

## PORON® Polyurethane EV Battery Pad Materials



Lithium-ion (Li-ion) batteries are the power source of choice for the new generation of electric, hybrid, and plug-in hybrid vehicles due to their high-power density and charging efficiency.

However, these batteries pose an array of safety, life-span, and performance challenges that require unique materials solutions. Battery packs must be protected from shock and vibration, sealed from unwanted elements, and carefully managed for thermal properties.

Rogers' engineered elastomeric options provide highly durable materials for cushioning, vibration isolation, and enclosure sealing of Li-ion battery packs.

PORON® polyurethane produces a very consistent level of force across a range of compressions. PORON foam compressibility curves illustrate the material's strength in withstanding the stresses of compression and temperature over time, vitally important to ensuring consistent performance over the life of the battery.

Drawing upon many years of collaborative development with key partners within the automotive and battery industries, Rogers has developed the capability to design and develop materials with customized compressibility curves. These materials perform within specified minimum and maximum thresholds to aid in the management and prediction of internal pressures required for increased efficiencies and longer term performance of the battery cell.

In addition to PORON polyurethane materials, Rogers also offers BISCO® silicone foams for sealing and protecting battery enclosures, and ARLON® Secure® silicone thermal transfer adhesives for use in power modules.



Challenge	Rogers' Solutions
<p><b>Cushioning</b></p> <p>Compression pads used inside an EV pouch cell battery pack must be firm enough to hold components in place yet compressible enough to withstand dimensional changes to the pouch cells over the life of the battery. Reliable compression set resistance and stress relaxation performance over a broad range of temperatures and conditions is critical.</p>	<p>PORON polyurethane foams have a unique ability to produce a very consistent level of force across a range of compressions. This allows the designer to predict the material's behavior across varied dimensional tolerances and as the pouches expand. In addition, our superior compression set resistance (C-Set) to withstand the stresses of compression and temperature over time will provide a consistently-performing solution over the life of the battery.</p>
<p><b>Vibration Isolation</b></p> <p>Batteries need to be packaged to absorb internal impact energy. Vibration must be managed both within the pack and between the pack and the surrounding vehicle.</p>	<p>PORON polyurethane and BISCO silicone foams are proven solutions as vibration dampeners and isolators within the automotive industry. This extends the life of the battery by absorbing shock and protecting sensitive components.</p>
<p><b>Enclosure Sealing</b></p> <p>Like most vehicles, EVs must withstand the elements and function in all environments. Safety is a key concern as damage could cause electrical shock or explosion if the battery pack is not properly sealed.</p>	<p>BISCO Silicone gaskets securely seal and protect the battery enclosure, sealing out water, dust and road debris while providing exceptional temperature and UV resistance.</p>
<p><b>Thermal Management</b></p> <p>Preventing overcharging, overheating, and damage in an accident is critical to preventing "thermal runaway," which can melt aluminum and cause batteries to explode.</p>	<p>BISCO Silicone foams and solid elastomers are highly resistant to temperature extremes and can be used in conjunction with other thermal solutions for added safety.</p>