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**TECHNOMELT**<sup>®</sup>

  
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**BERGQUIST**

# ALTERNATIVE ENERGY CONVERSION & STORAGE

**Henkel**

Henkel Adhesive Technologies





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## **2 INTRODUCTION**

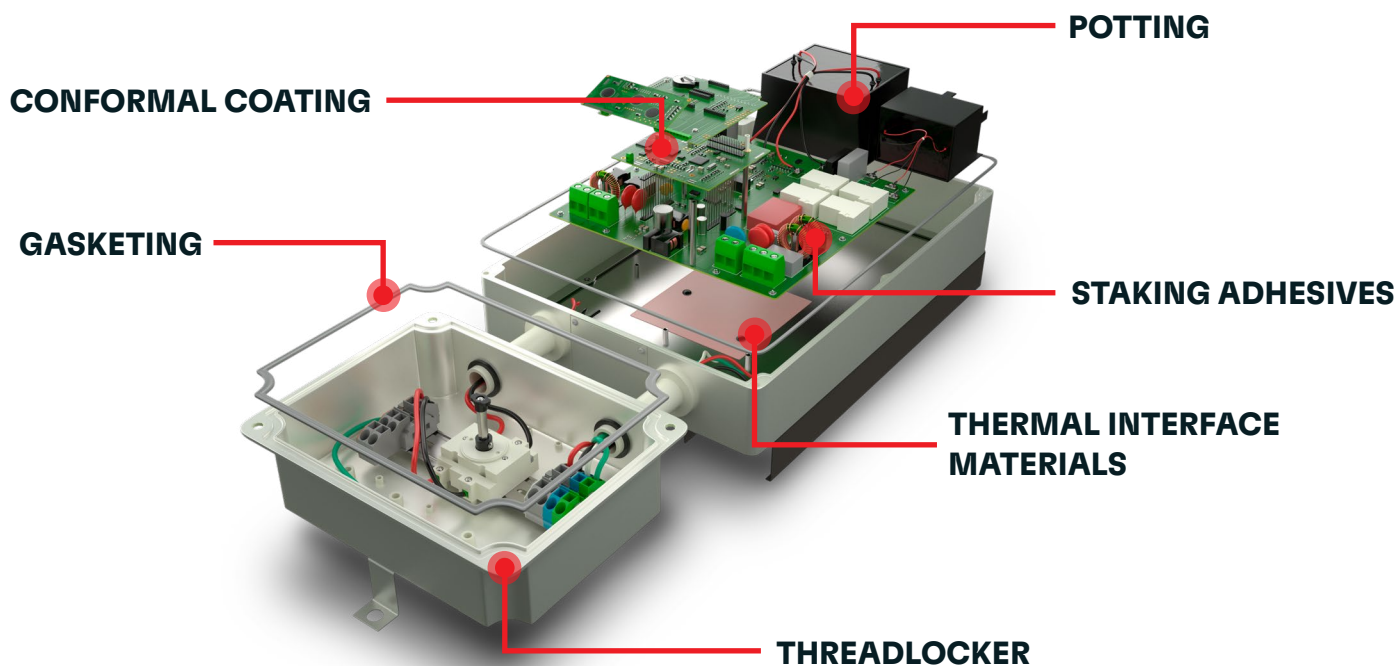
### **INTRODUCTION**

Extracting power from alternative energy sources like the sun not only addresses the objective of sustainability but also significantly increases the amount and extends the availability of power to serve global needs, even in areas where there is limited infrastructure. Driving up the efficiency of a solar power network is key to harnessing as much energy from the source as possible.

From the solar panel's DC output to the conversion in the inverter to the battery cell storage or grid, a solar energy system requires high-performance, dependable components to deliver power when and where required. Our advanced adhesive and thermal formulations protect outdoor electronics from environmental impacts, remove heat to raise performance efficiency and deliver on the long lifetime expectations of solar power systems.

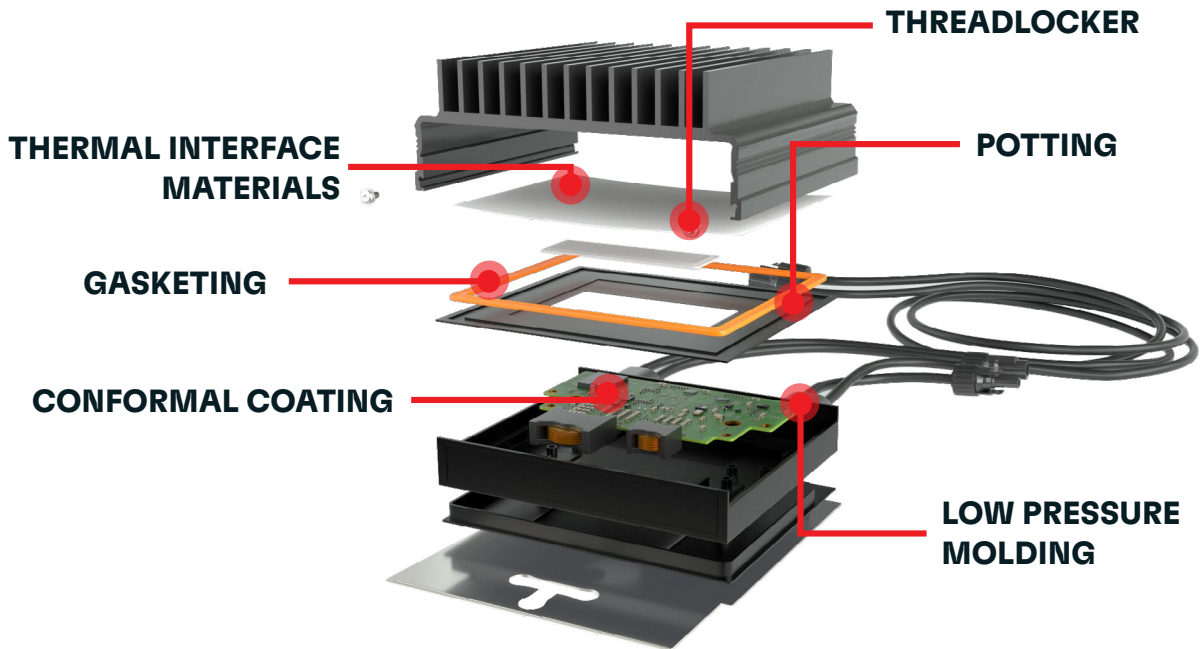
# HENKEL MATERIAL SOLUTIONS POWER CONVERSION

