

# MOSO<sup>®</sup> by Grad<sup>®</sup>

Bamboo Outdoor  
Products installed  
in one click



TIM Exclusive Gardens  
Olivr







Bamboo: the fastest growing plant in the world



## table of contents

<b>MOSO® Bamboo by Grad® benefits</b>	4
<b>Bamboo X-treme® by Grad® Outdoor Cladding</b>	6
<b>Bamboo X-treme® by Grad® Outdoor Decking</b>	8
<b>Bamboo N-durance® by Grad® Outdoor Decking</b>	10
<b>Grad® installation system</b>	12
<b>Grad® accessories</b>	13
cleaning & maintenance	14
user information	15



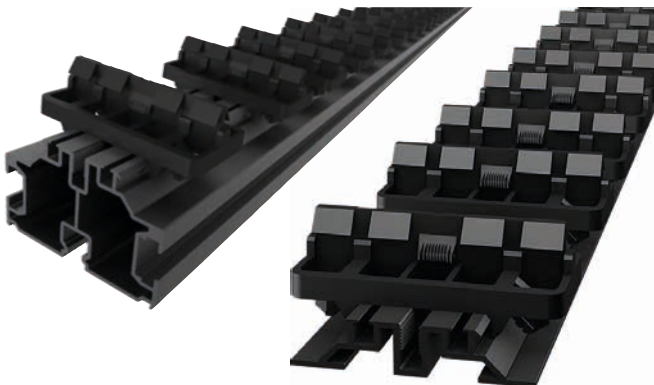
# MOSO® Bamboo

## X-treme® & N-durance®

### Grad® installation system

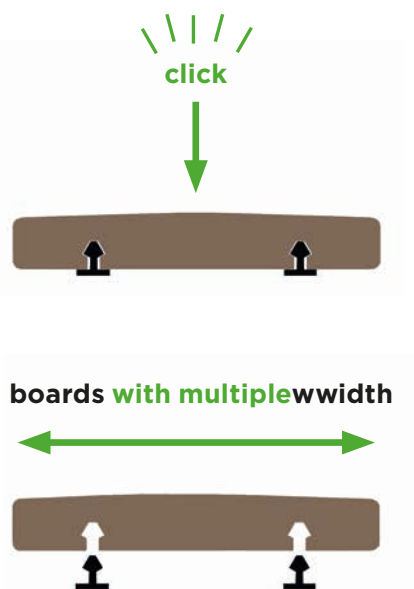


With Bamboo X-treme® and Bamboo N-durance®, MOSO® has developed **ecological** and **durable** decking and cladding products made of one of the fastest growing resources on earth. MOSO® uses unique processes that combine thermal modification and compression of bamboo to enhance **hardness**, **dimensional stability**, **fire resistance**, and **durability** to a level **superior** to that of the strongest wood species.



How it works: **Bamboo X-treme®** and **Bamboo N-durance®** boards are snapped onto the **Grad® Clips** that fit into the **grooves at the backside** of the boards. Grad® aluminium rails with pre-fixed clips, and multiple accessories to finish the deck and cladding, allow for a **fast, easy** and **reliable installation**, and ensure the perfect alignment of the Bamboo X-treme® or Bamboo N-durance® board to create a deck or façade that lasts.

**Grad® Keys** for easy to remove decking/cladding



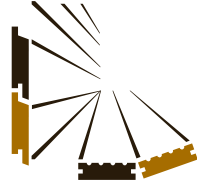
# discover the **benefits** of **MOSO® Bamboo by Grad®**



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

- Official LCA and carbon footprint studies (EN 15804) confirm that MOSO® Bamboo X-treme® is CO<sub>2</sub> neutral during the product lifespan\*.
- No use of fungicide in the production of Bamboo X-treme®.

