

Basics

Bio-Polyolefins | 52

Personality

Mark Verbruggen | 56

30 Preview



bio M A G A Z I N E . C O M plastics



Highlights

Fibers / Textiles | 12

Polyurethanes / Elastomers | 42

... is read in 91 countries

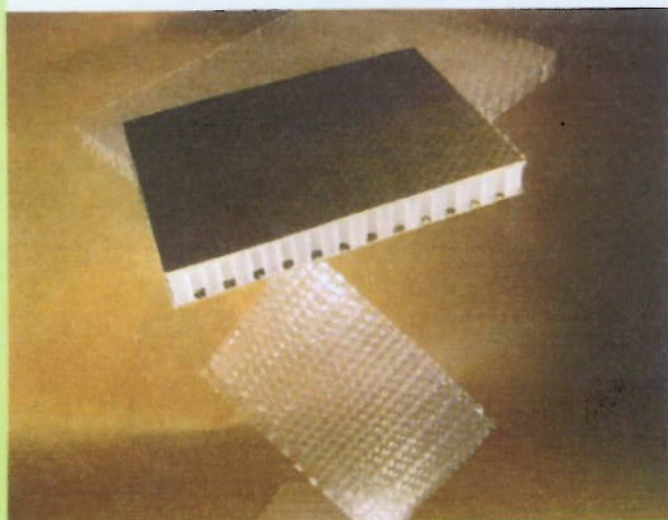
High Performance Composite Panels from Renewable, Bio-based Polymers

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Figure 1: honey comb cores and panels made from renewable resources



EconCore is proud to present the first 100% bio-based composite panel. Recently EconCore has optimized the patented ThermHex production technology to produce honeycomb cores and sandwich panels made from bio-based plastics.

"Today, the exploitation of the economical advantages of weight reduction has become essential for many industries", says François de Bie, EconCore head of sales and marketing. "Bio-based polymer materials are still relatively expensive compared to for example polypropylene (PP) alternatives what has limited the use of these materials in structural applications. Bio-based sandwich panels can be used in for example re-usable packaging, furniture, automotive interiors, separation walls or agricultural applications."

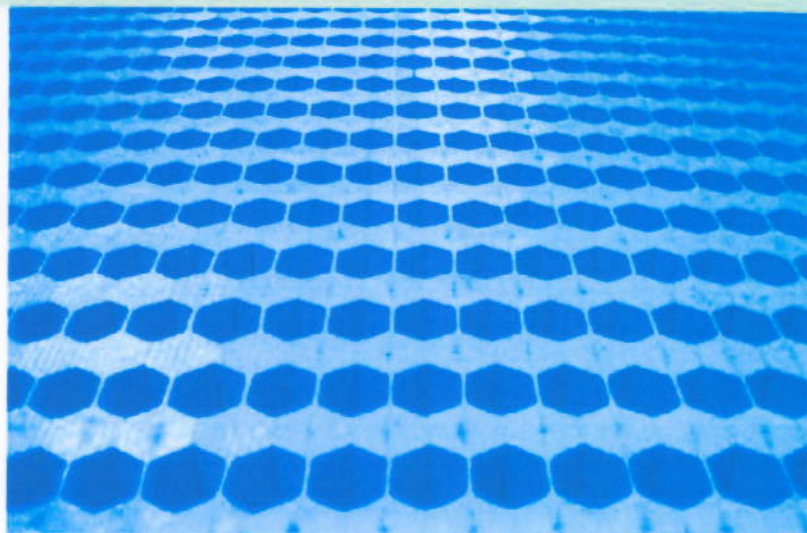
EconCore provides cutting edge production technology that enables its customers to produce cores and sandwich panels at optimal performance and lowest cost.

EconCore's patented ThermHex technology allows for cost-efficient production of hexagonal honeycomb cores from a range of thermoplastic polymers like for example PP, PE, PET, PVC, ABS, PC, PPS, PEI, PLA and many others.

