

Parker – Engineered Materials Group

ENGINEERING YOUR SUCCESS.



Parker at a Glance



3,000+
Product lines



\$15 Billion+
In global revenue



450,000+
Customers worldwide



55,000+
Team members worldwide



We are a global business with a local focus.

Footprint of a Global Leader

10

Divisions

Assembly and Protection Solutions Division
Chomerics Division
Composite Sealing Systems Division
Elastomer Process Materials Division
Engineered Polymer Systems Division
Latin America Division
Noise Vibration and Harshness Division
O-Ring and Engineered Seals Division
Prädifa Technology Division
Sealing Technologies Asia Division



310 Distributors



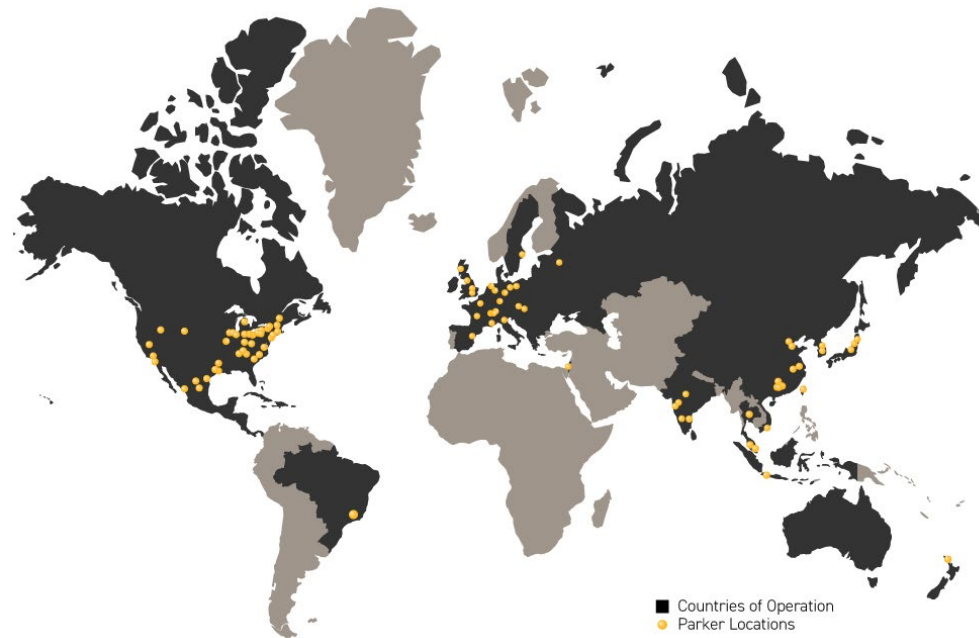
75 Manufacturing Locations
Worldwide



13,100 Employees



Serving **63,500** Customers in **32**
Countries





Who is EMG ?

Market Focus



Aerospace



Automotive



Chemical Industries



Consumer



General Industries



Mobile Industrial



Information Technology



Life Sciences



Military



Oil & Gas



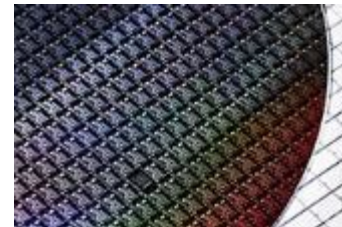
Other Transportation



Power Generation



Renewable Energy

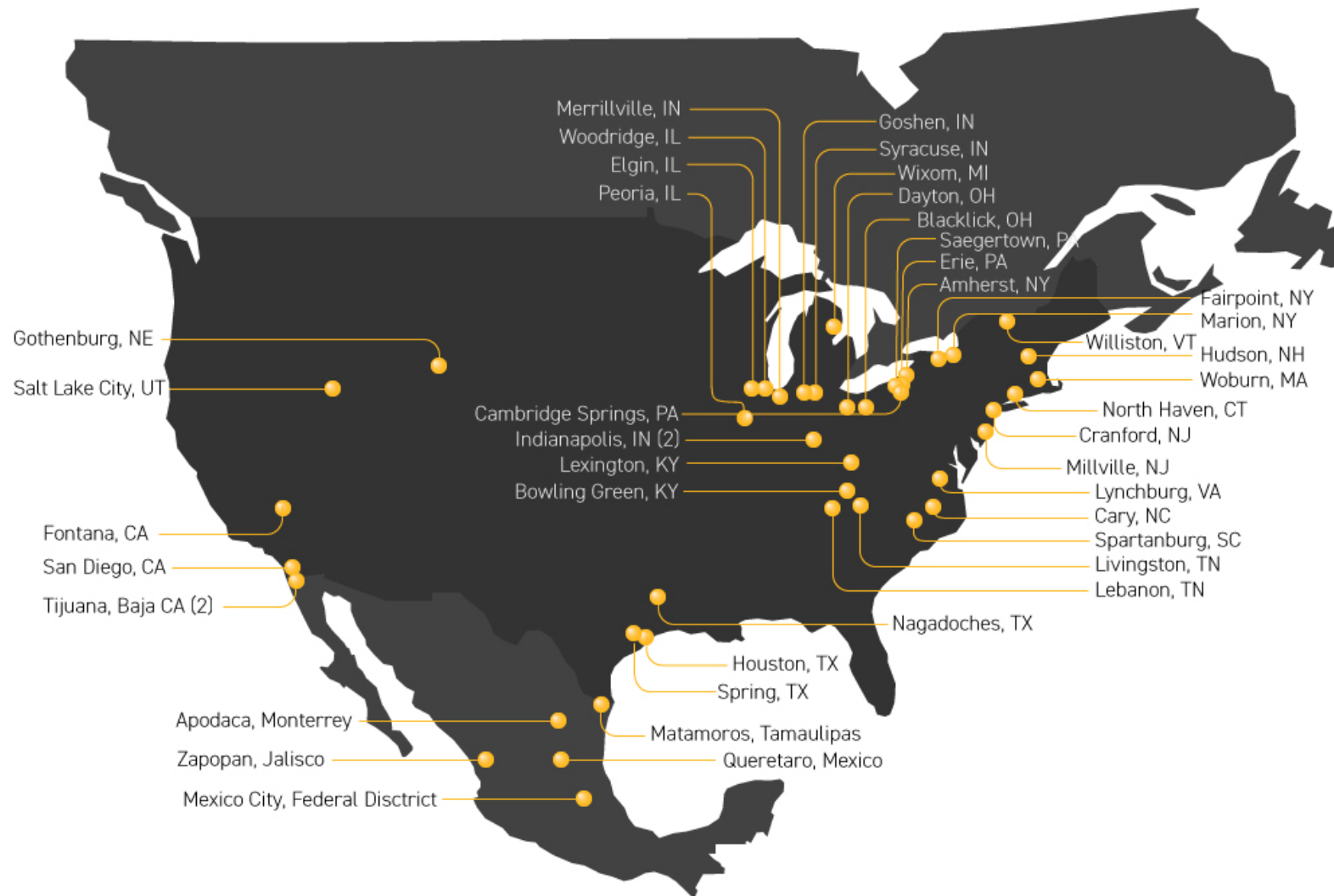


Semiconductor



Telecommunications

North America





Parker Chomerics

About Parker Chomerics



Global leader of premier engineered material solutions



Core competencies:

