

Typical Properties:

PHYSICAL PROPERTIES		TEST METHOD	UNITS	SPECIFICATION	
Colour and Form of feedstock				Grey beads	
Bulk Density (in BigBag)		ISO 1183	g/cm ³	0,66	
VOC Content			%	0%	
Moisture content			%	<2%	
Flame retardant properties		EN 11925-2:2002		Meets Euroclass E for 15-20kg/m ³ Test report R0529 Effectis (TNO) Dd 22-4-2010	
Thermal insulation properties Comparison EPS and BioXbeads		ISO 2796-1980	°C	Thermal Insulation W/mK*	Type
				0,034 at 16 gr/l 0,033 at 15 kg/m ³	BioXbeads® Neopor EPS
Reaction to fire classification in a brick wall construction.		EN-13823:2010+A1:2014		B-s2,d0	
Biobased percentage		C14-ASTM D6866-21	%	White: 100% ± 3% Grey: 93% ± 3%	

Mechanical properties:

Property	BioXbeads moulded		BioXbeads Extra large		BioXbeads HR Loose bead cavity wall with glue	
	Kg/m ³	value	Kg/m ³	value	Kg/m ³	value
white mW/mk	15	38	25	36		na
grey mW/mk		na		na	16	33
bending strength, kPa		na		na		na
tensile strength, kPa		na		na		na
compressive modulus MPa		na		na		na
shear strength kPa		na		na		na
shear modulus, Mpa		na		na		na
C-value for cushioning		na		na		na
halogens present		no		no		no
Fire: Euroclass E		pass		pass		pass

na = not applicable (yet)

HR means High R value and is common abbreviation for grey insulating foam with an improved low thermal conductivity.

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Granulometry control

Representative samples are taken from every octabin. One in five bins is controlled for conformity to the granulometry spec by sieving. If a deviation would be found the bin in question is disqualified and all sequential bins are and quarantined and measured.

Beads size of unexpanded raw material can be either 0,4-0,5 mm and 0,8-1,1 mm.

Bead Properties

BioXbeads has been specially developed to serve as a insulationmaterial for builings. Minimal

Achievable density 16 kg/m³, in one pass, typical range 15-20 kg/m³:

Biofoam has an available achievable density of 20kg/m³ in two passes. Typical range 20-25kg.m²

100% carbon Neutral

BioXbeads is tested by Nibe for its LCA and is to be expected 100% Carbon neutral.

BioXbeads is the same material as its predecessor Biofoambeads, but with an extremely optimized production method.

C¹⁴ – analysis by the international standard ASTM D6866-21, done by the University of Groningen, states 100% Biogenic Carbon content for BioXbeads®-white and 93% for the grey version with graphite (± 3%).

Pests proof



Photo of termites.

Termite test All Termites died after a formal 6 weeks test, there are minor traces of attack but all termites died probably due to lack of nutrients. Conclusion was that BioFoam is not sensitive to attack by termites conform the standard EN 117/118.

