



MOSO[®] Bamboo N-durance[®]

*Beautiful, elegant
and sustainable
outdoor products*



*Discover the
building material
of the future*



moso[®]

MOSO®

Bamboo N-durance®

With Bamboo N-durance®, MOSO® transforms the rapidly **renewable resource** bamboo into **beautiful** natural outdoor products with a warm caramel colour. The **technical** and **ecological** benefits make Bamboo N-durance® the real outdoor **'building material of the future'**. MOSO® uses a unique **Outdoor-Density®** process that combines special crushing, steam-pressure treatment and compression with a special finish to enhance the **durability, hardness, dimensional stability, fire resistance** and **look**.



Bamboo: the fastest
growing plant
in the world

“With

MOSO® Bamboo

N-durance®

*we use the latest technologies
to produce a product that
doesn't only perform in terms of
stability and durability, but also
has a warm, natural appearance
which is appreciated by so
many people”*

René Zaal, CEO Moso International BV

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from bamboo to Bamboo N-durance®

Thermally modified and engineered bamboo products are becoming more and more popular throughout the outdoor building industry. Kilometers of decking, numerous façades and various outdoor furniture projects have utilised **'the building material of the future'**. Bamboo is a rapidly renewable resource and the perfect material for MOSO®'s innovative outdoor product: MOSO® Bamboo N-durance®. Allow us to explain exactly how it is made.

stem to strands

After harvesting, the mature bamboo stems are split into strips in a longitudinal direction and the outer and inner skins are removed. The strips are then crushed using a number of incision rollers which create cross linked strands. The strands are light yellow in colour and have a rich caramel colour after a steam-heat process at a temperature of between 130°C and 140°C (carbonisation). By doing this, the material becomes more stable.

from strands to product

To create outdoor products, the raw bamboo material is converted into panels as follows: Bamboo strands are dipped into phenolic glue and, after drying, the strands are put into a mould and compressed under high pressure and at high temperature. The output of the compression is a large panel, which is cut into smaller sections (boards and beams). These are then further processed and profiled into the required shape (for example, for decking: a grooved surface and edge grooves to allow for installation with fasteners). As a last step, the outdoor products are prefinished with a special finish and treatment that prevents fast weathering and limits surface fungi development.

Outdoor-Density®

We call the combination of crushing, steam-pressure treatment and compression an Outdoor-Density® process. It increases the density from 650-700 kg/m³ to approx. 1200 kg/m³ and improves the hardness of this product significantly. After pressing, the material is stronger and harder than almost any other hardwood in the world. At the same time, the dimensional stability of bamboo is improved substantially. In addition, the Outdoor-Density® production process gives the material its beautiful natural appearance with a rich caramel colour.

Besides stability and hardness improvements, the durability is improved to the best durability class possible, from Class 5 to Class 1 according to EN 350 / CEN/TS 15083-2, simulated graveyard test / Class 1 according to EN 350 / EN 113-2 (CEN/TS 15083-1). Bamboo N-durance® achieves the use/risk Class 4 according to EN 335.

Test results are available at the end of the document.

Made from bamboo -
the fastest growing
plant on earth.
Ready to harvest after
only 4-5 years.



Splitting the bamboo
stems, removing the
outer and inner skins and
crushing the strips into
strands.



Special crushing
and carbonisation
at ca. 140°C.



Compressing under
very high pressure
into Outdoor-Density®
material.



Profiling and
sanding.



Applying a
special finish.



MOSO® Bamboo N-durance® benefits



beautiful & elegant

- A warm caramel colour.
- Natural, high quality look.
- Choice between flat / grooved reversible board or the curved surface board.
- Use of hidden fasteners avoids face screwing and plugging.
- Yearly maintenance is required to retain the caramel colour and ensure a luxurious appearance.



hard & durable

- Exceptionally hard: Brinell $\pm 9.5 \text{ kg/mm}^2$ (harder than any tropical hardwood available).
- Very high density: $\pm 1200 \text{ kg/m}^3$.
- Bamboo N-durance® with Durability Class 1 according to EN 350 / CEN/TS 15083-2, simulated graveyard test / Class 1 according to EN 350 / EN 113-2 (CEN/TS 15083-1).
- Use Class 4 in accordance with EN 335.
- Strong fungi resistance according to EN ISO 846, after superficial treatment (tested on new material).
- MOSO® gives Bamboo N-durance® Decking 25 years warranty.



high stability

- Very stable as a result of a unique Outdoor-Density® process: crushing, carbonisation under high pressure and compression.
- Far more stable than tropical hardwoods - enabling an end-match system (tongue & groove on ends).
- Limited tendency to warp.
- No gap between the ends of the boards necessary.
- Only 5-6 mm space between the boards when MOSO® Fasteners are used.



fire resistant

- Achieves fire resistance Class Bfl-s1 (decking) and B-s1-d0 (beams) following EN 13501-1 without the use of fire retardants.
- As a result, MOSO® Bamboo N-durance® can be easily applied in public projects without additional protective measures.



easy to install

- Can be installed using hidden fasteners (edge grooved) or face screwed.
- Both sides of the board - grooved or flat - can be used.
- Fixed board length 1850 mm, easy for 1 person to install, no complicated installation plans necessary.
- MOSO® Fasteners make it easy to install and uninstall.
- End-match system simplifies the installation by allowing the joint to float between the joists.
- MOSO® Bamboo X-treme® Sub frame joists available.



endless resource

- Made from bamboo; with a growing speed of up to 1 meter per day it is the fastest growing plant on earth.
- Ready to harvest after 4-5 years (compared to up to 100 years for hardwood species).
- Engineered product consisting of 83% natural bamboo strands.



economical

- Simple and fast installation; up to 30% savings in installation costs!
- Reduced waste because of the end-match system.
- Cost effective transportation because of the fixed 1850 mm length.
- Cost effective and space reducing stocking because of unique multi usable board.