Material science and process technology



Market and customer driven new product development



Integrated electronics housings and displays



Custom engineered solutions based on industry expertise



Global supply chain management and manufacturing

Key Technologies

- Integrated Assemblies
- Thermal Management
- Grounding
- Board Level Shielding
- EMI Enclosure Shielding
- Engineered Plastic Solutions
- Optical Display Solutions

Key Markets

- Aerospace
- Automotive
- Consumer Electronics
- Defense
- Industrial
- Information Technology
- Life Science
- Telecommunications

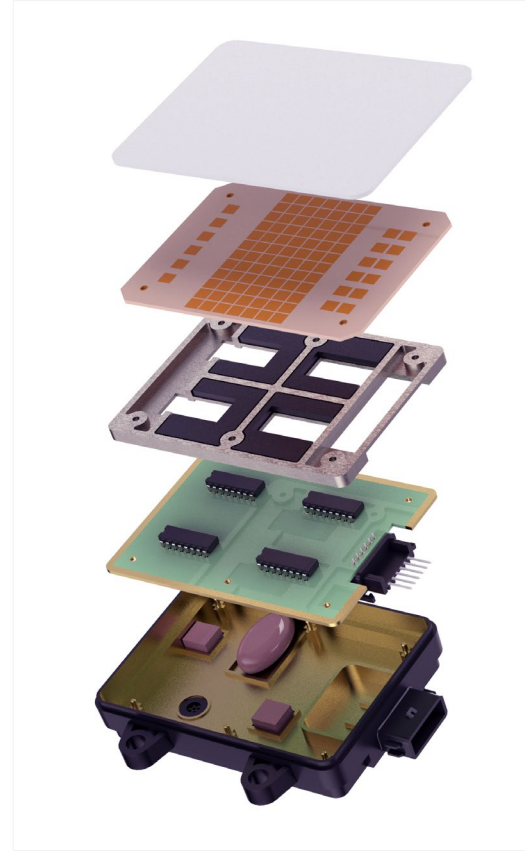
Technology Portfolio



**EMI SHIELDING AND
GROUNDING**



**THERMAL
INTERFACE MATERIALS**



INTEGRATED SOLUTIONS



**ENGINEERED
PLASTICS**

EMI Shielding and Grounding Products

ELASTOMER GASKETS



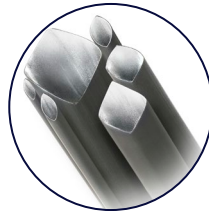
CHO-SEAL®

FORM-IN-PLACE GASKETS



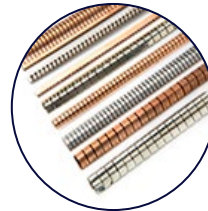
CHOFORM®

CABLE WRAP/TUBING



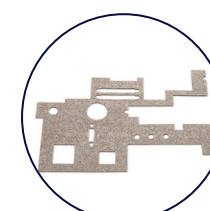
CHO-SHRINK®

METAL FINGER STOCK



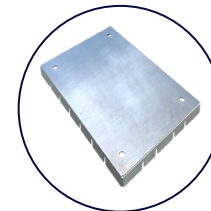
SPRING-LINE®

FABRIC- OVER-FOAM



SOFT-SHIELD®

BOARD LEVEL SHIELDING

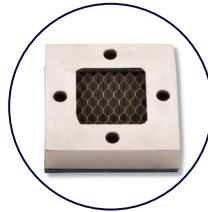


ADHESIVES, COATINGS & SEALANTS



CHO-BOND®
CHO-SHIELD®
TECKNIT®
PRO-SHIELD®
CHO-LUBE®

AIR VENT PANELS



STREAMSHIELD™
SHIELD-CELL™
OMNI-CELL™
SLIMVENT™
CHO-CELL™

METAL WIRE BASED



**PORCUPINE
METALASTIC®**
METALASTIC™
EXP-URE
POLA® SPONGE
POLA® SOLID
POLASTRIP®

TAPES/ LAMINATES



CHO-FOIL®
CHO-MASK® II
CHO-FAB

METAL CABLE WRAP



SHIELD WRAP™

Thermal Interface Products

DISPENSABLE GELS	GAP PADS	DIELECTRIC PADS	PHASE CHANGE MATERIALS	THERMAL TAPES
 THERM-A-GAP™	 THERM-A-GAP™	 CHO-THERM®	 THERMFLOW®	 THERMATTACH®
	CURE-IN-PLACE COMPOUNDS	HEAT SPREADERS	THERMAL GREASES	
	 THERM-A-FORM™	 T-WING®		