## Solar Power Inverters

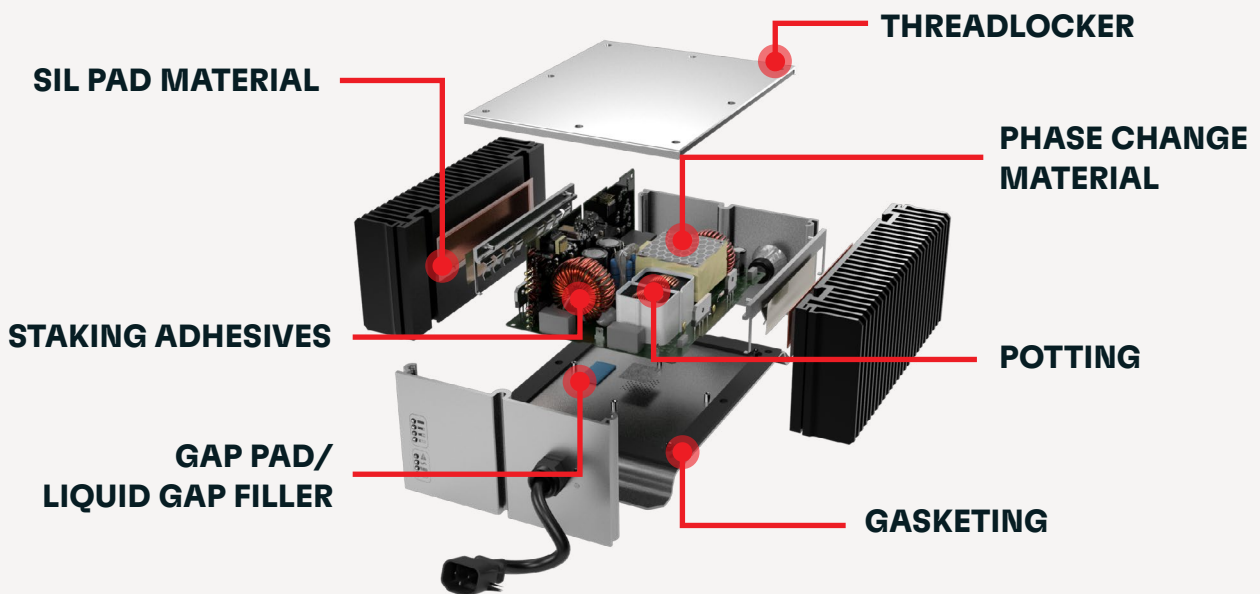




## Solar Power Optimizers

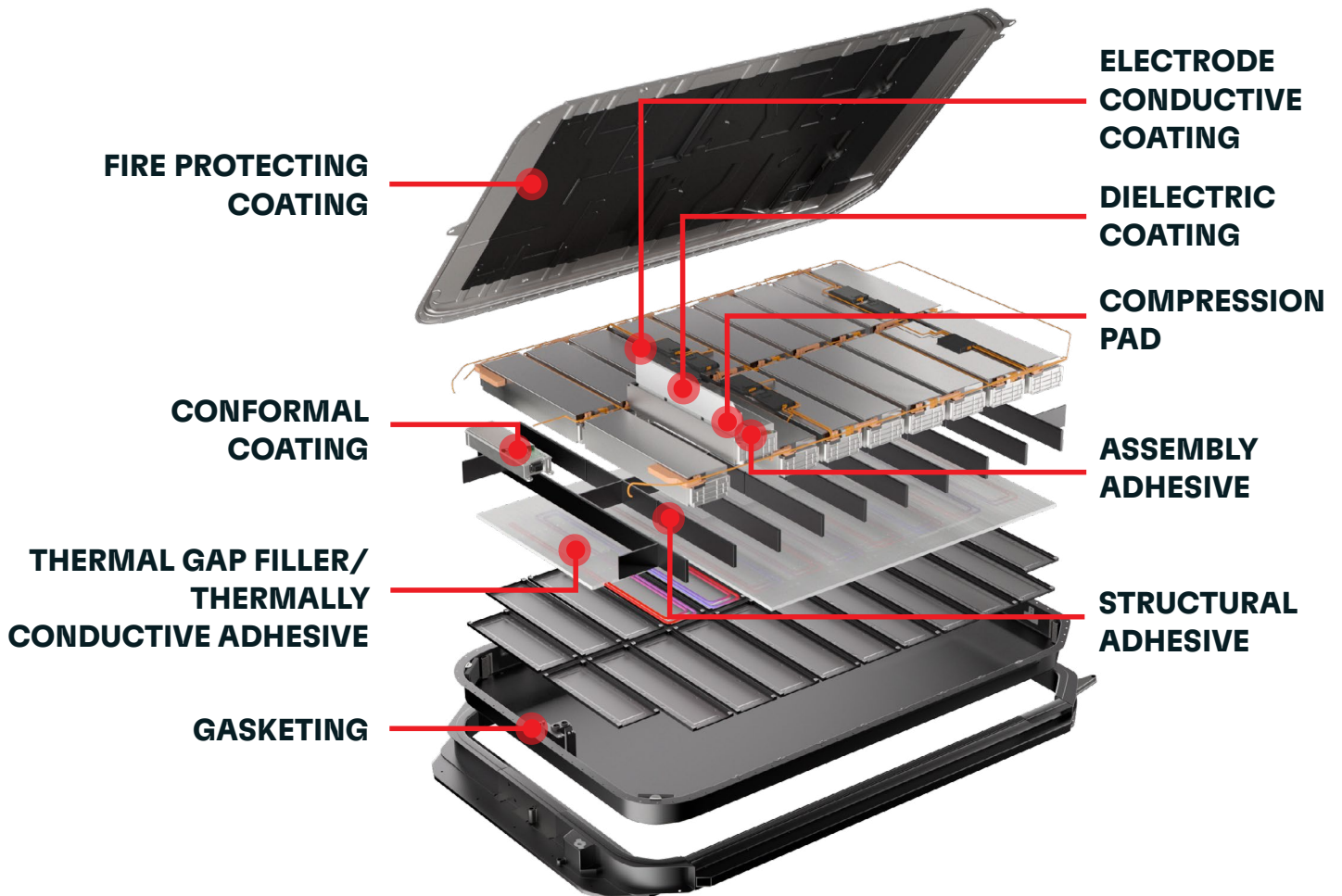


## Industrial Battery Chargers

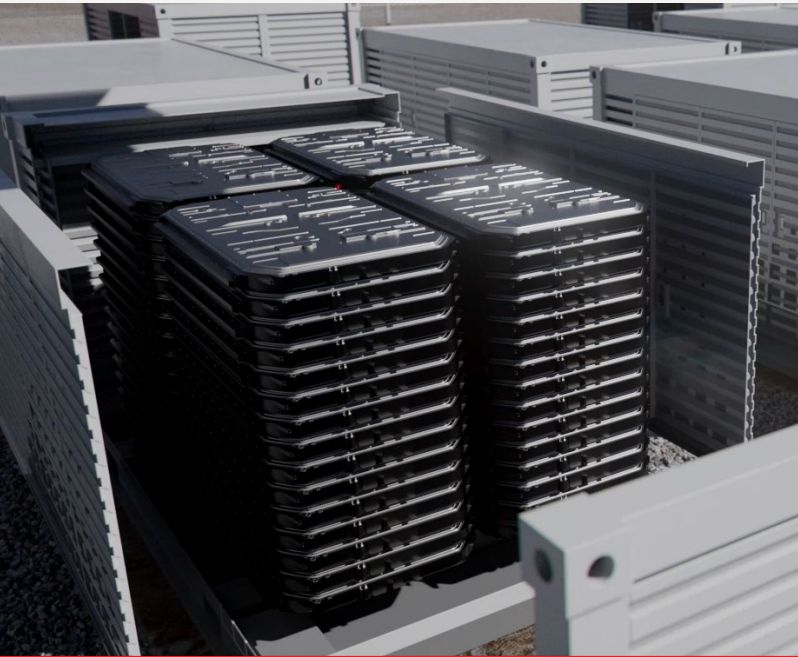


# ENERGY STORAGE

## Lithium-Ion Batteries



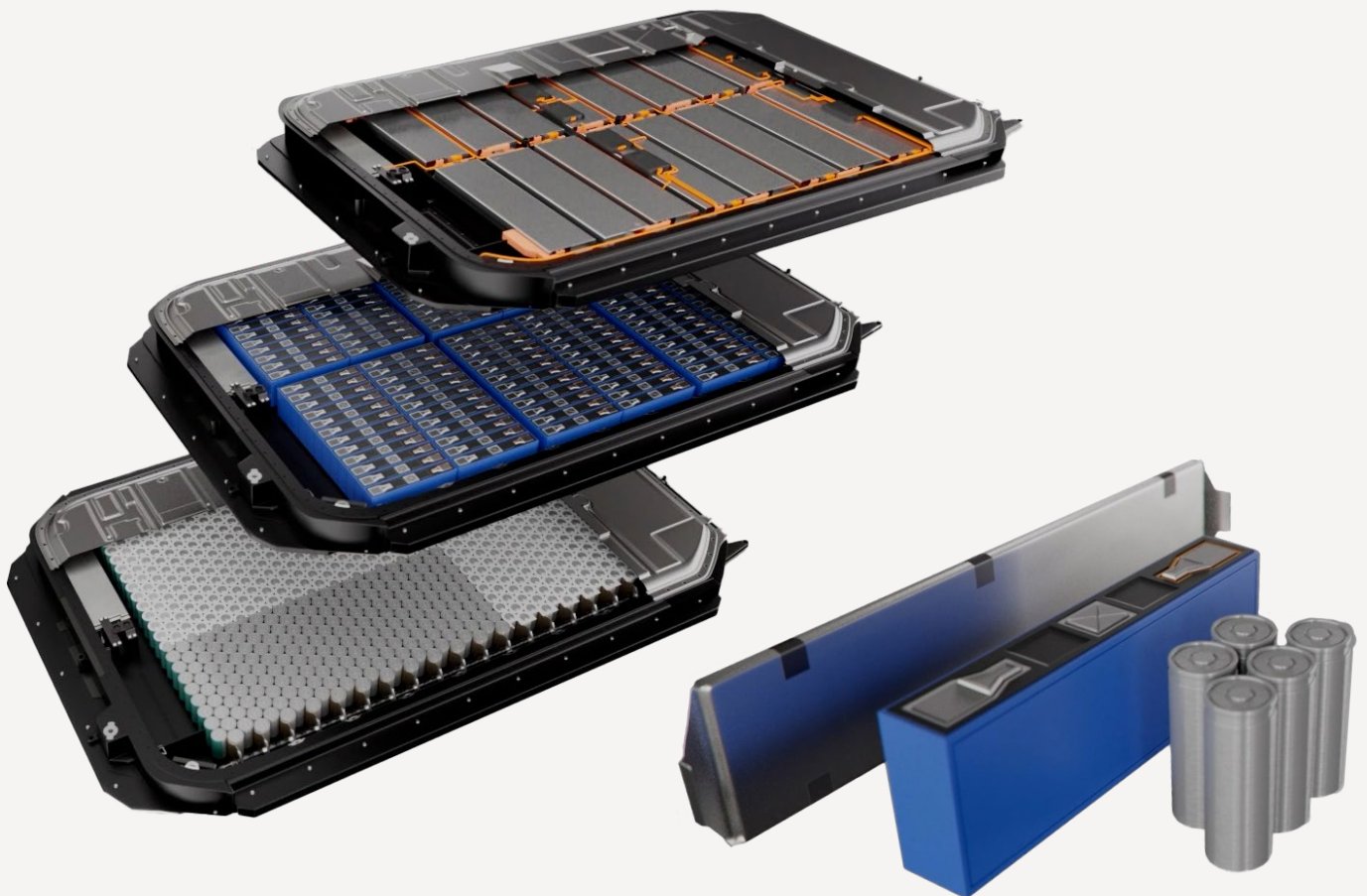
## COMMERCIAL ENERGY STORAGE



## RESIDENTIAL ENERGY STORAGE



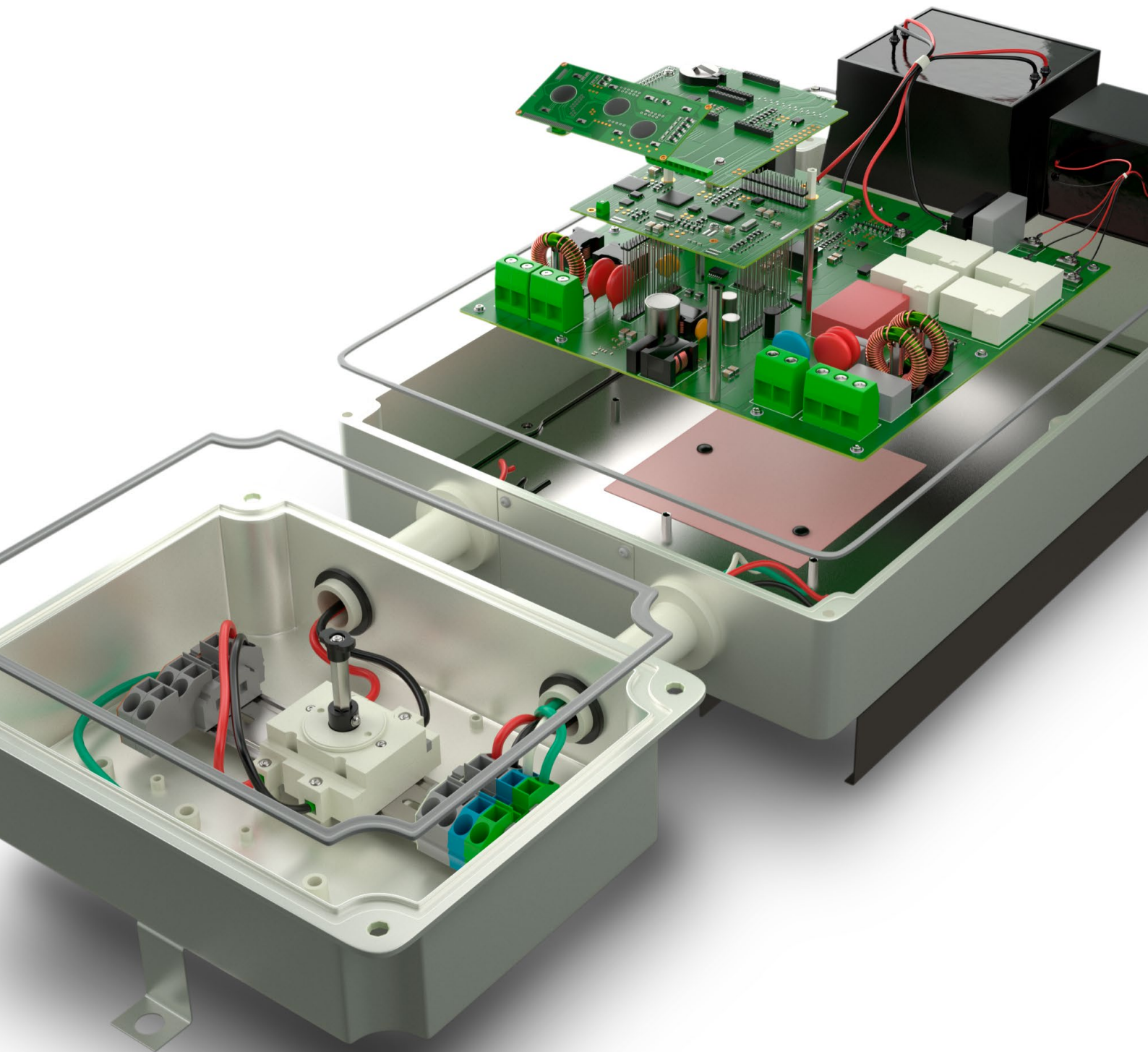
*Our solutions are applicable for all battery designs and cells*





# THERMAL MANAGEMENT SOLUTIONS

- Thermal Interface Materials (TIM) help dissipate heat from power switching components while providing safety agency recognized insulation.
- Provide a safe reliable product with proven pedigree to meet expected lifetimes in outdoor and unprotected environments.
