in the long run as the risk of fungus and decay increases. Therefore, proper treatment and maintenance is required yearly in order to keep the bamboo panel beautiful and long lasting. However, maintaining a bamboo panel is not just a matter of applying some decking oil to the surface. That would be equivalent to building a house directly on the lawn. The key to a beautiful and durable result is to clean the panel thoroughly before applying any kind of oil. If cleaning is not done, the oil will not be able to penetrate deeply into the panel, but instead create a new layer of oil on top of the dirt and former hardened oil. This will cause the newly applied oil to peel off, it is almost inevitable and the panel will need to be surface-treated once again.

- Clean your panel thoroughly and avoid do-overs. Never use chlorine, algae remover etc. for the actual cleaning of the panel. These methods can cause more damage than good.
- Soak the deck with plenty of water. If possible use a garden hose;
- Scrub the soaked panel along the bamboo grain till the deck appears clean. Repeat the cleaning if necessary;
- By extreme dirt, WOCA Exterior Cleaner is recommended to use. Mix Exterior Cleaner with water in the ratio 1:2 and apply it with a nylon brush or spray. By extreme dirt, the Exterior Cleaner may be used undiluted;
- Immediately after cleaning, hose down the surface with water;
- Leave the deck to dry for approx. 24-48 hour, subject to weather condition. The panel must be completely dry as a moist surface will prevent the oil from penetrating into the deck, and to remove fibre rising with sandpaper before an oil treatment;
- After cleaning, we recommend protecting with oil or paint depending on the actual finish.

Your panel will benefit from a high-quality oil. As soon as the panel is clean and completely

dry, the WOCA Exterior Oil can be applied. Make the application in dry weather only and ideally avoid direct sunlight.

WOCA Exterior Oil, which is recommended for the actual oiling, is oil with two unique properties: it contains a UV-filter to protect against bleaching and discoloration from the sun, and the special consistency makes it very easy to work with. Besides this, WOCA Exterior Oil provides the bamboo panel with a very hard-wearing and water-repellent surface, which in this way prevents mildew.

- Stir the oil thoroughly before use;
- Apply an even and thin coat of oil with the applicator or a brush. Begin with the butt ends of the panel. The wet oil may have a white shade. When the water has evaporated after a few minutes, the panel will appear oiled;
- Wipe off any excess oil with clean cotton cloths after no more than 5 minutes. Take particular care in removing excess oil from joints and grooves;
- Repeat step 2 and 3 if the surface does not appear saturated with oil;
- When the panel is dry, it may be polished with a polishing pad to ensure an extra hardwearing surface;
- Depending on weather conditions and outdoor temperature it takes 24 to 48 hours for the oil to harden thoroughly. The panel must not be exposed to water during this period;
- Repeat the oil treatment as required.

Reference:

How to clean, oil and maintain deck by WOCA: http://www.wocadenmark.com/guide/how-to-clean-oil-and-maintain-a-wooden-deck

pH- value	11
Declaration	Sodium hydroxide, sodium etasulfate, <5% anionic surfactants, <1% preservative
Form	Liquid
Flash point	>100
Odour	Faint
Application tools	Nylon brush or silicium brush, plastic bucket and a garden hose. Wood-en decks can also be cleaned with a polishing machine.
Cleaning of tools	With water

8 Decking warranty

Statement of warranty

We provide 5 years warranty for our bamboo panel to the original purchaser free from defects in material and workmanship, given the panel has been installed and regularly maintained in accordance with the installation and maintenance guidelines. The warranty covers the followings:

Pre-Installation Warranty: Installer should inspect each panel for quality, color and finish before installation. If not satisfied, please just return the uncut panel and new product will be replaced at no cost (material only). Complaint will not be accepted after installation, except for the cases described in the Structural Warranty.

Structural Warranty: Defective panel, which caused by delamination, mildewing, and unsightly deforming, will be replaced at no cost (material only) during the warranty period. Delamination is deemed to be a minimum of 30cm in length and 2mm wide separation between side-pressed slats. Natural cracking & end-splitting of surface splinter is not covered under this warranty.

Exclusions from Coverage

We cannot guarantee improper handling & storage, chemical or solvent corrosion, pollution by rusting metal or food & plants rotting and others, physical abrasion; installation directly on the ground or standing water or any other moisture circumstances which does not allow adequate airflow under, above and beside the deck boards; the gap between each decking is less than 4 mm, which does not allow purpose of drainage, cleaning and ventilation; improper cutting or alteration, repainting, refinishing; damage caused by settlement, shrinkage, distortion of the joist structure; force majeure including hurricane, tornado, flood, hail, earthquake or other severe weather and natural phenomena.