Comfil®

materials (Comfil® and Bio4M®) and

the Plastiki

catamaran

Outline

Comfil®
BIO4M®
SR-PET
Plastiki
Further info



Comfil



- Hans Knudsen,
- Technical Director and co-founder of COMFIL.
- MSc. in applied chemistry
- Graduate Diploma in Business Administration
- 39 years in textile and composites



Comfil[®] From chips to Item

- COMFIL[®] is an innovation and production company, who manufactures and develops materials to the thermoplastic fibre composite industry
- Started in 1991 within Trevira Neckelmann in Silkeborg (Belonged to Hoechst)
- MBO 1/10-2001 **20 Years**
- Research, development and administration in Gjern Denmark (close to Aarhus)
- Production in Romania



Comfil[®] today



Comfil[®] Ro







What is Comfil[®]

- A thermoplastic composite yarn (based on continues fibres, both reinforcement and matrixes)
- A fabric made from the Comfil [®] yarn
- Consolidated plates (Organo sheets).
- Pultruded rods and tapes



Comfil[®] from chips to part



Reinforcement fibres

- HT-PET (High tenacity polyester) Sr-PET
- Glass
- Aramid
- Carbon
- Basalt
- Other HT fibres



Thermoplastic overview



Comfil[®] yarns

Comfil [®] yarns are tailor made.

- That means that the ratio of the fibre and matrix in the Comfil [®] yarns are made as wished.
- Typically 40-50 vol% reinforcement, but can be from 10-90 %.
- The yarn count is made accordingly.





Hybrid fabrics

Comfil [®] fabrics are tailor-made according to the needs of the customer.

That will say:

- Fabric type
- Directions and placement of the fibres.
- Area weight of the fabric.



Organo sheets

- Manufactured from fabrics
- from 0.3 mm to app. 5 mm
- Length?
- Width? Depending of quantity, up to 650mm today.
- One off (or a few) can be made in 120cm*80cm*20cm





Comfil[®] from chips to part







R

Thermoplastic Composites







FABRICATION MANUAL



Outline

Comfil®
BIO4M®
SR-PET
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What is Bio4M[®] (bioform)

- Bio4M[®] is a 100% bio-based and biodegradable material.
- A thermoplastic composite yarn (based on continues fibres, same material in both reinforcement and matrixes)
- A fabric made from the Bio4M[®] yarn
- Consolidated plates (Organo sheets).



BIO4M[®] Composite intermediates Consolidated SR-PLA plate for thermoforming





- Manufactured from fabrics
- Thickness: from 0.3 mm to app. 5 mm
- Length?
- Width? Depending of quantity,
- For now up to 650mm



BIO4M® THERMOFORMING AND COMPRESSION MOULDING

- BIO4M® PLA SHEETS IS VERY EASY TO THERMOFORM AND COMPRESSION MOULD.
- A PROCES WERE IT IS POSSIBLE TO PROCESS A 2mm THICK ITEM IN LESS THAN A MINUTTE IS available.

Process temperature: 155-160°C



BIO4M® materials Manufacturing processes





Thermoformed sport shoe reinforcement made of self-reinforced PLA

BIO4M® materials









BIO4M® materials

Thermoplastic Composites







Acknowledgement to MoPaHyb project for use of the mold for the seat structure



Bio4Self Awards 2019

1. JEC WORLD INNOVATION AWARDS WINNER 2019

2. TECHTEXTIL **innovationaward.2019** Sustainable Solution

3. The 2019 Global Bioplastics Award









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 This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 685614



Outline

- Comfil®
 BIO4M®
 SR-PET
 Plastiki
- Further info



What is Comfil[®] SR-PET

- A thermoplastic composite yarn (based on continues fibres, Where both reinforcement and matrix is PET)
- A fabric made from the Comfil[®] SR-PET yarn
- Consolidated plates (Organo sheets).



SR-PET

SR-PET materials are available as:

- 1. Fabrics
 - a. 50/50 Standard Twill 2:2
 - b. 80/20 "UD" weave

2. Organo sheets

Made from above fabrics

size: 1000*600mm

Can custom made



SR-PET materials can be processed

At 180-200°C in different processes, such as: a) vacuum consolidation b) compression moulding c) other processes



SR-PET

SR-PET organo sheet





SR-PET

SR-PET organo sheet can together with a PET foam form a one material sandwich.

This sandwich can also be formed

The sandwich has Very good impact Properties>120J





SR-PET can also be overmoulded

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PET polymers

PET today is recycled.

Systems are in place.

PET bottles PET packaging Clothes from PET And more systems.



Outline

Comfil®
BIO4M®
SR-PET **Plastiki**Further info



Comfil[®] and Plastiki

- Plastiki is manufactured from Comfil[®] SR-PET material
- over 10.000 soft drink bottles
- Standard PET foam
- So 100% PET
- Apart from Rain-pipes as masts and solar panels
- Max speed app. 7 knots. Average 2.? knots
- Sailed from San Francisco to Sidney





















Plastiki and SR-PET





https://theplastiki.com/





Comfil[®] today

- Comfil in Denmark: 1500 m2 and production capacity of a 1000 tons commingled yarn.
- Development and speciality production in Denmark
- Special press for manufacturing of composite parts
- Comfil[®] in Rumania:
- 1) app. 3000 tons commingled yarn production
- 2) weaving of same
- 3) Hot-melt multifilament spinning of polymers
- 4) Continuous composite plate production
- Can be expanded if required



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CONTACT

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COMFIL® DEVELOP AND PRODUCE THERMOPLASTIC COMPOSITES

- COMMINGLED YARNS of reinforcement fiber together with matrix polymer
- FABRIC of commingled yarn for vacuum and compression molding
- PLATES/SHEETS of composite fabric for vacuum and compression shaping
- TEXTURIZED yarns for niche application

Basis:

Flexibility

Endless reinforcement fiber of: CARBON, GLASS, ARAMID, HTPET, PLA, LCP etc.

Endless thermoplastic matrix material i.e. : PET, LPET, PP, PPS, PEEK, PA6, PBT, PLA, PC, PEI etc.

THE ADVANTAGES OF COMFIL®

COMFIL IS KEY MANUFACTURER OF SELF-REINFORCED PLA

<u>See more under BIO4M®</u>

AWARDS



Skriv her for at søge

Comfil[®] today

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