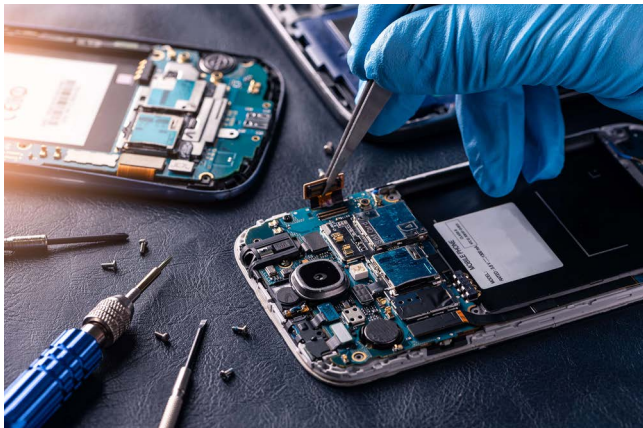


Celanese LCP ECO-B Materials Enable Drop-in Replacement with Sustainability Benefits



You need LCP materials that perform, meeting quality targets and regulatory requirements. You also want to improve your product’s sustainability. Look no further than Vectra® and Zenite® LCP ECO-B from Celanese.

Liquid crystal polymers (LCP) are preferred by product designers for their high precision and dimensional stability. They’re used often in thin-walled parts that may need to survive high-heat exposure. We’ve developed more sustainable LCP alternatives that allow customers to reduce the environmental impact of their end-use products and at the same time maintain regulatory compliance and consistent product quality across multiple industries.

Our Vectra® and Zenite® LCP ECO-B materials are produced using a mass-balance approach. Through this ISCC PLUS certified approach, up to 75% of Vectra® and Zenite® LCP ECO-B can be attributed to second-generation bio-feedstock (bio residue/waste) that does not compete with food or feed supplies.

Depending on the specific LCP grade and its composition, Vectra® and Zenite® LCP ECO-B provide up to 25% Product Carbon Footprint (PCF) reduction compared to the standard fossil version of the same grade.¹

¹ based on Celanese internal LCA data

In addition to their improved sustainability profile, the fundamental properties of LCP ECO-B materials are identical to those of Vectra® and Zenite® LCP produced through fossil feedstocks, and include:

- DTUL temperature up to 340°C
- Lead-free solderable, >4mins @260°C
- Low moisture absorption (consistent electrical properties in wide range of temperature and frequency)
- Low heat of fusion (LCP compounds exhibit a melting range rather than a single melting point)
- Excellent flow under shear
- Inherent flame resistance
- Best in class barrier properties to oxygen/moisture
- Excellent dimension stability
- Very high tensile strength and tensile modulus

Figure 1 shows the spiral flow characterization of 30% GF LCP vs other 30-40% GF resins at 3.2mm (0.125"). This demonstrates the remarkable ability of LCP, both fossil-based and ECO-B versions, to fill long, thin channels compared to other engineering resins.

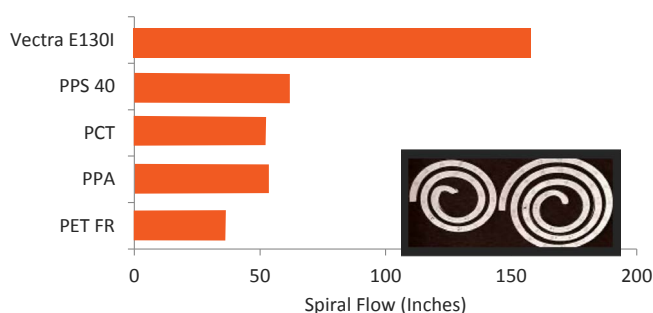


Figure 1: LCP ECO-B maintains identical properties to materials made using fossil feedstocks. Here, spiral flow test results illustrate the superior flow for these materials. (Test strips were molded at manufacturer’s recommended conditions and three injection pressures normalized to 30 Kpsi. Cavity thickness = 0.125 in.)

MASS BALANCE APPROACH

Using a mass balance approach means that fossil and bio-circular based feedstocks are mixed in production and accounted for separately. The mass-balance process is certified by the ISCC PLUS (International Sustainability and Carbon Certification) standard.

This approach is increasingly adopted by the plastics value chain because it is not only cost-efficient, but also increases the flexibility to manage through the value chain. In addition, it helps us to create the demand for renewable feedstocks, while maintaining the efficiency and emissions benefits of our large-scale production technologies.

