MOSO® Bamboo X-treme® outdoor products

certified 100% proven
durable - stable - sustainable
the fast growing hardwood alternative

since 2008 over 2.5 million m² installed, in more than 50 countries.

high stability:
end-match system

100% certified
100% proven
durable - stable - sustainable

durable
fire resistant
sustainable

EN350 Class 1
(CEN/TS 15083-2)

EN335 Class 4

fire resistant

sustainable

certified complete range

decking
cladding
fencing
beams
accessories
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 resistance 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.
For centuries bamboo poles and bamboo components have been used in outdoor applications. To guarantee a long lasting product for outdoor, many protective measures have to be taken. 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 China bamboo can be replaced 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 tropical hardwoods 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 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 EN 350 (not durable). By modifying the bamboo with the Thermo-Density® treatment, the dimensional stability of bamboo is improved by approximately 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 EN 350), unmatched by any other bamboo outdoor product.

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

<table>
<thead>
<tr>
<th>MOSO® Bamboo X-treme®</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ipê</td>
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<td>Bangkirai</td>
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<td>Oak</td>
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<td>Strand Woven Bamboo</td>
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<tr>
<td>Scots Pine</td>
<td></td>
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</tr>
</tbody>
</table>

The density heat treated bamboo is also very well protected against superficial fungi (EN 152, Class 0). This bamboo outdoor product achieves the use/risk Class 4 according to the EN 335, and is the only bamboo material available on the market that does so.

CO₂ 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 CO₂ 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 Thermo-Density® pressing (increasing the density from 650-700 kg/m³ to approx. 1,150 kg/m³) strongly improves 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 (EN 350) tested following CEN/TS 15083-2 class (simulated graveyard test).
- Durability Class 4 in accordance with EN 335 (use class).
- Class 0 fungi resistance in accordance with EN 152.
- Exceptionally hard: Brinell >9.5kg/mm² (harder than any tropical hardwood 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 an end-match system.
- Limited tendency to torsion.
- No gap between the end of the boards necessary.
- Only 5-6 mm expansion space between (the sides of) the boards.
- Possible to use pressure treated lumber or metal for joists and beams.

**easy to install**
- Can be installed using hidden fasteners or face screwed.
- Both sides of the board - reeded or flat - can be used.
- Fixed board length 1850 mm, easy for 1 person to install, no complicated installation plans necessary.
- End-match system simplifies the installation.
- 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 end-match system.
- 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.

**beautiful appearance**
- A beautiful, natural hardwood look.
- Choice for flat or reeded surface in one reversible board.
- Use of hidden fasteners avoids face screwing and plugging.
- Free of knots and natural plant resins.
- Choice for natural fading, resulting in a natural grey color or maintaining the rich brown color using an exterior penetrating oil.

**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.

**CO₂ neutral**
- Official LCA and carbon footprint studies by Technical University Delft according to ISO 14040/44 confirm that MOSO® Bamboo X-treme® is CO₂ neutral over the full life cycle. No use of fungicide in the production.

**fireproof**
- Reaches fire resistance Class Bfl-s1 (decking) and B-s1-d0 (cladding, fencing, beams) following EN 13501-1 without use of fire retardants. As a result, MOSO® Bamboo X-treme® can be easily applied in public projects without additional protective measures.
- Reaches flame spread index Class A following ASTM E84.
Private Residence (500 m²) Tossa de Mar, Spain

Texaco Gas Station
Nijkerk, the Netherlands / Design: Bogaers Architecten & ContrAll

Fünf Morgen Urban Village (1.750 m²) Berlin, Germany / Design: Stofanel

Center Court Chemelot Campus Geleen (1600 m² + 2466 m²) Geleen, the Netherlands

Photography: Daniele Kaehr

Photography: Derako

Photography: Petra Appelhof

Photography: Elad Gonen

Photography: WVZ

Photography: Denis Dubesset

Photography: Fiammetta Regis

Madikwe Game Reserve
South Africa

Sport Association Aquatics (WVZ)
Zandvoort, the Netherlands

National Museum Scienza e Tecnologia Leonardo da Vinci (800 m²) Milan, Italy

The Gas Museum - LEED Gold (700 m²) Sabadell - Barcelona, Spain / Design: Alarcon Tècnics

CLINEA Residence Medical Clinic (?) Saint Raphael, France / Design: ADMS Architects

