

Expanding The Frontier of Sustainable Plastics

The mantra 'save the planet' seems to be resonating across industries as we look at continued efforts to improve environmental sustainability.

Thermoplastics containing recycled material are in demand because they meet the requirements of sustainability. Lanxess has responded to this trend with its new "Eco" line of products made from high-performance properties despite recycled material content.

The European Union (EU) Directive on recycling end-of-life vehicles, and its heightened requirements, were one factor prompting the decision to introduce the new Eco products. Under the Directive, 95 percent by weight of the material in a motor vehicle must be recycled by 2015.

The first Eco products are Durethan Eco BV 35 H2, a polyamide 6, and Pocan Eco T3240 and Pocan Eco T 3230, two blends of polybutylene and recycled polyethylene terephthalate (PBT+R-PET). Tailored to injection molding, the products contain between 20 and 30 percent recycled material.

In addition to the benefit of conserving resources, these products enable Lanxess customers – and in turn their customers – to market their goods as "green products" and demonstrate environmentally responsible practices.

Trailblazing in Asia

The first request has come from a global electronics company based in Singapore and headquartered in Europe. This project has been on trial run and is now in the advance stage of being commercialized.

Milan Vignjevic, Lanxess's (Asia Pacific) head of semi-crystalline products (SCP) business unit, said, "The new Eco products attest to Lanxess's global commitment to provide



ECO Plastics from LANXESS contain between 20 and 30 percent recycled material.

high-performance products which are environmentally friendly. This ability to harmonize quality and sustainability is a key differentiator for Lanxess."

Vignjevic added, "The Eco products are immediately available to our customers in the region. At Lanxess, we have a market-oriented innovation strategy where we engage with our customers at the early stage of development. Our R&D facility in the heart of Asia plays an instrumental role in accelerating our efforts."

The SCP business unit has a Research and Development Testing Center (RDTC) at the company's Wuxi site in China. One of the center's key tasks is to speed up the development of new polyamide and polyester grades by means of extensive material testing. This will not only benefit customers in Asia but also all other international customers. The RDTC works closely together with the product development department at the Dormagen site in Germany, and they are connected online via a laboratory information management system. This enables the direct and rapid exchange of test jobs and results.

Sustainability and Performance

The technical makeup of the polyester blends contains polyethylene terephthalate (PET) obtained from beverage bottles. The special recycling process delivers PET that is free of all contamination, shows no fluctuations in quality and hardly alters the characteristics of the polymer at all. As a result of the high quality of the recycled PET, the properties of both new polyester blends are on par with those of primary product.

Pocan is used primarily in the electrical/electronics industry, although applications for this versatile material are also to be found in the automotive industry, in medicine, and in the sports and leisure sectors. The advantages of Pocan Eco T 3240, which contains 45 percent glass fiber, include high strength and stiffness, a low tendency to creep and a very good surface quality in the molded parts. Pocan Eco T 3230, reinforced with 30 percent glass fibers, shows little tendency to warp and, similarly, good achievable surface quality.

Durethan has a property profile that makes it ideal for applications in the automotive and electrical/electronics industries and in the construction sector. Durethan Eco BV 35 H2 is primarily designed for applications in automotive engineering. A thermoplastic reinforced with 35 percent glass fibers, the product is heat stabilized and can be used to good effect in under-the-hood components exposed to high temperatures. Its property set is similar to that of Durethan BKV 35 H2.0, a polyamide 6 already well established in the auto making sector. The recycled material comes from tested



DackeStop Museum of Arts in Virserum, Sweden, using Lexan Thermoclick sheet for its roofing and walls

post-production waste or not-for-sale batches of material resulting, for example, from color changes in production.

Eco Infrastructure

The sustainable design movement aims to reduce the negative impact of residential and commercial buildings on the environment. SABIC Innovative Plastics' growing portfolio of Lexan polycarbonate (PC) multi-wall sheet products aim to increase energy conservation, improve working and living environments, and promote recycling. Lexan sheet solutions can help architects, builders and contractors tap into the "green" building market, a \$12-billion sector and a bright spot in the current construction industry slump.

SABIC Innovative Plastics is contributing to this movement and strengthening sustainable building designs by offering its customers a broad portfolio of Lexan multiwall sheet solutions for roofing, cladding and glazing.

"Widespread concerns about the negative environmental effects of traditional building materials and methods are driving

the adoption of sustainable design," said Darrell Hughes, general manager for SABIC Innovative Plastics, Specialty Film & Sheet. "Lexan multiwall sheet products can make a significant contribution by helping our customers achieve sustainable designs. For example, Lexan sheet far surpasses double- and triple-pane glass windows in thermal insulation performance, and its light weight saves energy in transportation and installation. Plus, it's 100 percent recyclable. By incorporating Lexan sheet into their designs, our customers can make any building more sustainable."

Conserving Energy

Sustainable design is the practice of creating healthier and more resource-efficient models of construction, renovation, operation, maintenance and demolition. Plastics can enhance sustainability in a variety of ways, including energy conservation and the potential for recyclability.

One key focus of sustainable design is energy efficiency. For example, builders must balance the increasing demand for designs that admit large amounts of light with concerns about energy costs. The use of specialized PC glazing instead of traditional glass can achieve both.

Lexan PC sheet allows natural daylight to enter a building, creating a more aesthetically pleasing working or living environment while saving on electricity for artificial lighting. However, while letting light in, the material also offers ultraviolet (UV) protection for occupant health, and exceptional thermal insulation to enhance energy conservation. With new Lexan Thermoclear 9-wall sheet, U-values as low as 0.89 W/m²K (acc. ISO 10077 test) can be achieved – surpassing the insulation performance of double- and even triple-pane glass. Improved insulation reduces the use of energy for heating during cold periods and air conditioning during hot periods.

The use of specialized PC sheet that blocks infrared radiation (IR) can reduce the build-up of interior heat for lower energy consumption, while admitting plenty of light. This material is an excellent choice for skylights, walkways and roof domes where it is



Khalifa Stadium in Doha, Qatar using Lexan Thermoclear SunXP 25mm sheet in blue

important to admit high light levels while reducing heat that would otherwise require air conditioning.

Another area where Lexan sheet conserves energy is in handling. This lightweight material – at least three times lighter than a comparably sized glass panel with the same thermal insulation value – saves fuel in shipping and installation. Less weight also allows Lexan sheet to be supported by lighter-weight glazing bars and substructure, reducing the amount of support material required.

Even during manufacture, Lexan sheet offers environmental advantages over glass. Typical operating temperatures during the sheet extrusion process are in the 240C range. Therefore the energy used during the extrusion process in which Lexan polycarbonate resin is converted into Lexan polycarbonate sheet, is just a fraction of the energy needed to manufacture the flat glass that goes into the same building & construction applications. During the Lexan polycarbonate sheet extrusion process, up to 15 percent of recycled content is used to produce virgin material.