

BioFill® ,Sustainable high density foamed biopolymer alternative for (SBR) rubber infill in synthetic turf fields

Jan Noordegraaf Director Central R&D Bewi Synbra Raw

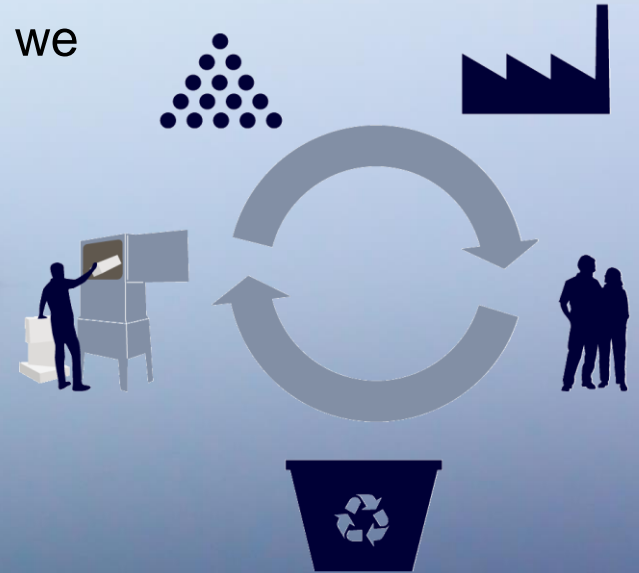
Anjo van der Wende Product Manager artificial grass Saltex Unisport



**WE HAVE KEPT SALMON COLD AND
HOUSEHOLDS WARM SINCE 1980.**

CLOSE THE LOOP

By managing the entire chain from raw material to finished product we can close the loop and lead the change towards a circular economy.



ONE OF THE LEADING INTEGRATED EPS PRODUCERS IN EUROPE



- One of the largest vertically integrated expandable polystyrene (EPS) producers in Europe

- Innovative and vertically integrated through Technology Innovation (T&I)



- 28 production facilities located across Norway, Denmark, Sweden, Finland, the Netherlands and Portugal
- Annual capacity of 185 kt EPS beads (RAW)