Center Court Chemelot Campus Geleen (1600m² + 2466 m²) Geleen, the Netherlands
Campus Repsol Madrid - LEED Platinum
Madrid, Spain / Design: Rafael de la Hoz Architects

Hard Rock Hotel & Casino Punta Cana
(360 m²) Punta Cana, Dominican Republic / Design: Bestinpro Group

Youth Olympic Park
(29,315 m²) Nanjing, China

Venco Campus - BREEAM Outstanding
The Netherlands

Vabali Spa
(2,350 m²) Berlin, Germany / Design: Theune Spa Management

Head Office MOSO®
(600 m²) Zwaag, Netherlands

Photography: Tip Top Alexandre Scargiglia

Photography: Elad Gonen
MOSO® bamboo x-treme® outdoor decking

MOSO® Bamboo X-treme® is a solid, Thermo-Density® decking board, made from compressed bamboo strips. 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 end-match system: 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 reeded 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.

installation summary
(full version available on www.moso.eu/x-treme)
• Install a suitable, fixed, stable and durable sub frame.
• Determine which side of the board will be used: the reeded 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 regularly, 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.

technical characteristics and certifications
• Density: +/-1150 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 Bfl-s1 (EN 13501-1)
• Flame spread index: Class A (ASTM E84)
• Slip resistance: USRV 37 (Dry), USRV 29 (Wet) (CEN/TS 15676)
• Thermal emittance: 0.81 (ASTM C1371)*
• Solar Reflectance Index (SRI): Low 27, Medium 30, High 33 (ASTM E1980)*
• Modulus of Elasticity: 13565 N/mm² (mean value - EN 408)
• Breaking strength: 54.4 N/mm² (characteristic value - 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 355)
• CO₂ neutral: LCA report TU Delft (ISO 14040/44) (www.moso.eu/lca)
• Environmental Product Declaration - EPD (EN 15804) (www.moso.eu/epd)
• FSC®: Products available with FSC® certification on request.
• Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5 (HD)
• Guarantee: 10 years
• Contribution v2009: MR 6, MR 7 (FSC®), IEQ 4.3, IEQ 4.4
• Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5 (HD)
• For further info: please see the installation/maintenance instructions.

* The mark for responsible forestry www.fsc.org

Only the products defined as such, are FSC certified

FSC® C002063
MOSO® bamboo x-treme® outdoor cladding

MOSO® Bamboo X-treme® cladding is a solid, Thermo-Density® exterior board, made from compressed bamboo strips. 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 resistance 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 (18 mm) 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-DTHT500G (rebated profile)  BO-DTHT510 (trapezium shape)

installation summary
(full version available on www.moso.eu/x-treme)
• Apply a waterproof membrane against the wall and screw vertical battens onto that.
• Each board should be fixed on at least 3 battens: so the maximum centre-to-centre distance between the battens is 616.7 mm (1850 mm/3).
• Install the first, bottom, row of fasteners on the battens and place the first row of boards onto them.
• Place the second row of fasteners / boards and continue like this with the whole surface.
• For further info: please see the installation / maintenance instructions.

technical characteristics and certifications
• Density: +/- 1150 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)
• Flame spread index: Class A (ASTM E84)
• Thermal emissance: 0.81 (ASTM C1777)*
• Solar Reflectance (SR): 32 (ASTM C1549)*
• Solar Reflectance Index (SRI): Low 27, Medium 30, High 33 (ASTM E1980)*
• Modulus of Elasticity: 13565 N/mm² (mean value - EN 408)
• Breaking strength: 54.4 N/mm² (characteristic value - 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)
• CO₂ neutral: LCA report TU Delft (ISO 14040/44) (www.moso.eu/lca)
• Environmental Product Declaration - EPD (EN 15804) (www.moso.eu/epd)
• FSC®: Products available with FSC® certification on request.
• Contribution LEED BD+C - v4: MR 1, MR 2, MR 3 (FSC®)
• Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5 (HD)
• Guarantee: 10 years
* Tested on 3 years weathered MOSO® Bamboo X-treme®

BO-DTHT500G
BO-DTHT510

Product Code  Grooved  Finish  Edges  Surface  End-match system  Effective width (mm)  Dimensions (mm)
BO-DTHT500G  Yes  -  B  F  Yes  128  1850x137x18
BO-DTHT510  No  -  B  F  Yes  132  1850x137x18

