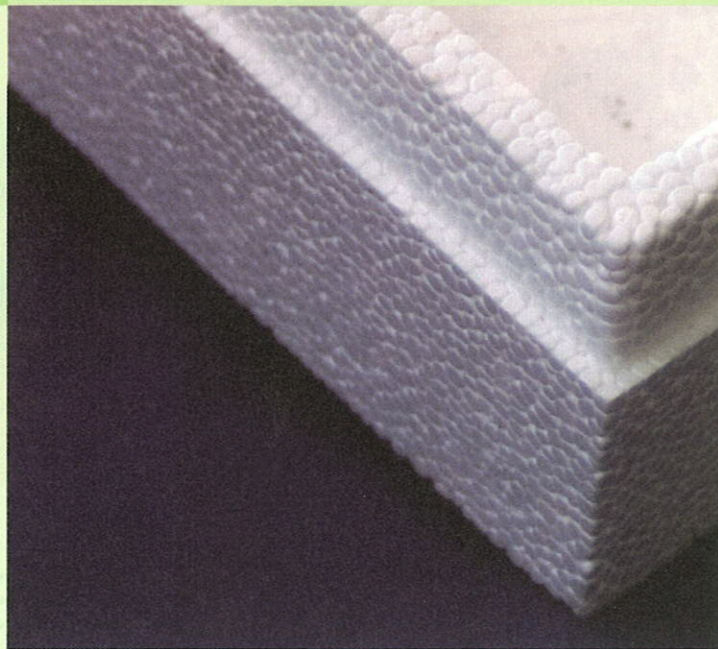


Expanded PLA as a particle foam



The first PLA producer that signed a partner contract with Purac and Sulzer Chemtech (see page 18) to produce their own PLA is the Dutch company Synbra from Etten-Leur, a company that has been producing EPS (expanded Polystyrene – a mouldable styrenics based particle foam) for many years. Now as customers from Synbra are increasingly looking for environmentally benign and sustainable solutions, Synbra wanted to find a biodegradable alternative based on renewable resources. Together with the University of Wageningen, The Netherlands, Synbra had already developed a process for E-PLA using CO₂ instead of pentane as a blowing agent. Thus the E-PLA does not contain any volatile organic compounds (VOCs). The E-PLA foam, now marketed under the brand name BioFoam® offers comparable or even better properties compared to EPS in properties like shock absorption, insulation value and moulding shrinkage. In order to better distinguish BioFoam from EPS and other particle foams, Synbra's E-PLA plans to colour it in a light green tone.

Although the situation seems to have eased, at the time they could not buy PLA. Synbra decided to make it themselves. "NatureWorks told us at that time to come back in three years" says Jan Noordegraaf, Managing Director of Synbra and we would not wait so long". Earlier in their polystyrene business Synbra had decided to go one step further in the value chain and polymerise their own Polystyrene, so now it was a logic step for them to do the same with PLA. "Then we found Purac, the market leader for lactic acid was only 40 km away from us. And Purac together with Sulzer were offering exactly what we were looking for, so it was clear for us what we had to do," adds Jan Noordegraaf.

The product development team of Synbra, Matthijs Gebraad, Jürgen de Jong and Hans van Sas showing the largest BioFoam part moulded to date



In addition, until recently, PLA couldn't be applied to applications such as expanded bead foam. The thermal properties as well as its brittleness did not allow reheating and expansion, but a solution was found for this. Additional opportunities are also identified since Purac started a new D-Lactide production last year, Synbra envisages now to also to use a stereocomplex PLA made from Purac's new D-lactide monomer, yielding foam with microwavable capabilities. The first results are extremely promising and prototypes were made.

A big advantage is that BioFoam can be custom expanded to densities between 20-40 grams per litre (g/l), without a limitation in moulded size. Achievable densities are far lower than with continuously extruded PLA (in an XPS like process) which hovers around 100-150g/l. "No wonder," Noordegraaf says, "that particle foam E-PLA is perceived to be superior to X-PLA and he adds "because E-PLA foam creates the highest amount of parts per kilo."

The main markets for BioFoam are for example specialty packaging for consumer goods and cushion filling made from biobased materials. The maker of the famous Fatboy beanbag furniture, the dutch company Fatboy the Original bv, is about to use BioFoam beads for filling.

For the cold chain transport sector DGP-Group of York (UK) is the leading launch customer.

End of last year Synbra started up a demonstration and product development plant located at Sulzer Chemtech in Switzerland. This unit, for the time being only available to partners of Purac, shall facilitate both product and process development to meet various application and customer demands. A production plant in Etten-Leur, the Netherlands with a capacity of 5,000 t/a is targeted to be operational by the end of 2009. Synbra intends to assume a leading position in Europe as supplier of biologically degradable foamed polymers from renewable sources and plans to expand the PLA capacity to 50,000 t/a.

Starting in Europe, Synbra already has plans to bring their BioFoam to North America in a partnership with a US based company. "BioFoam will be global," as Jan Noordegraaf puts it.

In January 2009 Synbra was awarded the prestigious PRIMA ondernemen gold innovation award by the Dutch rubber and plastics association (NRK) for its exemplary innovative and sustainable development.

www.synbra.com



The prestigious NRK sustainable innovation award 2008/2009 was handed over by MVO chairman Wim Lageweg to Synbra's Lex Edelman, Jan Noordegraaf and Wout Abbenhuis

