



# Thermal Runaway Solutions for EV Batteries

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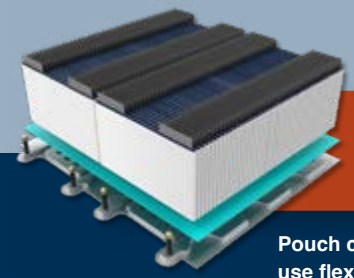


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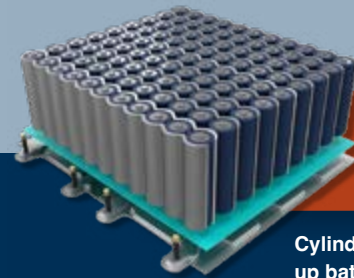
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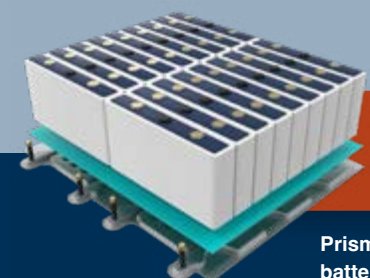
## Pouch cells

Pouch cells do not have a rigid structure; they use flexible materials, typically foil, to create a pouch that contains the battery cell. This reduces battery weight and provides greater design freedom.



## Cylindrical cells

Cylindrical cells place stacked and rolled-up battery materials in a cylinder-shaped container. A single AA battery is a good example of this type of structure.



## Prismatic cells

Prismatic cells press stacked or rolled battery materials into a rigid housing typically made from plastic or metal.



### Compression pads

Battery cells swell and compress as battery temperature cycles. Boyd's compression pads fit between cells to apply consistent pressure on the cells during these cycles. Compression pads reduce heat-generating friction, [protect cells against mechanical shock and impact](#) to prevent damage and spark or shorting issues, and block or isolate thermal runaway.




### Cell-to-cell bonding

Boyd custom fabricates a wide range of pressure-sensitive adhesives from 3M™ that require no cure time to efficiently bond battery cells to one another and enhance EV battery pack assembly structural integrity. Flame-retardant and dielectric tapes bond with immediate strength and are easier to work with than liquid adhesives in manufacturing environments.



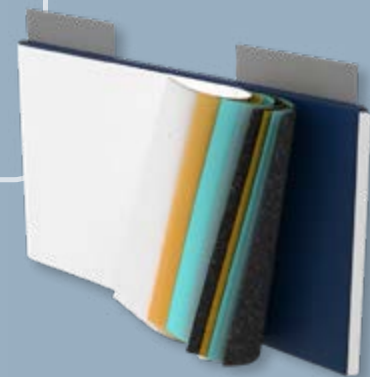
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Add insulating [foams](#) and other compressible materials to reinforce prismatic cells and enhance impact and thermal runaway protection. Compression pads reduce the negative impact of friction, mechanical movement and swelling forces.



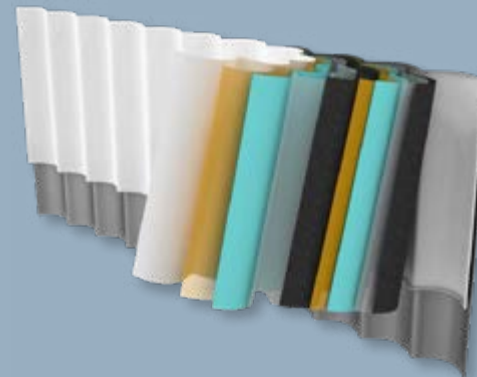

### Flame barriers

Boyd is an expert in specifying integrated flame barrier materials that block flame within a battery to isolate catastrophic events and prevent thermal runaway propagation.




### Thermal Insulation

Just like with pouch cells, Boyd wraps cylindrical cells with flame barrier and thermal insulation materials to isolate flame or thermal runaway events and prevent spark voltage between internal critical components that can lead to device shorting or fire.




### Electrical Insulation

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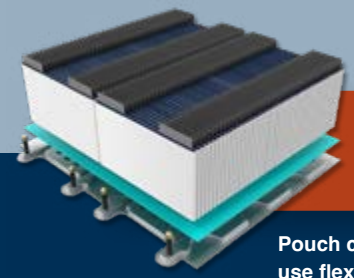