- Suspension 100 kt (FL), 70 kt (NL), Extrusion (NL), PLA 6 kt



- Revenue of more than ~SEK 5 billion based on annualised YTD Q3 2018 revenue



- ~1,300 employees located across 6 countries



x2 RAW

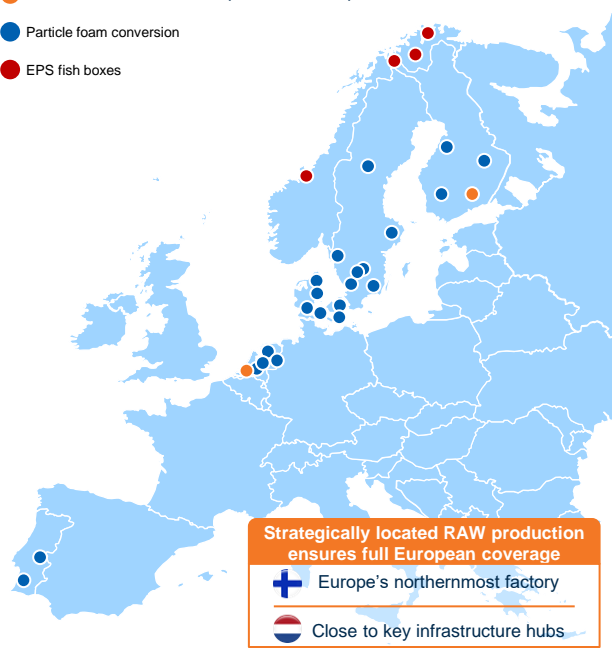


x22 Particle foam conversion



x4 EPS fish boxes

Overview of production footprint

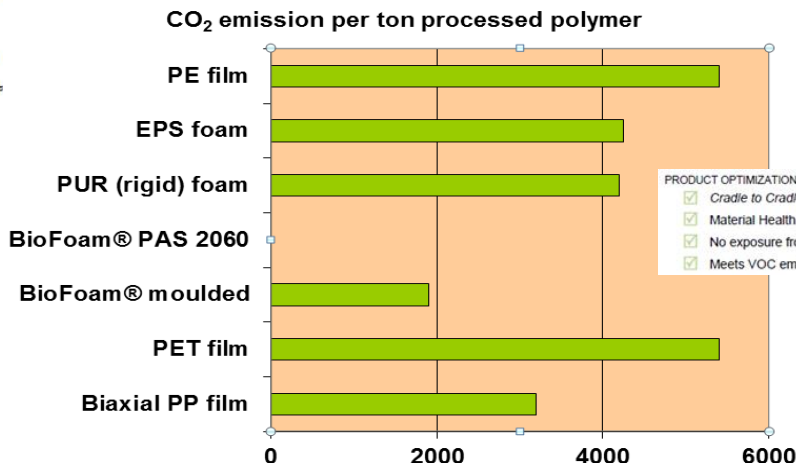


MAIN USP: ZERO CARBON FOOTPRINT PAS 2060



Greenhouse Gas Verification Statement
Number DIV-2015-08-00002

The Product Carbon Neutrality of the product BioFoam achieved by Synbra Technology BV in accordance with PAS 2060 at 31st December 2016 with commitment to maintain to 31st December 2018 for the period commencing 1st 2017.



Bewi Synbra LCA Tool 2.0, based on LCA according to ISO 14040 & 14044, prepared by Tobias Borén (AkzoNobel) and reviewed by Martin Patel (Utrecht University) review Thinkstep Sept. 2016

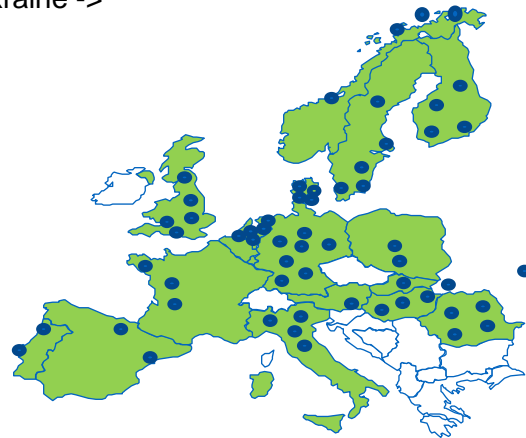
EXPANDING EUROPEAN BIOFOAM PARTNER NETWORK

Europe, core BewiSynbra countries,

- Scandinavia -> Styropack/Bewi
- IPS Germany/Netherlands->IsoBouw
- Portugal-> Plastimar
- Benelux -> Synprodo
- Germany -> Synprodo
-

Selected partners in

- Italy/Turkey -> Sulpol/ICSS
- USA-under NDA
- Eastern Europe/Poland/Ukraine -> Hirsch
- Spain/France under NDA
- UK-> DS Smith/Polybox
- Taiwan -> Supla



BIOFOAM® APPLICATIONS

Synprodo

Cooled transport

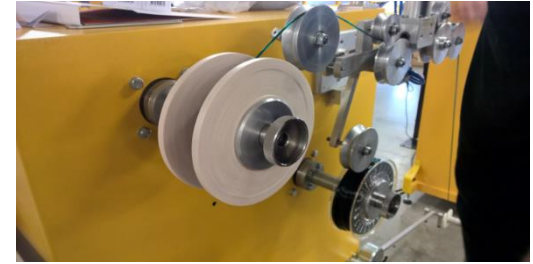
Fish boxes

Internet shipments



COLORFABB

- World leader 3D-printer spools
- PLA-thread grows rapidly
- Participation Synbra / Synprodo