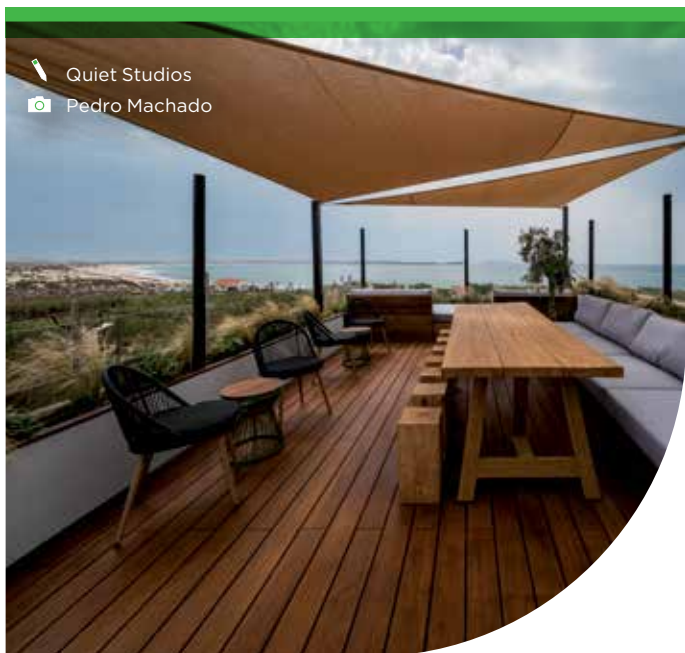
without slope

- Decking with a curved surface can be installed without a slope. Thanks to this curved surface, fast drainage from the boards is guaranteed.



Brenac & Gonzalez et Associés
MOSO®

Higher Roch Tower (4000 m²) Montpellier, France



Quiet Studios
Pedro Machado

Salty Hotel
(180 m²) Praia do Baleal, Portugal



Villa Pacheco
(70 m²) Paços de Ferreira, Portugal

Pedro Machado

MOSO® Bamboo N-durance® Outdoor Decking

MOSO® Bamboo N-durance® Decking is a solid, Outdoor-Density® board, made from compressed bamboo strips. Bamboo N-durance® has a warm caramel colour, resulting from a steam-pressure treatment on the bamboo material. A special crushing and compression technique increases the hardness and stability and provides Bamboo N-durance® with the highest durability class possible in the appropriate EU norms. Bamboo N-durance®'s end-match system enables an unlimited number of boards to be connected creating a visually infinite length. The special symmetrical shape offers the possibility to choose between either the grooved or the flat surface and allows for quick installation with MOSO® Fasteners. When exposed to outdoor conditions, the caramel colour of MOSO® Bamboo N-durance® will naturally fade.

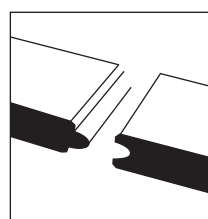
Standard Groove / Flat
(reversible board)



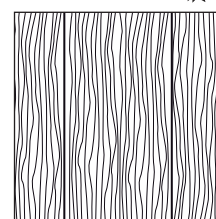
Curved



End-match system



Outdoor-Density®



P: Superficial preservative against surface fungi, **Woca:** Woca Exterior Wood Oil. Ends of the boards are protected with Sikkens Kodrin WV 456 sealer.

Product Code	Surface	Finish	Edge groove	End-matched	Length edges	End edges	Dimensions (mm)
BO-DTC171G	Grooved/Flat	P + Woca	2 sides	Yes	R3	2 mm x 45°	1850x137x20
BO-DTC191G-C	Curved	P + Woca	2 sides	Yes	R3	2 mm x 45°	1850x155x20

installation summary

- Install a suitable, fixed, stable and durable sub frame. MOSO® recommends the use of MOSO® Bamboo X-treme® Sub frame joists.
- Determine which side of the board will be used: the grooved or flat side.
- Fix the boards on the sub frame using fasteners (to be inserted in the edge grooves of the board) or alternatively with screws (through the surface).
- Use a 1-2% slope and ensure good ventilation of the decking. The slope is not necessary for the curved boards.
- After installation: make sure proper cleaning and maintenance is done.
- When an outdoor finish is not regularly applied the typical bamboo wood grain structure will become more visible.
- Bamboo N-durance® is available pre-oiled with Woca Exterior Wood Oil. In order to maintain the rich caramel colour it is recommended to reapply Woca Exterior Wood Oil 3 to 4 months after installation.
- Yearly maintenance with Woca Exterior Wood Oil is required to maintain the anti-surface fungi resistance.
- Yearly maintenance to retain the caramel colour and ensure the luxurious appearance.
- Store in a cool and dry place away from direct sunlight, and protected from weather influences, dirt and dust.
- For further info: please see the installation/maintenance instructions.
- Full version available on ► www.moso-bamboo.com/n-durance

technical characteristics and certifications

- Density: ± 1200 kg/m³
- Resistance to Indentation - Brinell Hardness: ± 9.5 kg/mm² (average value - EN 1534)
- Reaction to fire: Class Bfl-s1 (EN 13501-1)
- Slip resistance: R 10 (CEN/TS 16165 Annex B - DIN 51130)
- Modulus of Elasticity: 12090 N/mm² (mean value - EN 408)
- Bending strength: 99.6 N/mm² (characteristic value - EN 408)
- Biological durability: Class 1 according to EN 350 / CEN/TS 15083-2, simulated graveyard test / Class 1 according to EN 350 / EN 113-2 (CEN/TS 15083-1)
- Superficial preservatives and finish: comply with European biocide product regulation (BPR) and are not listed on the restrictions list of REACH Annex XVII/candidate list.
- Effectiveness against surface fungi: Class 0, Strong fungi static (EN ISO 846), treatment only superficial.
- Use Class: Class 4 (EN 335)
- Environmental Product Declaration - EPD (EN 15804) (www.moso-bamboo.com/epd)
- FSC®: Products available with FSC® certification on request.
- Contribution LEED BD+C - v4: MR 1, MR 2, MR 3 (FSC®), EQ 2, SS 7 v2009: MR 6, IEQ 4.3, IEQ 4.4
- Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5
- Guarantee: 25 years

Also available with FSC® certification.



The mark of responsible forestry
FSC® C002063



breem

MOSO® Bamboo N-durance® Outdoor Decking accessories

Clips MOSO®

With these fasteners MOSO® Bamboo N-durance® Decking 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.