Engineered Plastic Solutions

**AUTOMOTIVE
PLASTICS**

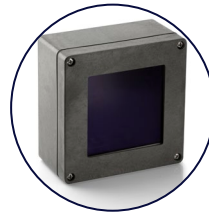


**CONDUCTIVE EMI
SHIELDING
PLASTICS**



PREMIER™

**VALUE ADDED
ASSEMBLIES**



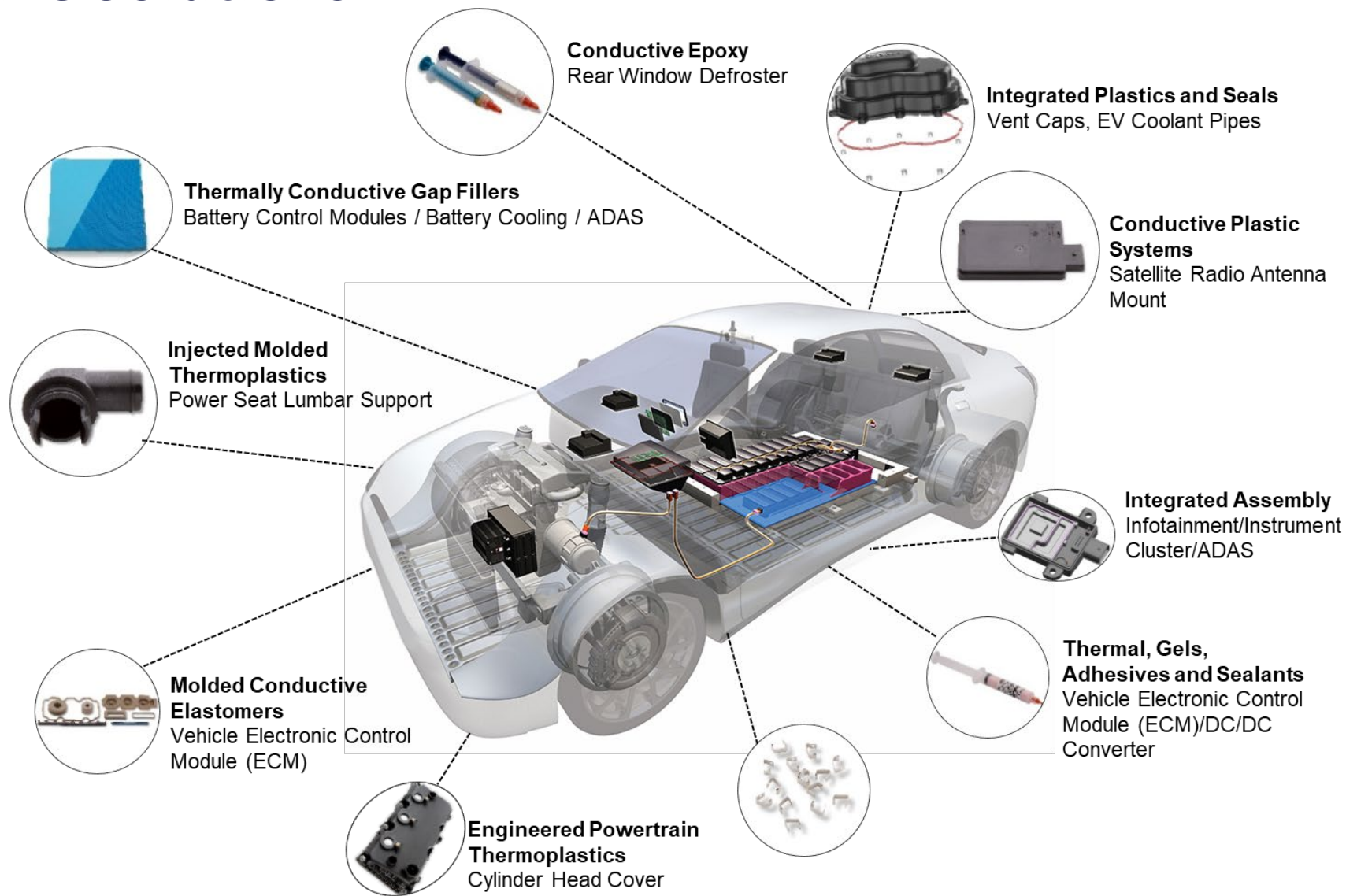
**INDUSTRIAL
PLASTICS**



**CONSUMER
PLASTICS**



Automotive Solutions





Parker Sealing Technologies

Products: O-Rings, Gaskets, Lip Seals

Compounds: Elastomers, PTFE, Plastics, 2K/3K



Back-up Rings



Buffer Seals



Cushioning Seals



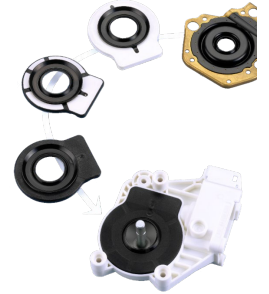
Custom Seals
2/3K-Parts



Fastener Seals



Extruded
Profiles



2/3K-Parts



Flange Seals



Guiding Elements and
Guiding Tapes



O-Rings and O-Ring
Accessories



Piston Seals



Rod Seals



Tolerance
Compensation Seal



Smart Seals



Rotary Seals & Bearing
Isolators



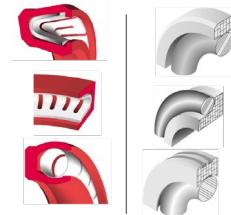
Static Seals



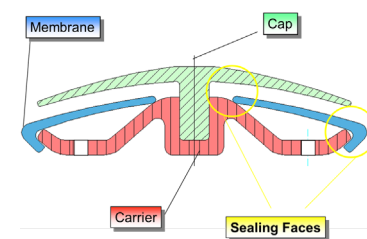