PRINTED VEGETABLE BOXES



Food contact approved

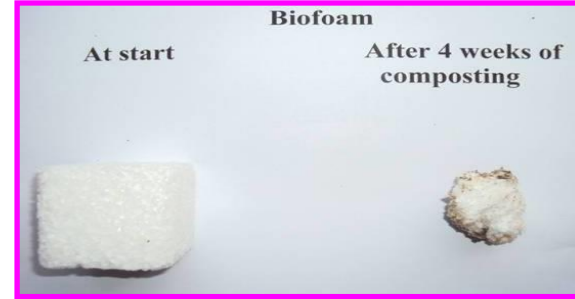
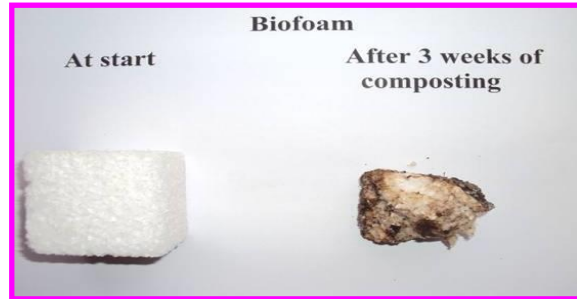
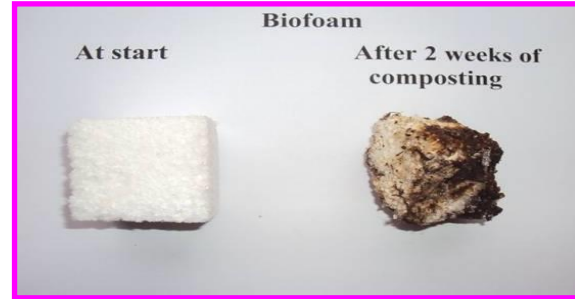
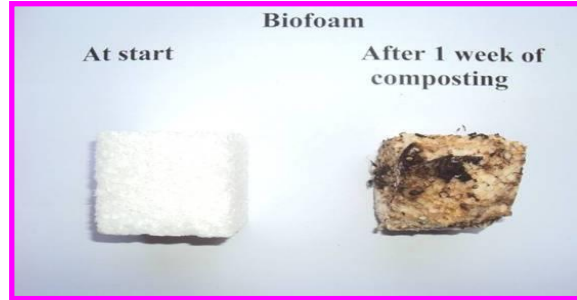


WHITE GOOD PRODUCER (UNDER NDA)

- Move out of EPS
 - by 2020
- Testing with EPS tool
- Feedback 1 -2-2018
- Technically approved



DISINTEGRATION/COMPOSTING EN 13432



54 g/l

@ 70° C

Home composting (at 30° C) → was not possible/ or is it?
PLA/BioFoam is not a solution for littering!

OCT 2018 COMPOSTING SWITZERLAND

- Grünverwertung Hufschmid
- **Normal cycle 4 weeks**
- After 2 weeks at 79.2 oC
- All Biofoam had dissapeared
- **6 weeks @50oC up to 70oc**
- **then again 6 weeks**
- All BioFoam had dissapeared



ATERRO COMPOSTING

- *FBR Report 1561 Composting trial.pdf*
- All tested BioFoam® materials were completely disintegrated after the standard industrial composting cycle. As source separated municipal solid biowaste ('GFT') generally takes several composting cycles to disintegrate sufficiently to pass the 15 mm sieve, it was concluded that BioFoam® disintegrates at least as fast.

Test sample C6X at the start of Trial 1: (a) mesh bag.



Test sample C6X, recovered after 13 days in Trial 1: (b) mesh bag, (c) total content, (d) close up.



Test sample C6X, recovered after another 13 days in Trial 2: (e) total content, (f) close up.

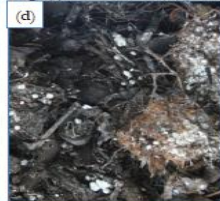


END OF LIFE COMPOSTING

Test sample C6X at the start of Trial 1: (a) mesh bag.



Test sample C6X, recovered after 13 days in Trial 1: (b) mesh bag, (c) total content, (d) close up.



Test sample C6X, recovered after another 13 days in Trial 2: (e) total content, (f) close up.

