

News Release

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December 13, 2016

Merck KGaA, Darmstadt, Germany, Presents Smart Liquid Crystal Windows at BAU 2017

- **Sun protection and privacy window variants developed further**
- **Spotlight on switchable glass in triangular format**
- **Production facility for liquid crystal window modules being built in Veldhoven, the Netherlands**

Darmstadt, Germany, December 13, 2016 – Merck KGaA, Darmstadt, Germany, a leading science and technology company, will be presenting its innovative liquid crystal window technology at the BAU 2017 exhibition in Munich, Germany from January 16 to 21, 2017. Visitors, such as architects and window manufacturers, can learn more about the advantages of smart, eco-friendly windows. Three different variants can be used in buildings: sun protection, glare protection, and privacy control. For the first time, Merck KGaA, Darmstadt, Germany, will be presenting its switchable liquid crystal window modules in triangular format at the world's premier exhibition for architecture, materials and systems.

Johannes Canisius, Head of the Liquid Crystal Windows business field within Performance Materials at Merck KGaA, Darmstadt, Germany, explains: "Going forward, we aim to be at the forefront of switchable glass for architecture and automotive applications. In order to bring the new technology to market quickly, we have set up a dedicated business field and are currently building a production facility for liquid crystal window modules in Veldhoven, the Netherlands. The manufacture and marketing of the modules is to begin at the end of 2017. Initially, the maximum size will be 1.60 x 3.50 meters. The BAU exhibition offers us an ideal platform to showcase how we have optimized the products over the past two years. We will be accepting orders for our modules as of June 2017."

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Thanks to the large selection of colors and shapes, the windows can be optimally adapted to the surroundings and they offer a high degree of design freedom. The sun protection variant can be realized in different light transmittance bandwidths and achieves energy savings of up to 40% in building climate control systems. For users, the windows offer maximum convenience since they offer continuously variable switching within seconds and are absolutely transparent and color-neutral in both switching states – two decisive advantages over competing technologies. With the glare protection variant, the glass not only darkens, it also becomes diffuse in order to prevent sun glare. This can make working on a computer monitor more comfortable. It replaces mechanical solutions such as blinds. The privacy variant switches from transparent to opaque and prevents outsiders from seeing in. The special feature of the technology from Merck KGaA, Darmstadt, Germany, is that the windows are crystal-clear in the non-switched state.

Merck KGaA, Darmstadt, Germany, has been developing liquid crystal window technology for several years as part of its strategic initiative known as “LC 2021”. As the market and technology leader in liquid crystals for displays, the company has extensive expertise that is being leveraged in applications such as televisions, laptops, smartphones and tablet computers.

Establishing a track record of successful installations

Pilot installations in the field have shown that the liquid crystal windows meet the highest demands. The window façade on the west side of the modular Innovation Center of Merck KGaA, Darmstadt, Germany, in Darmstadt was fitted with liquid crystal windows for sun protection in early 2015. Switchable windows in both the sun protection and privacy control variants were also installed in the new OLED materials production building inaugurated at the Darmstadt site in September 2016. They provide optimum light protection for the cleanrooms and prevent outsiders from looking inside the secure production environment. Long-term tests prove the longevity of the materials. They operate perfectly, from the icy cold of a winter's night to the afternoon heat of a midsummer's day. Other liquid crystal window installations include a building at Schiphol Airport in Amsterdam and a meeting room at the University of Eindhoven. The production site for the liquid crystal window modules will be located in Veldhoven in the greater Eindhoven area, a high-tech hotspot in the Netherlands.

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Convincing features, energy and economic efficiency

Licrivision makes buildings more pleasant to live and work in by maintaining the view outside the windows and reducing the heat gain, which translates into less cooling. The light transmittance values lie between a maximum of 70% in the light state and a minimum of 5% in the dark state. Various liquid crystal mixtures with different contrast and performance values can be selected within this range. Energy savings of up to 40% are possible. The energy consumption of the window modules is less than 1 W/m². Licrivision is invisibly integrated into the pane, with minimal space requirements. Since fewer components are necessary than with conventional shading solutions and the ongoing costs for cleaning and technical maintenance are lower, liquid crystal windows stand for high economic efficiency.

Visitors to the BAU exhibition in Munich will find Merck KGaA, Darmstadt, Germany, in Hall C2, Stand 308.

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Merck KGaA, Darmstadt, Germany, is a leading science and technology company in healthcare, life science and performance materials. Around 50,000 employees work to further develop technologies that improve and enhance life – from biopharmaceutical therapies to treat cancer or multiple sclerosis, cutting-edge systems for scientific research and production, to liquid crystals for smartphones and LCD televisions. In 2015, Merck KGaA, Darmstadt, Germany, generated sales of € 12.85 billion in 66 countries.

Founded in 1668, Merck KGaA, Darmstadt, Germany, is the world's oldest pharmaceutical and chemical company. The founding family remains the majority owner of the publicly listed corporate group. Merck KGaA, Darmstadt, Germany, holds the global rights to the Merck KGaA, Darmstadt, Germany, name and brand. The only exceptions are the United States and Canada, where the company operates as EMD Serono, MilliporeSigma and EMD Performance Materials.