Valve Seals



Wipers

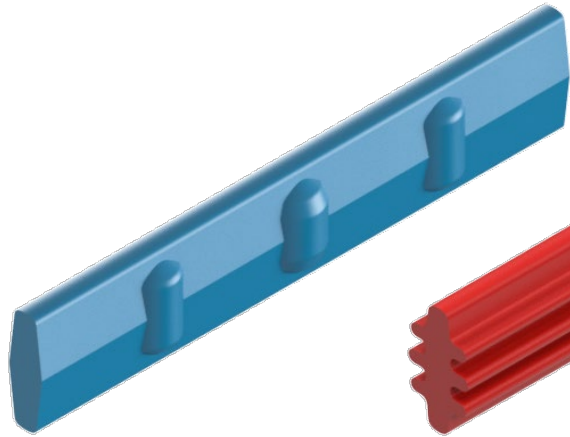


Energized
PTFE

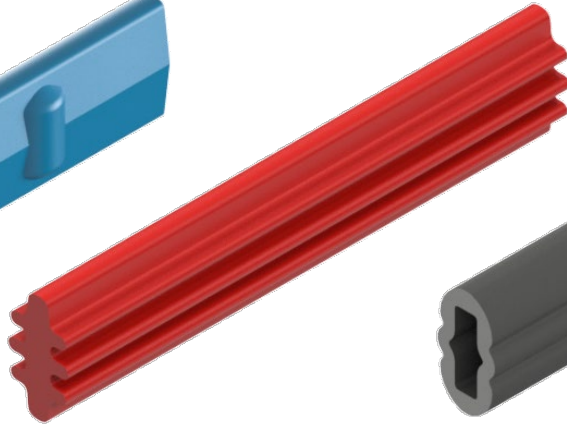


CLIPHVENT

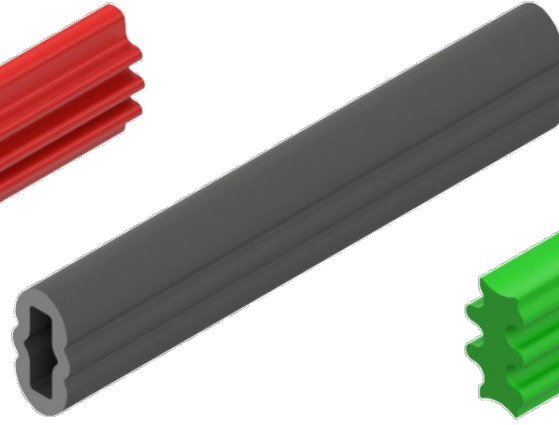
Product Portfolio



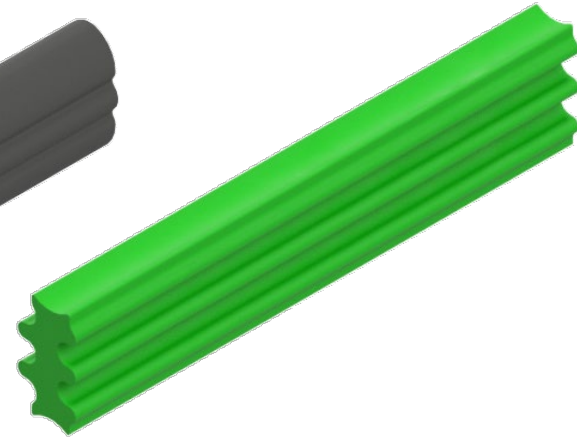
Diamond Seal



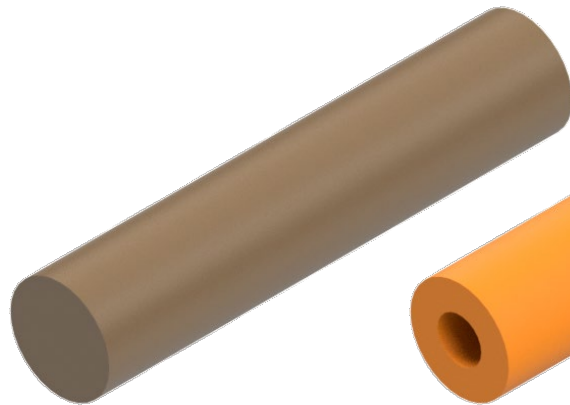
Hexapod Seal



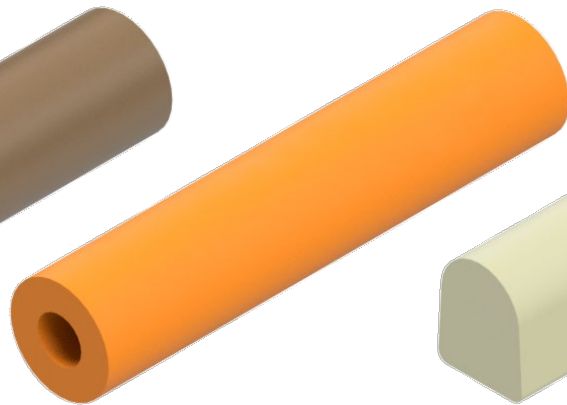
Keyhole Seal



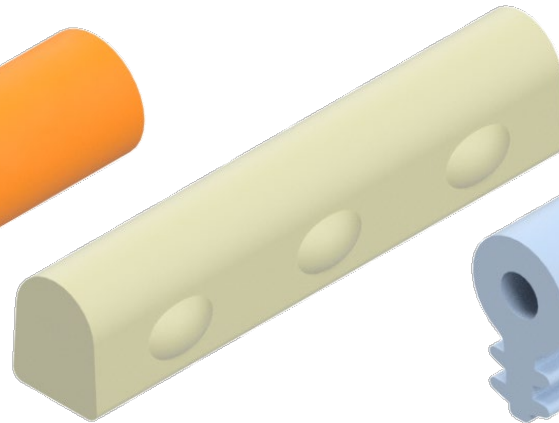
Jigsaw Seal



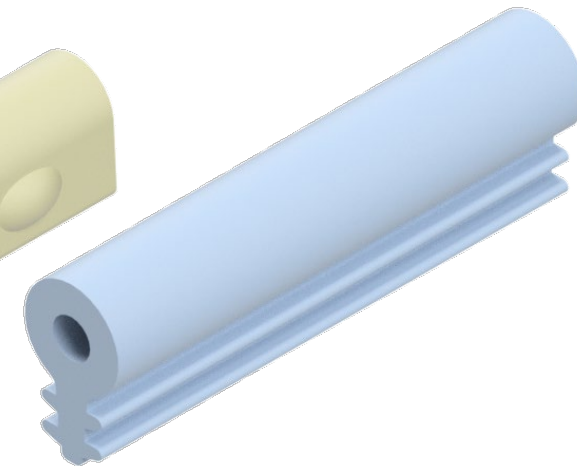
O-Ring



Hollow O-Ring

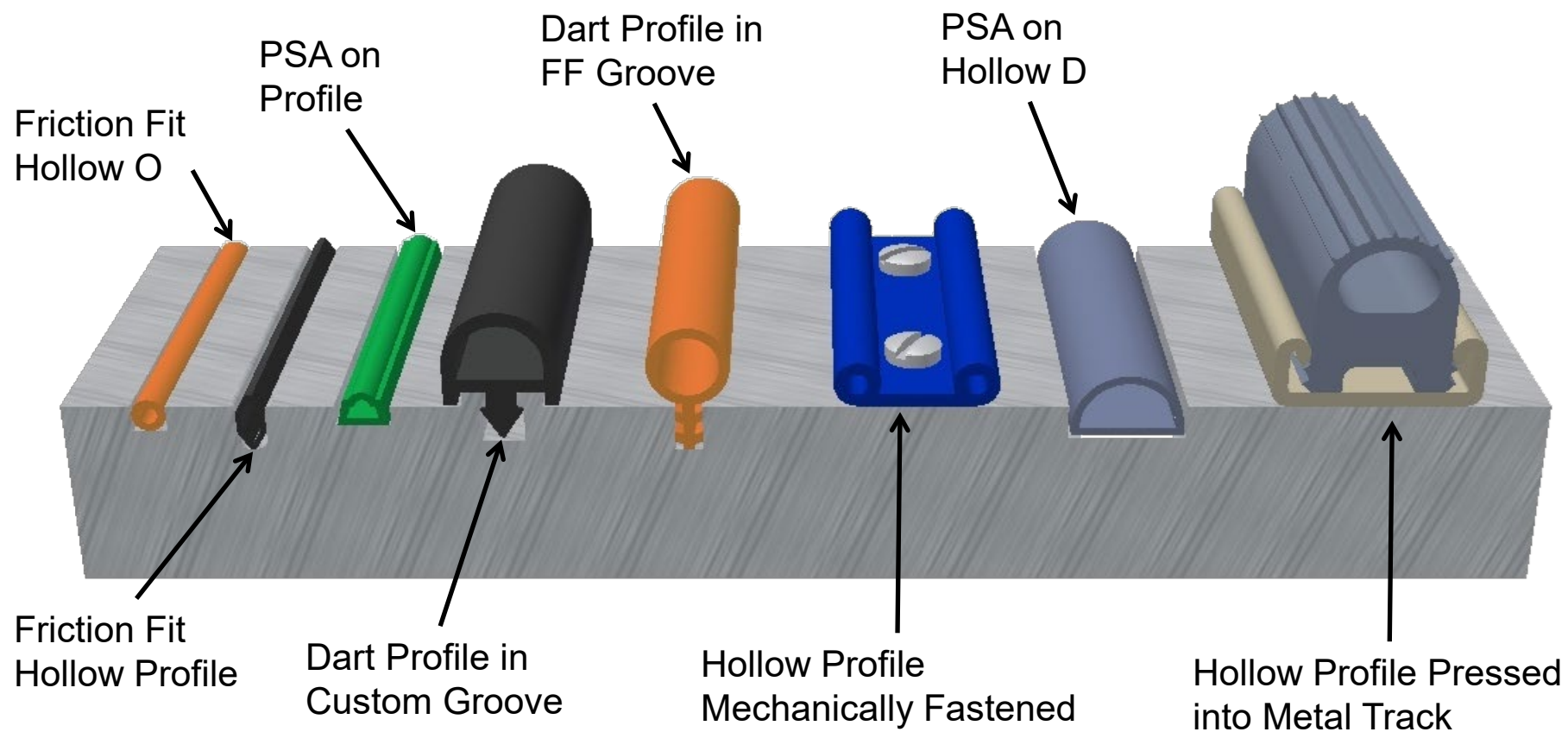


EZ-Lok Seal



Bulb Seal

Other Retention Options



PSA = Pressure sensitive adhesive

Battery Closures, Cooling Systems and HVAC

Cooling systems in electrified systems are some of the most critical parts of a vehicle. Parker provides highly engineered seals that are coolant compatible to ensure that this critical systems operates smoothly.



