

Press Release



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Covestro develops innovative design for future vehicle lighting

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Headlight concept using only one plastic material

- **Polycarbonate provides both functional and aesthetic benefits**
- **Modular design reduces complexity and costs**
- **Weight saving exceeding 1.5 kilograms lowers emissions**
- **Simplified recycling process due to focus on one plastic**

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[Covestro](#) has developed an innovative automotive [headlight concept](#) for the vehicle lighting of tomorrow. The visionary approach is based on different types of the polycarbonate Makrolon® and addresses the high demands in terms of functionality and aesthetics. Compared with conventional solutions, the new modular design makes do with fewer individual components and reduces assembly steps, space requirements and costs. In total, the headlight prototype may drop over 1.5 kilograms of weight, which contributes to reduced emissions and greater vehicle range.

The development is another example of Covestro's ambition to become fully circular. This also includes developing products and applications that make the recycling process easier. Thanks to the modular design of the headlight and a focus on a single plastic material type, the amount of work required for separating, sorting and storing materials in recycling streams is reduced. Apart from pure polycarbonate and a blend with acrylonitrile butadiene styrene (ABS), the headlight uses only a scratch-resistant coating for the outer lens cover and metalization on the reflectors.

Advanced technologies and reduced complexity

"We work together with car manufacturers and their suppliers and harness our global resources to implement advanced technologies. Examples are heat sinks that are integral to the housing, LEDs, multi-shot molding, in-mold-electronics, sensor integration and more," explains Jim Lorenzo, Application Development



Engineer at Covestro LLC. “This also includes designing parts and molds that provide the right balance between functionality, aesthetics and cost efficiency.” While traditional automotive headlights have a complex design and usually consist of dozens of components and screws, the design of this modular concept is reduced to a reflector with housing, a collimator lens, a bezel and an outer lens cover.

The LED modules for low and high beam and the corresponding reflectors are made of the thermally conductive polycarbonate Makrolon® TC8030 and the dimensionally stable type Makrolon® DS801, respectively. The production process combines multi-component injection molding with mold-in-place design. Thanks to these materials and the efficient production technology, the manufacturer can eliminate the additional cost and weight of heat sinks, attachments and other components.

Integrated heat management

In addition to light sources, the vehicle headlights of the future will also integrate technologies such as LiDAR, radar and cameras. This will require the use of thermally conductive materials, in order to dissipate the heat generated by the electronics and light sources. For this purpose, Makrolon® TC8030 integrates heat management directly into the housing of the new headlight concept.

The bezel made of different grades of Makrolon® polycarbonates is produced in a three-shot molding process. It hides the advanced driver assistance systems and consolidates the daytime running lights, turn-signals and pedestrian safety lighting into one part. The sensors are hidden behind a LiDAR-transparent panel. The bezel blends cutting-edge performance and aesthetics, including a “dead front”, seamless appearance, a high gloss finish enhanced with laser-etched effects and diffused back-lighting for improved safety and high recognition value.

About Covestro:

With sales of EUR 12.4 billion in 2019, Covestro is among the world’s largest polymer companies. Business activities are focused on the manufacture of high-tech polymer materials and the development of innovative solutions for products used in many areas of daily life. The main industries served are the automotive, construction, wood processing and furniture, and electrical and electronics industries. Other sectors include sports and leisure, cosmetics, healthcare and the chemical industry itself. Covestro has 30 production sites worldwide and employs approximately 17,200 people (calculated as full-time equivalents) as of the end of 2019.

Forward-looking statements

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