bufo technology

BioCore Sport

Flax fiber reinforced

bufo technology has developed and patented the bio-based fiber-reinforced cork composite HARDCORK® (EP3535120B1). HC Premix and / or prepregs are used to manufacture panels and molded parts using a pressing process. HARDCORK® BioCore is not a hazardous substance as defined by the Chemicals Act and therefore does not require any special labeling.

1. Material description

HARDCORK® BioCore »Sport« is our best-performing, environmentally friendly organic core material, which has proven itself in particular for sports equipment such as skate, wake, kite and balance boards in sandwich construction. The core has good drapability and is therefore a suitable alternative to conventional core material made of PVC foam or wood – even for winter sports equipment such as snowboards or skis.

The fibre-reinforced performance composite material made from cork granulate, flax short fibres and a biogenic binder consists of 98 % renewable plant-based raw materials. The cork accounts for 95 % of the volume and thus provides very good damping properties and an extremely climate-friendly CO_2 balance. The organic core material is lightweight, dimensionally stable, weather- / water- / corrosion- / heat-resistant, durable, resistant to rot and mould, resistant to most chemicals (with the exception of oxidising agents), flame-resistant, thermally and acoustically insulating, has very low thermal conductivity, low water absorption and has an extremely low swelling behaviour of < 1 % (depending on the density).

In combination with various cover layers, the fibre reinforcement creates sandwich structures with high mechanical strength and very good shear strength.

In various tests of sandwich structures, no core failure was detected in the bending test and the compressive strength is significantly higher compared to conventional cork panels. We recommend a symmetrical sandwich structure, especially for anisotropic top layers.

HARDCORK® BioCore »Sport« is to be regarded as a natural material that exhibits differences in colour and structure and may grey depending on the weather. The surfaces can be refreshed with oil (like wood). To date, no UV-related mechanical influences can be assumed.

Light | Weather-resistant | Damping | Strong | 98% Plant-based | CO_2-negative

2. Manufacturing & Storage

In our manufactory, we can produce panels in the format 2,400 x 1,000 x 10 mm in densities of 200 – 350 kg/m³ (max. pressing pressure 2.5 bar). Other versions on request; max. thickness 50 mm. Test pieces on a laboratory scale of 240 x 240 mm are also available on request in densities of up to 700 kg/m³ (max. pressing pressure 8 bar). Series production is currently being planned.

HARDCORK® BioCore »Sport« should be stored and transported horizontally. No special precautions or labelling as a hazardous substance in terms of transport regulations are required.

For producers

Our HC BioPremix made of cork granulate, natural fibres and a thermally reactive bio-resin cures irreversibly in the hot pressing process at temperatures > 120 °C and can also be pressed directly with dry top layers.
The laminates adhere during the process due to the escaping excess resin. Sandwich structures pressed in a single operation have better bending properties than subsequently laminated cores.

3. Processing

HARDCORK® BioCore »Sport« can be sawn, milled, water jet cut, sanded, screwed and coated / laminated using vacuum, cold and hot pressing processes.

Suitable adhesives include PU adhesives, thermosetting resins, contact adhesives, cyanoacrylate adhesives, hot-melt adhesives and silicone adhesives; PVAc glues and other white glues are also suitable for sanded surfaces.

The usual safety regulations regarding dust removal and fire protection must be observed during processing. Skin contact with HARDCORK® BioCore dust does not cause any known problems. Allergic reactions due to particular sensitivity cannot be ruled out in individual cases.

4. Cleaning

HARDCORK® BioCore »Sport« is resistant to many common household cleaners and chemicals. The surfaces are non-reactive. However, chemical cleaning before further processing is not recommended, as cleaning agent residues remaining in the porous structure could affect the adhesive properties of the boards. Instead, cleaning by suction is recommended if necessary.

5. Case of fire

HARDCORK® BioCore »Sport« is flame-retardant and has passed the UL94-HB fire test.

6. Environmental & health aspects

Products comparable to HARDCORK® BioCore »Sport« with a similar material composition were:

- Labelled with the »LGA tested for harmful substances« certificate. This award is only given to products that have minimal pollutant emissions and are often well below the legal limits.
- Classified at the highest level according to the French VOC regulation. Materials with the lowest VOC emissions are labelled with the »Label A+«.
- Recognised for VOC emissions and indoor air quality in accordance with the independent »TÜV-PROFiCERT« certification. The award confirms that the legal guidelines of the respective country are fulfilled.
- Honoured with the voluntary »BLAUE ENGEL« certification. The »BLAUE ENGEL« follows strict environmental standards and recognises products that meet these criteria.

With a proportion of 98 % renewable plant-based raw materials, HARDCORK® BioCore »Sport« is in the best possible classification of »DIN-tested biobased > 85 %« that biobased products can achieve.

