

Temperature regulation and electrical insulation are the most critical aspects of design and safe operation in rechargeable battery packs. Lithium Ion and other batteries can catch fire or explode under conditions of excess heat or if arcing or sparking occurs.

To mitigate thermal runaway in battery packs, Fralock provides highly effective material solutions for **passive thermal management, electrical insulation, vibration dampening, and impact protection.**

Working with your team, our engineers design, engineer, and manufacture multi-faceted material solutions to satisfy your critical requirements.

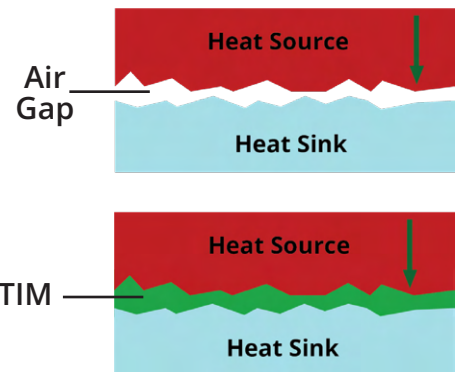


## THERMAL MANAGEMENT

### Thermal Interface Solutions

Fralock provides specialty engineered material components that are highly effective at dissipating heat inside the battery pack and preventing heat build-up using thermal pads, heat-spreading gaskets, thermal tapes, and gap pads.

- Silicone-based materials  
3M™ Thermally Conductive Silicone Interface Pad  
St. Gobain® ThermaCool® TC gap pads
- Graphite materials  
NeoGraf® SpreaderShield™, Grafoil®

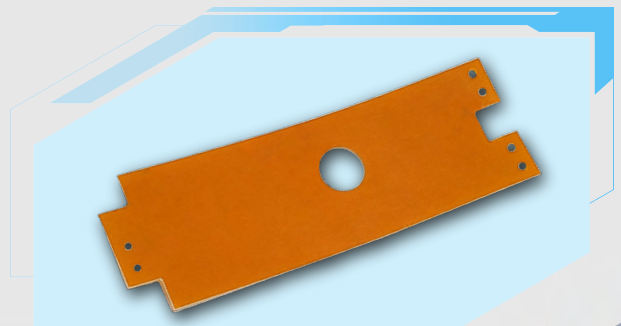


*TIMs have high thermal conductivity and are compressible, filling in air gaps to improve heat transfer from the heat source to the heat sink component.*

### Thermal Barriers, Thermal and Electrical Insulation

Battery packs require materials that prevent the transfer of heat between modules and to other components. Electrical insulation materials in batteries must also be able to withstand high heat and retard or block flame to mitigate thermal runaway. Fralock can help you determine the best flame-resistant thermal barrier and electrical insulation materials to insure safe battery operation.

- DuPont™ Cirlex® (a thick polyimide)
- DuPont™ Kapton®-based materials
- DuPont™ Nomex® - synthetic aromatic polyamide polymer
- St Gobain® polyurethane fire blocking and compression pad
- Avery Dennison Flame Tough™ adhesives
- 3M™ flame barrier films
- ITW Formex™ Fire-retardant polypropylene
- Sabic Lexan™ Fire-retardant polycarbonate films
- Fire resistant/fire retardant PSA tapes
- Aerogels - fire blocking, lightweight, flexible, compressible
- PET films
- Silicone-based mica plated tape

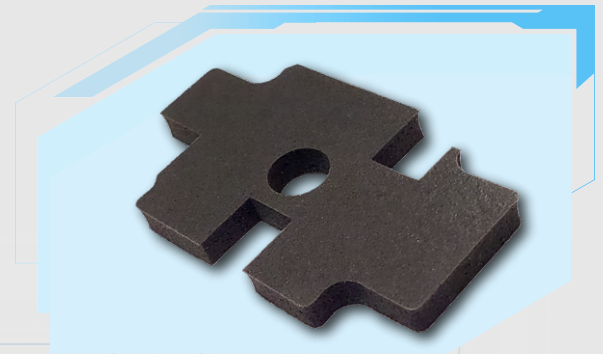


## IMPACT AND VIBRATION PROTECTION

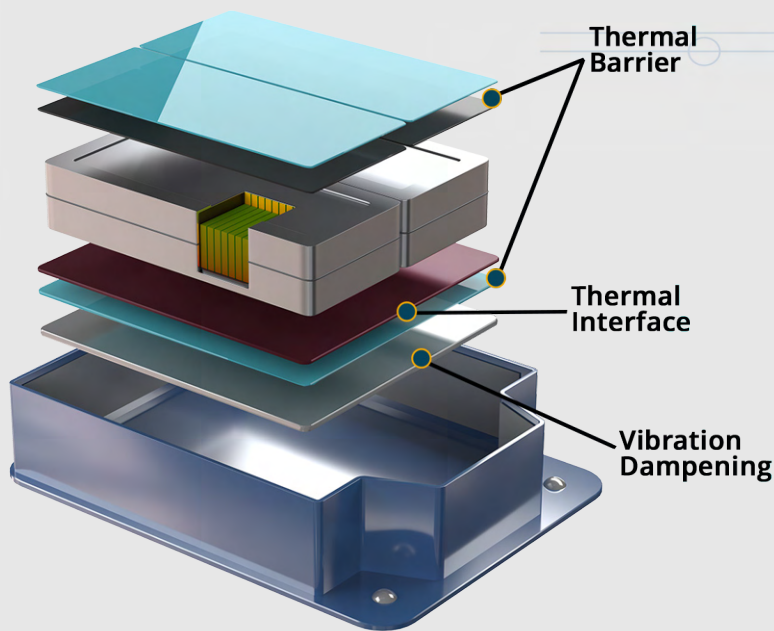
Vibration dampening and sudden impact resistance are important considerations for designing batteries used in applications that are subjected to mechanical stresses such as vehicles, space and aircraft, power tools, or portable electronics.

Fralock provides solutions with durable foams and rubbers:

- Rogers Poron<sup>®</sup> (urethane foam)
- Rogers Bisco<sup>®</sup> (silicone foam)
- Neoprene rubber
- NBR (natural Buna rubber)
- EPDM
- 3M<sup>™</sup> VHB<sup>™</sup> (foam and high bond adhesives)
- Fluorosilicone foams
- Silicone, polyurethane polyolefins
- Specialty laminates



## THE FRALOCK ADVANTAGE



*Our highly experienced engineering team and material science experts understand that your application is unique and requires the right material and fabrication process to satisfy your requirements. Our **precision manufacturing processes (die-cutting, laser cutting, machining, slitting, and specialty lamination)** is **second-to-none** and is one reason why customers come to us for their critical components. Top quality materials and precision production are a winning combination for your battery pack components, keeping you a step ahead of the competition.*

Get in touch with us to discuss your project

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