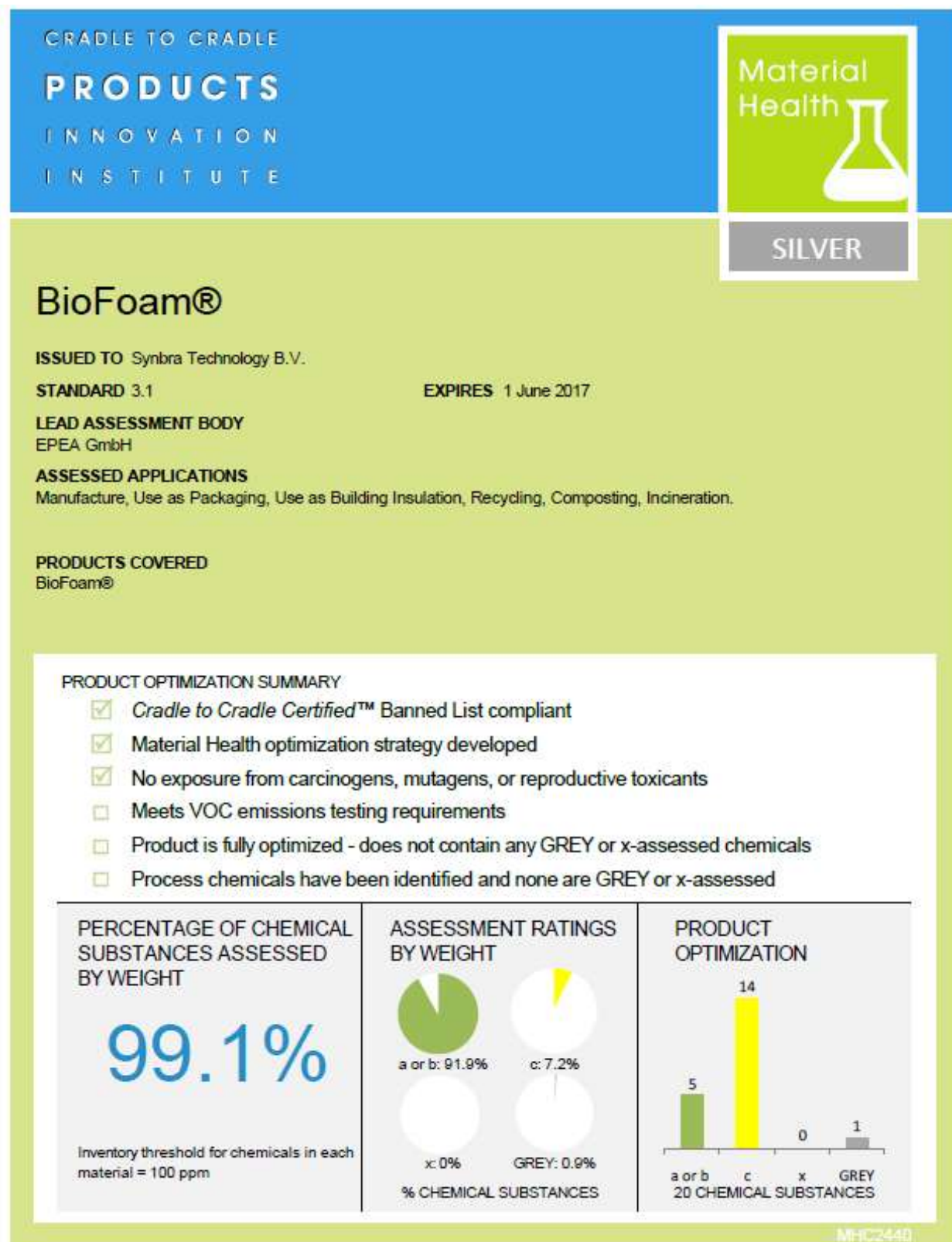
Insect test All Insects, larvae and eggs died without creating a new generation. This means that the components were not favorable to the consumption by the pests and then, they died by starving without continuing their development/reproduction, so there was no further insects' generation. Test done in 2018 by T.E.C. Laboratoire FR. The methodology was adapted from the requirements of the CUAP, Appendix D

Fungus tests No grow of mycelium was seen after the tests done with the subscribed funguses *Aspergillus Niger*; *Poria monticola*; *Conyphora cerebellas* (puteana); *Mercurius lacrymans* (*Serpula lacrymans*). TNO 060-DTM-2012-01234

