



## Die-Cut Solutions for ENERGY STORAGE SYSTEMS & DEVICE BATTERIES

Batteries are used to power many of the devices we use every day. **Marian manufactures custom die-cut parts for applications within the entire battery, including the cell, module, and pack for energy storage and battery devices (consumer electronics, appliances, and more).** Our solutions help designers address common issues around battery safety, durability, reliability, and weight.

With ISO 9001 and IATF 16949 certifications, our quality management systems are set up to meet the stringent standards of the energy storage industry. Marian provides rapid turnaround on material samples and prototypes while also offering design assistance and collaboration.

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# Solutions for ENERGY STORAGE SYSTEMS & DEVICE BATTERIES

Marian manufactures solutions for the entire battery and its charging system. Our highly trained engineers are involved in your processes every step of the way, from concept through mass production. With manufacturing facilities all over the globe as well as representatives in areas near you, we provide rapid support and turnaround on prototypes and finished parts.

## BATTERY CELL

Pouch, cylindrical, prismatic



## BATTERY MODULE



## BATTERY PACK



## BMS



## CHARGING



Marian custom die-cut components help address common issues within the battery and BMS like:

- safety
- durability
- reliability
- weight

## MATERIALS



Marian works closely with and has preferred status with the world's top manufacturers of thin, flexible materials. Our Sales Engineers also complete extensive training to help you choose the best materials for your application.

## MANUFACTURING



Once design and materials are finalized, we'll devise the most efficient, cost effective, and high-quality process to manufacture your parts with your application in mind. We'll also add any customer specific requirements like cleanroom converting or 100% inspection as necessary.

## QUALITY & CERTIFICATIONS



Marian heavily invests in obtaining and maintaining relevant quality certifications for the battery & automotive industry like:

- ISO 9001
- ISO 14001
- IATF 16949

# Solutions for ENERGY STORAGE SYSTEMS & DEVICE BATTERIES



## 1 THERMAL MANAGEMENT MATERIALS

Effective thermal management is essential to optimizing battery performance and longevity.

- Key materials: Thermal interface gap pads, heat spreaders, thermally conductive tapes, dispensable thermal epoxies and gels
- Key suppliers: 3M™, Polymer Science, tesa®



## 2 SEALS & GASKETS

Custom gaskets and seals provide long-term sealing in extreme temperatures & conditions.

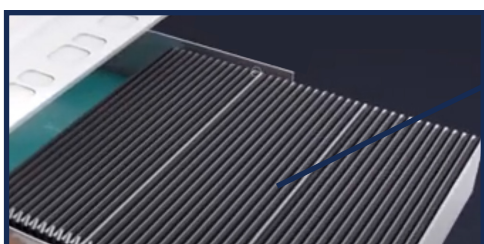
- Key materials : BISCO® silicone foams, PORON® urethane foams, Norseal® foams
- Key suppliers: Rogers, Saint Gobain



## 3 DIELECTRIC BARRIERS & INSULATORS

Dielectric barriers and insulators meet rigorous standards to keep the battery running safely.

- Key materials: Formex™, Flame Barrier FRB, Kapton® Polyimide, Nomex®
- Key suppliers: ITW, 3M™, DuPont



## 4 SPACERS & COMPRESSION PADS

Foam compression pads for cell expansion / contraction, shock, and vibration protection from regular use.

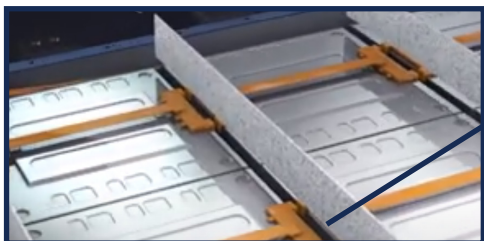
- Key materials: BISCO®, PORON®, Norseal®
- Key suppliers: Rogers, Saint Gobain



## 5 EMI SHIELDING

Protect the battery management system (BMS) and other electronics within the vehicle from malfunctioning due to EMI.

