ROGERS
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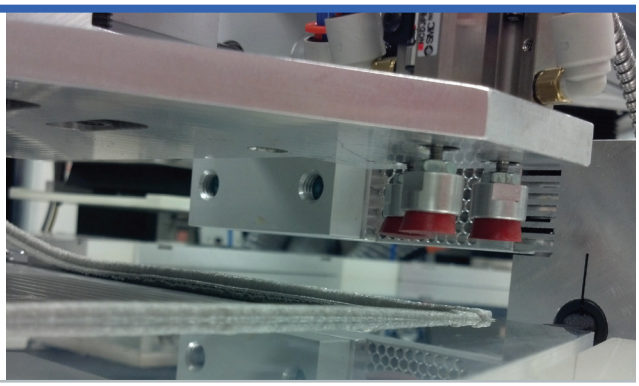
Hybrid Vehicle Battery Thermal Management

Client: Big-Three American automaker



Problem

A big-three American automaker needed a foam separator that could help keep a hybrid vehicle battery in the optimum temperature range. Maintaining battery temperature between -10C to 50C is critical to hybrid battery health and life span.

Solution

The in-house engineering team at Rogers Foam worked with the automaker to design a solution that keeps battery temperatures operating within spec. A foam separator was designed into the prismatic battery pack to keep aluminum cooling fins in contact with the pouches containing the Lithium-ion chemistry. Hybrid battery pack cells expand and contract significantly during normal use. The foam separator acts like a spring applying consistent pressure on the cooling fins, so they're always touching the Lithium-ion cells.

A key characteristic of the separator is compression force deflection (softness) and the shape of the compression curve. The foam also needs to spring back quickly after compression. Rogers Foam worked with the foam supplier to select the right custom grade that met these compression force deflection and compression set requirements.

The other challenge was to add a structural frame to hold the foam separator in place and create space for wire leads to attach at one end. Rogers engineers designed a molded cross-linked polyethylene frame with a three millimeter wide lip around the inside perimeter. The frame also includes indentations for the wire leads. Rogers Foam compression molds the frame in two "L" shapes to minimize material waste. This is accomplished by placing a heated blocker into a chilled mold. Then, an integral steel rule cuts the parts in place.

In addition to building the molds, Rogers designed and built rotary tables with stations for loading the sheet and the frame, heat welding the sheet to the frame lip, and pad printing a part number. Rogers installed this production line in a clean environment to maintain the customer's strict cleanliness requirements for the part.

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Results

Rogers Foam Automotive participated in the customer's material selection process, designed a part that meets the automotive manufacturer's needs, and tooled up for efficient and defect-free production. As a result, the automotive manufacturer has sourced a foam separator that helps its hybrid vehicle batteries stay within the required temperature range.

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