

# MOSO<sup>®</sup> bamboo x-treme<sup>®</sup> outdoor products





# the fast growing hardwood alternative



## certified

**durable**



**fire resistant**



**sustainable**



## proven

Since 2008 over  
**2.000.000 m<sup>2</sup>**  
installed, in  
more than  
**50 countries.**

## complete range

**decking**  
**cladding**  
**fencing**  
**beams**  
**accessories**

**high stability:**  
head side  
tongue & groove

# MOSO®

## Bamboo X-treme®

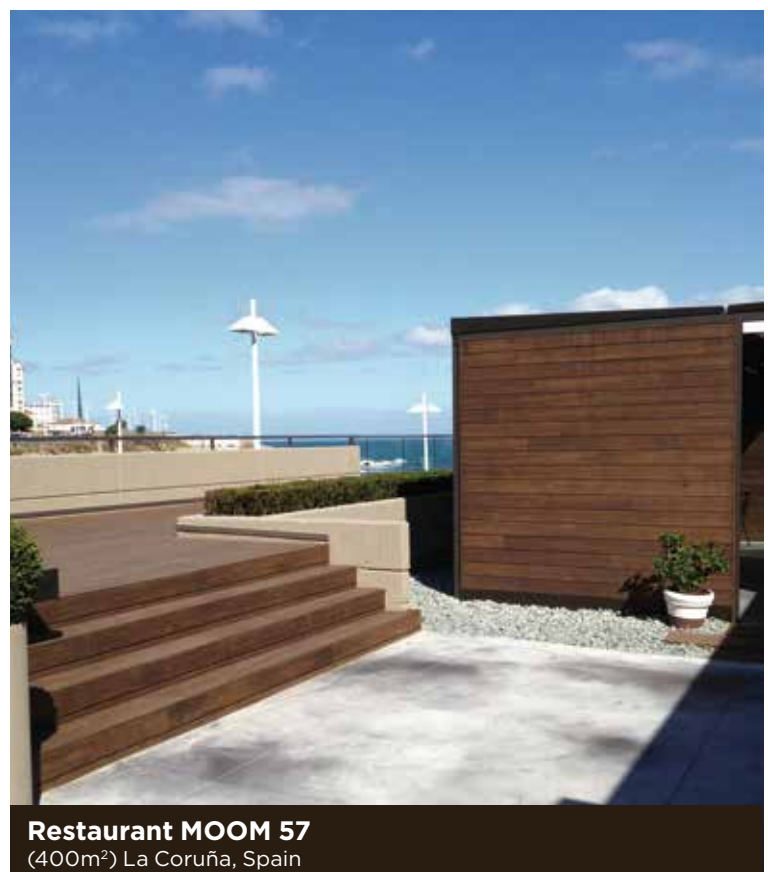
With Bamboo X-treme®, MOSO® has developed a truly **ecological** and **durable** alternative for increasingly scarce tropical hardwood. MOSO® uses a unique patented process to enhance the **hardness, dimensional stability, fire safety** and **durability** to a level **superior** to the best tropical hardwood species. MOSO® Bamboo X-treme® can be used for **decking, cladding, fencing** and **outdoor furniture**.

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**bamboo**  
x-treme

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**Restaurant MOOM 57**  
(400m²) La Coruña, Spain



# from bamboo to bamboox-treme®

For centuries bamboo poles and bamboo components have been used in outdoor applications. Unfortunately many additional protective measures are needed to guarantee a sufficient and acceptable lifetime. In dry environments poles will crack and the bamboo inner wood material, due to its high “sugar”-components, will be easily attacked by micro-organisms and fungi. In the land of origin bamboo can be replaced fast and cost efficiently, but in Western countries this is not an option. Therefore, wouldn't it be great to find a way to use one of the fastest growing plants on earth as an alternative for scarce hardwood species and to make the material suitable for outdoor applications?

## new production methods

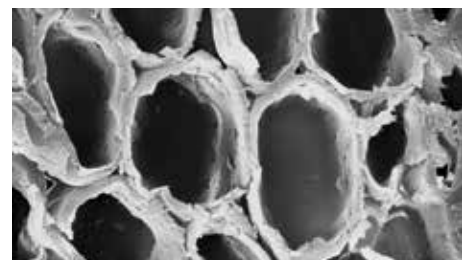
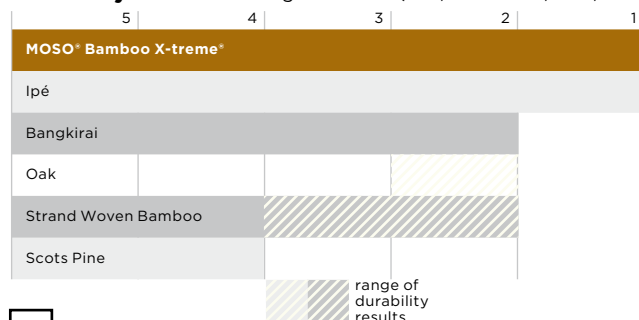
With this challenge MOSO® started to research and test various existing methods to protect bamboo in outdoor applications. The wood protection methods initially tested, which are also often used by other bamboo suppliers, were not satisfactory and did not perform according to MOSO's quality standard. Therefore MOSO® decided to develop its own way to solve the problem by modifying the density of the bamboo and combining this with a special heat treatment process at ca. 200°C, to improve the durability and stability of bamboo, referred to as “Thermo-Density® treatment” in this text.

In 2008 MOSO's invention was registered internationally. In 2014 the patent was registered in all European countries and several countries worldwide. In 2009 the relevant laboratory and practical tests were done, which proved that the Thermo-Density® treatment is the right method (and currently the only effective solution) to make bamboo suitable for outdoor applications.

## highest durability class

Untreated bamboo has a durability class 5 according to EN350 (not durable). By modifying the bamboo with the Thermo-Density® treatment, the dimensional stability of bamboo is improved by circa 50%. Besides stability improvement, the durability is improved to the best durability class possible, from class 5 to class 1 (CEN/TS 15083-2 class 1 - simulated graveyard test, CEN/TS 15083-1 class 1 according to EN350), unmatched by any other bamboo outdoor product.

**durability class** according to EN 350 (CEN/TS 15083-2 / CEN/TS 15083-1)



Bamboo on molecular level before (top) and after (bottom) the Thermo-Density® treatment: before the sugar molecules are still visible, after the treatment they have disappeared. With this treatment bamboo is no longer a food source for fungi and micro-organisms.

The density heat treated bamboo is also very well protected against superficial fungi (EN152, Class 0). This bamboo outdoor product achieves the use/risk class 4 according to the EN335, and is the only bamboo material available on the market that does so. This means it may be used in direct fresh water contact, direct earth contact and it does not need any additional treatment.

## CO<sub>2</sub> neutral or better over the full life cycle

Doesn't the Thermo-Density® process compromise the environmental sustainability of this product? No it does not: MOSO® commissioned Delft University of Technology to execute an official LCA and carbon footprint study according to ISO 14040/44. The report, available on request, concludes that this bamboo outdoor product is CO<sub>2</sub> neutral or better over the full life cycle. In fact, because of the superior durability, the product does not have to be replaced as often as other hardwood species while at the same time taking advantage of the enormous growth capacity of giant bamboo.