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Material Health Certificate

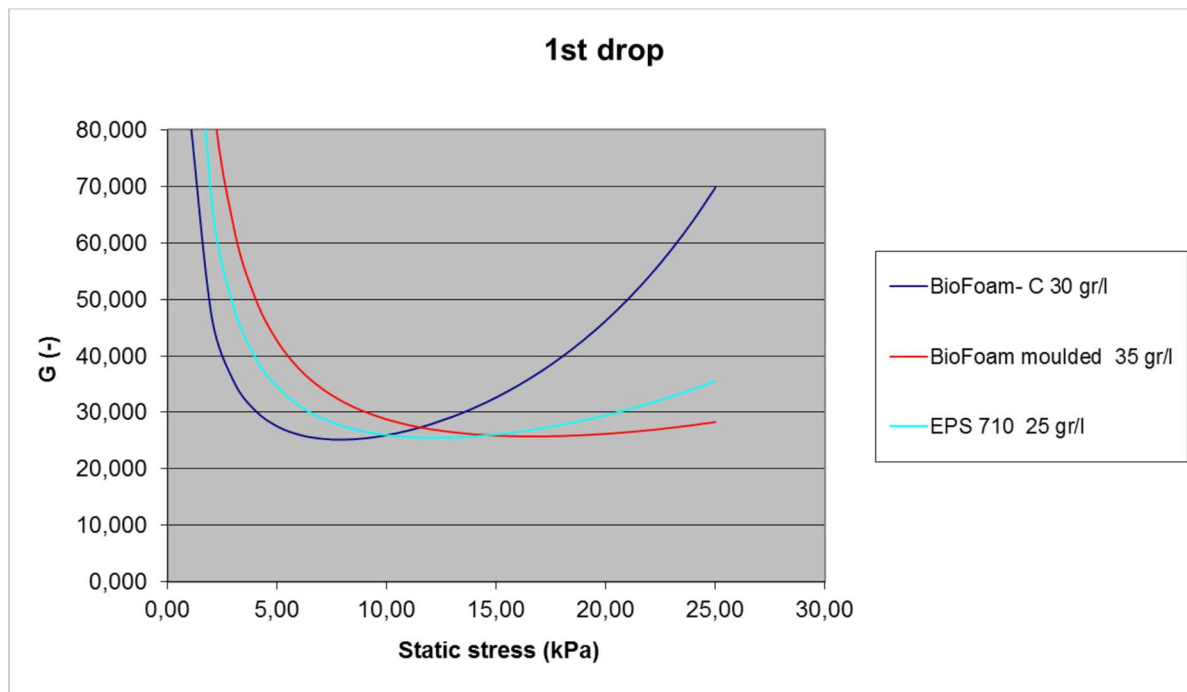
In addition a Silver material health certificate was given by EPEA and the ticked boxes apply.



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Cushioning

Dynamic Shock Cushioning Characteristics of Packaging Materials mentioned in ASTM norm 1596.
Sample 60x60x2,5 height 76 cm, 10 kg Drop, First drop 25G.
More drop testing graphs are available on request.
Test on BioXbeads to be done in 2026

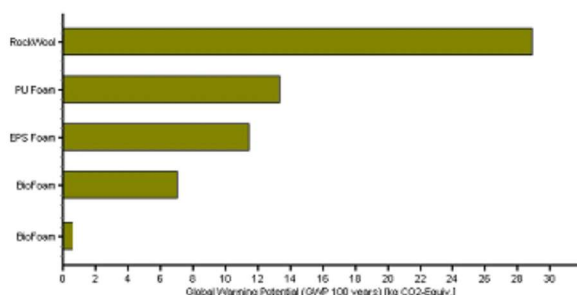


ROHS listing

All ingredients in BioFoam and BioXbeads comply with European Directive EC1994/45/EC with regard to absence of heavy metals and mutagenic and carcinogenic substances, and therefore also complies with European Directives 2002/95/EC and 2000/53/EC.