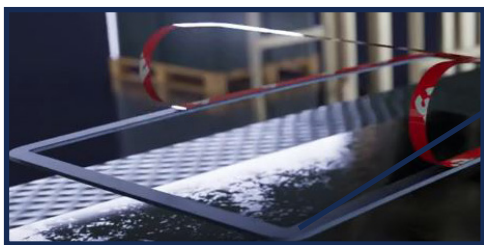
- Constructions: copper, aluminum, silver & tin-plated
- Key materials: Conductive elastomers, foams, foils, tapes
- Key suppliers: 3M™, Polymer Science



## 6 ANTI-PROPAGATION

These extremely high temperature resistant materials help in mitigating thermal runaway.

- Key materials: Films, fibrous papers, felts, intumescent foams, composites
- Key suppliers: Morgan, Alkegen, Rogers, tesa®



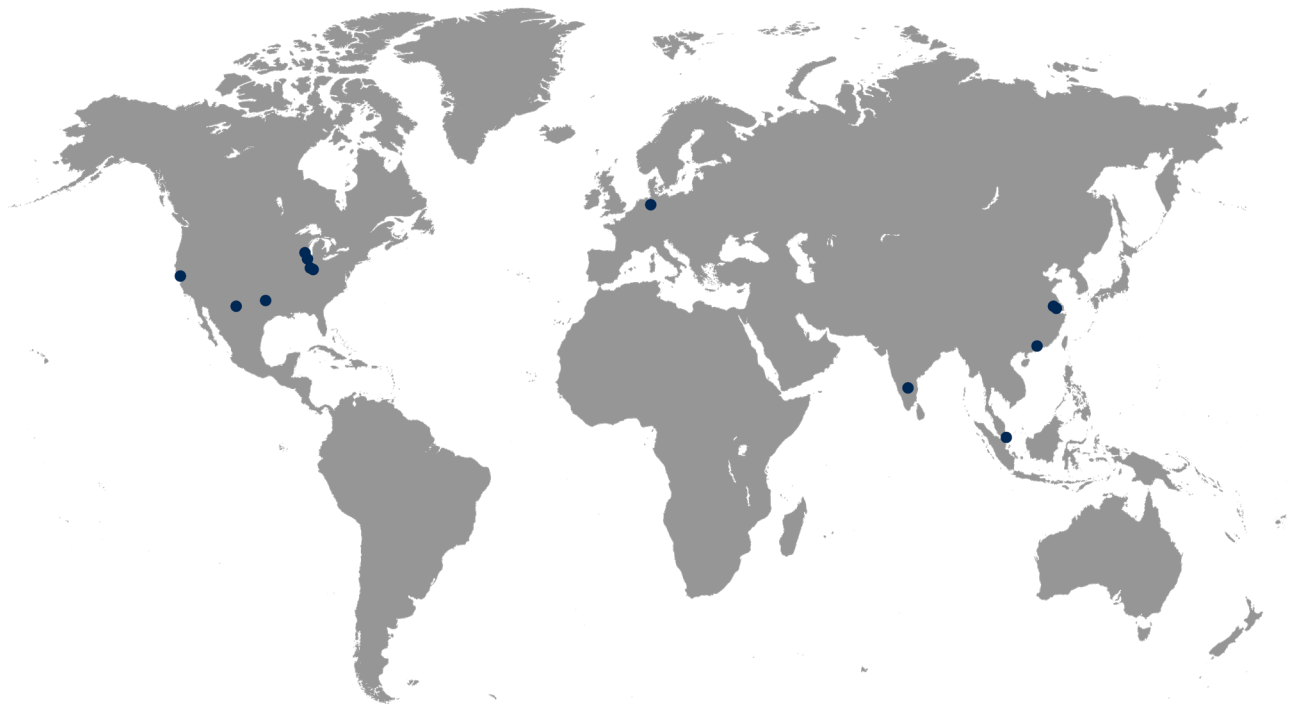
## 7 UL RATED ADHESIVES

UL rated adhesives are used for flame retardant, secure bonding, mounting, and laminating.

- Constructions: Double-coated, single-coated, transfer
- Key materials: electrically insulating, thermally conductive
- Key suppliers: tesa®, Avery®, 3M™



Marian is a global leader in providing precision die-cut component parts for customers in the consumer electronics, automotive, and medical industries. With over 1,000,000 square feet of production space worldwide and state-of-the-art manufacturing technologies, Marian engineers work closely with customers to solve complex manufacturing and assembly problems. Marian’s responsive approach, in-depth material knowledge, innovative manufacturing capabilities, and high standards for quality all add up to provide you with the best component solutions in the industry.



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