Product Code	Item	Material	Colour	Dimensions fastener (mm)	Dimensions screw (mm)
CLIP-SCREW-BX08	Fastener Asymmetric with screw (20 mm)	Stainless steel A2 (AISI304)	Brown	27x22.5x10.8	4.5x30
CLIP-BX08	Fastener Asymmetric without screw (20 mm)	Stainless steel A2 (AISI304)	Brown	27x22.5x10.8	
CLIP-SCREW-BX802	Fastener Start/End Top with screw (20 mm)	Stainless steel A2 (AISI304)	Brown	29x25x11.2	4.5x30
SCREW-BX11-01	Screw for aluminium sub frame joist	Stainless steel SS410 (AISI410)	Black*		4x20



recommended number of fasteners/m² decking

137 mm wide board
-20 pcs/m²

155 mm wide board
-17 pcs/m²

Based on a centre to centre distance of 462.5 mm between the joists.

CLIP-SCREW-BX08 / CLIP-BX08



CLIP-SCREW-BX802



SCREW-BX11-01

* Only black screw head



MOSO® Bamboo N-durance® additional products

The MOSO® Bamboo N-durance® additional products are made of the same material as the decking boards: Outdoor-Density® bamboo. The fascia board and edge profile are intended for an elegant finish of the sides of the decking. Fascia boards are installed vertically against the sides of the deck to cover the sub frame joists. Edge profiles can also be used to create stairs.

Product Code	Item	Finish	Dimensions (mm)
BO-DTC171G1	Fascia board, 1 edge groove	Woca Exterior Wood Oil	1850x137x20
BO-DTCBN171G	Edge profile, 2 edge grooves	Woca Exterior Wood Oil	1850x65x30/20

BO-DTC171G1



BO-DTCBN171G



MOSO® Bamboo X-treme® Sub frame joists

The MOSO® Bamboo X-treme® Sub frame joists are made of Thermo-Density® heat-treated bamboo.

Product Code	Item	Finish	Dimensions (mm)
BO-SB155	Sub frame joist	Unfinished	2440x60x40

BO-SB155



Cleaning & maintenance products

Under the influence of wind, rain, sun and snow the decking will weather. MOSO® recommends to maintain MOSO® Bamboo N-durance® Decking with Woca maintenance products, depending on the product installed. The silicon carbide broom and machine disk are perfectly suited to clean and smooth the decking surface of Bamboo N-durance® and to remove splinters due to the capability to sand the surface in addition to cleaning it.

Product Code	Material
DISK-01	16" Silicon carbide disk
BROOM-01	Silicon carbide broom
CLEANER-WOCA-01	Woca Exterior Wood Cleaner 2.5 ltr
OIL-WOCA-011	Woca Exterior Wood Oil Teak colour 2.5 ltr
SEALER-05	Sealer for ends of boards 250 ml
WOCA-APPLICATOR	Woca Applicator set for oil
PRIMER-WOCA-01	Woca Exterior Wood Primer 2.5 Ltr