- A broad portfolio of suitable products that can meet performance needs and process capabilities with a sensitivity to total cost of ownership.
- Thermal pads, insulators and phase change materials provide a wide range of thermal performance and insulation properties opening many power electronics packaging options.



## POWER CONVERSION - THERMAL INTERFACE MATERIALS

ADHESIVES	SIL PAD®	PHASE CHANGE MATERIAL	GELS	GAP FILLER	GAP PAD®	BOND-PLY
BERGQUIST LIQUI-BOND TLB SA1800	BERGQUIST SIL PAD TSP Q2500	LOCTITE® TCP 7800NC	BERGQUIST LIQUI-FORM TLF LF3500	BERGQUIST GAP FILLER TGF 1450	BERGQUIST GAP PAD TGP HC5000	BERGQUIST BOND-PLY TBP 1400LMS-HD
BERGQUIST LIQUI-BOND TLB SA3500	BERGQUIST SIL PAD TSP 3500	BERGQUIST HI-FLOW THF 1600P	BERGQUIST LIQUI-FORM TLF 6000HG	BERGQUIST GAP FILLER TGF 1500LVO	BERGQUIST GAP PAD TGP 6000ULM	
LOCTITE® 315	BERGQUIST SIL PAD TSP 1600S	BERGQUIST HI-FLOW THF 3000UT		BERGQUIST GAP FILLER TGF 3500LVO	BERGQUIST GAP PAD TGP 7000ULM	
LOCTITE® 3875	BERGQUIST SIL PAD TSP K1750	LOCTITE® TCP 4000 D		BERGQUIST GAP FILLER TGF 4000	BERGQUIST GAP PAD TGP 1000VOUS	
	BERGQUIST SIL PAD TSP 1800ST	LOCTITE® TCP 7000		BERGQUIST GAP FILLER TGF 4500CVO	BERGQUIST GAP PAD TGP 2200SF	
	BERGQUIST SIL PAD TSP K900			BERGQUIST GAP FILLER TGF 3000 SF	BERGQUIST GAP PAD TGP 3004SF	
	BERGQUIST SIL PAD TSP K1100				BERGQUIST GAP PAD TGP HC3000	
	BERGQUIST SIL PAD TSP K1300					