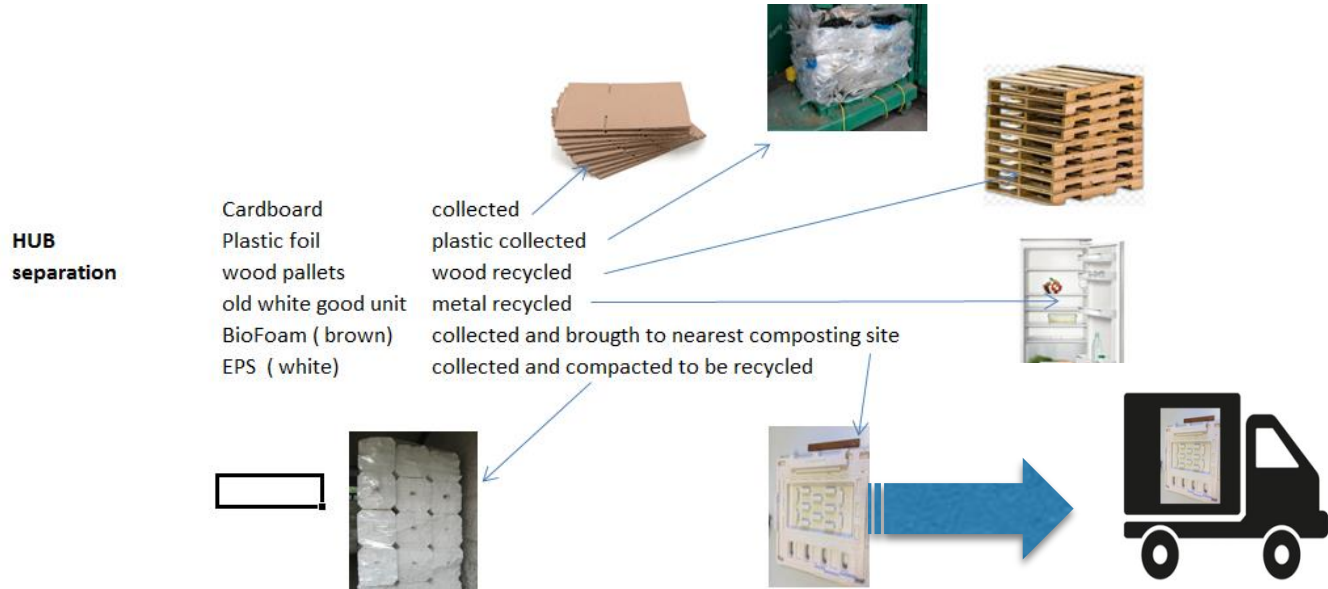


Figure 10
Placing the mesh bags in the composting tunnel (Trial 1).



Figure 11
Position of the mesh bags in the composting tunnel (Trial 5).

EOL SORTING IN A HUB



Saltex BioFill™

✓ Certified Biobased

ASTM D 6866:2008 (Edition 2011-10)

✓ Certified Biodegradable

EN13432 (2000), ASTM D 6400-04 & ISO 17088 (2008)

✓ Certified Compostable

EN13432 (2000), ASTM D 6400-04 & ISO 17088 (2008)

✓ Meets REACH

✓ No dust (compared to existing infills)

✓ No smell

✓ Based on non-GMO



TRISKELION
RESEARCH FOR BETTER LIVING



UNISPORT

Saltex BioFill™

The granulate is industrially processed and certified as 100% biodegradable and organic, which does not harm nature, water, animals or ourselves.



Saltex Legacy™



Artificial turf
Saltex Legacy™

Infill granulate
Saltex BioFill™

Backing
PU PowerBacking

Shock pad
Saltex PowerPlay

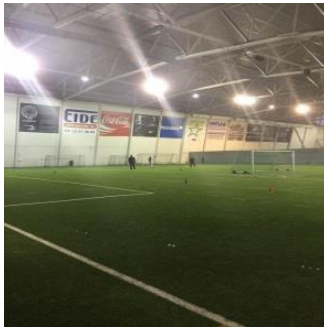


Saltex Legacy™
is approved by FIFA

UNISPORT 

EOL SALTEX /UNISPORT SOCCERFIELDS INFILL

- Replaces SBR rubber indoor /outdoor
- 3 fields in 2016/3 fields in 2017
- 10 fields in 2018 & launch in Finalnd
- FIFA approved
- EOL managed by system installer