MOSO® Bamboo N-durance® Outdoor Decking

installation instructions

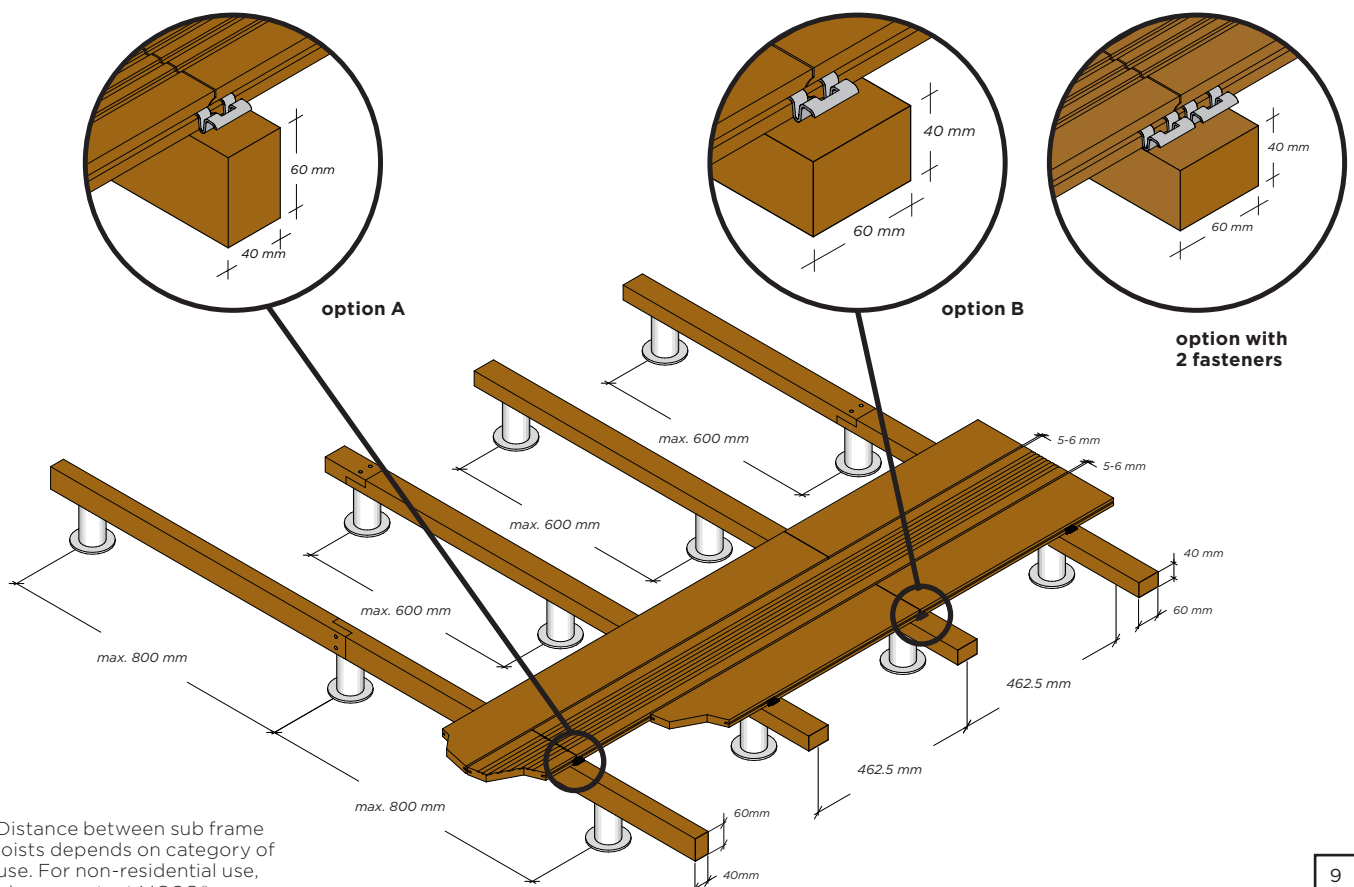
before installation

- Waterlogging 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 or pedestals to prevent weeds growing under the decking.
- Install the decking boards with a slope of 1-2% to enable water to run off the surface.
- The decking with the curved surface BO-DTC191G-C can be installed without a slope. Thanks to the curved surface, fast drainage from the boards is guaranteed.
- Ensure good ventilation of the decking by keeping at least 20 mm gap from walls and objects and avoid closing the decking at the sides. The gap between the boards must be open to ensure unrestricted ventilation.
- When the surface / soil underneath the decking is not fast drying, there should be at least 100 mm distance between the decking and the surface underneath.

- Use sub frame joists with the minimum size of 40x60 mm. MOSO® recommends the use of MOSO® Bamboo X-treme® Sub frame joists, which are specifically produced for use in combination with our decking products. Alternatively, suitable joists are those with the same durability class as the decking; aluminum sub frame joists, stable hardwood joists or pine joists. When using hardwood or pine as joists, make sure the moisture content of these joists is below 12%. Avoid direct contact with the soil.
- MOSO® Sub frame joists can be installed without gaps, connecting the joists with screws and glue suited for outdoor use. Other sub frame joists should be installed according to the instructions of the supplier.
- 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 joists. Always install the ends of the boards exactly on the joist. Distance between sub frame joist depends on category of use. For non-residential use, please contact MOSO®.
- If a random installation pattern is preferred, make sure that the sub frame joists (centre-to-centre) are no more than 300 mm apart.
- Always install cut off boards on at least 3 sub frame joists.

please note

- The MOSO® Bamboo N-durance® Decking board is a natural product, which varies in colour, grain and appearance. Colour can quickly change from caramel to a lighter colour, depending on the maintenance schedule.
- Small cracks and splinters on the surface and on the ends of the boards can arise from the different drying characteristics of the surface and cross cut ends. The surface will also get rougher over time. This phenomenon is normal for most wood species and is minimised for this product by its unique 'Outdoor-Density®' production method. Cracks on the board ends can be further minimised by applying sealer to the ends of the boards (see 'the installation').
- Splinters and roughness can be removed by cleaning the surface of the decking with the silicon carbide broom or machine disk which MOSO® supplies. The surface will become smoother and splinters are removed.
- Dimensional changes or cupping of the boards can occur after installation. This phenomenon is normal for most wood species and is minimised for this product by its unique Outdoor-Density® production process.
- When using the flat side of the boards as surface please note that deformation under influence of climate will be more visible. Some deformation and/or cupping of the material can occur. This phenomenon is normal for outdoor exposed wood and cannot be grounds for a claim.



MOSO® Bamboo N-durance® Outdoor Decking

installation instructions

the installation

- Keep at least 5-6 mm gap between the boards (in width direction). With MOSO® Fastener installation this is automatically the case.
- Due to the stability of the boards and the end-match system, no expansion gap is needed on the ends of the boards.
- Every cut end has to be treated with board end sealer, to prevent water penetration. A sealer is available from MOSO®.
- Yearly maintenance with Woca Exterior Wood Oil is required to maintain the warm caramel colour and the anti-surface fungi resistance. For decking oiled with Woca Exterior Wood Oil, it is recommended to perform the first maintenance after 3-4 months.

installation with fasteners

- Determine the surface side of the boards (grooved or flat surface).
- Use the MOSO® Asymmetric Fasteners in the following sequence:
 - Press fastener with hooked side in the edge groove of one board.
 - Pre-drill the joist screw holes 30 mm deep. On bamboo joists: use a 3.5 mm wide drill bit 110 mm long.
 - Fully tighten the screw. Always screw vertically to the joist. Apply low torque with slow screwing speed on the screwing machine. Perform some tests for correct torque and speed adjustment before full installation.
- Install every following board by sliding it under the waved side of the fasteners.
- Use approx. 20 fasteners per m² (137 mm) or 17 fasteners per m² (155 mm). When the tongue and groove are connected on the joist, use 1, preferably 2 fasteners, 1 for every board (see drawing options A/B).
- For bamboo or wood joists only use the included stainless steel decking screws (4.5 x 30 mm).

screw down installation

- Determine the surface side of the boards (grooved- 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 (80% of screw diameter) to avoid cracking of the decking.
- Always screw both sides (left and right in the width direction) of the board.
- Use at least A2 grade stainless steel decking screws (approx. 5 x 50 mm).

cleaning and maintenance

MOSO® Bamboo N-durance® Decking is oiled, on both sides, with Woca Exterior Wood Oil.

- Clean and maintain the decking at least once per year with Woca Exterior Wood Cleaner and silicon carbide broom or -disk. Depending on climate and use it may be necessary to perform cleaning and maintenance more than once per year.
- Remove the dirt water residue on the boards with clean water and let the surface dry.
- Prepare the surface with Woca Exterior Wood Primer. Afterwards, apply 1-2 new layers of Woca Exterior Wood Oil. When a new finish is not applied once a year, depending on the situation, the decking will change in colour. Surface (superficial) fungi may occur, but this has no effect on the material's integrity or fitness for use.
- It is advisable to keep the decking free from dust and dirt as much as possible (clean by broom regularly).

storing

Store MOSO® Bamboo N-durance® in a cool and dry place away from direct sunlight, and protected from weather influences, dirt and dust.