Because of the mass-balance approach, Vectra® and Zenite® LCP ECO-B grades are identical to Vectra® and Zenite® LCP standard (fossil feedstock) grades (see table below) in material specification, quality and performance.

As a result, LCP ECO-B materials enable drop-in replacement for customers across different markets, such as pharma and consumer electronics. No transition evaluation or retooling is needed after Vectra® and Zenite® LCP standard grades have been specified in the application.

LCP Standard Grade	LCP ECO-B Grade
Vectra® E130I	Vectra® E130I ECO-B
Zenite® 6130L	Zenite® 6130L ECO-B
Vectra® E471ID-2	Vectra® E471ID-2 ECO-B
Vectra® E130ID-2	Vectra® E130ID-2 ECO-B
Zenite® SEA 30 BD-3	Zenite® SEA 30 BD-3 ECO-B
Vectra® FIT30	Vectra® FIT30 ECO-B
Zenite® 5115L	Zenite® 5115L ECO-B
Vectra® C950RX	Vectra® C950RX ECO-B
Vectra® A950RX	Vectra® A950RX ECO-B
Vectra® A950LMV	Vectra® A950LMV ECO-B

Source: Celanese

Designers who seek to reduce the environment impact of their offerings, yet still require high-performance LCP materials for their products, will find an exceptional balance in ECO-B grades.

PERFORMANCE MATTERS

Designers choose LCP high-heat thermoplastic materials because they occupy a unique performance space in the polymer spectrum. Their exceptional flow for thin-wall designs is a result of the LCP resin's nematic rod-like crystalline structure, something not found in any amorphous or semi-crystalline resins (Figure 2).

Even without a filler material, unfilled LCP is extremely strong and stiff with similar mechanical properties to 20-30% glass fiber-filled composites. This combination of high flow with high stiffness and strength allows designers to make thinner structures without sacrificing structural performance. This in turn enables smaller parts and liberates more internal space for electronic and electromechanical components. With Vectra® and Zenite® LCP ECO-B, this unique mix of characteristics is now available in a range of more sustainable grades.

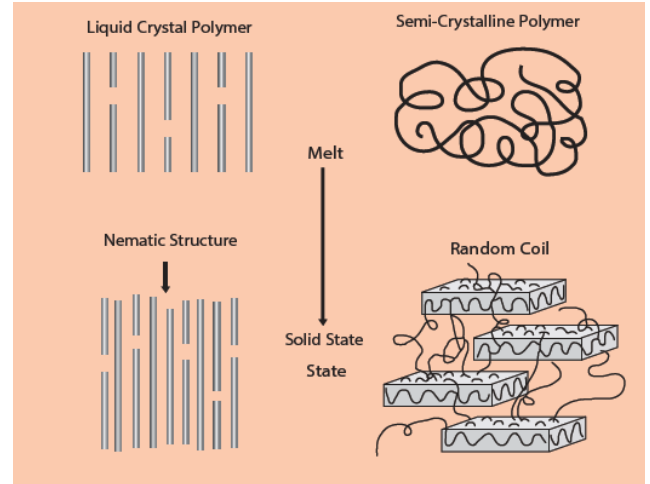


Figure 2: LCP thermoplastics exhibit a nematic structure in both liquid and solid states, which gives the materials its high stiffness and strength while ensuring high flow. LCP ECO-B grades behave identically, which adds sustainability to the benefits of using these materials.

In addition, LCP changes very little from molten to solid phases so there is a rapid cycle from melt injection to part ejection. Rapid cycling means higher molding productivity leading to lower capital cost. Fewer molds are needed for high volume production without the high mold temperatures commonly necessary with polyphenylene sulfide (PPS) or polyetheretherketone (PEEK).

LCP can be processed at mold temperatures less than 100°C, requiring only lower-cost, water-based temperature control units. This becomes an additional sustainability benefit during production when molding with Vectra® and Zenite® LCP ECO-B.

SUPPORT AND SUSTAINABILITY

By choosing Celanese materials, you also gain access to advanced material science plus our global team of application experts, who offer extensive support, from injection molding consultancy to conducting precise CAE simulations. We are equally committed to advancing sustainability for all customers. Our material portfolio includes sustainable solutions that help manufacturers address the growing demand for environmentally responsible products. These materials reduce the overall environmental impact of manufacturing processes and support our clients' sustainability goals.

DISCOVER MORE

Discover how new LCP ECO-B materials can enhance your next project. For more information about improving your product's carbon footprint using Vectra® and Zenite® LCP ECO-B, contact us today.

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