CO2 footprint

BioFoam and BioXbeads have a very low CO₂ footprint compared to other materials and is even better than the already very good insulant EPS. The emissions of CO₂ to produce a functional unit for a flat roof which is walkable and has an Rc of 3,5 are shown below. A formal LCA has been completed by Akzo Nobel sustainable systems and was peer reviewed. BioFoam moulded in 2015 is officially carbon neutral. A new LCA is formalized by Nibe for BioXbeads®. Finalized march 2026.
https://milieudatabase.nl/nl/viewer/milieuverklaring/nmd_202964/



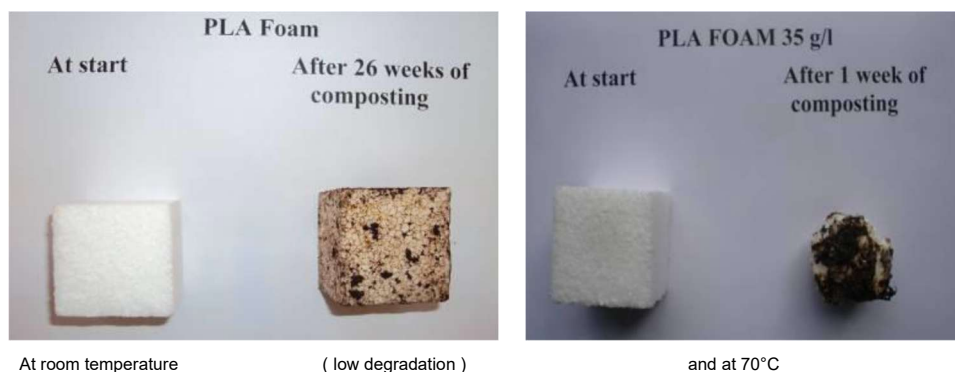
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Chemical resistance against solvents

BioFoam and BioXbeads are hardly attacked by styrene solvent present incurring formulations and has been used successfully as a sustainable filler, saving weight during thermosetting polyester/styrene/glass-fiber systems. It thus enabled a contribution to a reduction of styrene emission during the subsequent curing process and assists in mitigating styrene emission according to the tightened Dutch Emission (NER) guidelines per 30 November 2010.

Composting

BioFoam at 35 g/l does **slowly** disintegrate after 26 weeks of composting at room temperature at 20°C. BioFoam is therefore not suitable for home composting as proven by tests carried out by Organic waste Systems (OWS) Gent finished March 2010. Test was terminated according to the norm without visible alteration. Composting speed is similar to oak wood in the same circumstances.



BioFoam and BioXbeads disintegrates fast during **Industrial composting** at elevated temperature under the influence of moisture, bacteria and constant agitation. At room temperature it does disintegrate but very slow (like oak wood).

An industrial composting trial with cucumber plantroots intergrown in BioFoam-C was carried out by Attero in Venlo, the Netherlands.



FBR Report 1561
-Final- April 2015
Composting trial.pdf



All tested BioFoam® materials were completely disintegrated after a second industrial composting cycle. As source separated municipal solid biowaste. ('GFT')

generally takes several composting cycles to disintegrate sufficiently to pass the 15mm sieve, it is concluded that BioXbeads® disintegrates at least as fast.



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Proven Stability in construction

Naked foam displayed no degradation after 5 months in a Forest. (TNO surveyed) and as perimeter insulation it displays no degradation. (Photo of house below)

In all applications below the usage temperature of 60°C is never exceeded. It is experienced since 2011 that BioFoam and BioXbeads® then do not shrink.



Perimeter insulation

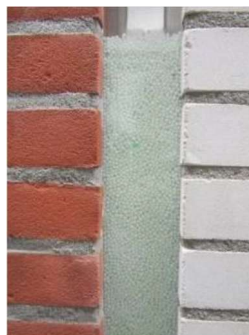


Deco BioBio Sandwich renovation



Unprotected use in duration test in forest

In cavity fill green BioFoam is used and a Grey BioFoam has been developed to improve thermal conductivity in cavity fill applications. BioFoam grey and green is used by Termokomfort system applicators for cavity fill insulation since 2011. In 2026 BioXbeads replaced Biofoam as it can be produced much faster and more efficiently.