## THERMAL MANAGEMENT MATERIAL

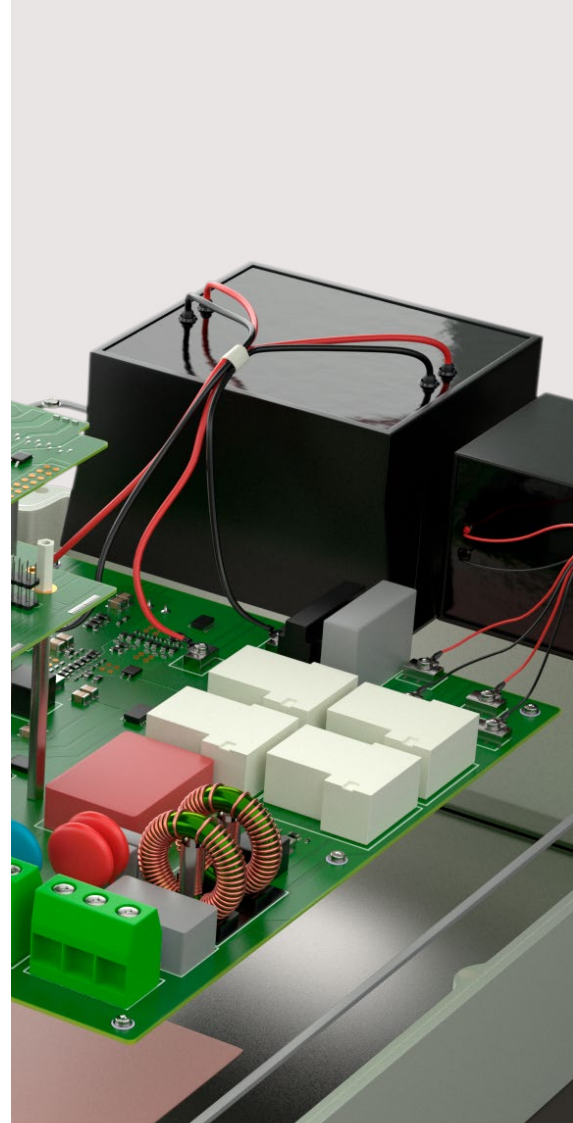
ADHESIVES	GAP FILLER	GAP PAD®
LOCTITE® EA 9497	BERGQUIST TGF 2010 APS	BERGQUIST TGP 1350
LOCTITE® TLB 9200 APS	BERGQUIST TGF 3010 APS	
LOCTITE® TLB 9300 APSi	BERGQUIST TGF 2200 APS	



# PROTECTING SOLUTIONS

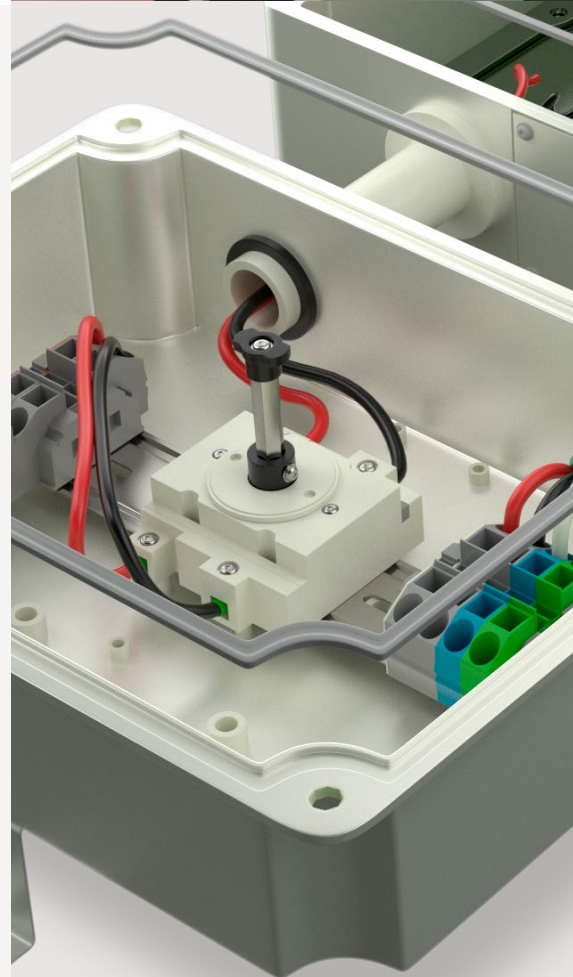
## POTTING

- UL V-0 potting with fast curing and easy dispensing:
  - » Multiple gel time options to fit process requirements
  - » Room temperature cure or can be accelerated by heat
- Tough materials with high elongation to break that are stable over a wide range of temperature and humidity.
- Good adhesion to common molding plastics to provide a high degree of protection.
- Strong dielectric properties for safe high voltage operation.