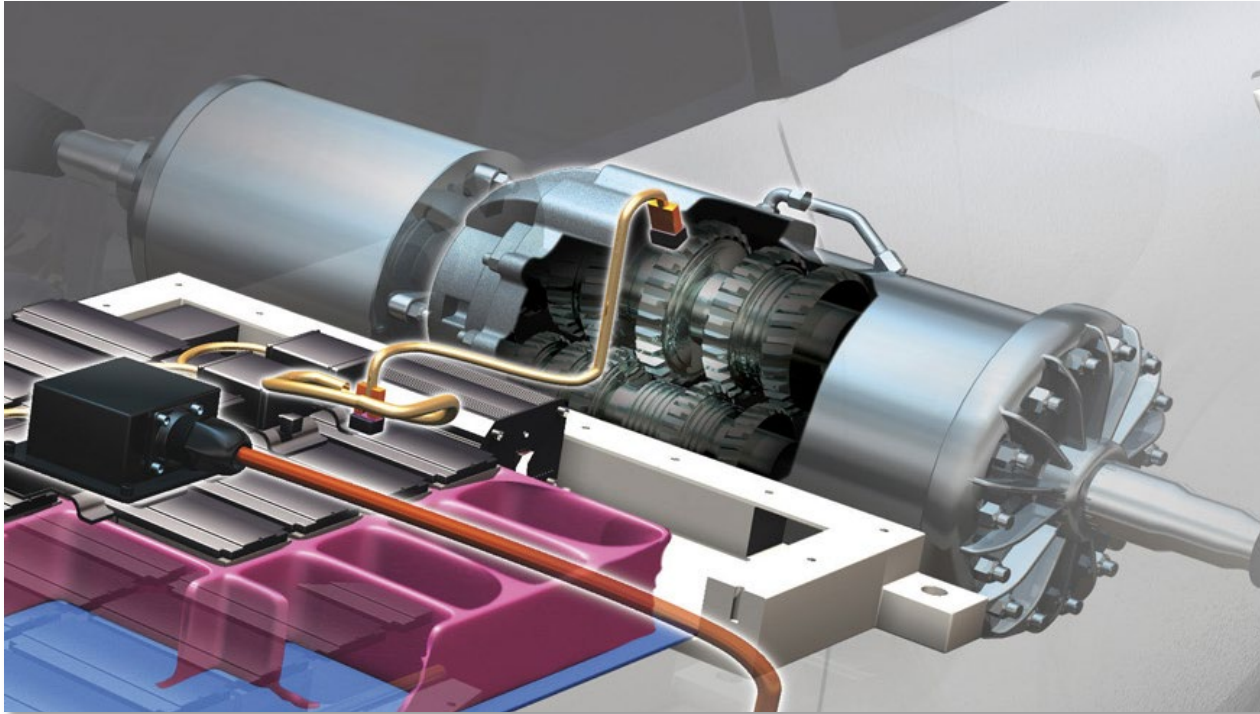
O-rings
Press-in-place seals
Thermal gels
Molded shapes
Integrated seals



Battery Closure Sealing Plug
Under Development
Lucid / CHO / OES

Electric Motors

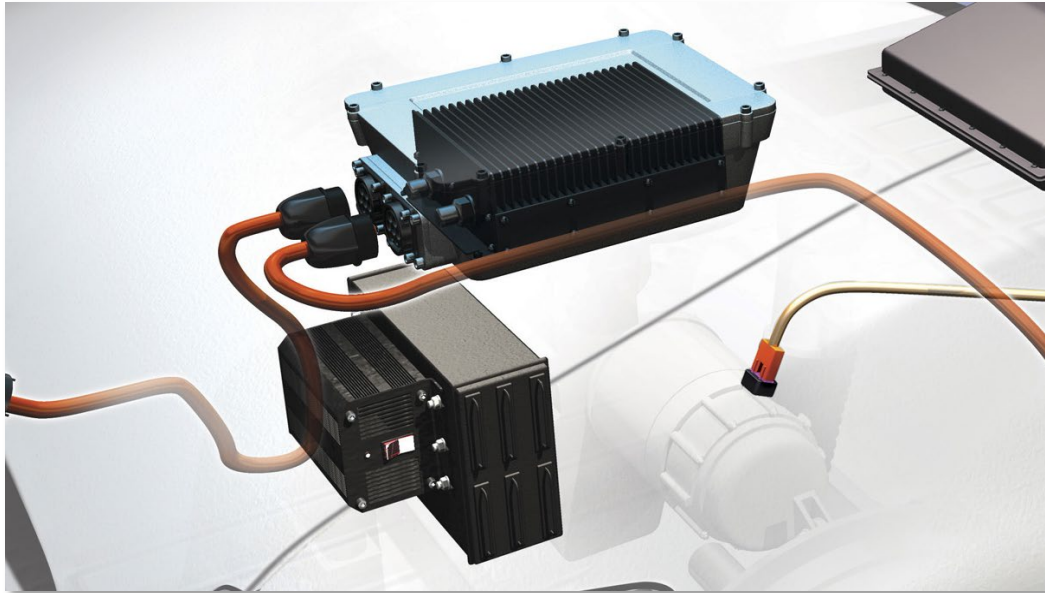
Electrical motors require a variety of static and dynamic seals to seal air and fluids.



Dust exclusion, bearing isolator seals
Press-in-place perimeter seals
Radial seals
High speed shaft seals

Inverters, Converters, Onboard Chargers

Electrical systems within the vehicle require perimeter seals, port seals, connector seals, EMI shielding and thermal management. Parker can provide all of these solutions.

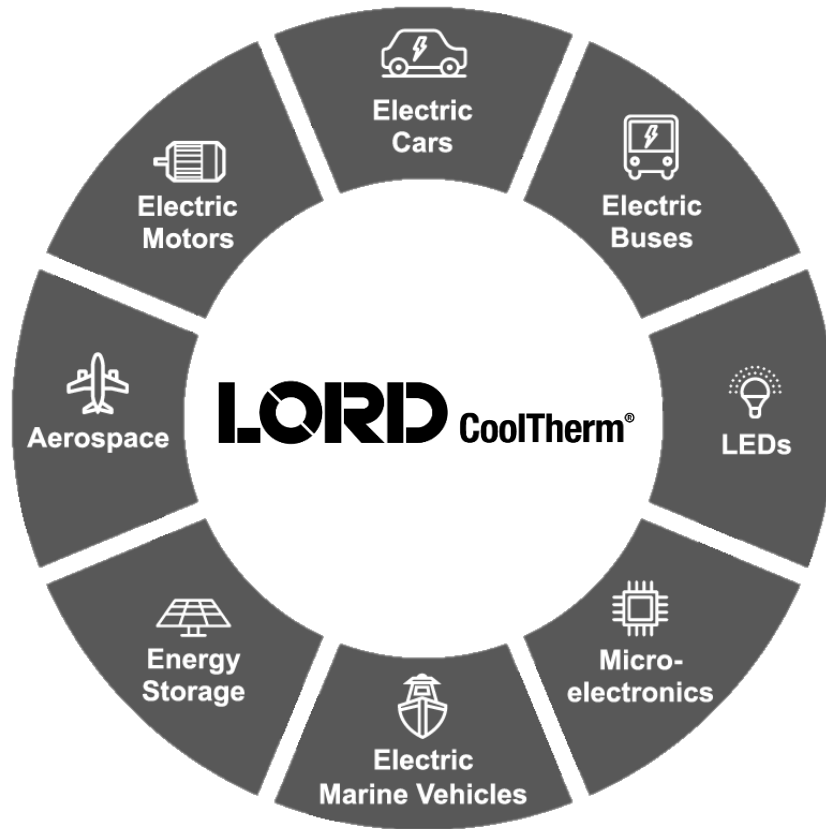


Cooling system O-ring seals
Extruded EMI gaskets
Liquid silicon rubber perimeter seals
Perimeter carrier gaskets
Press-in-place perimeter seals
Thermal gels
Press-in-place coolant seals
Press-in-place environment seals
Thermal interface materials
Custom molded connectors
Perimeter seals