Unlike with EPS there is no experience in excess of 15 years in a construction. So a 100 years guarantee is not possible as to not sufficient date have been generated to support that claim.

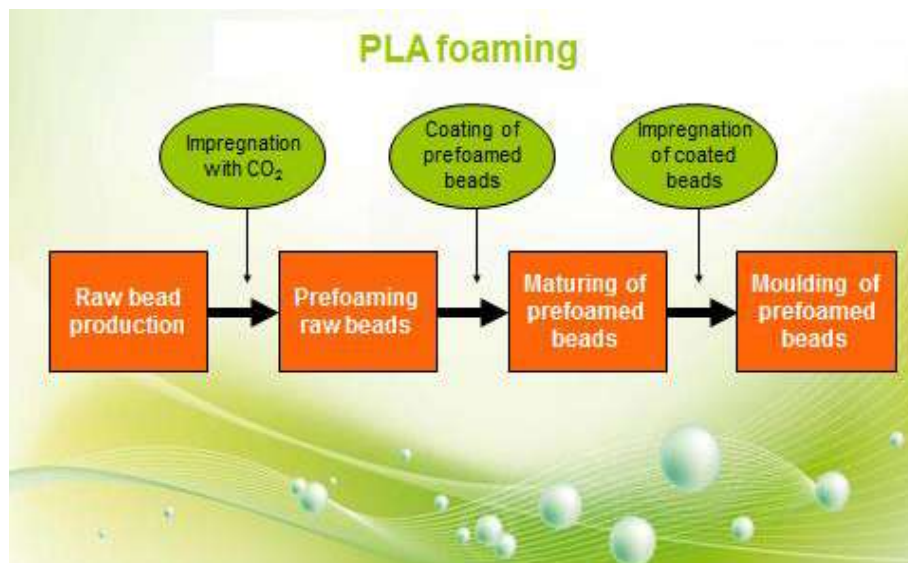
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Awards

BioFoam was awarded the first position of the 2010 MKB Top 100 SME awards innovation on May 25th 2010.
Biofoam was awarded the Rabobank Innovation Award 2020 in circularity.



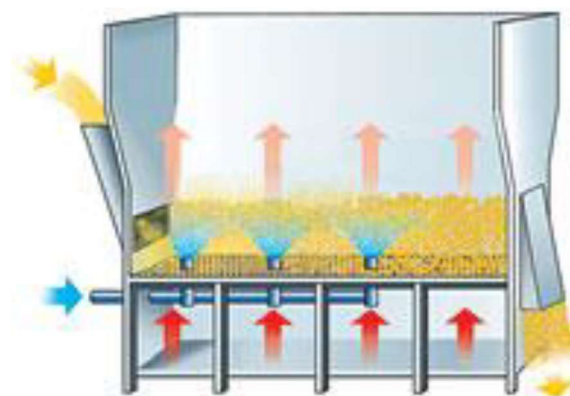
Processing steps of BioXbeads®



Processing Steps

Raw material for prefoaming is EPLA-microbeads, produced at a very specific recipe. This is an (almost) ready to use raw material made for Termokomfort. It still lacks the blowing agent.

1. Impregnation with CO² is required in a **special Impregnation machine**.
2. The impregnated beads are then released in a conventional EPS pre-expander which can process EPLA, **with a small technical modification, in one step for BioXbeads. (2 steps for Biofoam)**.
3. For Biofoam the expanded beads are then coated with a proprietary coating, in a **proprietary coating line**. Patented technology: WO 2008130226. BioXbeads don't need any coating.
4. Now the material can be stored indefinitely and it can be used for blow in insulation of constructions or used in a standard EPS moulding machine, which has a **small technical modification**.



In bold are the technical modifications needed to process E-PLA in conventional EPS equipment. This could require an investment in hardware.

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