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

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Item</th>
<th>Material</th>
<th>Colour</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLIP-SCREW-BX031</td>
<td>Fastener (20 mm)</td>
<td>Stainless steel A2 (AISI304)</td>
<td>Brown</td>
<td>27x22.5x10.8</td>
</tr>
<tr>
<td>CLIP-SCREW-BX301</td>
<td>Screw</td>
<td>Stainless steel A2 (AISI304)</td>
<td>Brown</td>
<td>4.5x30</td>
</tr>
<tr>
<td>CLIP-SCREW-BX041</td>
<td>Fastener (18 mm)</td>
<td>Stainless steel A2 (AISI304)</td>
<td>Brown</td>
<td>27x22.5x9.8</td>
</tr>
</tbody>
</table>

recommended number of fasteners/m²
- decking*: 137 mm -20 pcs/m²
- cladding**: 137 mm -14 pcs/m²
- 155 mm -17 pcs/m²
- 178 mm -14 pcs/m²

*) Based on distance of 462.5 mm between the sub frame joist axes.
**) Based on distance of 600 mm between the sub frame joist axes.

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

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Material</th>
<th>Finish</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BO-S8150</td>
<td>Thermo-Density® bamboo</td>
<td>Unfinished</td>
<td>2440x70x40</td>
</tr>
<tr>
<td>BO-S8155</td>
<td>Thermo-Density® bamboo</td>
<td>Unfinished</td>
<td>2440x60x40</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Material</th>
<th>Finish</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BO-DTHT162</td>
<td>Thermo-Density® bamboo</td>
<td>Unfinished</td>
<td>1850x137x20</td>
</tr>
</tbody>
</table>

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 Sikkens 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.

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wax-bx-01</td>
<td>Wax for board ends X-treme</td>
</tr>
<tr>
<td>Oil-Woca-003</td>
<td>WOCA Maintenance Oil Natural</td>
</tr>
<tr>
<td>Oil-Woca-011</td>
<td>WOCA Exterior Oil Exclusive Teak</td>
</tr>
<tr>
<td>Cleaner-Woca-01</td>
<td>WOCA Exterior Cleaner</td>
</tr>
<tr>
<td>SATURATOR-SIK01</td>
<td>SIKKENS Saturator Ipe</td>
</tr>
<tr>
<td>SATURATOR-SIK11</td>
<td>SIKKENS Saturator Transparent</td>
</tr>
<tr>
<td>Broom-01</td>
<td>Silicium carbid broom</td>
</tr>
<tr>
<td>Disk-01</td>
<td>16” Silicium carbid disk</td>
</tr>
</tbody>
</table>
MOSO® bamboo x-treme® fencing

MOSO® Bamboo X-treme® fence boards are solid, Thermo-Density® exterior boards, made from compressed bamboo strips. 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 end-match system, 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 ends), F: Flat

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Grooved</th>
<th>Finish</th>
<th>Edges</th>
<th>Surface</th>
<th>End-match system</th>
<th>Effective width (mm)</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BO-DTHT301TG</td>
<td>Board ends</td>
<td>O</td>
<td>B</td>
<td>F</td>
<td>No</td>
<td>131</td>
<td>1800x137x20</td>
</tr>
</tbody>
</table>

**technical characteristics and certifications**

- Density: +/- 1150 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)
- Flame spread index: Class A (ASTM E84)
- Thermal emittance: 0.81 (ASTM C1377)*
- Solar Reflectance (SR): 32 (ASTM C1549)*
- Solar Reflectance Index (SRI): Low 27, Medium 30, High 33 (ASTM E1980)*
- Modulus of Elasticity: 13565 N/mm² (mean value - EN 408)
- Breaking strength: 54.4 N/mm² (characteristic value - 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 1512)
- Use Class: Class 4 (EN 335)
- Environmental Product Declaration - EPD (EN 15804) (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

*) Tested on 3 years weathered MOSO® Bamboo X-treme®
MOSO® bamboo x-treme® outdoor beams

A special patented heat-treatment process at 200°C and increased density (by compressing the bamboo strips) 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.