The special high density pressing (increasing the density from 650-700 kg/m<sup>3</sup> to approx. 1.150 kg/m<sup>3</sup>) more than compensates for the disadvantage of material brittleness of heat treated bamboo, and will strongly improve the hardness of this product. After pressing, the material is stronger and harder than almost any other hardwood in the world. That is why we call it: **MOSO® Bamboo X-treme®**.

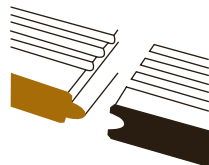
Only with MOSO® Bamboo X-treme® can you be sure to have the original, patented product. Copies of the original do not offer the same hardness and level of durability, dimensional stability and ecology. With a look-alike product, there is a large risk of claims after installation. Always ask for the original, certified MOSO® Bamboo X-treme® products!

# discover the **bamboo** **x-treme®** benefits



## hard & durable

- The only bamboo decking with class 1 durability (EN350) tested following CEN/TS 15083-2 class (simulated graveyard test).
- Durability Class 4 in accordance with EN335 (use class).
- Class 0 fungi resistance in accordance with EN152.
- Exceptionally hard: Brinell >9,5kg/mm<sup>2</sup> (harder than any tropical wood available).



## high stability

- Very stable as a result of the thermo treatment combined with High Density® compression.
- Far more stable than any other tropical hardwood - enabling head side tongue and groove connection.
- Limited tendency to torsion.
- No head side gap between boards necessary.
- Only 5-6 mm expansion space between (the sides of) the boards.
- Possible to use pressure impregnated pine as sub frame.



## easy to install

- 2 installation possibilities with just 1 product: (invisible) fixing with fasteners or screw down.
- Both sides of the board - ribbed or flat - can be used.
- Fixed board length 1850 mm, easy for 1 person to install, no complicated installation plans necessary.
- Head side tongue and groove for flexible installation.
- Macro bevel on head side, avoiding sharp edges.
- Complementing Thermo-Density® sub frame joists available.



## economical

- Simple and fast installation: Up to 30% savings in installation costs!
- Reduced wastage of material during installation because of the head side tongue and groove.
- Every plank has been hand checked after production, therefore no loss due to defective material.
- Cost effective transportation because of the fixed 1850 mm length.
- Cost effective and space reducing stocking because of unique multi usable board.
- 1 pallet= ca. 50 sqm= approx. 1.100 kg, therefore easy for transportation and stocking.



## beautiful appearance

- A beautiful, natural hardwood look.
- Customer choice for flat or ribbed surface.
- With fastener installation no damage to the boards by screw holes.
- Free of knots and natural plant resins.
- Customer choice for natural greying or keeping brown colour with maintenance.



## endless resource

- Made from Moso bamboo; With a growing speed of up to 1 meter per day the fastest growing plant on earth.
- Ready for harvest after 5 years (compared to up to 100 years for hardwood species) - no deforestation.
- Consisting of approx. 90% natural bamboo fibres.



## CO<sub>2</sub> neutral

- Official LCA and carbon footprint studies by Technical University Delft according to ISO 14040/44 confirm that MOSO® Bamboo X-treme® is CO<sub>2</sub> neutral over the full life cycle.
- No use of fungicide in the production.



## fireproof

- Reaches fire safety class Bfl-s1 (decking) and B-s1-d0 (cladding) following EN13501-1 without use of fire retardants. As a result, MOSO® Bamboo X-treme® can be easily applied in public projects without additional measures.





Photography: Derako

### **Texaco Gas Station**

Nijkerk, the Netherlands / Design: Bogaerds Architecten & ContrAll



### **Private Residence**

(500 m<sup>2</sup>) Tossa de Mar, Spain



Photography: Daniele Kaehr

### **Apartments Residenza Lotus**

(1.600 m<sup>2</sup>) Lago Maggiore, Switzerland



Photography: Elad Gonen

### **Beach promenade Tel-Aviv**

(700 m<sup>2</sup>) Tel-Aviv, Israel / Design: Mayslits Kassif Architects



### **Private Residence**

(120 m<sup>2</sup>) Cape Town, South Africa



Photography: Petra Appelhof

### **Center Court Chemelot Campus Geleen**

(1600m<sup>2</sup> + 2466 m<sup>2</sup>) Geleen, the Netherlands





Photography: Elad Gonen

### Tel-Aviv University - LEED Platinum

Israel / Design: Geotectura / Axelrod Grobman / NC / Braudo-Maoz



### Hotel Riberach

(1.200 m<sup>2</sup>) Belesta, France



### Youth Olympic Park

(29.315 m<sup>2</sup>) Nanjing, China



### Venco Campus - BREEAM Outstanding

The Netherlands



### Vabali Spa

(2.350 m<sup>2</sup>) Berlin, Germany / Design: Theune Spa Management

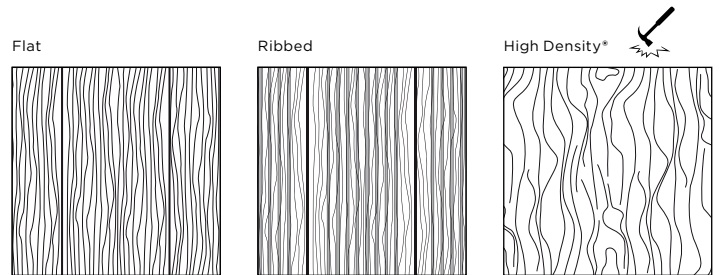
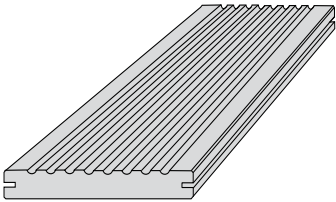


### Head Office MOSO®

(600 m<sup>2</sup>) Zwaag, Netherlands

# MOSO® bamboo x-treme® outdoor decking

MOSO® Bamboo X-treme® is a solid, High Density® decking board, made from compressed bamboo fibres. A special, patented heat treatment process at 200°C provides MOSO® Bamboo X-treme® the highest durability class possible in the appropriate EU norms (see technical characteristics below) and increases the hardness and stability. A unique feature of MOSO® Bamboo X-treme® is the headside tongue and groove: this can only be done with very stable materials and enables connection of an unlimited number of boards in the length. The special symmetrical shape of the sides offers the possibility to choose between either the ribbed or the flat surface, and allows for quick installation with MOSO® fasteners. Like any untreated tropical hardwood species, when exposed to outdoor conditions, MOSO® Bamboo X-treme® will turn grey over time creating a very natural look.



O: Oil Woca, B: Bevel (also on headside), R: Ribbed, F: Flat, Head-side T/G: Headside Tongue/Groove  
\*) Headsides protected with wax, \*\*) Check availability.

