News Release

LANXESS launches hollow-profile hybrid technology

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- **First customer projects at the prototype stage**
- **Innovative tolerance management for profiles with varying dimensions**
- **No internal support required for the hollow profiles in the production process**
- **Manufacturing process and component properties can be simulated precisely**

Cologne, September 1, 2021 – LANXESS is currently in the process of launching its hollow-profile hybrid technology on the market. With this new lightweight design technology, metallic hollow profiles can be functionalized on conventional injection molding machines with plastic compounds. The result is plastic-metal composite components that boast far greater torsional stiffness and strength than could previously be achieved with other technologies for functionalizing hollow profiles. “Hollow-profile hybrid technology has now progressed to such an advanced level that we have embarked on a variety of development projects with customers and have already reached the prototype stage with some of them,” says Dr. Matthias Theunissen, an expert in lightweight design at LANXESS. The potential applications in the automotive industry include cross car beams, coupling rods, stabilizers and seat elements. In addition, the new lightweight technology could be used to produce skiing and hiking poles and components for furniture and the construction industry, for example.

Simple injection molding technology, short cycle times

The hollow-profile hybrid technology is a further development of the “traditional” plastic-metal composite technology (hybrid technology) using sheet metal. The general strength of the new technology is that processors can manufacture with short cycle times, as is typical for injection molding in high-volume production. As a result, the

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manufacturing process is efficient and economical. There is no need for auxiliary units or tooling technology, which keeps investment costs low. The fact that reasonably priced hollow profiles with relatively large dimensional variations can be used helps to make the process cost-effective, too. As Theunissen explains, “With the aid of innovative tolerance management, we can prevent profiles of that type from damaging the mold or stop leaks occurring in the injection molding cavity.” When the thin-walled hollow profiles are overmolded with the molten plastic, high pressures often exceeding 400 to 500 bar occur in the cavity. As a result, there is a high risk of the profiles deforming or collapsing. “We have optimized the process such that the profiles withstand the pressures that occur and do not need to be supported from inside,” says Theunissen.

Weight saving of 30 percent for automotive cross car beams

For the hollow-profile hybrid technology, LANXESS offers highly reinforced polyamide 6 types such as the easy-flowing Durethan BKV60H2.0EF DUS060, which has a short glass fiber content of 60 percent by weight. With their high strength and stiffness, these compounds further enhance the performance of the corresponding components. In a simulation study, LANXESS examined how using the compounds pays off in the design of an automotive cross car beam. “The component can be designed with around 30 percent less weight than an all-steel structure while offering better mechanical performance in some respects,” says Theunissen. Typical load cases and component properties were calculated, such as vibration behavior and the stiffness of the steering wheel in the direction of gravitational forces. “The component also underlines the huge potential of the technology in implementing cost-saving functional integration. For example, connections for the A-pillar as well as mountings for the steering column, dashboard, climate control units and airbags were directly injected.

Simulations with a high level of forecast quality

LANXESS has developed new calculation models for the hollow-profile hybrid technology based on simulation tools that have proven successful for years in conjunction with the “traditional” hybrid technology. These allow precise prediction of the production process and the quality of the connection between the metal and plastic. “With these tools, we can, for example, accurately predict the maximum stresses hollow-profile hybrids will withstand and at what point they will fail. We apply this expertise in working with our customers,” explains Theunissen. A newly developed test specimen was used to validate the simulation. Extensive component testing for static and dynamic load cases underpinning the simulation results was carried out on real components.

You can find more detailed information about lightweight designs from LANXESS – as well as the hollow-profile hybrid technology – at www.lightweight.lanxess.com.

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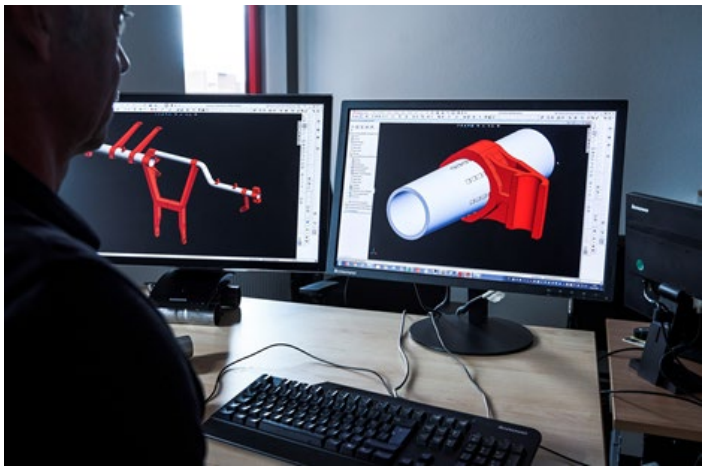
Images

Demonstrator components produced at LANXESS using the hollow-profile hybrid technology. They are characterized by a high degree of torsional stiffness and strength.

Photo: LANXESS



With its simulation tools, LANXESS is able to accurately predict the maximum stresses hollow-profile hybrids – such as automotive cross car beams (*left-hand screen*) – will withstand and at what point they will fail.

Photo: LANXESS

News Release

LANXESS is a leading specialty chemicals company with sales of EUR 6.1 billion in 2020. The company currently has about 14,800 employees in 33 countries. The core business of LANXESS is the development, manufacturing and marketing of chemical intermediates, additives, specialty chemicals and plastics. LANXESS is listed in the leading sustainability indices Dow Jones Sustainability Index (DJSI World and Europe) and FTSE4Good.

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