Artificial turf

Tennis courts

Tennis Stadium

Spectator seatings

Hybrid grass

Padel courts

Kristianstad Arena

Track & field courts



4 sport floors -
Telescop seatings

One-Stop-Shop

Artificial turf

Kristianstad Arenaområde

Live to move. Move to live.

unorganized activities

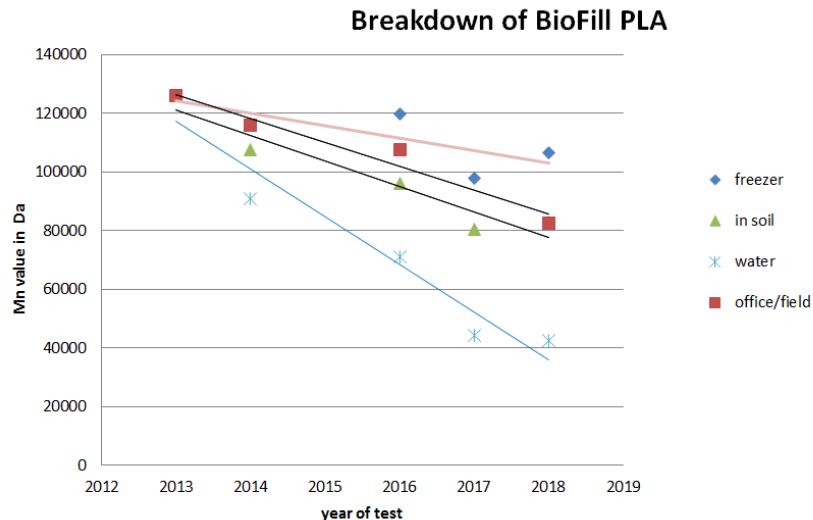


LOSS OF M_n OF FOAMED PLA , OVER A PERIOD OF 6 YEARS

Duplo PLA samples 2013

fully immersed in water, buried in the soil, left on field or put in the freezer.

Every year part of the samples was retrieved and the decay of the M_n value, which is an indication of the molecular length, was measured.

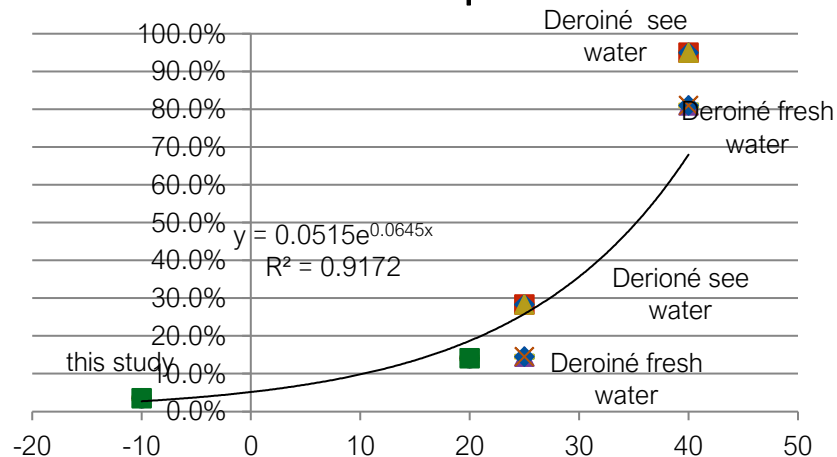


IN CASE OF ACCIDENTAL SPILL PLA BREAK DOWN IN WATER

- Breakdown as function of temperature
- No incentive to litter!

Temperature of water	time in years to reach 30kDa
40	0,9
30	2,0
25	3,2
20	4,7
15	6,7
10	9,0
5	11,7
0	14,8

% per year, fully immersed in water vs. temperature



HOME COMPOSTING (AT 70° C)

→ was not possible, But EPP insulates @ Rc 1,0



 Designed in Morpeth
Made in the UK

HOTBIN BASICS

HOTBIN SCIENCE

HOT Compost BIN

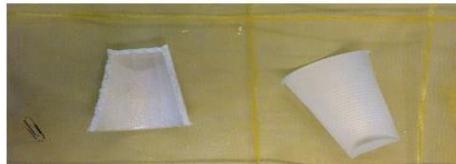
HOTBIN is an innovative hot compost bin that super heats your food and garden waste to 60°C. Get rich mature compost in just 90 days, 32 times faster than a cold compost bin. It's easy to use, fast and there's no tumbling or rotating required.