Product Code	Grooved	Finish	Edges	Surface	Headside T/G	Dimensions (mm)
BO-DTHT170G	Yes	-	B	R/F	Yes	1850x137x20
BO-DTHT171G	Yes	O	B	R/F	Yes*	1850x137x20
BO-DTHT181G	Yes	O	B	R/F	Yes*	1850x137x18
BO-DTHT190G**	Yes	-	B	R/F	Yes	1850x155x20
BO-DTHT191G	Yes	O	B	R/F	Yes*	1850x155x20
BO-DTHT210G**	Yes	-	B	R/F	Yes	1850x178x20
BO-DTHT211G	Yes	O	B	R/F	Yes*	1850x178x20

Also available with FSC® certification.

## installation summary

(full version available on [www.moso.eu/x-treme](http://www.moso.eu/x-treme))

- Install a suitable, fixed, stable and durable sub frame.
- Determine which side of the board will be used: the ribbed or flat side.
- Fix the boards on the sub frame using fasteners (to be inserted in the grooves of the board) or alternatively with screws (through the surface).
- Use a 1-2% slope and ensure good ventilation is available.
- After installation: make sure proper cleaning and maintenance is done, according to the chosen finish.
- When not applying outdoor oil 2x per year, the deck will acquire a grey colour tone and the typical bamboo wood grain structure will become less visible.
- Bamboo X-treme® is available pre-oiled or unfinished. Final treatment after installation with water based oil/ saturator is necessary for all versions.
- For further info: please see the installation/maintenance instructions.

## technical characteristics and certifications

- Density: +/- 1.150 kg/m<sup>3</sup>
- Dimensional stability:  
length: + 0.1 %; width + 0.9% (24 hours in water 20°C)
- Resistance to indentation - Brinell Hardness: ≥ 9.5 kg/mm<sup>2</sup> (EN 1534)
- Reaction to fire: Class Bfl-s1 (EN 13501-1)
- Slip resistance: USRV 37 (Dry), USRV 29 (Wet) (CEN/TS 15676) / R 10 (CEN/TS 16165 Annex B - DIN 51130)
- Modulus of Elasticity: 10373 N/mm<sup>2</sup> (EN 408)
- Breaking strength: 50.30 N/mm<sup>2</sup> (EN 408)
- Biological durability:  
Class 1 (EN 350 / CEN/TS 15083-2), simulated graveyard test  
Class 1 (EN 350 / CEN/TS 15083-1)
- Effectiveness against Blue Stain: Class 0 (EN 152)
- Use Class: Class 4 (EN 335)
- CO<sub>2</sub> neutral: LCA report TU Delft (ISO 14040/44) ([www.moso.eu/lca](http://www.moso.eu/lca))
- Environmental Product Declaration - EPD (EN 15804) ([www.moso.eu/epd](http://www.moso.eu/epd))
- FSC®: Products available with FSC® certification on request.
- Contribution LEED BD+C - v4: MR 1, MR 2, MR 3 (FSC®) v2009: MR 6, MR 7 (FSC®)
- Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5 (HD)
- Guarantee: 10 years



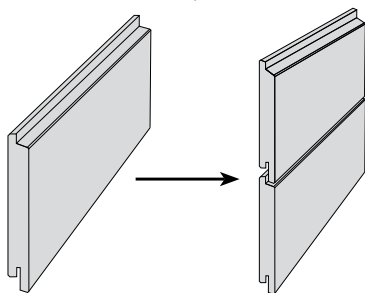
# MOSO® bamboo x-treme® outdoor cladding

MOSO® Bamboo X-treme® cladding is a solid, High Density® exterior board, made from compressed bamboo fibres. A special, patented heat treatment process at 200°C provides MOSO® Bamboo X-treme® the highest durability class possible in the appropriate EU norms, increases the stability and density, and consequently the hardness (see below).

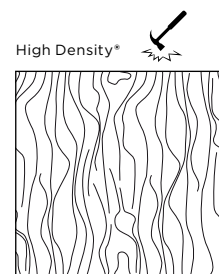
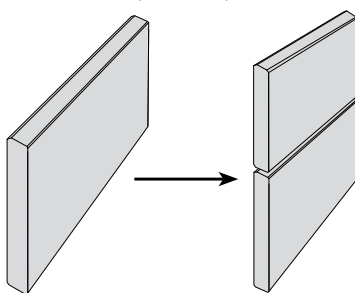
Furthermore, contrary to other wood products, this product achieves fire safety class B-s1-d0 (EN 13501-1) without impregnation with expensive and eco-damaging fire retardants.

MOSO® Bamboo X-treme® cladding is available in 2 shapes: a rebated profile and a trapezium shape. The former is installed with fasteners (18mm) and screws and the latter with screws. Like any untreated tropical hardwood species, when exposed to outdoor conditions, MOSO® Bamboo X-treme® will turn grey over time creating a very natural look.

BO-DTHT501G (rebated profile)



BO-DTHT510 (trapezium shape)



O: Oil Woca, B: Bevel (also on headside), F: Flat, **Head-side T/G**: Headside Tongue/Groove

Product Code	Grooved	Finish	Edges	Surface	Head-side T/G	Effective width (mm)	Dimensions (mm)
BO-DTHT501G	Yes	O	B	F	Yes	128	1850x137x18
BO-DTHT510	No	-	B	F	Yes	132	1850x137x18

## technical characteristics and certifications

- Density: +/- 1.150 kg/m³
- Dimensional stability:  
length: + 0.1 %; width: + 0.9 % (24 hours in water 20°C)
- Resistance to Indentation - Brinell Hardness: ≥ 9.5 kg/mm² (EN 1534)
- Reaction to fire: Class B-s1-d0 (EN 13501-1)
- Biological durability:  
Class 1 (EN 350 / CEN/TS 15083-2), simulated graveyard test  
Class 1 (EN 350 / CEN/TS 15083-1)
- Effectiveness against Blue Stain: Class 0 (EN 152)
- Use Class: Class 4 (EN 335)
- CO<sub>2</sub> neutral: LCA report TU Delft (ISO 14040/44)  
([www.moso.eu/lca](http://www.moso.eu/lca))
- Environmental Product Declaration - EPD (EN 15804)  
([www.moso.eu/epd](http://www.moso.eu/epd))
- FSC®: Products available with FSC® certification on request.
- Contribution LEED BD+C - v4: MR 1, MR 2, MR 3 (FSC®)  
v2009: MR 6, MR 7 (FSC®)
- Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5 (HD)
- Guarantee: 10 years

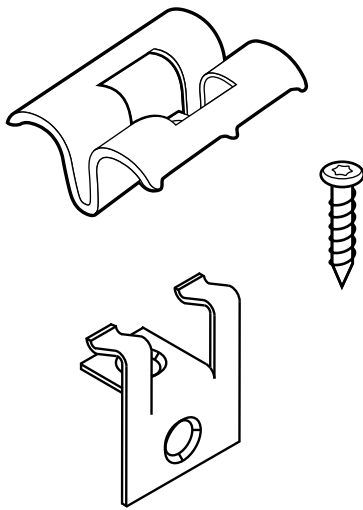


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breeam 9

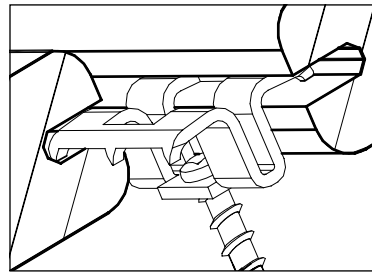
# MOSO® bamboo x-treme® accessories



## MOSO® fasteners and screws

With these fasteners MOSO® Bamboo X-treme® decking and cladding can be easily installed. When installed correctly there will be 5-6mm gaps between the boards. The fasteners are supplied with matching stainless steel screws (square bit). For installation on aluminium sub beams (not provided by MOSO®), special screws are available.