Parker APS Division

Our Expertise



Visit us online at www.LORD.com/CoolTherm

Key Markets

- Automotive
- Energy
- Electronics
- Marine
- Industrial
- Aerospace and Defense
- Oil and Gas

Key Products

- Thermal Management/Electronic Materials
- Adhesives and Coatings
- Sensing Systems
- Electro-Mechanical Motion and Vibration Control Systems
- Motion and Vibration Control Assemblies

Electrification Solutions

INFOTAINMENT / NAVIGATION MCU, BOARD / CHIP LEVEL ELECTRONICS

- Potting & Encapsulant
- Thermally Conductive Gap Filler
- Gels, Greases, Underfills
- Thermally and Electrically Conductive Materials

HEADLAMPS

- Potting & Encapsulant
- Thermally Conductive Gap Filler
- Electrically Conductive Adhesive
- Sealants

BATTERY PACK

- Potting & Encapsulant
- Thermally Conductive Gap Filler
- Thermal Adhesives
- Structural Adhesives
- Dielectric Coatings
- Low-Density Foams

MOTOR

- Potting & Encapsulant
- Dielectric Coating for Magnets

CHARGING STATION

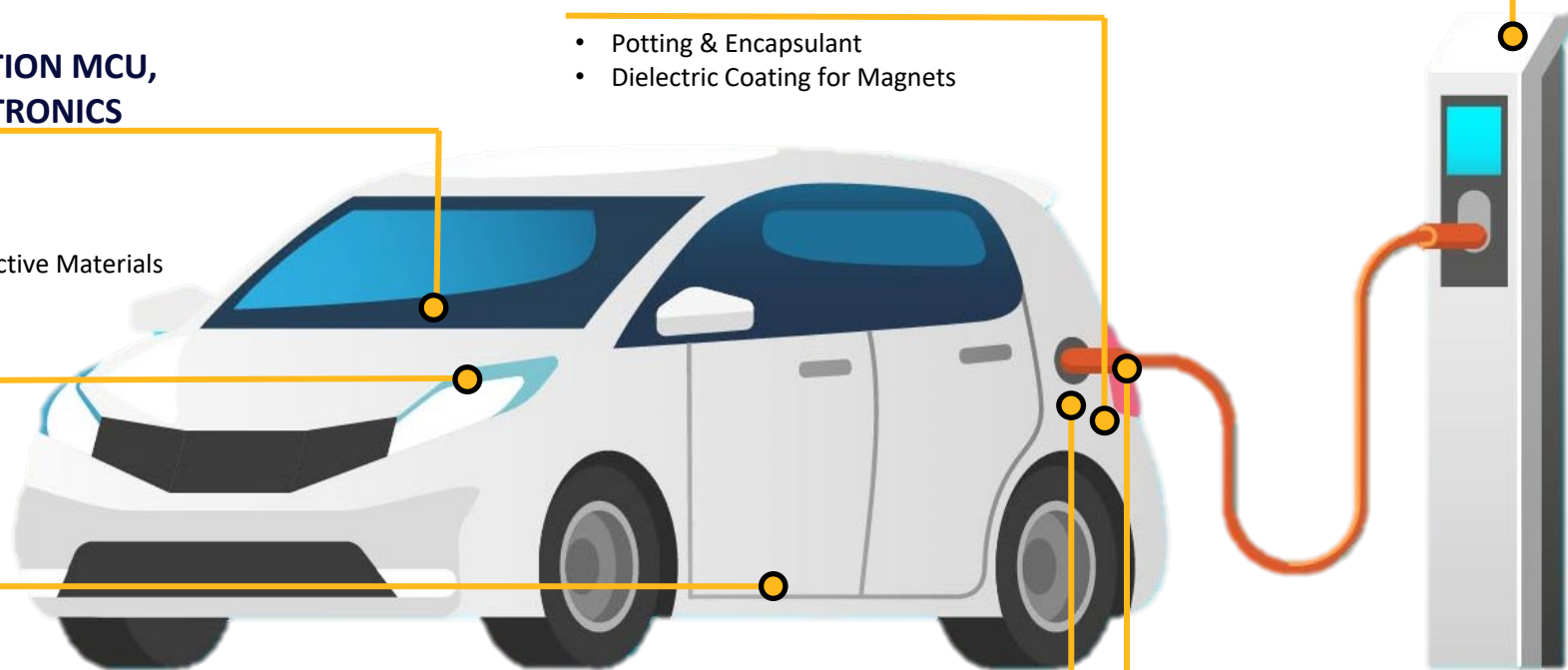
- Potting & Encapsulant
- Dielectric Coating
- Structural Adhesives

CHARGER / INVERTER

- Potting & Encapsulant
- Thermally Conductive Gap Filler
- Dielectric Coating

CHARGER HANDLE

- Potting & Encapsulant
- Structural Adhesives



One Company, Multiple Chemistries

Properties	Silicone	Urethane	Epoxy	Acrylic
	Wide temp range, protects fragile electronics	Low temp silicone alternative, good moisture barrier	High adhesion, chemically resistant, rigid	Structural bonding with thermal conductivity
Temperature range	●	◐	●	◐
Delicate electronics	●	●	◐	◐
Moisture barrier	◐	●	●	●
Adhesive strength	◐	◐	●	●
Processing	◐	◐	◐	●
Chemical resistance	◐	●	◐	◐
Electrical insulation	●	●	●	●
Repairability	●	◐	◐	◐
Hardness	Low	Medium	High	High

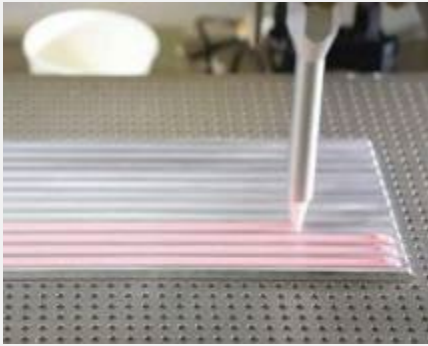
**These values are only applicable to our thermally conductive materials.*