[LEARN MORE](#)

[BUY NOW](#)

FOAM PACKAGING DISINTEGRATION/COMPOSTING

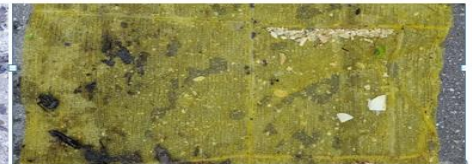
- Foam cups completely composted in a hot bin in 6 weeks
- Normal PLA also dissapeared
- Has the potential to solve the waste issue for all bioplastics



Prior to test 30-6-2017



11-8-2017 before washing after washing ,
only the paperclip remains



All BioWare parts moved to the side of the nett ,

C2C AND OTHER VALIDATIONS

- C2C Silver Awarded since March 2011 BioFoam PLA
- New scrutiny passed May 2017 (2 years)
- Lowest VOC emission in foams in automotive applications
- BioFoam has a Werkstoff number 7W0175
- Certified non GMO
- Certified compostable
- PAS 2016 carbon neutral

ZERTIFIKAT

Der Firma
Synbra Technology BV
Kettwilerstr. 37
40546 DUISBURG ALB
40623 DUISBURG
für die (einstufige) Produktivität
Biofoamcellulose parts
als Konformitäts- mit
ASTM D 6868-2008
Zertifizierungsprogramm: Biobasierte Produkte (Stand: 2011-16)
Inventar- und das Zulassungsnummer für das Zulassungs-



In Verbindung mit der unter genannten Registrierungsnummer ausstellen.
Dieses Zertifikat ist gültig bis 2016-11-30.

Greenhouse Gas Verification Statement

Number: BV-2016-08-0002

The Product Carbon Footprint of the product Biofoamcellulose parts is verified by Synbra Technology BV in accordance with the ISO 14064-3:2009 standard (2016-11-30).

Based on the Life Cycle Analysis (LCAs) conducted by Synbra Technology BV, which is based on the ISO 14064-3:2009 standard (2016-11-30).

Synbra Technology BV

ISO 9001:2015
ISO 14001:2015
The following:

has been verified in accordance with ISO 14064-3:2009 in meeting the requirements

PAS 2016:2014 - Specification for the demonstration of

Carbon Neutrality.

Amount of CO₂ emitted for the period 1st January 2016 to 31st December 2016.

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NOTIFICATION OF REGISTRATION

Member
Synbra Technology BV
Zweifelstr. 37
40546 DUISBURG ALB
REWEKSTOFFE

Product
Biobased foams

Type, Model
Biobased

Testing body
DIN CERTCO

Mark of conformity
ISO 14064-3:2009

Registration No.
0016-01-01

Valid until
2016-11-30

Right of use
With this notification of registration the holder is granted the special entitlement to use the DIN CERTCO logo for the purpose of demonstrating the conformity of the product with the requirements of the DIN CERTCO standard.



POINTS TO TAKE AWAY

BioFoam® is:

1. Based on renewable feedstock
→ carbon neutral
2. Food approved by
3. Biodegradable → providing an additional & sustainable end-of-life option;
4. Cradle to cradle Silver certified;
5. Available in larger quantities produced in a commercial molding site.
6. Free from Carciogenic/mutagenic/reprotoxic compounds



A low-angle shot of the lower legs and feet of several soccer players standing on a green artificial turf field. The players are wearing various colored shorts (orange, black, green, blue) and red socks. Their soccer cleats are visible, including orange, green, and blue ones. A white soccer ball with orange and blue accents is in the foreground on the right. The word "Questions?" is overlaid in large white text in the center.

Questions?