Product Code	Item	Material	Colour	Dimensions (mm)
CLIP-SCREW-BX03	Fastener (20mm)	Stainless steel A2 (AISI304)	Brown	27x22.5x10.8
	Screw	Stainless steel A2 (AISI304)	Brown	4.5x30
CLIP-SCREW-BX301	Fastener starter/end (20mm)	Stainless steel A2 (AISI304)	Brown	27x17x31
	Screw	Stainless steel A2 (AISI304)	Brown	4.5x30
SCREW-03-01	Screw for aluminium sub beams	Stainless steel (AISI410)	Brown	4.2x16
CLIP-SCREW-BX04	Fastener (18mm)	Stainless steel A2 (AISI304)	Brown	27x22.5x9.8
	Screw	Stainless steel A2 (AISI304)	Brown	4.5x30



### recommended number of fasteners/m²

#### decking\*

137 mm  
-20 pcs/m²

155 mm  
-17 pcs/m²

178 mm  
-14 pcs/m²

#### cladding\*\*

137 mm  
-14 pcs/m²

\*) Based on distance of 462.5 mm between the sub beam axes.

\*\*) Based on distance of 600 mm between the sub beam axes.

## sub frame joists

The MOSO® Bamboo X-treme® sub frame joists are made of the same material as the decking boards: High Density® heat treated bamboo.

Product Code	Material	Finish	Dimensions (mm)
BO-SB150	High Density® heat treated bamboo	Unfinished	2440x70x40
BO-SB155	High Density® heat treated bamboo	Unfinished	2440x60x40

## endprofile

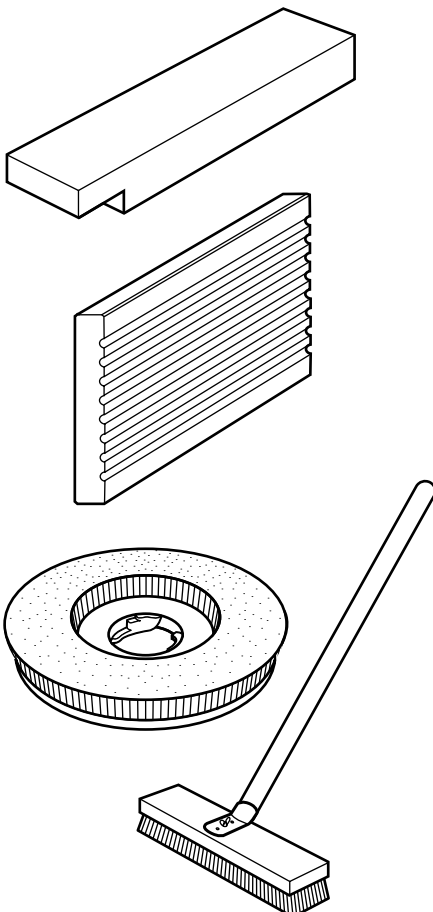
The BO-DTHT162 is an endprofile for an elegant finish of the sides of the decking. It is placed vertically against the sides of the terrace to cover the sub frame.

Product Code	Material	Finish	Dimensions (mm)
BO-DTHT162	High Density® heat treated bamboo	Unfinished	1850x137x20

## maintenance & cleaning

Under the influence of wind, rain, sun and snow the decking will weather. MOSO® recommends to impregnate and maintain the pre-oiled decking with Woca Maintenance materials. Unfinished decking must be treated with Sikksens Saturator or Woca oil right after installation. The silicium carbid broom and machine disk are perfectly suited to clean and smooth the decking surface of Bamboo X-treme® and to remove splinters due to the capability to sand the surface in addition to cleaning it.

Product Code	Material
Wax-bx-01	Wax for headsides X-treme
Oil-Woca-003	WOCA Maintenance Oil Natural
Oil-Woca-011	WOCA Exterior Oil Exclusive Teak
Cleaner-Woca-01	WOCA Exterior Cleaner
SATURATOR-SIK01	SIKKENS Saturator Ipe
SATURATOR-SIK11	SIKKENS Saturator Transparent
Broom-01	Silicium carbid broom
Disk-01	16" Silicium carbid disk

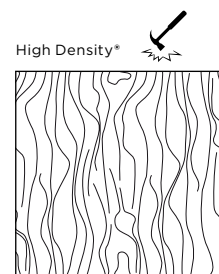
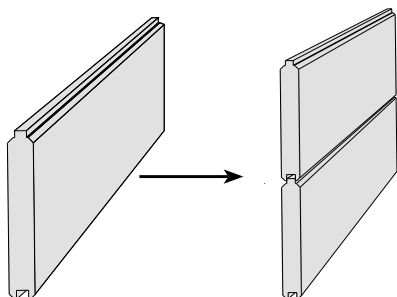




# MOSO® bamboo x-treme® fencing

MOSO® Bamboo X-treme® fence boards are solid, High Density® exterior boards, made from compressed bamboo fibres. A special, patented heat treatment process at 200°C provides MOSO® Bamboo X-treme® the highest durability class possible in the appropriate EU norms and increases the stability and density. The fence boards, with tongue and groove, are mounted between posts with U-profiles (not provided by MOSO®). Like any untreated tropical hardwood species, when exposed to outdoor conditions, MOSO® Bamboo X-treme® will turn grey over time creating a very natural look.