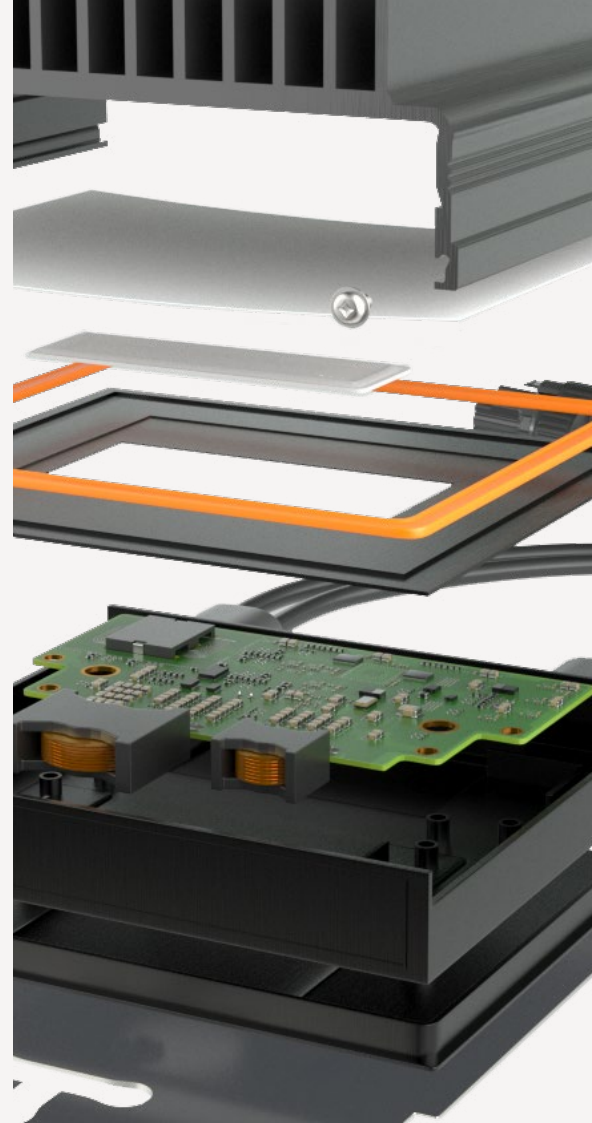
## SEALING /GASKETING

- Proven sealing solution for electrical enclosures and automotive applications.
- Automated to provide cost effective, repeatable deposition of gasket for high volume applications:
  - » Deposition can be easily modified for different enclosure geometry for different charger types
  - » Cures at room temperature or can be accelerated with heat.
- In situ foaming and curing in place to remove seams.
- Provides good adhesion to powder coated and plastic housings.
- NEMA certified solutions.
- Applicable for environments:
  - » PU based solutions from -40°C to 80°C
  - » PDMS based solutions extended from -55°C to 150°C.



## CONFORMAL COATING

- Conformal coating materials protect PCBs and advanced substrates from thermal shock, moisture, corrosive liquids and other adverse environmental conditions, ensuring long product life cycles.
- With exceptionally fast cure capability and wide processing windows, Henkel's conformal coatings provide fast processing and high yields.
- Solventless, SVHC and Tin-free formulations with UL and moisture cure capability provide a sustainable advantage.



## THERMAL PROPAGATION PREVENTIONS

- Thermal propagation prevention materials are essential to protection from the risk of fires and help to inhibit the spread of fires.
- These solutions also deliver efficient and cost-effective application processes to ensure that manufacturers can continue to optimize battery production while further enhancing safety.