technical characteristics and certifications

- Density: +/- 1150 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)
- Flame spread index: Class A (ASTM E84)
- Thermal emittance: 0.81 (ASTM C1377)*
- Solar Reflectance (SR): 32 (ASTM C1549)*
- Solar Reflectance Index (SRI): Low 27, Medium 30, High 33 (ASTM E1980)*
- Modulus of Elasticity: 13565 N/mm² (mean value - EN 408)
- Breaking strength: 54.4 N/mm² (characteristic value - 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)
- Environmental Product Declaration - EPD (EN 15804) (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

*) Tested on 3 years weathered MOSO® Bamboo X-treme®

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Finish</th>
<th>Bevel</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BO-DTHT2170-01</td>
<td>LR</td>
<td>R=6mm</td>
<td>2000x115x40</td>
</tr>
<tr>
<td>BO-DTHT2171-01</td>
<td>LR</td>
<td>R=6mm</td>
<td>2000x80x40</td>
</tr>
<tr>
<td>BO-DTHT2172-01</td>
<td>LR</td>
<td>R=6mm</td>
<td>2000x60x40</td>
</tr>
<tr>
<td>BO-DTHT2173-01</td>
<td>LR</td>
<td>R=6mm</td>
<td>2000x40x40</td>
</tr>
<tr>
<td>BO-DTHT2174-01</td>
<td>LR</td>
<td>R=6mm</td>
<td>2000x55x40</td>
</tr>
<tr>
<td>BO-DTHT2175-01</td>
<td>LR</td>
<td>R=6mm</td>
<td>2000x90x40</td>
</tr>
</tbody>
</table>
MOSO bamboo x-treme deck 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 root barrier 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 end of the joists.
• 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.

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 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 carbidity 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 Thermo-Density® heat-treated process.
• 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.

Distance between sub frame joist depends on category of use. For non-residential use, please contact MOSO®.
**MOSO® bamboo x-treme® decking installation instruction**

**the installation**

- Keep at least 5-6mm 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 end-match system no expansion space is needed on the end of the boards.
- Every cut end has to be impregnated with board end wax, to prevent water penetration. Board end wax is available as accessory.

**installation with fasteners**

- Determine the surface side of the boards (reeded- 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 3.2-3.5mm 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 fasteners per m², this is depending on the type of board 137/155/ 178mm wide. When the tongue and groove are connected on the sub beam use 2 fasteners, 1 for every board.
- Only use the included stainless steel decking screws (4.5 x 30mm).
- Please watch the installation video www.moso.eu/x-treme.

**screw down installation**

- Determine the surface side of the boards (reeded- or flat surface).
- Pre-drill the screw holes 20mm 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 5x50mm).

**maintenance and cleaning**

**directly after installation**

- Unfinished version: Apply one coat of Ipé or Teak pigmented waterbased saturator oil after installation. Follow instructions from your supplier (MOSO recommends SIKKENS Cetol WF771 saturator oil – Ipé colour).
- Pre-oiled version: Apply one coat of WOCA saturator oil following the suppliers instructions.

**pre-finished version**

- The MOSO® Bamboo X-treme® decking is pre-finished with WOCA waterbased saturator oil (Teak colour) on all sides.
- It is advisable to keep the deck clear of dust and dirt as much as possible (sweep regularly).
- Clean the deck surface at least once a year with WOCA soap solution or a product for cleaning exterior wood, and using a silicium carbid brush or machine disk. Follow the instructions at: www.moso.eu/youtube.
- Apply 1-2 coats new WOCA saturator oil. This maintenance should be undertaken 1-2 times a year to prevent the bamboo turning a greyish tone and losing its characteristic bamboo grain. The first application can be performed either after installation or 3-4 months later where the pores will be more open to absorb this product. Follow instructions at: www.moso.eu/x-treme.
- After application of the saturator oil it is advisable to allow the deck to dry sufficiently before using it again.

**unfinished version**

- You can leave the deck without any maintenance, but take into consideration that without maintenance and oiling the deck will develop a rougher, fissured surface that will more quickly lighten and become grey (similar to most timber).
- Application of a waterbased saturator oil (pigmented or clear) immediately after installation is recommended. The SIKKENS product Cetol WF 771 – Ipé colour is recommended.
- Clean the deck with clean water, soap and a stiff brush. Once dry, apply the saturator oil according to the manufacturer’s instructions. Regular cleaning with a stiff brush is recommended.
- For annual maintenance: Use of SIKKENS WV 840 is recommended to remove the grey colour. If the deck is not grey, but just lightly weathered, it is sufficient to just clean with soap and brush. After drying, again apply the SIKKENS Cetol WF 771 saturator oil according to the manufacturer’s instructions.