*\*) This includes the CO<sub>2</sub> (biogenic carbon - EN 16449) stored in the product.*



## high stability

- Unique production techniques render the boards far more stable compared to traditional tropical hardwoods and limits its tendency to torsion.
- Aluminium is not subject to corrosion; its properties are not altered over time.
- 119 & 155 mm - wide boards with curved surface to allow for water drainage in decking without a slope.
- Gaps of 4-5 mm are respected between all boards to ensure continuous ventilation.



## fire resistant

- Meets fire resistance Class Bfl-s1 as per EN 13501-1 without the addition of fire retardant. As a result, MOSO® Bamboo Decking can be easily applied in public projects without additional protective measures.
- Bamboo X-treme® meets Class A flame spread index as per ASTM E84.
- The Closed profile meets the fire resistance Class B-s1-d0 (EN 13501-1) for the complete cladding system with the Grad® Flat Rails.



## hard & durable

- Biological durability Class 1 (EN 350 / CEN/TS 15083-2), simulated graveyard test / Class 1 (EN 350 / CEN/TS 15083-1).
- Use Class 4 in accordance with EN 335.
- Effectiveness against blue stain Class 0 (EN 152).
- Exceptionally hard: Brinell ±9.5 kg/mm<sup>2</sup> (harder than any tropical hardwood available).



## MOSO® Bamboo X-treme® and N-durance®

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

	5	4	3	2	1
<b>MOSO® Bamboo X-treme® &amp; Bamboo N-durance®</b>					
Ipé					
Strand Woven Bamboo					
Bangkirai					
Oak					
Scots Pine					

range of durability results



### certified

**durable**



**fire resistant**



**sustainable**



### proven

Since 2008 over  
**6 million m<sup>2</sup>**  
**Bamboo Outdoor**  
**products** installed,  
in more than  
**60 countries.**





### maintenance-free

- Bamboo X-treme® Cladding does not require periodic maintenance and offers the choice between natural greying or retaining the brown colour with an exterior finish.
- Bamboo X-treme® Decking and Bamboo N-durance® products require periodic cleaning or maintenance to retain the brown/caramel and beautiful look.



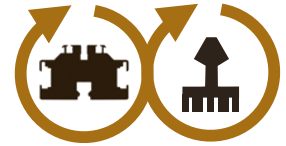
### easy to install/remove

- Easy set-up thanks to the combination of aluminium rails, clips, and pedestals (for decking).
- The aluminium rails are delivered already equipped with the Grad® Clips spaced at the right distances for first time perfect board alignment and fixed gaps between boards all around.
- The Grad® 3D designing software guides all your decking project creations.
- Boards can be removed and put back effortlessly into place, and the subdeck can be accessed at anytime.



### economical

- 20% faster compare to installation with standard clip.
- Lengths of boards and aluminium rails optimised to minimise transportation costs and allow for easy handling.
- Tried and tested system offering a 20-year warranty.



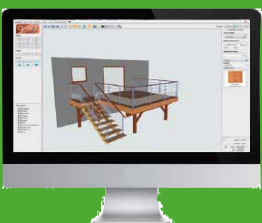
### Grad® Clips & Rails

- Extreme heat and cold resistant (-40°C to 70°C).
- Pull-out resistance of 240 kg per board (fixed by 2 fasteners).
- Aluminium rails offer extreme stability and durability.
- Up to 90% of the aluminium used in the Grad® Rails comes from recycable sources.

Grad® installation system: reliable, fast and accurate



### quote on request



Lépine gold medal - Paris + world of the inventors Geneva - 2008

### proven

Since 2006, over **1.5 million m<sup>2</sup> of Grad® system** has been **installed**, 100% satisfaction everytime.