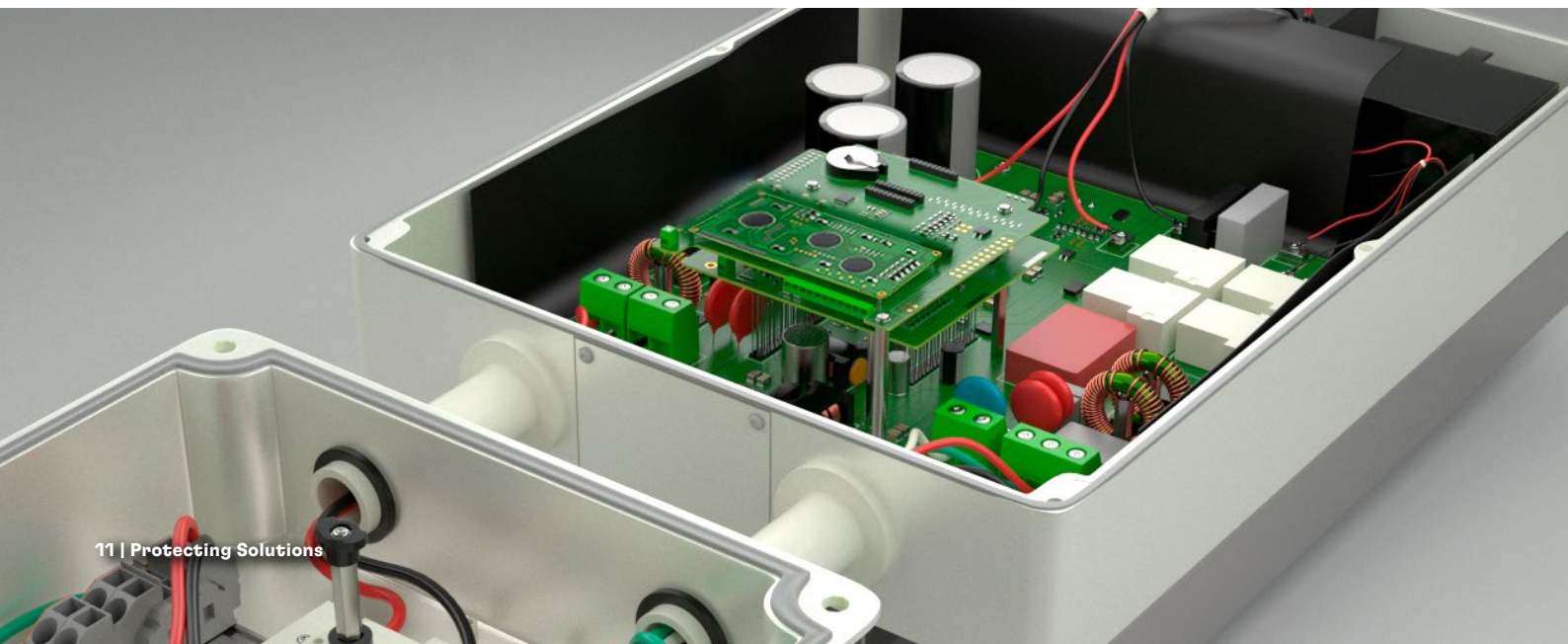


# PROTECTING SOLUTIONS

## POWER CONVERSION

### POWER CONVERSION - PROTECTING MATERIALS

UNDERFILL	POTTING	SEALING/GASKETING	ENCAPSULANT	CIRCUIT BOARD PROTECTION
<b>CORNERBOND</b>	<b>SILICONE</b>	<b>CURE IN PLACE</b>	<b>EPOXY</b>	<b>LOW PRESSURE MOLDING</b>
LOCTITE® 3508NH	LOCTITE® STYCAST SI 5088	LOCTITE® SI 5699	LOCTITE® ECCOBOND FP4450	TECHNOMELT® PA 6208 N BLACK
<b>EDGE BOND</b>	<b>POLYURETHANE</b>	LOCTITE® 5810F	LOCTITE® ECCOBOND FP4451	TECHNOMELT® PA 6481
LOCTITE® 3128	LOCTITE® STYCAST US 2350	LOCTITE® SI 5910	LOCTITE® ECCOBOND UV 9060F	TECHNOMELT® PA 687
LOCTITE® DSP 190024/S	LOCTITE® STYCAST US 5544	<b>FORM IN PLACE FOAM GASKET (FIPFG)</b>	LOCTITE® ECCOBOND EO 1061	TECHNOMELT® PA 646
<b>EPOXY</b>	LOCTITE® STYCAST US 5538	FERMAPOR K31	LOCTITE® ECCOBOND EO 1072	TECHNOMELT® PA 678
LOCTITE® ECCOBOND UF 1173	<b>EPOXY</b>	FERMASIL	LOCTITE® ECCOBOND EN 3838T	TECHNOMELT® PA 2692
LOCTITE® ECCOBOND E 1216M	LOCTITE® STYCAST 2534 FR/CAT 24LV		LOCTITE® ABLESTIK EN 3839	<b>CONFORMAL COATING</b>
LOCTITE® 3517M	LOCTITE® STYCAST ES 4512			LOCTITE® STYCAST SI 5296
LOCTITE® ECCOBOND UF 3812	LOCTITE® STYCAST EO 1058			LOCTITE® STYCAST UV 7993
	LOCTITE® STYCAST EO 7038			LOCTITE® STYCAST PC 40-UMF
	LOCTITE® STYCAST 2651-40/CAT 11			LOCTITE® STYCAST PC 62
	LOCTITE® STYCAST 1090 SI/CAT 11			LOCTITE® STYCAST SI 5293
	LOCTITE® STYCAST E 2850FT/CAT 11			
	LOCTITE® STYCAST ES 2505/CAT 11			