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. Always follow the local building code.

These instructions are subject to change. For the latest version visit www.moso-bamboo.com/n-durance

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MOSO® Bamboo N-durance® Outdoor Decking

cleaning & maintenance

maintenance with Woca

The surface of decking becomes weathered under the influence of wind, rain, frost and sunshine (UV). As a result, the surface turns grey, dirty and cracks/splinters will appear. WoodCare Denmark (Woca) has developed different outdoor cleaning- and maintenance products. Woca Exterior Wood Cleaner loosens dirt and removes green growth from the surface, without damaging it. Woca Exterior Wood Oil protects the bamboo decking and bringing back the warm caramel colour.

cleaning

- Soak MOSO® Bamboo N-durance® with plenty of water. If possible use a garden hose. Do not use high-pressure cleaners.
- Mix Woca Exterior Wood 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 silicon carbide broom or machine disk (see accessories).
- Scrub the soaked material lengthwise following the bamboo grain until the material appears clean. If the decking has been installed flat side up, 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. In case some deeper stains remain after cleaning on the surface of the material, we recommend sanding (100 grit, in length grain direction).
- Clean the surface by rinsing thoroughly with clean water ensure that the surface is clean before oiling.
- Leave MOSO® Bamboo N-durance® to dry for approx. 24 hours. The material must be completely dry before oil treatment can be done.

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.
- Apply in dry weather only. Avoid direct sunlight and high temperatures.
- To prepare the surface for oiling, apply Woca Exterior Wood Primer. Make sure it is fully dried before applying oil in the next step.
- 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 oiling 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.
- Pay attention to the ends of the joists and cut ends of the boards, which tend to absorb more water, and finish well to prevent water penetration. A sealer is available from MOSO®.

theoretical consumption

- Mix Woca Exterior Wood Cleaner with water in the ratio 1:2 and apply it. If the decking is extremely dirty, exterior cleaner may be used undiluted.
- Woca Exterior Wood Primer: 8 - 10 m² / litre.
- Woca Exterior Wood Oil: 12 - 15 m² / litre.

maintenance of flat surface

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 grooved surface. With regular maintenance with Woca Exterior Wood Oil, 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. For more details, check the instructions of the finish supplier.



Check out the maintenance
and cleaning movie at:
www.moso-bamboo.com/youtube/n-durance



RUD Ketten

RUD Ketten Solaris sun lounger Germany



FURNS®
ADEZZ®

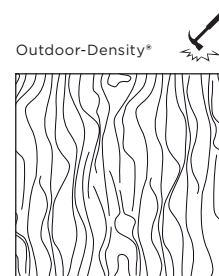
FURNS benches
The Netherlands

Miramondo benches
Austria



MOSO® Bamboo N-durance® Outdoor Beams

MOSO® Bamboo N-durance® Outdoor Beams are solid, Outdoor-Density® finished beams, made from compressed bamboo strips. The pre-profiled rounded edges make MOSO® Bamboo N-durance® Outdoor Beams ideal for use in outdoor furniture products, façade cladding and other applications. A special crushing and compression technique increases the hardness and stability and provides Bamboo N-durance® with the highest durability class possible in the appropriate EU norms. As with tropical hardwoods, the colour of the material changes under the influence of wind, rain, frost and sunshine (UV-light). Regular cleaning and maintenance protects the material from this weathering and brings back the rich caramel colour.



Product Code	Finish	Edges (also on ends)	Dimensions (mm)
BO-DTC2170-2-01	Sikkens Cetol WF 771 lpe	R4	2000x115x40
BO-DTC2175-2-01	Sikkens Cetol WF 771 lpe	R4	2000x90x40
BO-DTC2171-2-01	Sikkens Cetol WF 771 lpe	R4	2000x80x40
BO-DTC2172-2-01	Sikkens Cetol WF 771 lpe	R4	2000x60x40
BO-DTC2174-2-01	Sikkens Cetol WF 771 lpe	R4	2000x55x40
BO-DTC2173-2-01	Sikkens Cetol WF 771 lpe	R4	2000x40x40

Other dimensions, bevel and finish can be produced custom made.

installation summary

- To allow natural shrink- and swell behaviour, install beams with a minimum of 4 mm distance.
- MOSO® Bamboo N-durance® Beams must be mechanically fixed, using screws/bolts. The fixation instruction depends on the application.
- Use A2 stainless steel screws/bolts.
- For all our standard size beams, except 40x40 mm, we advise a minimum of 2 screws per fixing point. 40x40 mm beams can be fixed with 1 screw per fixing point.
- Horizontal installation:
 - The number of fixation points is depending on the application and applicable load.
 - In general, a 2 meter beam should at least have 3 fixation points (2 on the sides and 1 connection in the middle).
- Vertical installation:
 - Beam ends should be angled (min. 15°) to improve water drainage.
 - Beams longer than 1 meter have to be fixed in at least 3 points.
- To avoid cracks caused by excessive water uptake, the (cut) ends of the beams must be treated with a sealer.
- Yearly maintenance will be required to maintain the anti-surface fungi resistance.
- Store in a cool and dry place away from direct sunlight, and protected from weather influences, dirt and dust.
- Full version available on ► www.moso-bamboo.com/n-durance

technical characteristics and certifications

- Density: ± 1200 kg/m³
- Resistance to Indentation - Brinell Hardness: ± 9.5 kg/mm² (average value - EN 1534)
- Reaction to fire: Class B-s1-d0 (EN 13501-1)¹⁾
- Modulus of Elasticity: 12090 N/mm² (mean value - EN 408)
- Bending strength: 99.6 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)
- Superficial preservatives and finish: comply with European biocide product regulation (BPR) and are not listed on the restrictions list of REACH Annex XVII/candidate list
- Effectiveness against surface fungi: Class 0, Strong fungi static (EN ISO 846), treatment only superficial
- Use Class: Class 4 (EN 335)
- Environmental Product Declaration - EPD (EN 15804) (www.moso-bamboo.com/epd)
- FSC®: Products available with FSC® certification on request
- Contribution LEED BD+C - v4: MR 1, MR 2, SS 7 v2009: MR 6
- Contribution BREEAM: MAT 1, MAT 5
- Guarantee: 10 years

¹⁾ Tested on 18 mm thickness, without gaps between boards, with ventilation space behind boards.