# 20

years of warranty on the structure by Grad®



WARRANTY  
25  
YEARS



Spee Architects  
Ossip-van-Duivenbode



Restaurio Architecten Peter van Velzen  
Awood



DAVL Studio



# MOSO® Bamboo X-treme® Varibo Outdoor Cladding for Grad® installation system

MOSO® Bamboo X-treme® Grad® Cladding are a solid boards in various widths, for exterior applications made from bamboo strips that have been compressed and thermally modified at 200°C. This unique Thermo-Density® process provides Bamboo X-treme® with the highest durability class possible in the appropriate EU norms, increases the stability and density, and consequently the hardness. MOSO® Bamboo X-treme® Grad® Cladding is designed for installation on the Grad® demountable and hidden installation system. Contrary to wood products, this material can achieve fire resistance without impregnation with expensive and eco-damaging fire retardants. The Closed profile achieves the fire resistance Class B-s1-d0<sup>1)</sup> (EN 13501-1) with the Grad® installation system. Like any tropical hardwood species, when exposed to outdoor conditions, Bamboo X-treme® will turn grey over time creating a very natural look.



Product Code	Shape	Finish	Surface	End-matched	Length edges	End edges	Effective width (mm)*	Dimensions (mm)
BO-DTHT1180-BG	Grad®	Unfinished	Flat	No	R3	2mm x 45°	45	1850x45x20
BO-DTHT1190-BG	Grad®	Unfinished	Flat	No	R3	2mm x 45°	64	1850x64x20
BO-DTHT220-BG	Grad®	Unfinished	Flat	No	R3	2mm x 45°	119	1850x119x20
BO-DTHT540-1-BG	Grad®	Unfinished	Flat	Yes	R1	2mm x 45°	136	1850x136x20

\* Effective width without gap between the boards, distance after installation on Grad® system 6 mm (except for Closed profile).

## installation

- Installation instructions are available from MOSO®: ▶ [www.moso-bamboo.com/cladding/grad](http://www.moso-bamboo.com/cladding/grad)
- MOSO guarantees the bamboo material and the mounting materials (fastener/screw) it supplies but does not guarantee the connection with other materials (such as sub frame joist/battens). It is the responsibility of the installer to make sure the used installation method matches such materials during the full lifetime of the product.
- Store in a cool and dry place away from direct sunlight, and protected from weather influences, dirt and dust.
- Installation instructions for the Grad® installation system are available from Grad®: ▶ [www.gradconcept.com](http://www.gradconcept.com)

Flat Rail



## technical characteristics and certifications

- Density: ± 1150 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> (average value - EN 1534)
- Reaction to fire: Class B-s1-d0 (EN 13501-1)<sup>1)</sup>
- Flame spread index: Class A (ASTM E84)
- Thermal emittance: 0.81 (ASTM C1371)<sup>2)</sup>
- Solar Reflectance (SR): 0.32 (ASTM C1549)<sup>2)</sup>
- Solar Reflectance Index (SRI): Low 27, Medium 30, High 33 (ASTM E1980)<sup>2)</sup>
- Modulus of Elasticity: 13565 N/mm<sup>2</sup> (mean value - EN 408)
- Bending strength: 54.4 N/mm<sup>2</sup> (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)
- CO<sub>2</sub> neutral: LCA report TU Delft (ISO 14040/44) ([www.moso-bamboo.com/lca](http://www.moso-bamboo.com/lca))
- Environmental Product Declaration - EPD (EN 15804) ([www.moso-bamboo.com/epd](http://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®), SS 7 v2009: MR 6, MR 7 (FSC®)
- Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5 (HD)
- Guarantee: 25 years

<sup>1)</sup> Tested on 18 mm thickness, without gaps between boards, with ventilation space behind boards.  
<sup>2)</sup> Tested on 3 years weathered MOSO® Bamboo X-treme®.



The mark of responsible forestry  
FSC® C002063



breeam



WARRANTY  
**25**  
YEARS



TIM Exclusive Gardens  
Olivr



Frédéric GODARD - Grad®



Grad®



# MOSO® Bamboo X-treme® Outdoor Decking

## for Grad® installation system

MOSO® Bamboo X-treme® is a solid, Thermo-Density® decking board, made from compressed bamboo strips. A special, unique heat-treatment process at 200°C provides Bamboo X-treme® with the highest durability class possible in the appropriate EU norms and the compression increases the hardness and stability. The boards are precisely profiled to be installed on the Grad® system. Like any untreated tropical hardwood species, when exposed to outdoor conditions, Bamboo X-treme® will turn grey over time creating a very natural look. MOSO® Bamboo X-treme® Decking achieves fire resistance Class Bfl-s1 (EN 13501-1).