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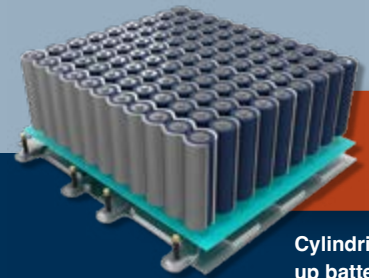
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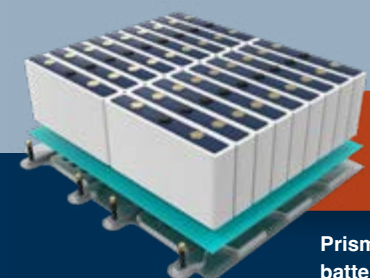
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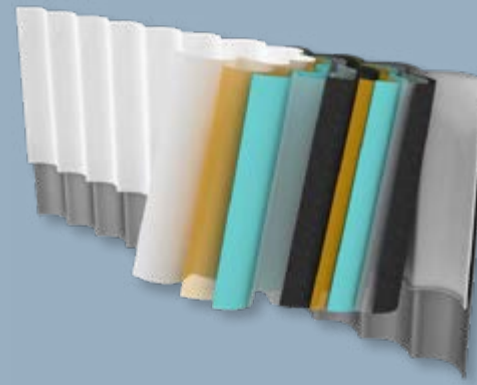
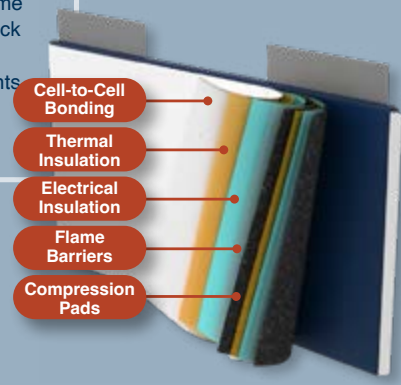
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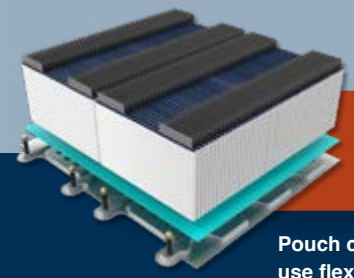


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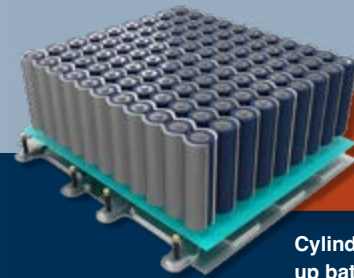
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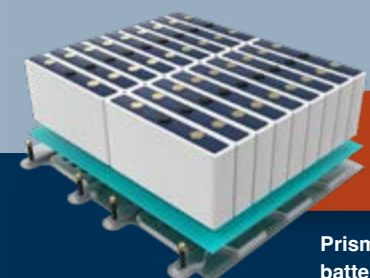
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- Mica
- Ceramic fibers
- Adhesives
- Foams
- Thermal interface materials (TIMs)
- Insulators
- Advanced engineered materials
- Protective tapes and films
- 3M™ Flame Barrier Paper FRB
- Aerogels





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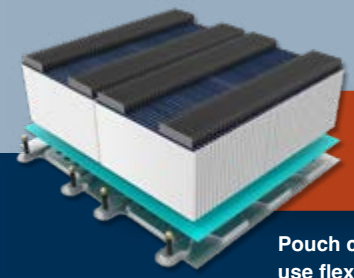


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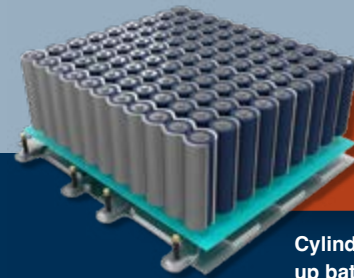
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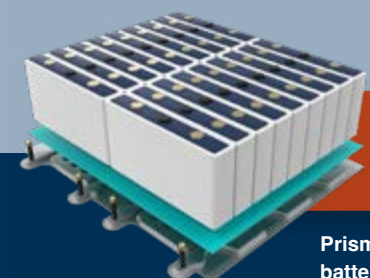
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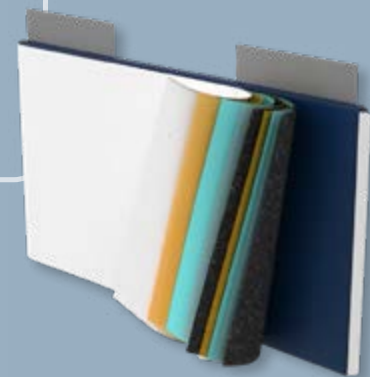
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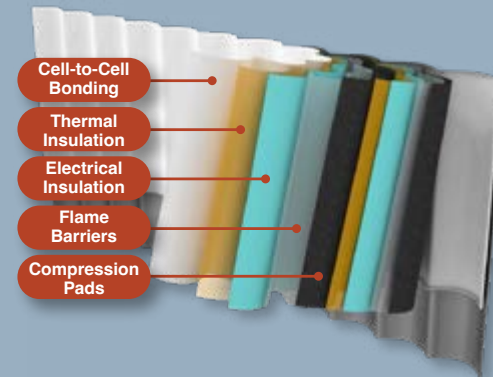