Also available with FSC® certification.



The mark of responsible forestry
FSC® C002063



breem





MOSO® Bamboo N-durance® Outdoor Decking

user information

appearance and colour

MOSO® Bamboo N-durance® 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 warm caramel colour when installed, which can change in colour several weeks after installation.

If a warm caramel colour is preferred, maintenance should be done with Woca Exterior Wood Oil or a similar waterbased finish. For further details see the installation and maintenance instructions:

www.moso-bamboo.com/n-durance

Yearly maintenance with Woca Exterior Wood Primer and Woca Exterior Wood Oil will be required to maintain the warm caramel colour and the anti-surface fungi resistance. For decking oiled with Woca Exterior Wood Oil it is recommended to perform the first maintenance after 3-4 months.

MOSO® Bamboo N-durance® shows similarity to other hardwoods in grain and structure. The characteristic bamboo nodes however can still be recognised and give the product a special and lively look.

swimming pool

If MOSO® Bamboo N-durance® Outdoor Decking is to be used around swimming pool areas, the following has to be taken into account: MOSO® Bamboo N-durance® 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 N-durance® are normally smaller than (tropical) hard wood splinters. A regular application of a finish (more frequently necessary around swimming pools) is required to reduce the formation of splinters.

Furthermore, regular maintenance with the silicon carbide broom or disk is required to effectively remove splinters and smoothen the surface. The boards must be installed in such a way that the surface water cannot flow directly into the pool.

Also bear in mind that treated swimming pool water contains salt and chlorine which can cause the boards around the pool to "weather" and become bleached faster than the boards in areas not exposed to the swimming pool water.

normal phenomena

Cracks on the surface and on the ends of the boards can occur due to the different drying characteristics of the surface and board ends. This does not affect the stability or durability of the board.

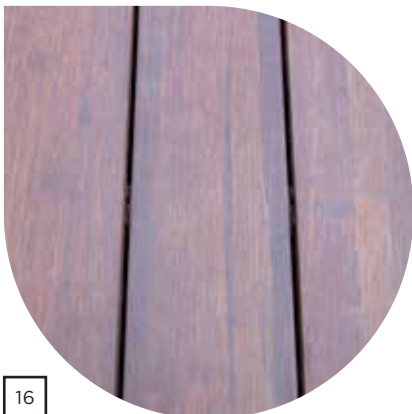
The surface side of the boards will become rougher over time and can form (small) splinters as a result of continuous water absorption and desorption due to dry and wet weather periods. Dimensional change or cupping of the boards can occur after installation. These phenomena are normal for most hardwood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

After installation, there might be some bleeding or leaching of colour from the bamboo material when it gets wet, e.g. when it rains. This possible bleeding is typical for wood and will disappear over time. The brownish liquid can easily be cleaned from the Bamboo N-durance® material, however controlled water drainage and prevention of splash water is required to prevent any discoloration of surrounding or underlying building components.

maintenance of flat surface

When using the flat side of the boards as top surface please note that deformation under influence of climate may be more visible. Some deformation and/or cupping of the material can occur. This phenomenon is normal for outdoor exposed wood and cannot be grounds for a claim.

dry condition



wet condition



MOSO® Bamboo N-durance® Outdoor Beams

user information

appearance and colour

MOSO® Bamboo N-durance® is a natural product, which can vary in colour, grain and appearance. Colour will change over time depending on the maintenance schedule. The beams have a warm caramel colour when installed, which can change in colour several weeks after installation.

If a warm caramel colour is preferred, maintenance should be done with Sikkens Cetol WF 771 or a similar waterbased finish. Periodic maintenance with Sikkens Cetol WP 567 BPD and Sikkens Cetol WF 771 is required to maintain the warm caramel colour and the anti-surface fungi resistance. For further details see the installation and maintenance instructions:
www.moso-bamboo.com/n-durance

MOSO® Bamboo N-durance® shows similarity to other hardwoods in grain and structure. The characteristic bamboo nodes however can still be recognised and give the product a special and lively look.

swimming pool

If MOSO® Bamboo N-durance® Outdoor Beams are to be used around swimming pool areas, the following has to be taken into account: MOSO® Bamboo N-durance® 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 N-durance® are normally smaller than (tropical) hard wood splinters. A regular application of a finish (more frequently necessary around swimming pools) is required to reduce the formation of splinters. Furthermore, regular maintenance with the silicon carbide broom or -disk is required to effectively remove splinters and smoothen the surface. The beams must be installed in such a way that the surface water cannot flow directly into the pool. Also bear in mind that treated swimming pool water contains salt and chlorine which can cause the beams around the pool to "weather" and become bleached faster than the boards in areas not exposed to the swimming pool water.

normal phenomena

Cracks on the surface and on the ends of the beams can occur due to the different drying characteristics of the surface and beam ends. This does not affect the stability or durability of the beam.

The surface side of the beams will become rougher over time and can 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 beams can occur after installation. These phenomena are normal for most hardwood species and MOSO® Bamboo N-durance® and cannot be grounds for a claim.

After installation, there might be some bleeding or leaching of colour from the bamboo material when it gets wet, e.g. when it rains. This possible bleeding is typical for wood and will disappear over time. The brownish liquid can easily be cleaned from the Bamboo N-durance® material, however controlled water drainage and prevention of splash water is required to prevent any discoloration of surrounding or underlying building components.

test results of MOSO® Bamboo N-durance®

The excellent performance of MOSO® Bamboo N-durance® 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 MOSO® can ensure you have the original, unique Bamboo N-durance® product.** Other products that copy the original do not offer the same quality 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 MOSO® Bamboo N-durance® products!