BO-DTHT301TG (fencing board shape)



O: Oil Woca, B: Bevel (also on headside), F: Flat, T/G: Tongue/Groove

Product Code	Grooved	Finish	Edges	Surface	Head-side T/G	Effective width (mm)	Dimensions (mm)
BO-DTHT301TG	T/G	O	B	F	No	131	1800x137x20

## technical characteristics and certifications

- Density: +/- 1.150 kg/m<sup>3</sup>
- Dimensional stability:  
length: + 0,1%; width + 0,9% (24 hours in water 20°C)
- Resistance to Indentation - Brinell Hardness: ≥ 9.5 kg/mm<sup>2</sup> (EN 1534)
- Reaction to fire: Class B-s1-d0 (EN 13501-1)
- Biological durability:  
Class 1 (EN 350 / CEN/TS 15083-2), simulated graveyard test  
Class 1 (EN 350 / CEN/TS 15083-1)
- Effectiveness against Blue Stain: Class 0 (EN 152)
- Use Class: Class 4 (EN 335)
- CO<sub>2</sub> neutral: LCA report TU Delft (ISO 14040/44)  
([www.moso.eu/lca](http://www.moso.eu/lca))
- Environmental Product Declaration - EPD (EN 15804)  
([www.moso.eu/epd](http://www.moso.eu/epd))
- FSC®: Products available with FSC® certification on request.
- Contribution LEED BD+C - v4: MR1, MR2, MR3 (FSC®)  
v2009: MR 6, MR 7 (FSC®)
- Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5 (HD)
- Guarantee: 10 years

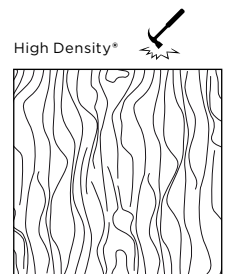
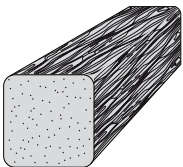


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# MOSO® bamboo x-treme® outdoor beams

A special patented heat treatment process at 200°C and increased density (by compressing the bamboo fibres) make the MOSO® Bamboo X-treme® material extremely durable and stable. This durability and stability, and the pre-profiled rounded edges, make MOSO® Bamboo X-treme® beams ideal for use in outdoor furniture products. The elaborate manufacturing process provides MOSO® Bamboo X-treme® outdoor beams the highest durability class possible in the applicable EU norms. As with tropical hardwoods, the colour of the material changes under the influence of wind, rain, frost and sunshine (UV-light). This results in a typical weathered natural grey-tone. Regular cleaning and maintenance with a Lasur/oil protects the material against this weather related discolouration.



LR: Lasur Sigma

Product Code	Finish	Bevel	Dimensions (mm)
BO-DTHT2170-01	LR	R=6mm	2000x115x40
BO-DTHT2171-01	LR	R=6mm	2000x80x40
BO-DTHT2172-01	LR	R=6mm	2000x60x40
BO-DTHT2173-01	LR	R=6mm	2000x40x40
BO-DTHT2174-01	LR	R=6mm	2000x55x40
BO-DTHT2175-01	LR	R=6mm	2000x90x40

## technical characteristics and certifications

- Density: +/- 1.150 kg/m<sup>3</sup>
- Dimensional stability:  
length: + 0,1 %; width + 0,9% (24 hours in water 20°C)
- Resistance to Indentation - Brinell Hardness: ≥ 9.5 kg/mm<sup>2</sup> (EN 1534)
- Reaction to fire: Class B-s1-d0 (EN 13501-1)
- Modulus of Elasticity: 10373 N/mm<sup>2</sup> (EN 408)
- Bending strength: 50.30 N/mm<sup>2</sup> (EN 408)
- Biological durability:  
Class 1 (EN 350 / CEN/TS 15083-2), simulated graveyard test  
Class 1 (EN 350 / CEN/TS 15083-1)
- Effectiveness against Blue Stain: Class 0 (EN 152)
- Use Class: Class 4 (EN 335)
- CO<sub>2</sub> neutral: LCA report TU Delft (ISO 14040/44)  
([www.moso.eu/lca](http://www.moso.eu/lca))
- Environmental Product Declaration - EPD (EN 15804)  
([www.moso.eu/epd](http://www.moso.eu/epd))
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- Contribution LEED BD+C - v4: MR1, MR2, MR3 (FSC®)  
v2009: MR 6, MR 7 (FSC®)
- Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5 (HD)
- Guarantee: 10 years



# MOSO® bamboo x-treme® decking installation instruction

## before installation

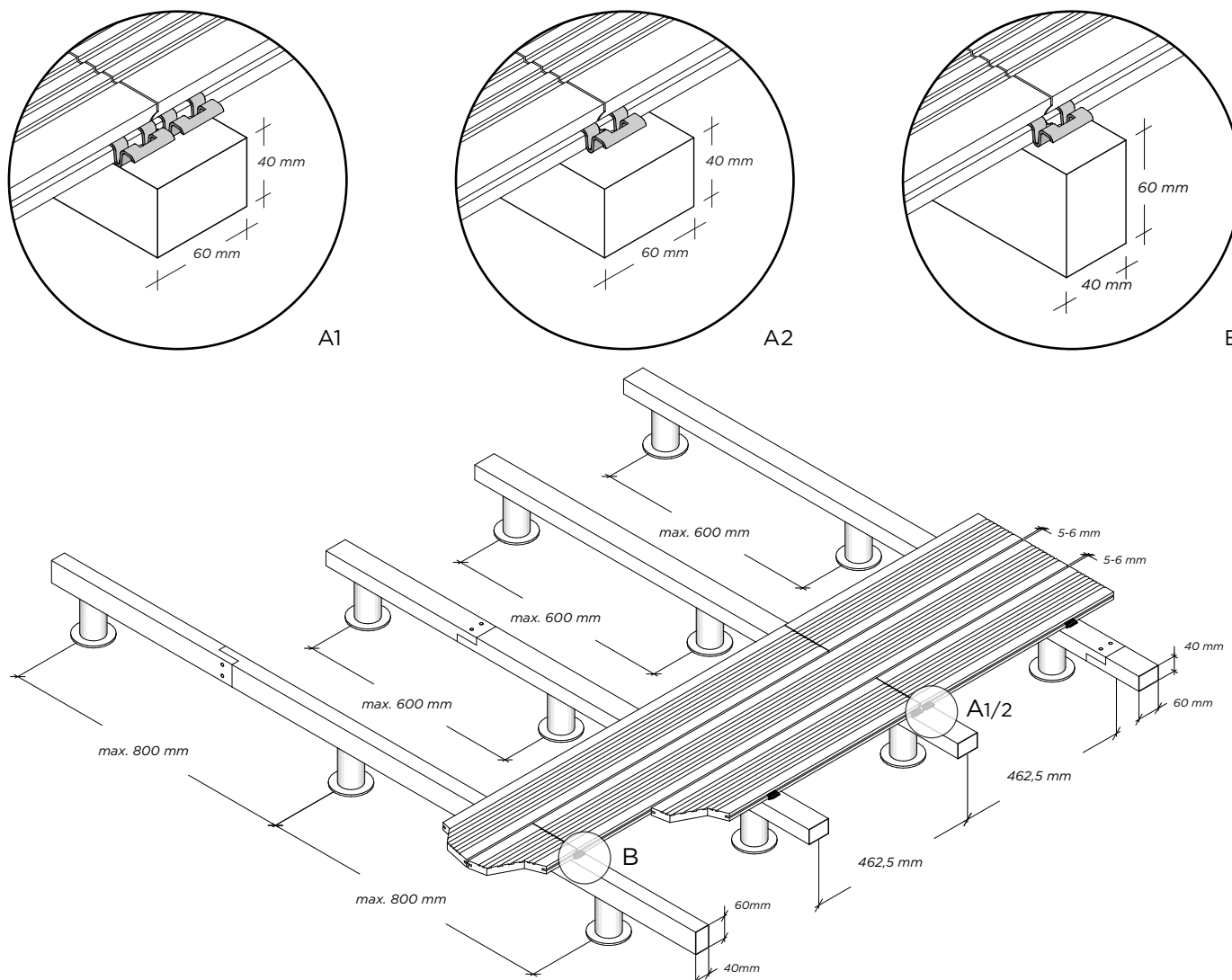
- Water logging under the decking must be avoided by preparing a water permeable ground structure. This can be achieved by sand layers and gravel dispersion above.
- Use cement/stone tiles 40-50 mm thick or pedestals, to support the sub frame. See drawing.
- Place a rootbarrier under the tiles to prevent weeds to grow from under the decking.
- Install the decking boards with a slope of 1-2% to enable water to run off the surface.
- Ensure good ventilation of the decking by keeping at least 20 mm space at walls and obstacles and avoid closing the terrace on the sides.
- When the surface underneath the decking is not fast drying, there should be at least 100 mm distance between the decking and the surface underneath the floor.
- Use sub frame joists with the minimum size of 40x60 mm. Suitable joists are those with the same durability class as the decking; MOSO® sub frame joists, ALU sub frame joists, stable hardwood joists or impregnated pine joists. Avoid direct contact with the earth.
- MOSO® sub frame joists can be installed without distance, connecting the joists with screws and glue suited for outdoor use. Other sub frame joists should be installed with 5-8 mm distance between the head sides.

