Dielectric Coatings

PPG EV Battery Pack Material Solutions

PPG delivers dielectric coating systems, applications solutions and coating services to support battery pack assembly. Through this capability we can support OEM's and component manufacturers to accelerate the development of electric vehicle energy storage solutions. Specifically defined dielectric coating systems can improve performance, durability, safety and manufacturing throughput for our customers. PPG dielectric coatings are used by our customers in place of film and/or tape solutions to eliminate gaps, bubbles, reduce seam failures, enhance edge protection, and to support high throughput and automated application.

PPG Value Leveraging Core Competencies

Product/Formulation

- Robust "green" design – resin, process
- Low temperature, fast cure options
- > 95% material utilization, very low to zero VOC*
- Additional functionality *(corrosion, color, Tc)*

Application

- Turnkey equipment options
- Premium edge coverage
- Eliminate gaps, bubbles
- Scalable automation
- Coatings operation management

Trusted global supplier to OEMs & Tiers

Coatings Ensuring Dielectric Separation, Address Industry Problems

Problems addressed with coatings options:

- Automation
- Gaps and bubbles
- Seam failures
- Edge challenges
- Application options at tier players, job coaters, OEM's

	PROVEN SOLUTION	POTENTIAL SOLUTIONS/ UNDER DEVELOPMENT	
	POWDER COATINGS	UV COATING	ELECTROCOAT
Insulation Resistance	★ ★ ★	★ ★	★
Dielectric Withstand Voltage	★ ★ ★	★ ★	★
Edge Protection	★ ★ - ★ ★ ★	★ - ★ ★ ★	★ ★ - ★ ★ ★
VOC Mitigation	★ ★ ★	★ ★ ★	★ ★ - ★ ★ ★
Material Utilization	★ ★ - ★ ★ ★	★ - ★ ★ ★	★ ★ - ★ ★ ★
Applied Cost Efficiency	★ ★ ★	★ - ★ ★	★ ★ ★
Process Tact Time/Footprint	★ - ★ ★	★ ★ ★	★ - ★ ★
Low Temperature Application	★	★ ★ ★	★
Recommended Applications	• Dielectric primary function • High temp capable • Cell cans (unfilled) • Cooling system components • Module housing (metal) and frame plates • Pack lids and trays • Bus bars and connectors	• Dielectric primary function • Low temp / short tact time • Cell cans (filled) • Co-molded module components	• Dielectric secondary function • High temp capable • Metal shell cases • Cooling tubes and plates

★- weak
★- medium
★- strong

★- ★★ - weak to medium, depending on the product*
★- ★★★ - weak to strong, depending on the product*
★- ★★★ - medium to strong, depending on the product*

Please consult our experts on the last page for more information.

Dielectric Coatings

PPG coatings can be used alone or in layering systems to provide the best performance and cost position for dielectric separation within the battery pack.

The following are examples of coatings from PPG that are developed to specifically provide the electrical insulation performance required for battery pack components, including cell cans, module housings, module racking, cooling system components, bus bars, and pack shells.

ENVIROCRON® Extreme Protection Dielectric Powder Thermally Conductive Coating

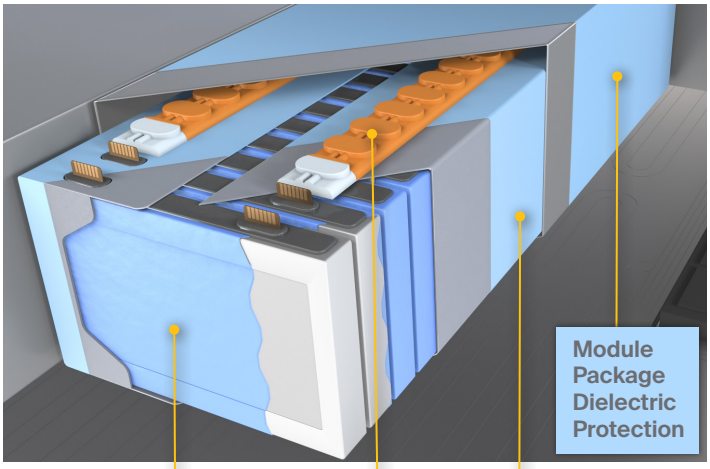
- High-temperature process for metal components *(cooling plates, cooling tubes and any components that need thermal management)*
- Multi-functional solution designed for heat management and electrical isolation
- Enhanced thermal conductivity for improved performance in cooling systems
- Excellent dielectric performance
- >95% material utilization
- 100% solids, solvent-free*
- *Finalist in the 2021 R&D® 100 Awards*

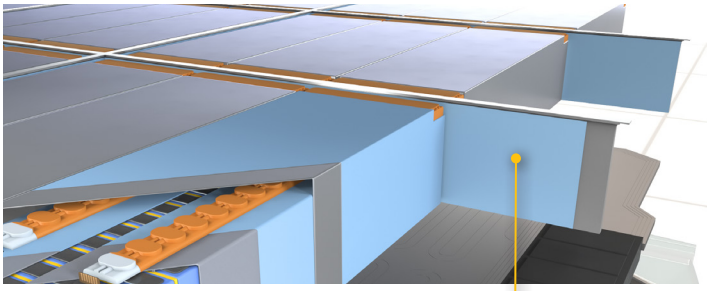
ENVIROCRON® Extreme Protection Dielectric Powder Coating

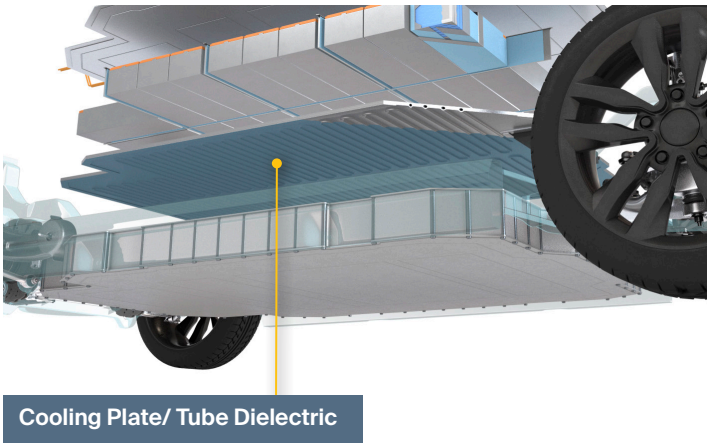
- High-temperature process for metal components *(cooling plates, cell cans [unfilled], and bus bars and connectors)*
- Outstanding dielectric performance
- 100% solids, solvent-free*

RAYCRON® UV-Cure Dielectric Coating

- Low-temperature process for temperature sensitive components *(prismatic cell cans [filled] / module separators)*
- Few seconds takt time
- Outstanding dielectric performance
- 100% Solids, solvent-free*, sprayable liquid







*No intentionally added solvent as supplied. Zero-VOC according to Directive 1999/13/EC, EPA Method 24, EUR Directive: 2004/42/IIA(i)(500)

Visit **ppgautocoatings.com** and **ppg.com** for more information or email **PPGMobility@ppg.com**