Classification Durability Class					
Use Class	1. very durable	2. durable	3. moderately durable	4. slightly durable	5. not durable
1 interior	o	o	o	o	o
2 moist interior	o	o	o	(o)	(o)
3 exterior, above ground	o	o	(o)	(o)-(x)	(o)-(x)
4 ground contact / fresh water	o	(o)	(x)	x	x
5 salt water	*	(x)	(x)	x	x

o 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.
 x Preservative treatment necessary.
 * Natural durability of Bamboo N-durance® not tested in salt water.

durability

EN 350 / CEN/TS 15083-2
EN 350 / EN 113-2
(CEN/TS 15083-1)

class 1

use/risk class

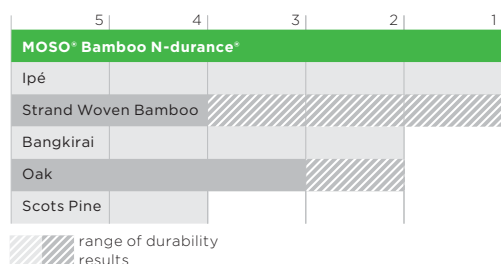
EN 335

class 4

durability class

class 1

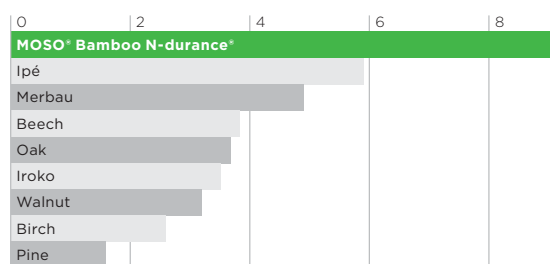
EN 350 (CEN/TS 15083-2) and EN 350 / EN 113-2 (CEN/TS 15083-1)



average brinell hardness

± 9.5 kg/mm²

(EN 1534)



5 Test results

Summarized results of dry mass losses and the assigned durability classes with each fungus are shown in table 2. Negative mass losses (mass increase) were considered to be zero when calculating mean and median values. Single values can be provided by EPH on request.

Table 2: Results of the durability test of "MOSO Bamboo N-durance (outdoor)"

Test fungus	mean dry mass loss (n = 20) [%]	median dry mass loss (n = 20) [%]	percentage of specimens in DC classes [%]					durability classification (see table 3)
			DC 1	DC 2	DC 3	DC 4	DC 5	
<i>C. puteana</i>	1,8 ± 1,1	2,2	100	0	0	0	0	1
<i>R. placenta</i>	1,5 ± 0,9	1,3	100	0	0	0	0	1
<i>G. trabeum</i>	1,6 ± 1,0	1,5	100	0	0	0	0	1
<i>T. versicolor</i>	1,6 ± 0,8	1,5	100	0	0	0	0	1
<i>P. ostreatus</i>	3,7 ± 1,0	3,7	95	5	0	0	0	1
<i>D. expansa</i>	0,9 ± 1,0	0,5	100	0	0	0	0	1

Final DC classification: 1 (very durable)

durability

EN 350 / CEN/TS 15083-2
EN 350 / EN 113-2
(CEN/TS 15083-1)

class 1

5 Results

Each one specimen was grown very slightly at the edge area by fungi; all of the other specimens were free from growth (table 2, figures 4 and 5). The agar surrounding the specimens was grown heavily at eight of ten test vessels.

Table 2: Rating¹ of the growth on the specimen surface / agar surface

	sp. 1	sp. 2	sp. 3	sp. 4	sp. 5
Fungus mix I (EN 846)	2/5	0/5	0/5	0/5	0/5
Fungus mix II (discolouring moulds)	0/0	0/0	2/3	0/5	0/5

¹ Rating scale

- 0 no growth detectable at microscopic inspection
- 1a growth detectable by microscopic inspection on max. 25 % of the test surface
- 1b growth detectable by microscopic inspection on max. 50 % of the test surface
- 1c growth detectable by microscopic inspection on more than 50 % of the test surface
- 2 growth visible to the naked eye on max. 25 % of the test surface
- 3 growth visible to the naked eye on max. 50 % of the test surface
- 4 growth visible to the naked eye on more than 50 % of the test surface
- 5 heavy growth on the whole test surface

resistance against surface fungi

EN ISO 846:2019

resistant to wooddiscolouring fungi

class 0

4. CLASSIFICATION AND FIELD OF APPLICATION

4.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 12 of EN 13501-1:2018.

4.2 CLASSIFICATION

The product, **MOSO® Bamboo N-durance**, in relation to its reaction to fire behaviour is classified:

B_s

The additional classification in relation to smoke production is:

s1

Reaction to fire classification: B_s - s1

SGS

Test Report

NO.: SHPS2104000111FF Date: Apr. 27, 2021 Page 3 of 6

IV. Classification and field of application

a) Reference of classification

This classification has been carried out in accordance with EN 13501-1:2018. The classes with their corresponding fire performance are given in annex A.

b) Classification

The product, in relation to its reaction to fire behaviour is classified:

TEST	Class B
Classification	B-s1, B _s

c) Field of application

This classification is valid for the following end use applications:

- With an air gap, pine battens.
- Fixed mechanically
- Horizontal and vertical orientation
- Free standing
- Joints in the long and short joints

fire resistance

EN 13501-1

decking

class Bfl-s1

beams

class B-s1-d0

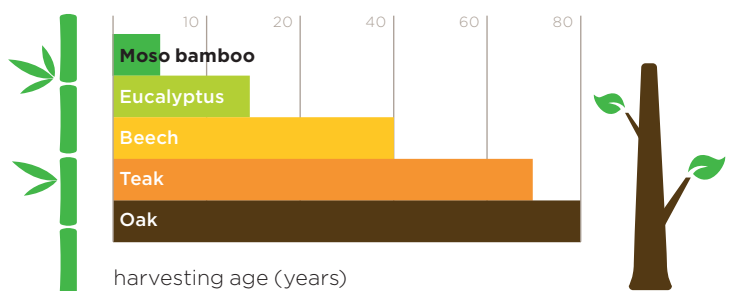
Bamboo N-durance®: the sustainable choice

MOSO® Bamboo N-durance® offers sustainable advantages. The inclusion of Bamboo N-durance® contributes to a higher LEED, BREEAM, Green Star, HQE and DGNB certification score for green building projects. That's one of the reasons why you can find MOSO® Bamboo N-durance® and other MOSO® products in many sustainable reference projects all over the world.

