

News Release

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Chemetall launches first global chromium- and fluoride-free Gardolene[®] D passivation solution for copper foils to the market

- **Pioneering innovation that supports green transformation by enhancing the performance of electric vehicles and energy storage systems**
- **New Gardolene D passivation solution provides superior corrosion protection and improves battery performance**

Chemetall, the global surface treatment business unit of BASF Coatings and a leading provider of innovative surface treatment solutions, introduces the first chromium-free and fluoride-free passivation technology for copper foils, Gardolene D. This pioneering solution is unique in the industry and offers superior corrosion protection as well as improved performance of copper foils used in electric vehicle battery packs, energy generation and storage systems. The new Gardolene D technology sets a new benchmark for sustainability and performance while also offering long-term regulatory compliance in copper foil treatment for the battery manufacturing market.

The world has seen an increasing demand for high-performance batteries in electric vehicles (NEV), consumer electronics (3C), and energy storage systems (ESS) over recent years – a trend that is expected to continue. A key element for the success of a global green transformation is battery performance in electric mobility and energy storage systems. The new Chemetall Gardolene D passivation solution for copper foils enhances battery performance, is more sustainable, and is fully compliant with the European Union's new Battery Regulation (EU 2023/1542), which

mandates carbon footprint declarations, digital battery passports, and strict limits on hazardous substances. From 2027, only batteries meeting these standards will be allowed on the European market, driving the need for green manufacturing and chromium-free pretreatment technologies.

Gardolene D directly enables superior battery performance in the end product. A key feature of the new Gardolene D for copper foils is the improvement of surface energy, which enables better adhesion of anode active materials and reduces electrical resistivity, which results in higher battery efficiency. Intensive analyses and tests have proven that batteries treated with Gardolene D benefit from extended lifespans and improved capacity retention, extending lifetime by up to 6 percent after 1,000 cycles at 25 degrees Celsius. This is a significant performance increase compared to batteries using copper foil pretreated with traditional chromium (VI) passivation methods.

Perhaps most importantly from a sustainability perspective, Chemetall's new Gardolene D products, such as Gardolene D 6701 and Gardolene D 6702, are the first chromium-free and fluoride-free passivation solutions for copper foil in the world. They thereby significantly improve the eco-friendliness of the entire battery value chain in a way no other products can. The new solutions are compatible with existing equipment and suitable for both electro-deposited and rolled annealed copper foil substrates used in the production of batteries for electric vehicles and a wide range of other energy generation and storage applications. This innovative technology delivers superior heat and corrosion resistance compared to existing solutions.

"The green transformation, with continuously rising electric vehicle numbers and an increasing market for new concepts in energy generation and storage systems, needs new, innovative surface treatment solutions. At Chemetall, we are committed to solving our customers' challenges and supporting their business with our expertise. The new Gardolene D passivation solution for copper foil ushers in a new era for copper foil passivation, with increased battery performance, greater sustainability, and future-proof customer processes. It is another great example of what our claim 'expect more' means for us: providing innovative solutions in the metal-using industry that offer added value to customers," says Frank Naber, Senior Vice President Global Surface Treatment at BASF Coatings.

“The new Gardolene D passivation solutions for copper foil are a pioneering innovation for the market. Our dedicated research and technology teams across the globe have intensively analyzed available solutions and market needs. Based on our comprehensive expertise in surface treatment and close exchange with our customers, we were able to push boundaries and develop this one-of-a-kind global solution for copper foil pretreatment. It ensures stable copper foil properties, improved electrode conductivity, and supports manufacturers in meeting evolving regulatory and sustainability requirements compared to standard passivation processes,” says Arjan Termaten, Head of Global Technology at Chemetall.

As the first surface treatment solutions provider to offer chromium-free and fluoride-free passivation technology for copper foil, Chemetall reaffirms its commitment to innovation, sustainability, and customer success. Gardolene D solutions for copper foil treatment are now available globally, enabling battery manufacturers to improve their processes and end-products through this next-generation technology without extra investments in existing operations.

About BASF Coatings

BASF Coatings is a global expert in the development, production and marketing of innovative and sustainable automotive OEM and refinish coatings as well as applied surface treatments for metal, plastic and glass substrates in a wide range of industries. We create advanced performance solutions and drive performance, design and new applications to meet our partners' needs all over the world. We share skills, knowledge and resources of interdisciplinary and global teams for the benefit of customers by operating a collaborative network of sites in Europe, North America, South America and Asia Pacific. In 2024, our businesses achieved global sales of about €3.8 billion.

BASF Coatings – Driven by passion and science, we always go beyond the surface. For more information, visit www.basf-coatings.com and [follow us on LinkedIn](#).

About BASF

At BASF, we create chemistry for a sustainable future. Our ambition: We want to be the preferred chemical company to enable our customers' green transformation. We combine economic success with environmental protection and social responsibility. Around 112,000 employees in the BASF Group contribute to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio comprises, as core businesses, the segments Chemicals, Materials, Industrial Solutions, and Nutrition & Care; our standalone businesses are bundled in the segments

Surface Technologies and Agricultural Solutions. BASF generated sales of €65.3 billion in 2024. BASF shares are traded on the stock exchange in Frankfurt (BAS) and as American Depositary Receipts (BASFY) in the United States. Further information at www.basf.com.