- In order to create a stable deck frame, the outsides of the frame have to be connected at regular intervals to the ground/ structure below. Alternatively cross bracing can be applied.
- Install the boards on sub frame joists with 462.5 mm space between the joists (centre-to-centre) so each board is supported by 5 battens. Always install the head sides of the boards exactly on the sub beam.
- If a random installation pattern is preferred, make sure that the sub frame joist (centre-to-centre) are no more than 300 mm apart.
- Always install cut off outdoor boards on at least 3 sub frame joists.

- and cross cut ends. Besides this the surface gets rough. This phenomenon is normal for most wood species and is minimized for this product by its patented 'Thermo-Density®' production method. Head sides cracks can be further minimized by applying wax on cross end sides of the cut boards, see below.
- Splinters and roughness can be removed by cleaning the surface of the decking with the silicium carbid broom or machine disk MOSO® supplies, the surface will become smooth and splinters are removed.
- Dimensional change or cupping of the boards can occur after installation. This phenomenon is normal for most wood species and is minimized for this product by its patented Density® - heat treated production method.
- When using the flat side of the boards as surface please note that deformation under influence of climate will be significantly more visible. Deformation of the surface is not considered to be fault of the material.

## please note

- The MOSO® Bamboo X-treme® outdoor board is a natural forest product, which varies in colour, grain and appearance. Colour can change fast from dark brown to brown or grey, depending on the maintenance schedule.
- Cracks and splinters on the surface and on the end of the boards will arise from the different drying characteristics of the surface



# MOSO® bamboo x-treme® decking installation instruction

## the installation

- Keep at least 5-6 mm expansion space between the boards (in width direction). With MOSO® Bamboo X-treme® fastener installation this is automatically the case.
- Because of the stability of the boards and the shape of the head side tongue and groove no expansion space is needed on the head side.
- Every cut head side has to be impregnated with head side wax, to prevent water penetration. Head side wax is available as accessory.

### installation with fasteners

- Determine the surface side of the boards (ribbed- or flat surface).
- Use the MOSO® Bamboo X-treme® fasteners or other suitable fasteners in the following sequence:
  - Press fastener in the groove of one board.
  - Pre-drill the screw holes. On hardwood/bamboo: use 3.2-3.5 mm extended drill (11cm long) in order to pre drill deep enough.
  - Mount the screw without fully tightening.
  - Install the following board.
  - Tighten the screw in the fastener and the sub beam. Always screw vertically to the joist. Apply low torque with slow screwing speed on the drilling machine. Perform some tests for correct torque speed adjustment before full installation.
- Use approx. 20/17/14 clips per m², this is depending on the type or board 137/155/178mm wide. When the tongue and groove are connected on the sub beam use 2 clips, 1 for every board.
- Only use the included stainless steel decking screws (4.5 x 30 mm).
- Please watch the installation video [www.moso.eu/x-treme](http://www.moso.eu/x-treme).

### screw down installation

- Determine the surface side of the boards (ribbed- or flat surface).
- Pre-drill the screw holes 20 mm from the side of the board. Be sure to pre drill with a large enough drill to avoid cracking of the decking.
- Always screw both sides (left and right) of the board.
- Use stainless steel decking screws (ca 5x50 mm).

## maintenance and cleaning

### prefinished version

- MOSO® Bamboo X-treme® outdoor decking is pre-oiled, double sided, with WOCA exterior water based decking oil (teak colour).
- Clean the floor at least one time per year with WOCA Decking Cleaner and silicium carbid broom or -disk. Follow the instructions on [www.moso.eu/youtube](http://www.moso.eu/youtube). Depending on climate and use it may be necessary to perform cleaning more than once per year.
  - Remove the dirt water residue on the boards with clean water and let the floor dry.
  - Apply 1-2 new layers of WOCA Decking Oil (WOCA exterior oil, teak colour). When not applying new outdoor oil 1-2x per year, the floor will turn in to a grey colour tone and the typical bamboo wood grain structure will become less visible. First oiling can be performed directly after installation, the best moment for the first maintenance is 3-4 months after installation, when the surface is more open than immediately after installation. Follow the instructions on [www.moso.eu/youtube](http://www.moso.eu/youtube).
  - It is advisable to keep the decking free from dust and dirt as much as possible (clean by broom regularly).

### unfinished version

- It is possible to leave the decking without oiling, however cleaning once a year is necessary; the result will be a rough and grey appearance. An initial application with water based decking oil/ saturator is necessary in order to impregnate the decking. This can be done immediately after installation or, to have better impregnation, after 3-4 months when the surface is more open.
- Clean the decking with water, cleaner and silicium carbid broom or - disk.
  - Let the decking dry. When the decking is completely dry please follow the instructions of the supplier of the used oil or saturator.
  - After this first application the decking can remain without oil treatment for natural greying. However annual cleaning with the silicium carbid broom or disk is obligatory. If you want to keep a darker colour, regular application of oil/saturator is needed.
  - It is advisable to keep the decking free from dust and dirt as much as possible (clean by broom regularly).

## storing

Store MOSO® Bamboo X-treme® in a dry, cool place protected against dust and direct sunlight.

## additional note

Whilst all due care is taken to ensure the accuracy of the installation instructions, individual circumstances (location, sub floor and installation procedures) may vary and are beyond the manufacturer's control. In case of doubt, therefore, consult the distributor.

**These instructions are subject to change. For the latest version visit [www.moso.eu/x-treme](http://www.moso.eu/x-treme)**

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# bamboo x-treme® decking maintenance & cleaning



Surface of MOSO® Bamboo X-treme® with different maintenance and cleaning scenarios: weathered, dirty decking (left), weathered, cleaned decking (middle), and re-oiled decking (right).