**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.

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bamboo x-treme® decking maintenance & cleaning

maintenance with Sikkens Cetol WF771
The maintenance and cleaning of the MOSO® Bamboo X-treme® decking is similar to other tropical wood, with the difference that the waterbased saturator oils provide greater protection than traditional oils. Sikkens Cetol WF 771 water based saturator oil is recommended for optimal protection.

cleaning
- Wet the deck well with clean water. Apply SIKKENS WV 840 with a synthetic roller (wall roller with long pile) or a brush.
- Scrub the greyer parts with a nylon brush.
- Leave on for 15-20 minutes.
- Rinse thoroughly with plenty of water or water at high pressure (maximum 60 bar and 50cm away from the surface of the deck to avoid damage). Do not use strong jets of water close to the surface, as this may cause the fibres to lift and the bamboo material to be damaged.
- Allow the wood a minimum of three days to dry in warm, dry weather (maximum 60 bar and 50cm away from the surface of the deck to avoid damage). Do not use strong jets of water close to the surface, as this may cause the fibres to lift and the bamboo material to be damaged.
- You can then apply the waterbased saturator oil SIKKENS Cetol WF 771.

application of oil
- Always make sure the decking is clean, dry, free of dust or dirt, and without any coating. Never work on a deck in direct sun.
- Brush the deck with a silicium carbid brush or machine disk. If this does not give a satisfactory result, the surface can be sanded using a machine with 80 grit.
- Stir the saturator oil before and during the application to avoid colour variation.
- Apply a generous layer of saturator with a brush, or with an air gun (35 to 65 bar) on the working surface.
- Important: remove any excess product before it dries, to avoid any dripping or glossy areas. The saturator must penetrate the material and not remain on the surface, so that it dries leaving a matt look.
- Pay attention to the head end joints and cut ends, which tend to absorb more water, and saturate well to minimise water ingress.

theoretical yields
- WV 840: 8 to 15 m² / litre.
- Cetol WF 771 IPE for the first treatment: 10 - 12 m² / litre (for 1 layer saturation).
- Cetol WF 771 - for periodic maintenance: 14 to 15 m² / litre (for 1 coat of saturator).

maintenance flat side
Please be aware of the fact that on the flat surface, irregularities in the surface (e.g. cracks, splinters) are better visible than on the reeded 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.
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!

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Durability of MOSO Bamboo X-treme, Heat Treated Strand Woven Bamboo: resistance against soft-rotting micro fungi according to CEN/TS 15083-2

Report code: 17.0083-C  Date: 29 March 2017  Page: 8/14

According to EN 350, the durability class is determined based on the x-value. To calculate the x-value, the median mass loss or the test species is compared to the median mass loss of the Beech or Pine references. Hardwoods are compared to Beech, Softwoods are compared to Pine. As Bamboo is neither softwood nor hardwood a comparison is made with both reference wood species Pine sapwood and Beech.

Based on the mass loss found and the comparison to Beech and Pine, the tested MOSO Bamboo X-treme, Heat Treated Strand Woven Bamboo, can be classified in durability class 1 when using the method described in EN 350.

MOSO Bamboo X-treme, Heat Treated Strand Woven Bamboo, performs comparable to Azobé and Merbau. Little variance is found between the different boards.

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Durability of het treated strand woven bamboo: resistance against degradation by Basidiomycetes according to EN 350 and CEN/TS 15083-1

Report code: 17.0083-B  Date: 29 March 2017  Page: 8/14

According to EN 350, the durability class is calculated based on the mass loss obtained with the fungus resulting in the highest median mass loss. For all fungi the mass loss is less than 5%. This implies that, when using the EN 350 to determine the durability, MOSO Bamboo X-treme, Heat Treated Strand Woven Bamboo can be classified in durability class 1.