Thermoplastic skins of the above mentioned thermoplastic polymers can be added in a second step in the production line to form mono-material sandwich panels, but also glass or carbon fiber composite, CPL, non-woven, aluminum or steel skins are possible. Another example includes polypropylene honeycomb faced by wood-flour / polypropylene composite. This sandwich panel concept, where high modulus but lightweight and inexpensive skins are laminated on the honeycomb, exhibits outstanding mechanical performance level while the solution is fully recyclable and eco-friendly. To show the benefit, such 20 mm sandwich panel whereby the skins are only 1 mm thick has bending stiffness equivalent to that of solid polypropylene at more than 14 mm thickness or to almost 3 mm thick steel sheet and this at total weight of less than 4 kg per square meter...

By combining its innovative production technology with renewable materials, EconCore is able to present a sandwich panel that has excellent mechanical properties, while still being cost competitive to traditional sheet materials.

Figure 2: Hexagonal Honeycomb core.



The last six months EconCore has optimized its technology for continuous production to produce PLA (Poly-Lactic Acid) based hexagonal honeycomb cores. Only moments after the core is produced skin layers are added in a second step of the continuous production process. These skins can be made of unfilled PLA material to make a mono material panel or, in case a higher performance is required, they can be replaced with a composite version of e.g. natural fiber reinforced PLA. The 'optical' advantage of the 100% PLA honeycomb sandwich panel over the composite one will be its level of transparency and light transmission, surely attracting the designer's eye!

To give an example of efficiency of sandwich panels, a 100% based PLA ThermHex panel at a thickness of 20 mm has equivalent bending stiffness to that of 12 mm thick solid PLA sheet or chipboard, as shown in table 1. Same rigidity is offered by a 10 mm thick plywood panel, known very well for its outstanding mechanical performance, but unfortunately also for its relatively high cost. Looking at weight of the PLA ThermHex, it is 4 times less compared to its monolithic sister. The solid wood-based products, used in large volumes in the furniture and construction market segments, appear to be 'solid' also in regard to their weight as they are up to factor of 2 - 3 heavier than the honeycomb board.

The EconCore technologies for automated continuous production of honeycombs are protected by granted patents. The company has sold a number of licenses to well established partners who have successfully introduced panels using the EconCore patents. The application list started with reusable packaging but started to grow fast after the first licensee was installed with its first ThermHex line. Players in the market

segments of automotive, B&C or furniture appeared to be very attracted by the idea of cost and weight savings.

In general EconCore supports licensees in their application development and integration of EconCore technologies into existing production lines. The company offers engineering services to select and optimize core-skin material combinations providing maximal mechanical performance at an optimal compromise between material cost, production cost and weight saving. "This know-how, combined with the cutting edge ThermHex technology, allows to maximize cost saving potential of our customers" says Tomasz Czarnecki, Technical Marketing Manager at EconCore.

Besides for more traditional polymers EconCore has recently received a lot of interest from companies that would like to use bio-based skin materials like natural fiber filled PP or PLA and natural fiber based non wovens. These skin materials in combination with renewable core materials would fit in a range of market segments like automotive, building & construction, furniture, sign & display and packaging market segments.

"We are currently looking for partners that would be interested in bringing these PLA panels to the market", says François. "The other possibility would be where EconCore takes ownership of producing the panels and selling these to a distributor company that has access to the different markets where these panels could be used."

At K'2010 EconCore is present at the booth of ThermHex Waben GmbH (Hall 08b Stand D79)

	100% PLA ThermHex sandwich panel (0.8 mm skins / 90kg/m ³ core)	Solid PLA panel	Chipboard	Plywood
				
Total panel thickness (mm)	20	12.1	12.4	9.8
Relative bending stiffness	1	1	1	1
Total panel weight (kg/m ²)	3.7	15.1	9.9	5.9

Table 1: Weight saving potential of PLA ThermHex sandwich panel, compared to solid PLA panel and traditional wood-based materials