ENVIROCRON®
DIELECTRIC POWDER COATINGS

Advanced Materials and Coatings
for Electric Vehicle Battery Packs

Dielectric Coatings

PPG has been at the cutting edge of powder coating advancements in the electric vehicle (EV) battery space. A commitment to a legacy of quality combined with innovative technology allows PPG to deliver advanced dielectric powder coating systems, application solutions, and coating services to support battery pack assembly.

Our **Envirocron® Dielectric Powder Coatings** platform of products are specifically designed to meet the evolving challenges within the EV world. These products are engineered powder coating solutions that help improve component performance, durability, safety, and manufacturing throughput. This is done by creating customized solutions that have differentiated property sets. These properties are designed to the unique needs of the different components within the battery pack.

Through this capability of technology coupled with application excellence, PPG can support automotive and component manufacturers desire to accelerate their development of electric vehicle energy storage solutions.

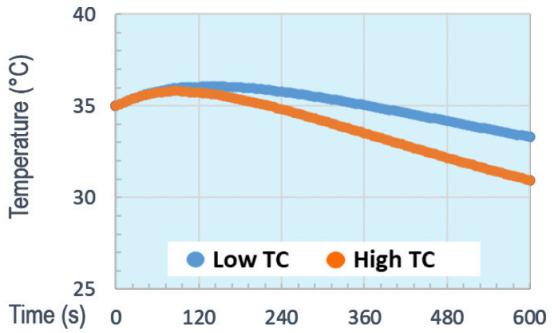
	ENVIROCRON® Dielectric PRO	ENVIROCRON® Dielectric BOND	ENVIROCRON® Dielectric EDGE	ENVIROCRON® Dielectric THERM
Key features	Outstanding dielectric strength and impact resistance with good elasticity	Excellent adhesion & flexibility, combined with good dielectric strength	Outstanding edge protection and uniform coverage with a thinner surface film	Advanced thermal conductivity and good dielectric strength
Dielectric strength	★★★	★★	★★	★★
Thermal conductivity	★	★	★	★★★
Flexibility	★★★	★★★	★	★
Adhesion (lap shear)	★★	★★★	★★	★★
Edge protection	★	★	★★★	★★
Color	Clear / Black	Black / Blue	Black	Black
Gloss	> 90 @ 20°	> 80 @ 60°	> 70 @ 60°	> 55 @ 60°
Region (availability)	US / China / EMEA	China	US / China / EMEA	US / China / EMEA

★ Good ★★ Very Good ★★★ Excellent

ENVIROCRON® Dielectric THERM

Battery packs are becoming more energy dense and are being subjected to faster charging demands by customers, these conditions lead to an increase in system heating and a greater requirement for thermal mitigation.

PPG's high thermally conductive powder has the potential to aid cooling systems, allowing battery packs to run more efficiently and at lower operating temperatures.

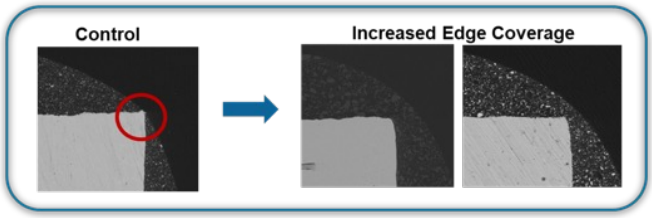


Computer modelling indicating the impact of thermal conductivity on pack cooling

ENVIROCRON® Dielectric EDGE

Sharp edges are a weakness for dielectric isolation, and many manufacturers rely on using more material to ensure a sufficient coated edge is established.

PPG's high-edge dielectric powder is designed for increased dry film thickness on the edge while using lower total amounts of material.



Cross section of PPG's ENVIROCRON® Dielectric EDGE compared to control

Dielectric Layering Systems

	Powder on Powder	TC Powder on TC Powder	Powder on ecoat	TC Powder on ecoat
Example applications	 Cooling tubes and plate Un-filled prismatic cell can		 Module racking	 Cooling plate
Total DFT (µm)	140 + /- 30	140 + /- 30	100 + /- 20	100 + /- 20
Dielectric strength	★★ - ★★★	★★	★★	★★
Lap shear strength	★★ - ★★★	★★	★★	★★
Capital assets	2 stage powder spray lines, gel and full bake		Ecoat line, powder spray line and conventional or IR bake	

Fit for Purpose Solutions

Component	Substrate	PreTreatment	Ecoat	RAYCRON® Dielectric UV	ENVIROCRON® Dielectric PRO	ENVIROCRON® Dielectric BOND	ENVIROCRON® Dielectric THERM	ENVIROCRON® Dielectric EDGE
Battery Lid	Alu/Steel	Chemical	x		o	x	o	x
Battery Tray	Alu/Steel	Chemical	x		o	x	o	x
Frame Plates	Alu/Steel	Chemical	x*		o	x	o	x
Module Racking	Alu/Steel	Laser/plasma Chemical	x*	o	o	x	o	x
Module Housing	Alu/Steel	Chemical	x*		o	x	o	x
Cooling Plate	Alu/Di-Cast	Chemical	x*	o	x	o	x	o
Cooling Tube	Alu	Chemical			x		o	
Cell (Filled)	Alu	Laser/plasma		x				
Cell Can (Unfilled)	Alu	Chemical			o	x		

Legend / Notes: X Recommended applications O Suitable applications * Not a stand-alone system