Press release

Evonik and VESTARO consortium partners develop new generation of electric vehicle battery packs, the "Pure Performance Battery"

- Novel approach is based on lightweight Sheet Molding Compounds for high voltage battery module housings
- Semi-integral vehicle-integration process meets energy saving and safety demands for all future vehicle types
- Evonik's expertise in composite-matrix systems enable high performance and fast charging capabilities at reasonable costs

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Marl/Essen, Germany. Evonik as part of the VESTARO GmbH consortium of companies working to produce lighter and more cost-effective solutions for battery electric vehicles (BEV), has developed a new generation of battery packs, the "Pure Performance Battery" (PBB). Based on Sheet Molding Compound (SMC) technology made using Evonik's curing agents, the new holistic battery system concept provides the automotive industry with a safe, lightweight, and most importantly cost-effective alternative to the traditional heavier metal-based solutions.

Formed at the end of 2019 to investigate alternative battery solutions, VESTARO first developed a new cost-effective glass fiber (GF)-SMC cover based on Evonik's high-performance epoxy curing agent VESTALITE® S. In addition to reducing the weight of the battery housing by almost 10 percent compared to equal performing covers made from more cost-prohibitive materials, the state-of-the-art SMC materials also deliver the performance levels of previous metal-based enclosures but enable the design-freedom for semi-integral integration.

Following the publication of the successful results of VESTARO's new GF-SMC cover produced by VESTARO partner, Lorenz Kunststofftechnik at the beginning of 2021, the consortium was boosted further when TIER 1 automotive component manufacturer, Minth GmbH joined. With the additions of Minth's in-depth know-how for aluminum solutions, the enhanced consortium tackled two major challenges for today's battery packs: the bottom impact use case and the vehicle integration.

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To meet these stringent OEM requirements in terms of side pole, and bottom impact without any leakage or failure, the consortium came up with a novel approach that fully utilized the design freedom of the versatile SMC material. The old bottom structure was replaced with an aluminum sandwich plate developed by Minth GmbH, which increases the performance in terms of the bottom impact, but also plays a key role in the semi-integral vehicle concept. With this concept the consortium was able to remove the additional side deformation elements and use the freed space for more battery cells instead.

Additionally, due to the improved bottom impact performance of the sandwich floor, the space required for the module mounting could be reduced. The creation of these extra spaces for battery cells has led to an overall capacity increase of 10kWh, from 65 to 75 kWh, with nearly the same outer dimensions of the battery pack compared to the Group's previous generation.

"Our new battery pack is designed for performance and it's the exceptional properties of our VESTALITE® curing agents that give the unique Epoxy-SMC-cover its outstanding performance and safety potential in terms of fire-resistance and crash behavior," said Sebastian de Nardo, Marketing Director for Adhesives and Composites at Evonik. "We've successfully overcome all concerns regarding the EMI-shielding performance of the GF-composites using Evonik's broad material toolbox and expertise and we can tailor the PBB's performance to meet each customer's individual requirements."

Designed and validated using Forward Engineering's unique BEV-floor structure development tool, the new "Pure Performance Battery" is around 2.1 meters long and 1.58 meters wide with maximum heights between 0.15 – 0.22 meters (Penthouse-architecture) and is suitable for a variety of vehicle architectures. In terms of weight, the new GF-SMC cover-based PPB competes with today's high-end solutions but delivers a significant increase in performance.

Additionally, the battery's semi-integral modular series design enables flexible adjustment of the number of modules, and the production of complex geometries in a one step process enables tailored battery performance levels to suit all regional requirements. The supercell concept is based on LION Smart's LIGHT Battery which enables a calculated fast charging result of around 13 minutes with charging power constantly above 200 kW (10 % - 80 % SOC). The system is currently being developed with the aim of achieving charging times of less than 10 minutes.

Improving the sustainability of vehicle components is also an important topic for the automotive industry, so the new cover has been designed to be easily demounted to provide quick access to battery-modules and peripheral equipment. Additionally, the cover itself can be recycled via LORENZ Kunststofftechnik's unique recycling process and used again for new composite parts.

The VESTARO joint venture's development partners Evonik & Forward Engineering GmbH, together with Lorenz Kunststofftechnik GmbH, LION Smart GmbH and Minth GmbH fully understand the complex dynamics of the industry and have the shared automotive engineering and materials expertise to deliver final battery-packs today to interested customers. Additional "mix-and-match" services to cater for other potential customer requests are also possible through the VESTARO consortium partners.

For more detailed information about the GF-SMC cover and new PBB high-performance battery concept please visit https://crosslinkers.evonik.com/en/products/vestalite

About Evonik
Evonik is one of the world leaders in specialty chemicals. The company is active in more than 100 countries around the world and generated sales of €15 billion and an operating profit (adjusted EBITDA) of €2.38 billion in 2021. Evonik goes far beyond chemistry to create innovative, profitable and sustainable solutions for customers. About 33,000 employees work together for a common purpose: We want to improve life, today and tomorrow.

About Evonik Crosslinkers
The Crosslinkers Business Line offers a broad range of products and competences for coatings and adhesives, as well as for high-performance elastomers and composites. Besides products based on isophorone chemistry the

portfolio contains a full toolbox of amine curing agents for ambient and heat cure applications. The products are mainly used in industrial applications due to the mechanical strength, durability, chemical resistance and excellent adhesion properties. www.evonik.com/crosslinkers

About VESTARO GmbH
Bundling expertise in engineering and specialty chemicals, VESTARO was formed in 2017 as a joint venture of Evonik and Forward Engineering. Based in Munich, the Company supports automotive manufacturers with tailored composite-matrix systems and consulting services that help them to deliver efficient manufacturing processes and lightweight construction of vehicles.
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