unsurpassed growing speed

bamboo: the fastest growing plant in the world

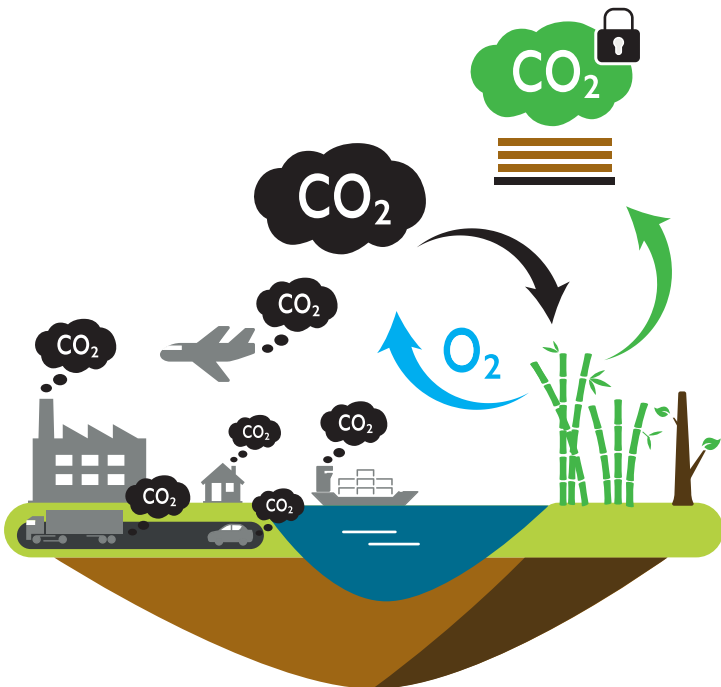
Because of the fast growth, Moso bamboo is managed as an agricultural crop: the annual harvest of the 4 to 5-year-old stems - compared to 60-80 years for tropical hardwood! - provides a steady annual income to farmers and stimulates the bamboo plant to reproduce even faster. Therefore, by default, no deforestation occurs with production of MOSO® Bamboo N-durance®, while large amounts of CO₂ are captured in the bamboo forests and products (www.inbar.int/understanding-bamboos-climate-change-potential).



carbon storage in bamboo

biobased materials act as CO₂ sinks

Through photosynthesis, plants absorb carbon dioxide (CO₂) and convert it into glucose (building block for biomass) and oxygen. The CO₂ is stored in the material for the lifetime of the product, and even longer if the product is recycled into new, durable products. Due to the fast growth - and related high yields - Moso bamboo locks far more CO₂ in durable products compared to wood species. The locked amount of CO₂ can be calculated rather simply by looking at the density of the material and taking into account the biobased content. For example, Bamboo N-durance® locks 1.635 kg CO₂ per m³ of bamboo, which is the equivalent to the CO₂ emitted by a mid-range car after 13.750 km driven.



Check out how bamboo can save the world at:
www.moso-bamboo.com/sustainability



Discover the
full range of

MOSO[®] Bamboo Outdoor

📷 Ron Turner Studios

Private Residence Candlewood Lake - Bamboo X-treme[®] Decking installed next to the water and just above the ground requires a very stable decking material - (55 m²) Mount Gilead, Ohio, United States of America



📐 BRT Architecten
🌿 Awood
📷 Ronnie Zeemering

Notiz Hotel NHL Stenden - Bamboo X-treme[®] Cladding installed to reflect the “dressing” of a chocolate cake - (1200 m²) Leeuwarden, The Netherlands

Oxygen La Défense Paris - Bamboo X-treme[®] Outdoor Beams installed on a façade with different lengths and thicknesses - (5500 m) Paris, France



📐 Stéphane Malka
📷 David Ducastel (Philéas Fotos)

MOSO® Mastering Bamboo

Endless possibilities with MOSO® Bamboo Products: MOSO® develops and creates bamboo products for interior and exterior applications that meet the highest technical requirements and quality standards, enhance the beauty of applications and are made from the sustainable, renewable resource: Moso bamboo. MOSO® Products can be divided into four product groups:

MOSO® Bamboo Outdoor

By using unique production processes the material is made suitable for many exterior applications, such as decking, cladding, fencing, and furniture.



MOSO® Bamboo Flooring

A complete range of flooring types with multiple variations in size, colour and style, thus providing dozens of different bamboo flooring possibilities for each application (ranging from residential to commercial).



There is no other company worldwide with an equal – and still expanding – broad assortment in high quality bamboo products, permanently available from stock either in Barcelona (office Moso Europe), Milan (office Moso Italy), Cape Town / Johannesburg (office Moso Africa), Worcester (office Moso USA), Dubai (office Moso Middle East), Hangzhou (office Moso China) or at the main office near Amsterdam (MOSO International). Furthermore, MOSO® works with several partner companies and leading distributors worldwide to guarantee the availability of MOSO® products in each region.

Furthermore, because of its expertise, MOSO® is able to develop unique, customised bamboo solutions for industrial clients meeting exceptionally stringent requirements. Through its experience, innovative attitude and world-wide network, MOSO® is recognised as the global A-brand in bamboo products. The proof is the impressive list of references and clients such as Madrid Airport, BMW, AkzoNobel, Texaco, Guggenheim Museum, Rabobank, United Nations (FAO), Iberostar and CitizenM Hotels. For an overview of our references and clients please refer to our website: www.moso-bamboo.com/bamboo-inspiration

MOSO® Bamboo Beam, Panel & Veneer

A very broad assortment in various sizes, colours and styles, offering solutions for indoor decoration (walls, ceilings, furniture, doors, etc) and (semi-) structural applications (window frames, curtain walls, etc).



MOSO® Bamboo Unlimited

Unique solutions to meet exceptionally high requirements from project partners and customised solutions for industrial clients like MOSO® Veneer for BMW car interiors, MOSO® Outdoor Beams for Erlau outdoor furniture, MOSO® Panels for HR Groep traffic signs and MOSO® Jacking Beams for Mammoet.



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bamboo

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