

PLA based particle foam

The first CO₂ neutral foam in the world with Cradle to Cradle certification

Synbra Technology is currently finalising the certification of the world's first particle foam to receive a Carbon Neutrality verification in compliance with the PAS 2060 standard.

BioFoam® is a fully biobased particle foam made from renewable resources (PLA based). Already starting up in 2006, Synbra Technology invented, developed and patented this unique material. Through its converting companies, Synbra Group wants to become the leading supplier of sustainable and biodegradable particle foam.

Synbra Group companies, such as IsoBouw, Synprodo, Plastimar and Styropack, are already using the BioFoam material in series production for the white goods sector, ice cream packaging and the pharmaceutical sector, amongst others. Besides its own production facilities, Synbra is setting up a network of pioneering partner companies in the USA, the UK, Italy and is seeking coverage in other strategic markets. The existing distribution and production network already offers BioFoam moulded products as a valuable and sustainable addition to the existing range of particle foam products.

About PLA & BioFoam:

Based on renewable resources, BioFoam is extremely environmentally friendly. After use BioFoam can be either reformed into a new foam product or recycled into solid PLA. Besides that it's got the unique possibility to be fully composted. Since 2009 BioFoam is a C2CCM (Silver) certified foam – the first foam to obtain this certification. It is already used in many applications and has become a driver for product innovation within many industries (see also the cases below). Some recent applications are Alabastine (Akzo Nobel) trays for tubes (DIY market), Zandonella ice-cream box (Germany), Greeny ice-cream box (Italy), Cryostore (cold chain boxes), IsoBouw (Deco-Bio) and Termokomfort (BioFoam pearls).

BioFoam and LCA – Life Cycle Analysis

The peer reviewed BioFoam LCA was originally prepared by Akzo Nobel Sustainable Development in October 2010.

It was updated by thinkstep AG in September 2016 (see Table 1). Through the use of biomass, short-cycle CO₂ is used for the growth of plants, and this contributes to the reduction of the greenhouse effect, which constitutes in itself again a compensation for a part of the emissions further in the chain. This production chain includes transport, fermenting lactic acid and lactide production and PLA polymerisation, where electricity, gas and oil are used. The entire chain is, therefore, still not Carbon Neutral. It is exactly known how much emission takes place, and in which manufacturing step it takes place. This applies to CO₂ emission, but also for other emission sources, which are important for a Life-Cycle-Analysis

In the development process, Synbra Technology has always aimed at the most sustainable solutions possible. And with a high interest from both large retail chains and producers, Synbra has put extra effort into making BioFoam CO₂ neutral. Please note for sake of clarity, it is not emission neutral. But the emissions related to CO₂ emissions of gas are compensated annually with CO₂ certificates and in this way the emissions related to the BioFoam productions becomes neutral. The emissions related to CO₂ emissions remaining in the value chain and which does not fall under their direct influence, Synbra compensates for the full 100%. The certificates are available in different quality levels. Synbra has chosen the highest level: Gold Standard certificates. Electricity used is derived from hydropower.

Environmentally friendly and CO₂-neutral

During composting, biodegradable blends of fossil and biobased plastics on the market, still may release fossil CO₂, this is not the case for BioFoam, which is fully biobased. It was the first foam to be awarded the Cradle to Cradle™ certificate and has also received a material health certificate from EPEA - Hamburg, Germany certifying that BioFoam is free from any CMR (carcinogenic, mutagenic and reprotoxic) substance.

Unlike any other particle foam on the market, only CO₂ (taken from the atmosphere) is used as a blowing agent. No VOC's are emitted during production. BioFoam is a certified food-approved



Application example: white goods buffer.



Application example: colorFabb 3D printing reel

Foam



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material. Without addition of a flame retardant it meets the Euro class E fire standard.

New product developments

In December 2016 BioFoam E-PLA has been approved as a material that can be used in the entire range of a large furniture retail chain and has also been approved as filler protection in furniture products. In January 2017 it was approved as a buffer protection material by several white goods producers.

ColorFabb, Venlo, The Netherlands, Europe's leading and most innovative 3D wire printing producer has chosen to introduce BioFoam reels instead of the much heavier polycarbonate injection moulded reels. This reduced the reel weight by 80 %, saving weight in internet shipping. In addition after its use the reel can be composted or brought back to a distribution hub for regrinding and re-extrusion into 3D wire.

Synbra is working actively on further breakthrough developments in substrates, fish boxes and leisure applications.

www.biofoam.nl | www.synbra-technology.nl
www.synprodo.nl | www.styropack.dk

indicator	1 kg of moulded BioFoam	1 kg of moulded BioFoam (compensated)
Non-Renewable Energy Use, MJ	35.6	35.6
Renewable Energy Use MJ	56.8	56.8
Carbon Footprint, kg CO ₂ -Equiv.	1.74	0.00
Acidification, kg SO ₂ -Equiv.	0.0337	0.0337
Photochemical Oxidant Formation, kg Ethene-Equiv.	0.00262	0.00262
Eutrophication, kg Phosphate-Equiv.	0.0107	0.0107

Table 1: The CO₂ offsetting is not included in the GABI LCA i-report. In the Technical Specification "ISO/TS 14067:2013 Greenhouse gases -- Carbon footprint of products -- Requirements and guidelines for quantification and communication" it is stated that "The CFP (Carbon Footprint) and the partial CFP shall not include offsetting." (chapters 3.1.1.4. and 6.3.4.1.). Also for example in the PCR (Product Category Rules) of the German EPD system (IBU) it is specified that "IBU does not allow CO₂ certificates to be included in the quantification of the global warming potential." (chapter 5.5.8, see attachment p.17). Based on these methodological guidance documents thinkstep does not recommend to include the offsetting into the calculations but to communicate it in a qualitative way to show your commitment. The table below summarises this in a transparent way.