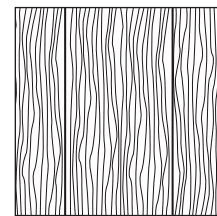
BO-DTHT191-C-BG



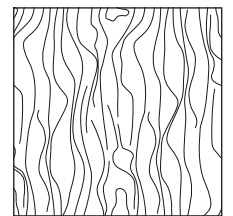
BO-DTHT221-C-BG



Smooth



Thermo-Density®



Boards Oiled Woca: Ends of the boards are protected with Sikkens Kodrin WV 456 sealer.

Oiled Woca	Unfinished	Surface	Grooved	End-matched	Length Edges	End edges	Dimensions (mm)
BO-DTHT191-C-BG	BO-DTHT190-C-BG	Curved	Grad® system	No	R3	2mm x 45°	1850x155x21
BO-DTHT221-C-BG	BO-DTHT220-C-BG	Curved	Grad® system	No	R3	2mm x 45°	1850x119x21

### installation summary

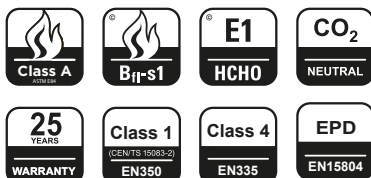
(full version available on [www.moso-bamboo.com/x-treme](http://www.moso-bamboo.com/x-treme))

- Install a suitable, fixed, stable and durable sub frame and follow Grad's installation instructions:
  - [gradconcept.com](http://gradconcept.com)
- 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.
- Thanks to the curved surface installing with a slope is not required.
- For further info: please see the general Bamboo X-treme® installation/maintenance instructions:
  - [moso-bamboo.com/x-treme/decking](http://moso-bamboo.com/x-treme/decking)
- After installation: make sure proper cleaning & maintenance is done.
- 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. In order to maintain the rich brown colour an exterior penetrating oil for hardwoods is recommended to be applied 3 to 4 months after installation. We advise to apply the initial coat 3-4 months after installation.
- Store in a cool and dry place away from direct sunlight, and protected from weather influences, dirt and dust.

### technical characteristics and certifications

- Density: ± 1150 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> (average value - EN 1534)
- Reaction to fire: Class Bfl-s1 (EN 13501-1)
- Flame spread index: Class A (ASTM E84)
- Slip resistance: USRV 55 (Dry), USRV 29 (Wet) (CEN/TS 15676) / R 10 (CEN/TS 16165 Annex B - DIN 51130) (Dry)
- Thermal emittance: 0.81 (ASTM C1371)<sup>1)</sup>
- Solar Reflectance (SR): 0.32 (ASTM C1549)<sup>2)</sup>
- Solar Reflectance Index (SRI): Low 27, Medium 30, High 33 (ASTM E1980)<sup>1)</sup>
- Modulus of Elasticity: 13565 N/mm<sup>2</sup> (mean value - EN 408)
- Breaking strength: 54.4 N/mm<sup>2</sup> (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)
- CO<sub>2</sub> neutral: LCA report TU Delft (ISO 14040/44) ([www.moso-bamboo.com/lca](http://www.moso-bamboo.com/lca))
- Environmental Product Declaration - EPD (EN 15804) ([www.moso-bamboo.com/epd](http://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, MR 7 (FSC®), IEQ 4.3, IEQ 4.4
- Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5 (HD)
- Guarantee: 25 years

<sup>1)</sup> Tested on 3 years weathered MOSO® Bamboo X-treme®.