## maintenance WOCA

The surface of decking is weathered under influence of wind, rain, frost and sunshine (UV). As a result, the surface turns grey, dirty and cracks/splinters will appear. WoodCare Denmark has developed different outdoor cleaning- and maintenance products. WOCA Exterior Cleaner loosens dirt and removes green growth from the surface, without damaging it.

### cleaning

- Soak MOSO® Bamboo X-treme® with plenty of water. If possible use a garden hose.
- Mix exterior cleaner with water in the ratio 1:2 and apply it. If the decking is extremely dirty, exterior cleaner may be used undiluted. Clean the decking with a silicium carbide brush or machine disk (see accessories). Scrub the soaked material lengthwise following the bamboo grain until the material appears clean. If the decking has a flat surface, first scrub under an angle of 45 degrees before scrubbing in the length direction. When using a machine disk this is not necessary. Repeat the cleaning if necessary. Clean the surface carefully with water.
- Leave MOSO® Bamboo X-treme® to dry for approx. 24 hours. The material must be completely dry before oil treatment can be done.

### application of oil

- Apply in dry weather only. Avoid direct sunlight and high temperatures.
- Stir the oil thoroughly before use. Apply an even thin coat of oil with a brush.
- The oil is cream-coloured when it is wet.
- After a few minutes, the material has an oily appearance as the water is evaporating.
- Wipe off any excess oil with clean cotton cloths after no more than 5-10 minutes.
- Take particular care to remove excess oil from joints and grooves.
- Repeat the above process.
- When the material is dry, it may be polished with a polishing pad or polishing machine to ensure an extra hard-wearing surface. It takes 24 to 48 hours for the oil to harden thoroughly, depending on weather conditions and outdoor temperature. The material should not be exposed to water during this period.

## maintenance of flat side

Please be aware of the fact that on the flat surface, irregularities in the surface (e.g. cracks, splinters) are more visible than on the ribbed surface. If regular maintenance with a water based decking oil is performed, this will be reduced.

## risk of self-ignition

Due to the risk of self-ignition it is important that oil-wetted cloths are soaked in water and are disposed in a tightly closed container after use.



Check out the maintenance movie at [www.moso.eu/x-treme](http://www.moso.eu/x-treme).



# MOSO® bamboo x-treme® test results

The excellent performance of MOSO® Bamboo X-treme® has been extensively tested by acknowledged research institutes. Find a summary of the most important test results below. Full reports are available upon request. Only with MOSO® Bamboo X-treme® can you be sure to have the original, patented product. Copies of the original do not offer the same hardness and level of durability, dimensional stability and ecology. With a look-alike product, there is a large risk of claims after installation. Always ask for the original, certified MOSO® Bamboo X-treme® products!



Durability of Heat Treated Strand Woven Bamboo: soft rot fungi

Report code: 10.620w2

Date: August 30<sup>th</sup>, 2011

Page: 8/13

## 4 Conclusion

Moso International BV in cooperation with Moso Europe SLU commissioned SHR to determine the durability of Heat Treated Strand Woven Bamboo according to EN 350-1 and following the ENV 807 laboratory soil box test using 4 boards of decking.

Based on mass loss of the Beech and Pine sapwood reference samples, the test was declared valid after 12 weeks of exposition to the soil box. The mass loss of the bamboo was comparable to that of the durable reference wood species Azobé and Merbau. The durability of the tested bamboo material was found to be class 1.

## durability

ENV 807  
(CEN/TS 15083-2) /  
EN 350

class 1



Durability of Heat Treated Strand Woven Bamboo

Report code: 9.061-D

Date: August 18, 2009

Page: 9/10

## 4 Conclusion

On behalf of Moso International BV the durability of Heat Treated Strand Woven Bamboo is tested according to EN 113 and EN 350-1. Material originating from 3 different production batches or shipments were tested. Five fungi were used in the test: *Poria placenta*, *Coriolus versicolor*, *Gloeophyllum trabeum*, *Coniophora puteana*, *Donkaporina expansa*. The results obtained with *Coniophora*, *Poria*, *Coriolus* and *Donkaporina* were used to assess the durability and reproducibility of to production. Based on the test results of the mass loss Moso Heat Treated Strand Woven Bamboo can be classified in durability class 1 and can be produced reproducibly.

## durability

EN 113  
(CEN/TS 15083-1) /  
EN 350

class 1



Resistance of Heat Treated Strand Woven Bamboo against blue staining fungi

Report code: 9.061-E

8 September, 2009

Page: 10/10

## 4 Conclusion

On behalf of Moso International BV an EN 152 blue stain test was performed on Heat Treated Strand Woven bamboo. UV- weathering was used as preconditioning of part of the samples. The combination of UV light and water spray resulted in strong discoloration of the surfaces of both the bamboo samples and the Pine sapwood reference samples.

Neither on the weathered nor on the original Bamboo samples discoloration of the blue stain fungi or the hyphae of the blue stain fungi could be observed. As a result it can be concluded that the susceptibility of this Heat Treated Strand Woven Bamboo towards blue stain is very low.

## resistance against surface fungi

EN 152

class 0

Use Class	Service situation	Biological agents	Used test standard	Test result
1	Interior, covered	Wood boring beetles	n.a.	n.a.
2	Interior or covered	As above + Disfiguring fungi + Decay fungi	EN152 CEN/TS 15083-1 / EN350	Class 0 Class 1
3	Exterior, above ground			
4	Exterior, in ground contact and/or fresh water	As above + Soft rot	CEN/TS 15083-2 / EN350	Class 1

## use/risk class

EN 335

class 4

### 4. Classification and field of application

#### 4.1 Reference of classification

This classification has been carried out in accordance with clause 12 of EN 13501-1:2007+A1:2009.

#### 4.2 Classification

The product, **BAMBOO X-TREME™ DECKING**, in relation to its reaction to fire behaviour is classified:

**B<sub>s</sub>**

The additional classification in relation to smoke production is:

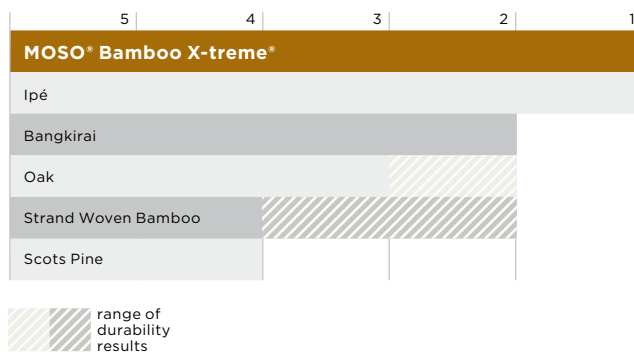
**s1**

**Reaction to fire classification: B<sub>s</sub> - s1**

## firesafety

EN 13501-1

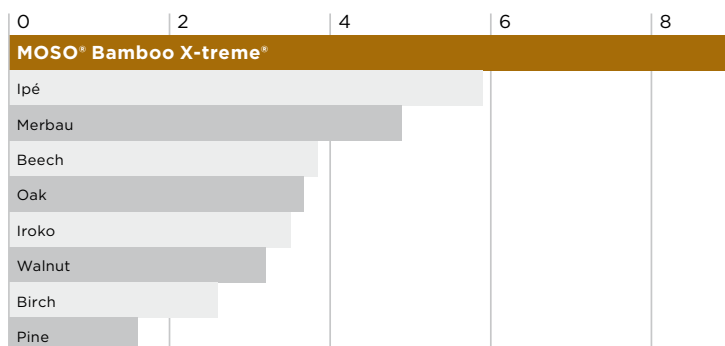
class Bfl-s1



## durability

EN 350 (CEN/TS 15083-2 / CEN/TS 15083-1)