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Resistance of Heat Treated Strand Woven Bamboo against blue staining fungi

Report code: 9.081-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.
# MOSO® Bamboo X-treme®

## Classification Durability Class

<table>
<thead>
<tr>
<th>Use Class</th>
<th>1. very durable</th>
<th>2. durable</th>
<th>3. moderately durable</th>
<th>4. slightly durable</th>
<th>5. not durable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 interior</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>2 moist interior</td>
<td>○</td>
<td>○</td>
<td>(o)</td>
<td>(o)</td>
<td>(o)</td>
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<tr>
<td>3 exterior, above ground</td>
<td>○</td>
<td>(o)</td>
<td>(o)-(x)</td>
<td>(o)-(x)</td>
<td>(o)-(x)</td>
</tr>
<tr>
<td>4 ground contact / fresh water</td>
<td>(o)</td>
<td>(x)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>5 salt water</td>
<td>(x)</td>
<td>(x)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

- ○: Natural durability sufficient.
- (o): Natural durability normally sufficient, but for certain end uses treatment may be advisable.
- (o)-(x): Natural durability may be sufficient, but depending on end use, preservative treatment may be necessary.
- (x): Preservative treatment is normally advisable.
- *: Preservative treatment necessary.
- **: Natural durability of Bamboo X-treme® not tested in salt water.

## Classification ASTM E84

<table>
<thead>
<tr>
<th>Classification</th>
<th>Flame Spread Index</th>
<th>Smoke Developed Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0 - 25</td>
<td>0 - 450</td>
</tr>
<tr>
<td>B</td>
<td>26 - 75</td>
<td>0 - 450</td>
</tr>
<tr>
<td>C</td>
<td>76 - 200</td>
<td>0 - 450</td>
</tr>
</tbody>
</table>

## Brinell Hardness

- MOSO® Bamboo X-treme®: 9.5 kg/mm²

## Carbon Footprint (CO2eq) per kg final product

<table>
<thead>
<tr>
<th>Carbon Footprint (CO2eq) per kg final product</th>
<th>Eco-costs (€) per kg final product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co2 footprint CO2eq/kg</td>
<td>Eco-costs €/kg</td>
</tr>
<tr>
<td>Co2 credit CO2eq/kg</td>
<td>Eco-costs €/kg</td>
</tr>
<tr>
<td>Storage CO2eq/kg</td>
<td>Eco-costs €/kg</td>
</tr>
<tr>
<td>Total CO2eq/kg</td>
<td>Eco-costs €/kg</td>
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<tr>
<td>Neutral Y/N</td>
<td>Co2 storage €/kg</td>
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<tr>
<td>1.193 -0.704 -0.607 -0.118 Yes</td>
<td>0.356 -0.132 -0.082 0.142</td>
</tr>
</tbody>
</table>

## Fire Resistance

- Use/risk class EN 350-1: deck, cladding, fencing, beams
- Classification EN 13501-1: class A

## Reaction to Fire

- Classification EN 13501-1: class A
- EN 13501-1: deck, cladding, fencing, beams

## Durability

- Use class EN 350 (CEN/TS 15083-2 / CEN/TS 15083-1): class 1
- EN 350 (CEN/TS 15083-2 / CEN/TS 15083-1): class 1

## Brinell Hardness

- MOSO® Bamboo X-treme®: 9.5 kg/mm²

## Classification

- Classification Durability Class
- Classification ASTM E84
- Classification Flame Spread Index
- Classification Smoke Developed Index

## Carbon Footprint

- ISO 14040/44: CO2 neutral
- CO2 neutral

## Carbon Footprint

- ISO 14040/44: CO2 neutral

## Author


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For more information: www.moso.eu/lca

The full report is available on request.

The life cycle and the carbon footprint of MOSO products are evaluated according to ISO 14040/44. For more information: www.moso.eu/lca

The full report is available on request.
user information for MOSO® bamboo x-treme®

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 exterior oil (Teak colour) or Sikkens Cetol WF771 saturator oil (Ipé colour), or a comparable water based oil/saturator with Ipé or Teak pigments (for the unfinished version).

Directly after installation, 1 layer of oil must 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, grain raise or cupping of the boards can occur after installation. These phenomena are normal for most hardwood species and MOSO® Bamboo X-treme®.

Like many wood species, some tannins can come out of the Bamboo X-treme material and into the water when it gets wet, e.g. when it rains. This is a normal phenomenon and will decrease over time. The brownish liquid can easily be cleaned from the Bamboo X-treme material, however be careful of possible staining of materials adjacent to or below the Bamboo X-treme (i.e. white walls underneath a balcony).

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. 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.
since 2008 over 2,5 million m² installed in more than 50 countries
see the ease of installation, cleaning and maintenance of MOSO® Bamboo X-treme® on: www.moso.eu/x-treme