bufo technology

BioCore Multigrain

Hemp 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 »Multigrain« was developed for the construction of ecologically safe, weather-resistant nesting boxes and insect houses. The low-resin formulation with granules of 0.5 – 4 mm has good insulating properties, enables components with a low density from 150 kg/m³ and is characterized by a lighter untreated surface compared to our other HC BioCores. The organic cork panels are also ideal for various DIY projects, acoustic elements, sandwich structures and much more.

The fiber-reinforced performance composite material made from cork granules of different sizes, hemp short fibers and a biogenic binder consists of 99 % renewable plant-based raw materials. The cork accounts for 97 % of the volume and thus provides excellent insulating and damping properties as well as an extremely climate-friendly CO_2 balance. The organic cork panels are lightweight, dimensionally stable, weather- / water- / corrosion- / heat-resistant, durable, resistant to rot and mold, resistant to most chemicals (with the exception of oxidizing agents), flame-resistant, thermally and acoustically insulating, have very low thermal conductivity and has an extremely low swelling behavior of < 2 % (depending on the density).

In combination with various top layers, the fiber reinforcement creates mechanically resilient sandwich structures. The compressive strength is significantly higher compared to conventional cork panels. We recommend a symmetrical sandwich structure, especially for anisotropic top layers.

HARDCORK® BioCore »Multigrain« 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** | **Insulating** | **Flame-resistant** | **99% 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 150 – 450 kg/m³ (max. pressing pressure 2.5 bar). Other versions on request; max. thickness 60 mm. Test pieces on a laboratory scale of 240 x 240 mm are also available on request in densities of up to 800 kg/m³ (max. pressing pressure 8 bar). Series production is currently being planned.

HARDCORK® BioCore »Multigrain« 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 hardens irreversibly in the hot pressing process at a temperature > 120 °C and can be pressed directly into shape using heated tools.

3. Processing

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

6. Environmental & health aspects

Products comparable to HARDCORK® BioCore »Multigrain« 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 99 % renewable plant-based raw materials, HARDCORK® BioCore »Multigrain« 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			Standard
Panel thickness	mm	10			–
Raw density	kg/m³	150	300	450	–
Tolerance Raw density	kg/m³	± 10			–
Tolerance Panel thickness	mm	± 1			–
Panel length	mm	2,400			–
Panel width	mm	1,000			–
Optics, colour	–	Natural cork, dark			–
Surface	–	Raw, untreated			–
Flexural strength	MPa	0.3	2.1	4.2	EN 310
Deflection	mm	–	–	–	–
E-modulus	MPa	–	–	–	EN 310
Tensile strength	MPa	–	1.2	–	EN 527-4
Compressive strength (10 % compression)	MPa	0.5	1.1	1.7	EN 826
Max. water absorption (24 h)	M.-%	–	21	–	DIN EN 317
Relative thickness swelling at max. water absorption (24 h / 1 month)	%	–	< 2	–	DIN EN 317
Relative length swelling with max. water absorption (24 h / 1 month)	%	–	< 1	–	DIN EN 317
Thermal conductivity	W/mK	0.047	0.055	0.062	–
Solubility	–	Insoluble in water or oil			–
CO_2 emissions	kg CO_2e/t	- 44,180			cradle-to-gate

Avoidance of plastic

Using cork instead of plastic helps to reduce dependence on fossil resources and the environmental impact of plastic waste. Cork is obtained from the bark of the cork oak, which grows in Mediterranean regions. The special thing is that the bark of the cork oak grows back again and again after harvesting without the tree having to be felled. A cork oak can be harvested every 9 to 12 years and often lives for several hundred years. The tree absorbs large amounts of CO_2 from the atmosphere.

7.2 Handling and health

Property	Value	Standard
Storage and transport	HARDCORK® BioCore »Multigrain« 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 »Multigrain« must be disposed of in controlled landfills in accordance with local regulations.	–
Health aspects	HARDCORK® BioCore »Multigrain« is not classified as hazardous to humans or animals. There is no evidence of toxic and ecotoxic effects.	–
Hazardous substances	HARDCORK® BioCore »Multigrain« 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® BioPremix

Our HC BioPremix made from cork granules, plant-based short fibres and bio-resin can be stored for up to 6 months at room temperature.

The thermosetting resin is activated at a temperature > 100 °C. The BioPremix loses moisture / stickiness over the storage period, after 1-2 weeks, becomes drier and the pourability increases. We recommend pressing times of
• 10 minutes / 10 mm at 150 °C,
• at 180 °C 4-5 minutes / 10 mm are sufficient.

↗ Further information on request.

7.3 Stability and reaction behaviour

Property	Value	Standard
Resistance	HARDCORK® BioCore »Multigrain« is neither reactive nor corrosive.	–
Hazardous reactions	None.	–
Incompatibilities	No macroscopic changes to the surface of HARDCORK® BioCore »Multigrain« 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 »Multigrain« 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 »Multigrain« generates dust. Standard safety precautions and adequate ventilation must be provided.	–
Protection against explosion and fire	In case of fire, HARDCORK® BioCore »Multigrain« 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

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(haftungsbeschränkt)

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