● = Excellent ◐ = Moderate ○ = Poor

Thermal Management Products

KEY PRODUCTS

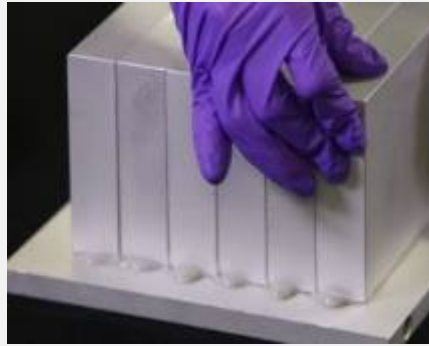
Gap Fillers



Liquid-dispensed stays in place,
cures in place

High-speed dispense, plus high
performance
thermal conductivity

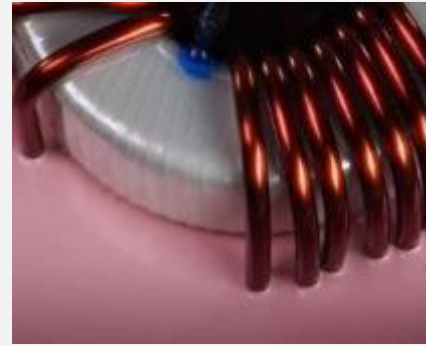
Adhesives



Liquid-dispensed, stays in place,
cures in place

High speed dispense, high thermal
conductivity, adds structural
adhesion functionality

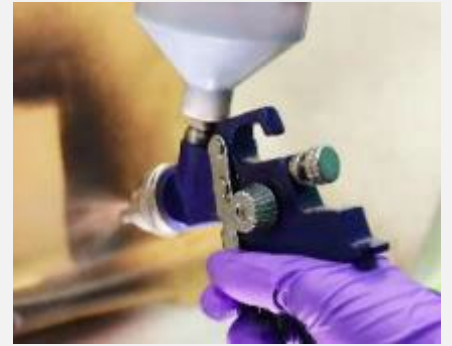
Potting & Encapsulants



Liquid-dispensed, readily flows into
all areas, cures in place

Easily dispensed, encapsulates all
surfaces, high thermal conductivity,
protects sensitive electronics

Coatings



Spray applied, cures on the surface

Easily applied, coats metallic
surfaces, provides **excellent high
voltage insulation**, and provides
environmental protection

Applications: Battery Packs

LORD CoolTherm® gap fillers, encapsulants, and adhesives act as a thermal link between batteries/modules and a heat sink, ensuring proper heat flow. This easy to dispense, room-temperature cure is fully customizable and compatible with cylindrical, pouch and prismatic batteries.

Gap Filler

Liquid-dispense, cure in place gap fillers provide low stress on components and improve thermal resistance when compared to thermal pads.

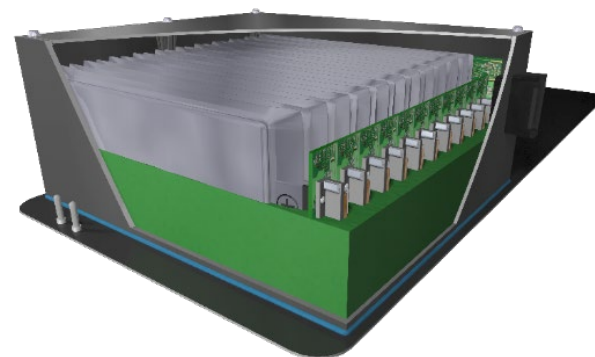
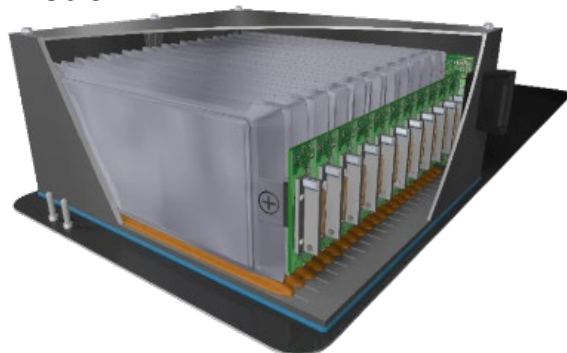
Adhesives

Provide mechanical rigidity and thermal connection where heat is an issue, improving design flexibility by freeing constraints of mechanical fasteners.

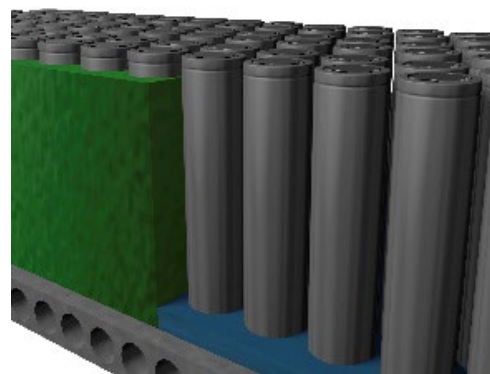
Potting & Encapsulation

Facilitate optimum heat transfer due to high thermal conductivity and low viscosity. Ensure even coverage and elimination of all air gaps.

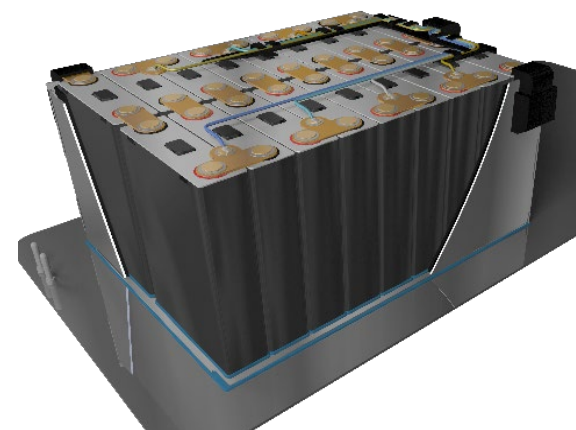
Pouch



Cylindrical



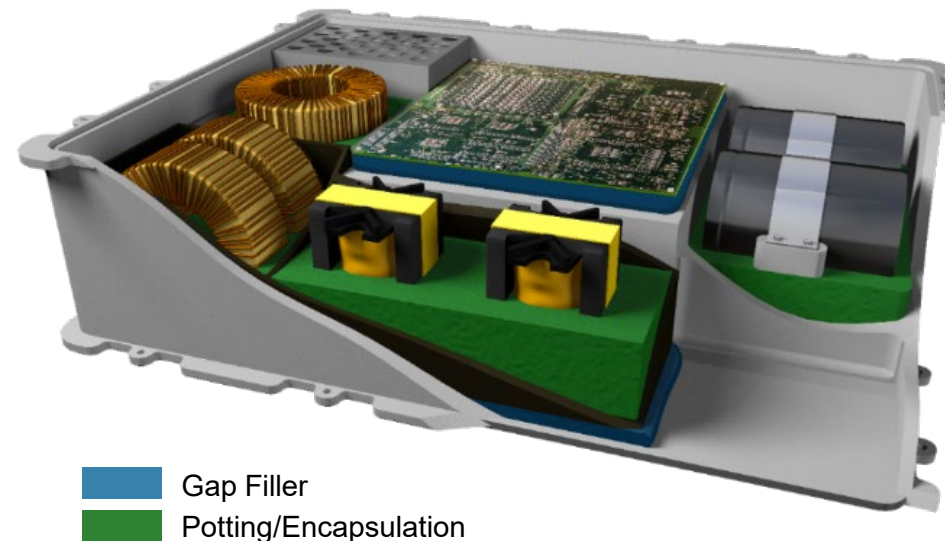
Prismatic



Applications: Charging Systems and Power Electronics

CoolTherm® encapsulants and gap fillers enable proper heat flow, resulting in improved thermal performance and lengthened lifespan of parts.