## ENERGY STORAGE - PROTECTING MATERIALS

### THERMAL PROPAGATION

LOCTITE® CR 6127 / LOCTITE CR 4300

LOCTITE® FPC 5060

### SEALING/GASKETING

LOCTITE® SI 5486

LOCTITE® SI 5970

LOCTITE® ESB 5100

TEROSON® MS 9320 SF

FERMAPOR® K31

FERMASIL®

TEROSON® MS 939 FR

TEROSON® MS 930

### CONFORMAL COATING

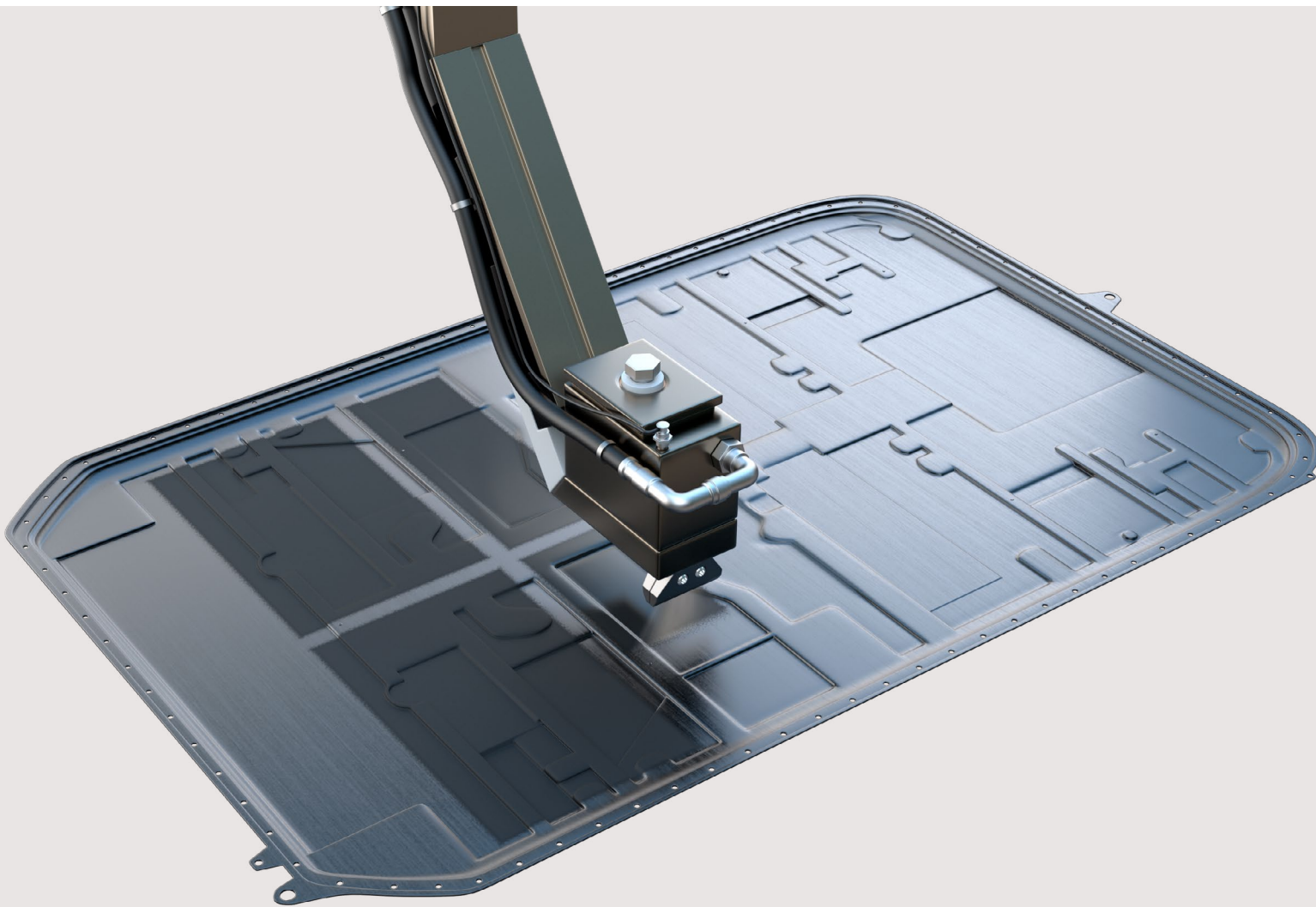
LOCTITE® STYCAST SI 5296

LOCTITE® STYCAST UV 7993

LOCTITE® STYCAST PC 40-UMF

LOCTITE® STYCAST PC 62

LOCTITE® STYCAST SI 5293

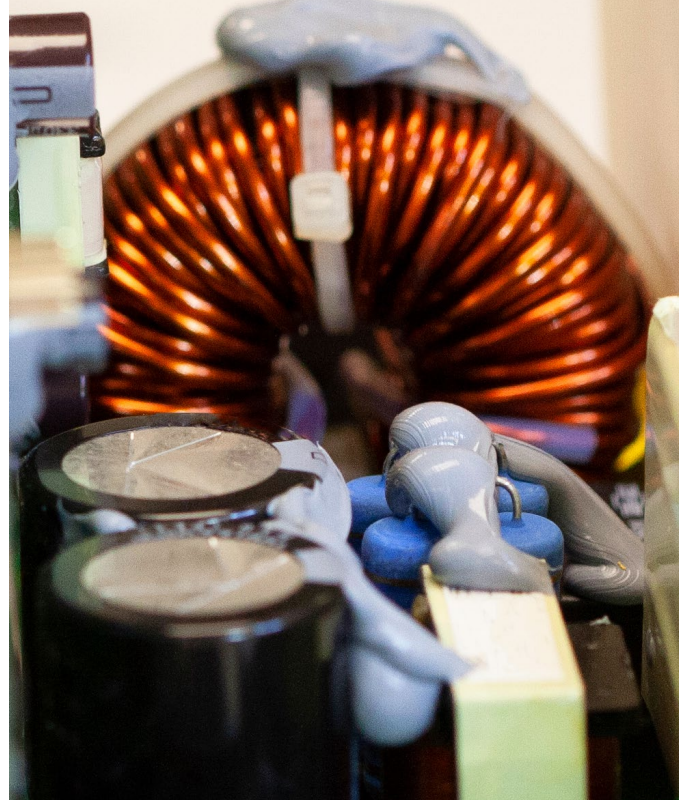




# BONDING SOLUTIONS

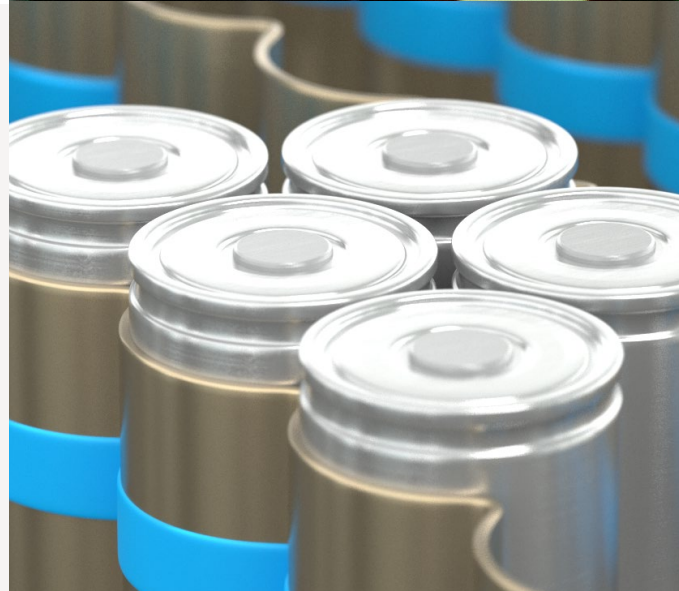
## STAKING ADHESIVES

- Designed for bonding and enhancing mechanical and structural stability, staking adhesives offer resistance to multiple fluids, salts, acids and alkalis.
- Epoxy-based, solvent-free, low-outgassing and non-conductive, staking materials have adhesion compatibility with a wide range of materials for enhanced physical strength and reliability.



## ASSEMBLY AND STRUCTURAL ADHESIVES

- Assembly adhesives are used to mount battery cells with good adhesion and high bonding strength.
- Structural adhesives for energy storage applications are challenged with high requirements regarding a structural, primerless bonding at a high production speed.



## THREADLOCKERS

- Threadlockers will reliably lock, and seal threaded fasteners.
- Liquid threadlockers also provide reliable disassembly – you can take it apart when needed.
- Key benefits include:
  - » Locks mating threads to prevent loosening from vibration & shock
  - » Seals against fluids & corrosion
  - » Provides lubricity to achieve controlled strength during assembly
  - » Prevents galling and seizing for reliable disassembly.



## POWER CONVERSION - BONDING MATERIALS

THREADLOCKER	DIE ATTACH ADHESIVES	CHIP BONDER	ASSEMBLY ADHESIVES
<b>ACRYLIC</b>	<b>EPOXY</b>	<b>EPOXY</b>	<b>EPOXY</b>
LOCTITE® 243	LOCTITE® ABLESTIK ABP 8068TB	LOCTITE® 3609	LOCTITE® ABLESTIK 2151
LOCTITE® 248	LOCTITE® ABLESTIK SP 2020	LOCTITE® 3616	LOCTITE® ABLESTIK 2332
	LOCTITE® ABLESTIK QMI529HT	LOCTITE® 3627	LOCTITE® ABLESTIK 3128
	LOCTITE® ABLESTIK QMI529HT-LV		LOCTITE® ABLESTIK G 500
	LOCTITE® ABLESTIK 84-3		<b>ACRYLIC</b>
	LOCTITE® ABLESTIK 8700K		LOCTITE® AA 3103
	LOCTITE® ABLESTIK 8900NC		
	LOCTITE® ABLESTIK ABP 8064T		

## ENERGY STORAGE - BONDING MATERIALS

TEROSON® MS 9399

TEROSON® EP 5065

LOCTITE® AA 3525

TEROSON® PU 6700ME/6800

LOCTITE® AA 3963

TECHNOMELT® PS 1573 E

LOCTITE® AA H8000

LOCTITE® UK 2015



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# **FORMULATED FOR CONTINUOUS PERFORMANCE AND SUSTAINABLE RESULTS**

Henkel materials are driving value for the Industrial Automation & Power Conversion market through high-performance formulas that secure steadily operation with effective thermal management, durable adhesion, efficient protection, reliable electrical function and long-term sustainability.

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**LINKEDIN**



**henkel-adhesives.com**

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