The mark of responsible forestry  
FSC® C002063

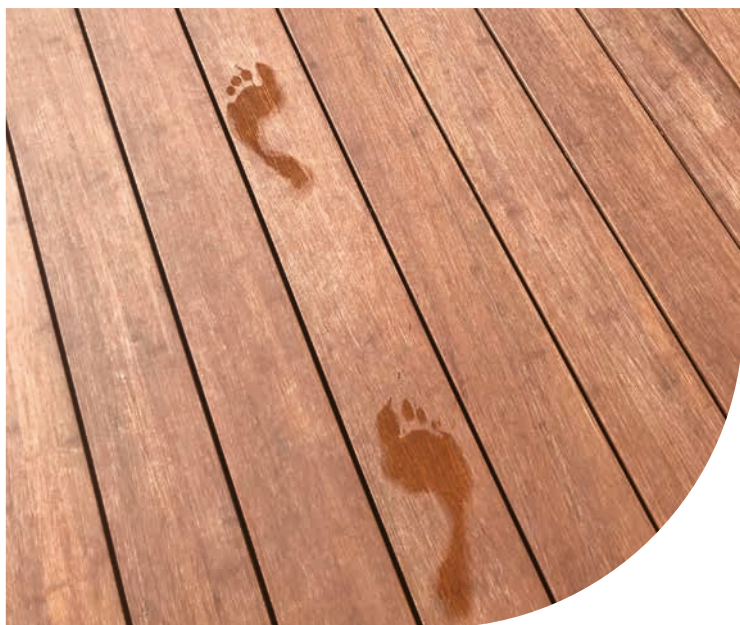


breeam





WARRANTY  
25  
YEARS





# MOSO® Bamboo N-durance® Outdoor Decking

## for Grad® installation system

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. The boards are precisely profiled to be installed on the Grad® system. When exposed to outdoor conditions, the caramel colour of Bamboo N-durance® will naturally fade. MOSO® Bamboo N-durance® Decking achieves fire resistance Class Bfl-s1 (EN 13501-1).

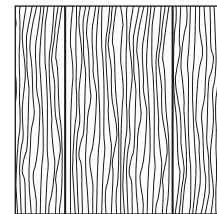
BO-DTC191-C-BG-01



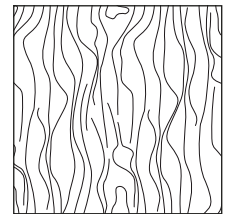
BO-DTHT221-C-BG-01



Smooth



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	Grooved	End-matched	Length Edges	End edges	Dimensions (mm)
BO-DTC191-C-BG	Curved	P + Woca	Grad® system	No	R3	2mm x 45°	1850x155x21
BO-DTC221-C-BG	Curved	P + Woca	Grad® system	No	R3	2mm x 45°	1850x119x21

### installation summary

(full version available on [www.moso-bamboo.com/n-durance](http://www.moso-bamboo.com/n-durance))

- Install a suitable, fixed, stable and durable sub frame and follow Grad's installation instructions:
  - ▶ [gradconcept.com](http://gradconcept.com)
- 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.
- Thanks to the curved surface installing with a slope is not required.
- For further info: please see the general Bamboo N-durance® installation/maintenance instructions:
  - ▶ [www.moso-bamboo.com/n-durance](http://www.moso-bamboo.com/n-durance)
- After installation: make sure proper cleaning is done.
- 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, 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.

### technical characteristics and certifications

- Density: ± 1200 kg/m<sup>3</sup>
- Resistance to Indentation - Brinell Hardness: ± 9.5 kg/mm<sup>2</sup> (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: 12610 N/mm<sup>2</sup> (mean value - EN 408)
- Bending strength: 95.5 N/mm<sup>2</sup> (characteristic value - EN 408)
- Biological durability: 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](http://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
- Contribution LEED EQ 4.3, IEQ 4.4
- Contribution BREEAM: MAT 1, MAT 3 (FSC®), MAT 5
- Guarantee: 25 years



The mark of responsible forestry  
FSC® C002063



breem