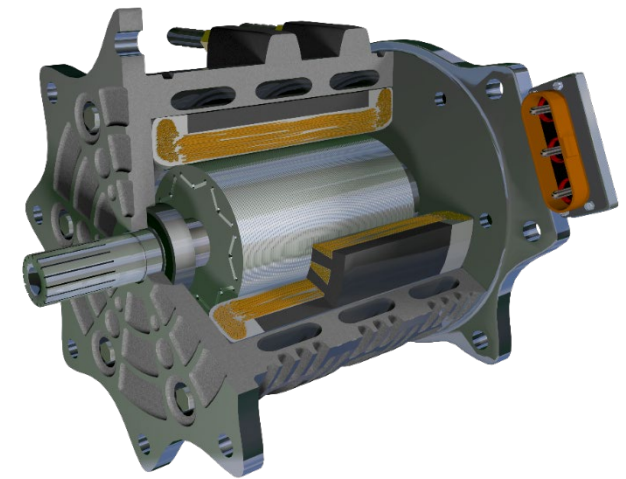
- High thermal conductivity coupled with low viscosity allows for direct connection of the magnetics to the cooling plate.
- Reduce or eliminate inductor hum
- Material quality remains stable over time



Applications: Motors

CoolTherm[®] potting materials decrease motor operating temperature by up to 50°C and can increase power output by at least 30%

- Relatively low viscosity allows for full impregnation of end windings and stator slots
- Stable to over 200°C
- Material properties do not change within the typical operating temperature of a motor
- Materials survive extended thermal cycling from -40 to 200°C without cracking



■ Potting/Encapsulation

Structural Adhesives Products

KEY APPLICATIONS



Body In White

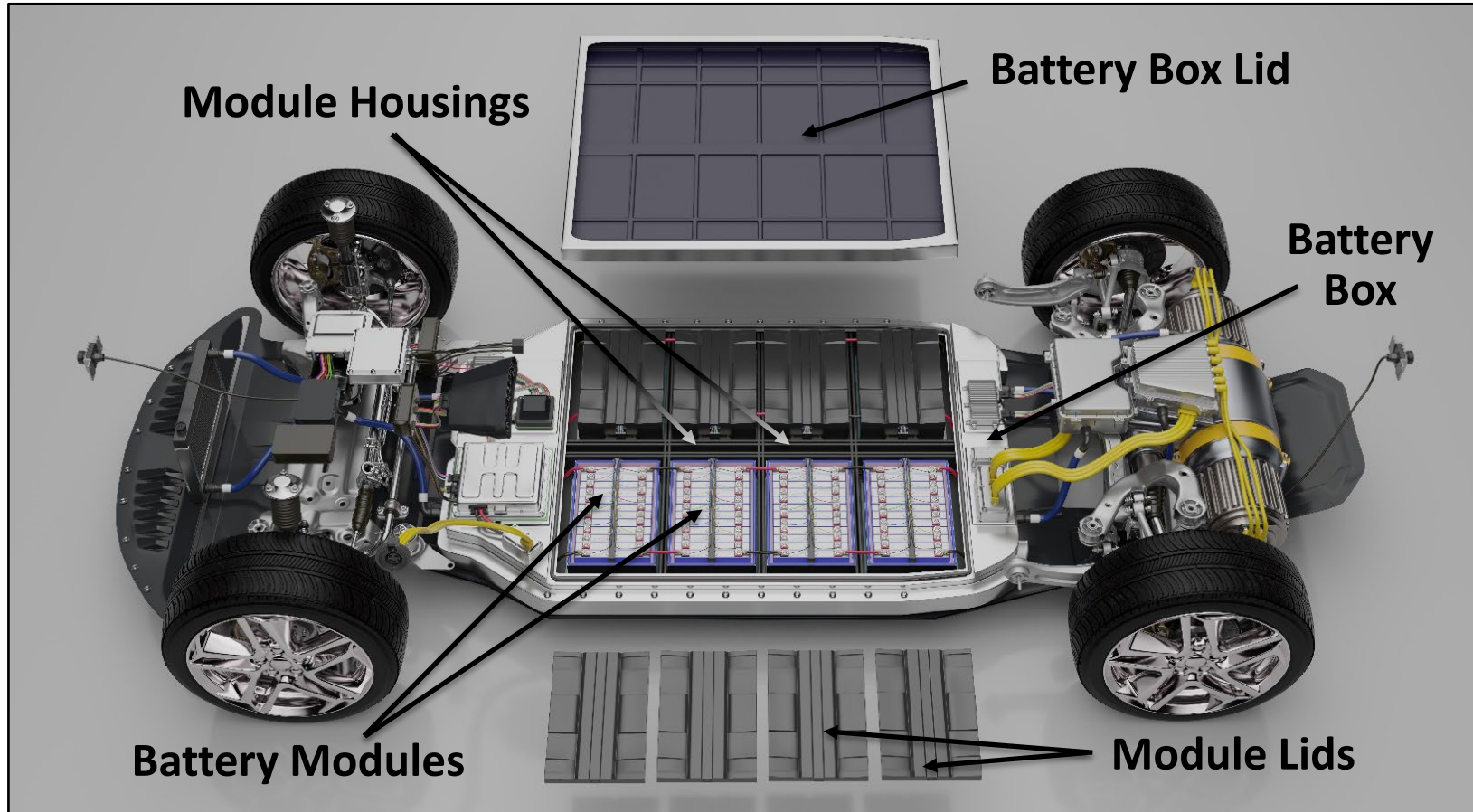


Tailgates, Spoilers



Battery Pack

Typical Modular Battery Pack Design

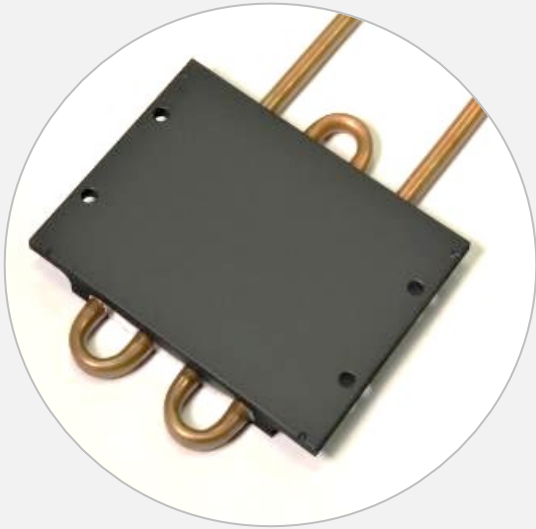


Structural adhesives are used in:

- Module housings
- Cell holders
- Module lids
- Battery box lid attachment and/or sealing
- Various metal-to-metal and metal-to-composite assemblies for lightweighting

Coatings and Foaming Products

KEY PRODUCTS



COATINGS

✓ Dielectric insulation



FOAMS

✓ Low density potting (Silicone and Urethane)

Questions?

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4422261494