class 1



## brinell hardness

EN 1534

9.5 kg/mm<sup>2</sup>

### Carbon Footprint (CO<sub>2</sub>eq) per kg final product

PRODUCTION	END OF LIFE	CO <sub>2</sub>	CO <sub>2</sub>	CO <sub>2</sub>
CO <sub>2</sub> footprint CO <sub>2</sub> eq/kg	CO <sub>2</sub> credit CO <sub>2</sub> eq/kg	Storage CO <sub>2</sub> eq/kg	Total CO <sub>2</sub> eq/kg	Neutral Y / N
1.193	-0.704	-0.607	-0.118	Yes

### Eco-costs (€) per kg final product

PRODUCTION	END OF LIFE	ECO-COSTS	ECO-COSTS
Eco-costs Euro/kg	Eco-costs Euro/kg	CO <sub>2</sub> storage Euro/kg	Total Euro/kg
0.356	-0.132	-0.082	0.142



The life cycle and the carbon footprint of MOSO products are evaluated according to ISO 14040/44. For more information: <http://www.moso.eu/LCA>. The full report is available on request.

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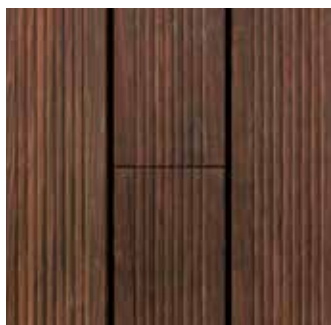
## carbon footprint

ISO 14040/44

CO<sub>2</sub> neutral



# user information for MOSO® bamboo x-treme®



Gradual greying of MOSO® Bamboo X-treme® over time: new, non-weathered decking (left), after 3 months of weathering (middle) and after 18 months of weathering (right).

## appearance and colour

MOSO® Bamboo X-treme® is a natural product, which can vary in colour, grain and appearance. Colour will change over time depending on the maintenance schedule. The boards have a brown to dark brown colour when installed, which turns into a lighter caramel colour several weeks after installation. Without further maintenance the colour gets greyish relatively fast (similar to most other wood species).

If a brown colour is preferred, maintenance should be done with WOCA exclusive exterior oil teak colour or a comparable water based oil/saturator with teak pigments (for the unfinished version).

Direct after installation 1 layer of oil (pre-oiled version) or 2 layers of oil (unfinished version) have to be applied. See for further details the installation instructions. MOSO® Bamboo X-treme® shows similarity to other hardwoods in grain and structure. The characteristic bamboo nodes however can still be recognized and gives the product a special and lively look.

## normal phenomena

Cracks on the surface and on the end of the boards can arise from the different drying characteristics of the surface and cross cut ends. This does not affect the stability or durability of the board.

The surface sides of the boards will get rougher over time and will form (small) splinters as a result of continuous water absorption and desorption due to dry and wet weather periods. Dimensional change or cupping of the boards can occur after installation. These phenomena are normal for most hardwood species and MOSO® Bamboo X-treme®.

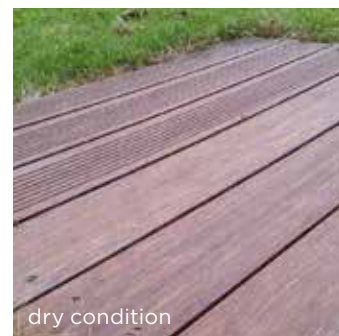
## swimming pool

If MOSO® Bamboo X-treme® is to be used around swimming pool areas, the following has to be taken into account: MOSO® Bamboo X-treme® is a natural (wood like) product and can therefore not be referred to as a “bare foot” product.

As with any wooden product used outdoors, there is always a risk of formation of splinters, however splinters from MOSO® Bamboo X-treme® are normally smaller than (tropical) hard wood splinters. A regular application of oil (more frequently necessary around swimming pools) is required to reduce the formation of splinters. Furthermore, regular maintenance with the silicium carbid broom or -disk is required to effectively remove splinters and smoothen the surface.

## use of the flat side

When using the flat side of the board as surface side please note that surface deformation (under influence of weather changes) will be significantly more visible compared to the ribbed side. Deformation of the surface is not considered to be a defect of the material.



wet condition

dry condition

since 2008 over  
**2.000.000 m<sup>2</sup>**  
installed in  
more than **50**  
countries

**Jumbo Maritime Head Office**

(2.500 m<sup>2</sup>) Rotterdam, Netherlands / Design: Meyer en van Schooten



**AGC Glass Headoffice - BREEAM Excellent**

Louvain la Neuve, Belgium / Design: Philippe SAMYN + PARTNERS



**Outdoor Furniture Floriade**

Venlo, Netherlands / Design: Grijsen

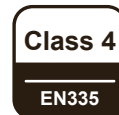




see the ease of installation,  
cleaning and maintenance of  
**MOSO® Bamboo X-treme®** on:  
[www.moso.eu/x-treme](http://www.moso.eu/x-treme).



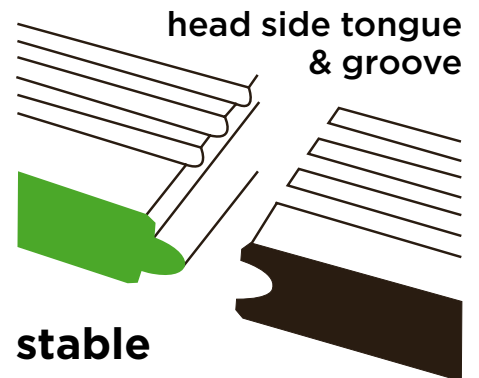
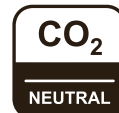
**durable**



**fire resistant**



**sustainable**



**Moso Bamboo Surfaces**  
Units A1 & A2 Stirling road  
South Marston Business Park  
Swindon SN3 4TQ  
T 01793 208030 Select Option 2  
[enquiries@mosobamboosurfaces.co.uk](mailto:enquiries@mosobamboosurfaces.co.uk)

**m<sub>o</sub>so®** bamboo surfaces

Headquarters:

**Moso International B.V.**  
Adam Smithweg 2  
1689 ZW Zwaag  
the Netherlands  
T +31 (0)229 265 732  
[info@moso.eu](mailto:info@moso.eu)

[www.moso.eu](http://www.moso.eu)

**m<sub>o</sub>so®** bamboo products