7. Technical data

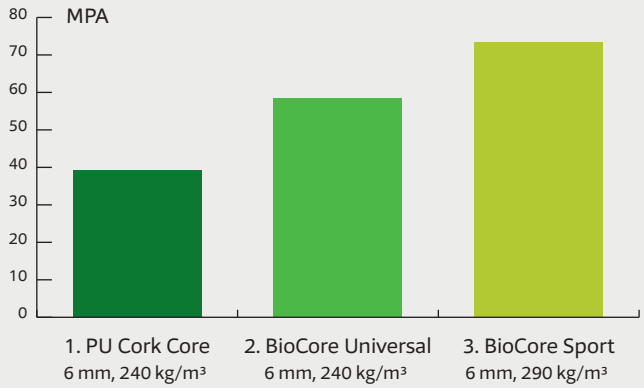
7.1 Physical and chemical properties

Property	Unit	Value						Norm
Panel thickness	mm	6	8	10				–
Raw density	kg/m³	300	300	200	250	300	350	–
Tolerance Raw density	kg/m³	± 10		± 10				–
Tolerance Panel thickness	mm	± 1		± 1				–
Panel length	mm	2,400		2,400				–
Panel width	mm	1,000		1,000				–
Optics, colour	–	Natural cork, dark						–
Surface	–	Raw, untreated						–
Flexural strength	MPa	3.8	3.6	1.5	2.2	3.5	4.2	EN 310
Deflection	mm	8	12	19	–	16	–	–
E-modulus	MPa	–	–	82	–	190	–	EN 310
Tensile strength	MPa	1.8	1.6	0.9	–	2.4	2.7	EN 527-4
Compressive strength (10 % compression)	MPa	1.5	1.7	1.0	1.5	1.8	2.1	EN 826
Max. water absorption (24 h)	M.-%	–	–	–	5	–	–	DIN EN 317
Relative thickness swelling at max. water absorption (24 h / 1 month)	%	–	–	–	< 0.3	–	–	DIN EN 317
Relative length swelling with max. water absorption (24 h / 1 month)	%	–	–	–	< 0.2	–	–	DIN EN 317
Thermal conductivity	W/mK	0.055	0.055	0.050	0.052	0.055	0.057	–
Solubility	–	Insoluble in water or oil						–
CO_2 emissions	kg CO_2e/t	- 35,240						cradle-to-gate

Comparison in sandwich construction, laminated with 996 g/m² fabric

Due to the fibre reinforcement, laminated HARDCORK® BioCore sandwich panels achieve significantly better bending properties than comparable core material without fibres. In this case, the following 3 core materials were laminated in the same process with fibreglass fabric U-E-996 g/m² and tested for flexural strength:

1. Cork Core, PU-bonded, 6 mm, 240 kg/m³
2. HARDCORK® BioCore »Universal«, 6 mm, 240 kg/m³
3. HARDCORK® BioCore »Sport«, 6 mm, 290 kg/m³



7.2 Handling and health

Property	Value	Standard
Storage and transport	HARDCORK® BioCore »Sport« is not classified as a hazardous material for transport and therefore there are no special requirements.	–
Workplaces	The usual safety regulations for dedusting must be applied.	–
Personal protective equipment	Wearing safety goggles is recommended to prevent eye injuries. The inhalation of material particles must be prevented by using adequate dust extraction and / or masks with particle filter P2 in accordance with EN 149.	–
Waste disposal	HARDCORK® BioCore »Sport« must be disposed of in controlled landfills in accordance with local regulations.	–
Health aspects	HARDCORK® BioCore »Sport« is not classified as hazardous to humans or animals. There is no evidence of toxic and ecotoxic effects.	–
Hazardous substances	HARDCORK® BioCore »Sport« is not a hazardous substance within the sense of the German Ordinance on Hazardous Substances (GefStoffV).	REACH-Regulation
Pentachlorophenol	Not included.	–
Formaldehyde	≤ 0.03 ppm / class E1	EN 717-1

HARDCORK® Skateboards

HARDCORK® decks are lightweight, durable, weather-resistant and dimensionally stable. The isotropic HC BioCore enables a thin construction and free drapability, both lengthways and crossways. HARDCORK® skateboards have good damping properties and impress with their smooth ride and long-lasting pop.

HARDCORK® decks are particularly sustainable and CO_2-negative, which means that more CO_2 is bound than is emitted. The entire production process is solvent-free. Cork oaks are harvested and not felled for cork production. A cork oak that is regularly harvested binds more than three times as much CO_2 as an unused cork oak, making it the leader in the field.

7.3 Stability and reaction behaviour

Property	Value	Standard
Resistance	HARDCORK® BioCore »Sport« is neither reactive nor corrosive.	–
Hazardous reactions	None.	–
Incompatibilities	No macroscopic changes to the surface of HARDCORK® BioCore »Sport« caused by acids, alkalis, acetone, ethanol.	–

7.4 Fire and explosion protection data

Property	Value	Standard
Fire test	Passed.	UL94-HB
Thermal decomposition	Is possible above 250 °C. Toxic gases (e.g. carbon monoxide, carbon dioxide) can arise depending on the fire conditions (temperature, oxygen content, etc.).	–
Smoke and toxicity	As with any other organic material, toxic substances may be contained in the smoke during combustion.	–
Flammability	HARDCORK® BioCore »Sport« is flame-resistant.	–
Extinguishing agent	Carbon dioxide, water jets and dry chemical foam can be used to extinguish flames. In case of a fire, people should wear breathing apparatus and fire protection clothing.	–
Explosion hazard	The processing, sawing, grinding and milling of HARDCORK® BioCore »Sport« generates dust. Standard safety precautions and adequate ventilation must be provided.	–
Protection against explosion and fire	In case of fire, HARDCORK® BioCore »Sport« should be treated in the same way as wood-based materials.	–

Thank you for your interest!

www.hardcork.com

The data and information listed here were determined on the basis of our own investigations, mechanical tests, supplier information and research. Some of them are not at institute level and some are based on the standard. As of: Dec. 2024

bufo technology UG
(haftungsbeschränkt)

Emdenstr. 2 – Courtyard entrance
30167 Hannover, Germany
Phone: +49 (0)511 / 3970.3813

contact@bufo-tech.com