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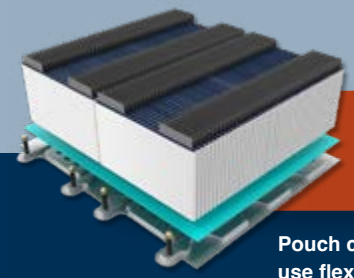


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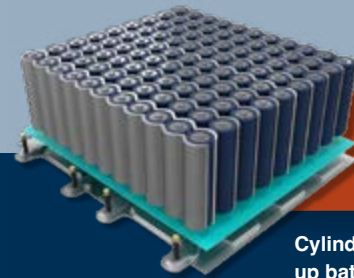
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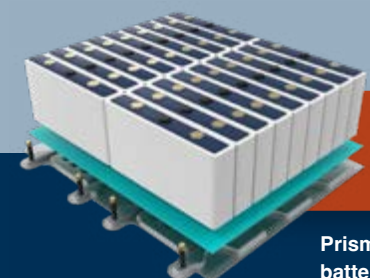
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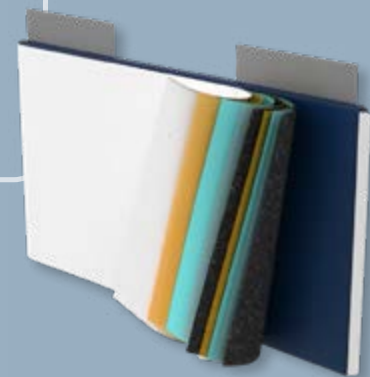

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- Adhesives
- Foams
- Thermally insulating tapes and films
- Insulating foams
- Thermal interface materials (TIMs)
- Advanced engineered materials





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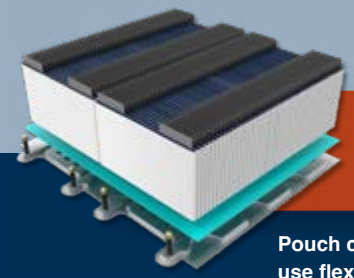


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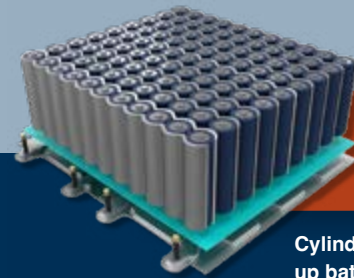
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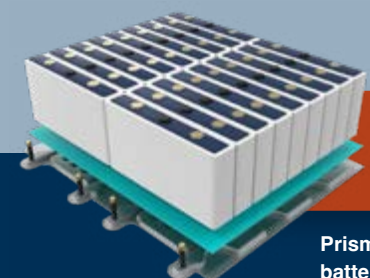
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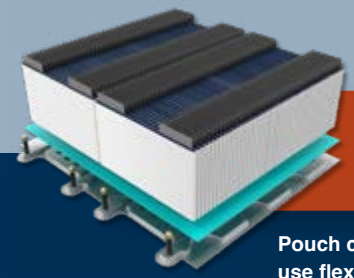


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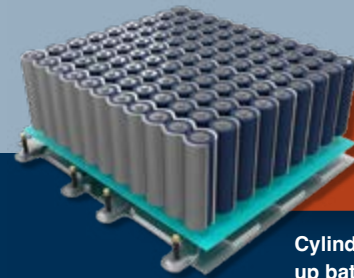
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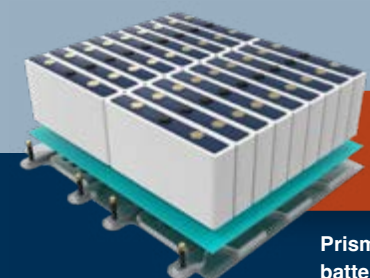
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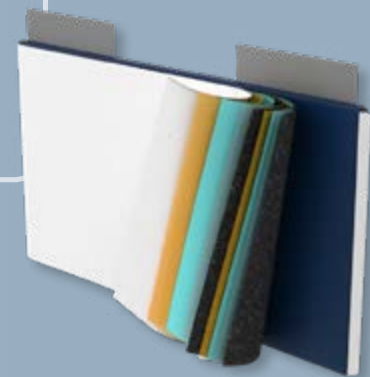

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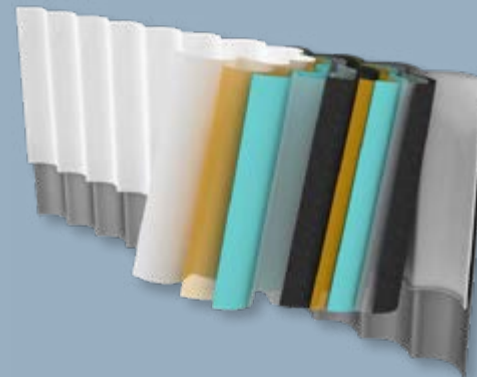
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