

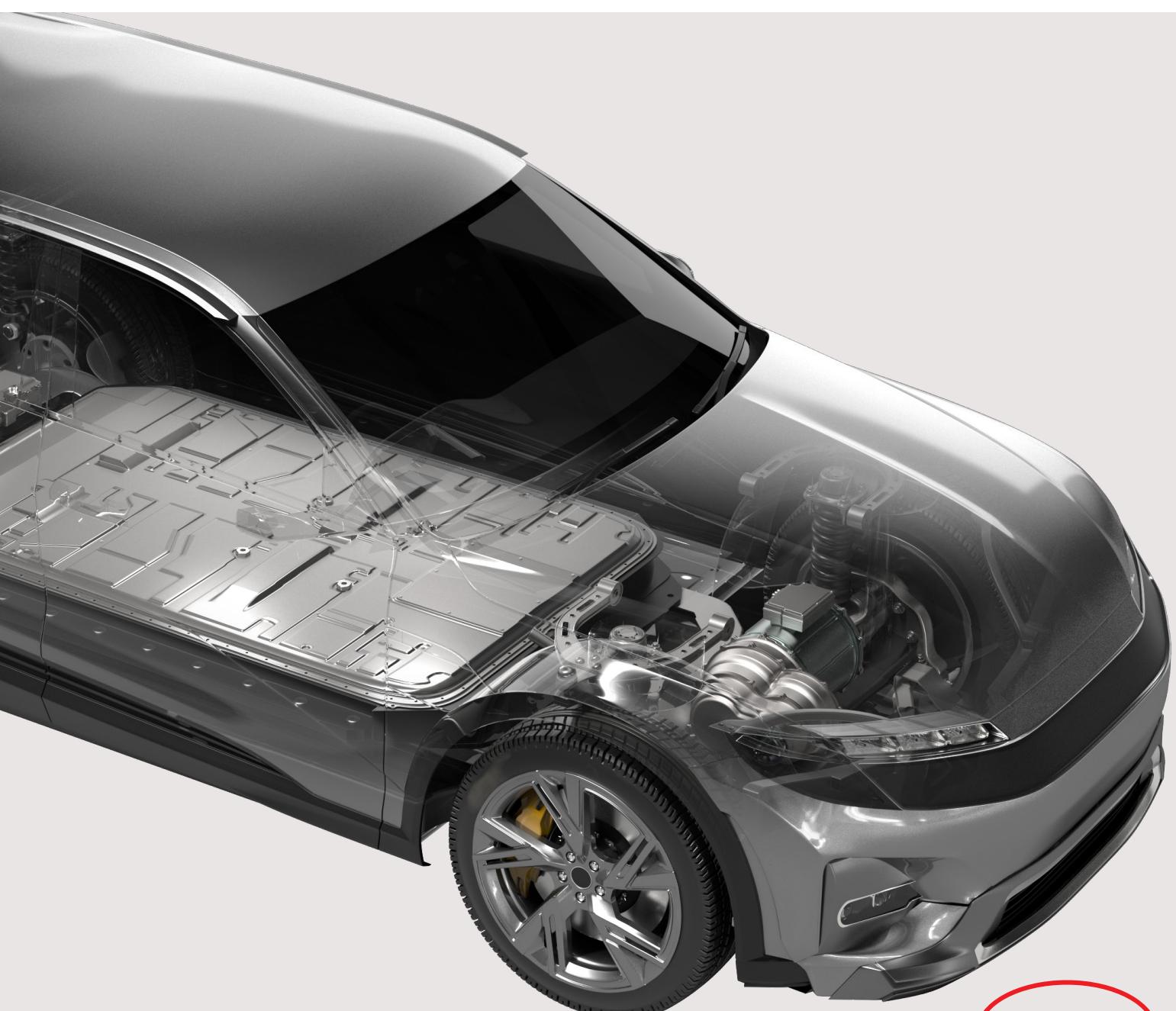
**LOCTITE®**  
**BONDERITE®**  
**TEROSON®**

**BERGQUIST®**

  
sonderhoff

# **HENKEL SOLUTIONS FOR E-MOBILITY**

## **BATTERY SYSTEMS, POWER CONVERSION SYSTEMS AND E-DRIVE SYSTEMS**



**Henkel**

# Content

<b>Customer Challenges and Henkel Solutions Offering</b>	<b>03</b>
<b>Henkel Solutions for EV Battery Systems</b>	<b>05</b>
<b>Customer Use Case BERGQUIST® TGF 2010 APS</b>	<b>10</b>
<b>Henkel Solutions for Power Conversion Systems</b>	<b>12</b>
<b>Customer Use Case BERGQUIST® GAP FILLER TGF 3600, BERGQUIST® GAP PAD® TGP 1000VOUS, LOCTITE® SI 5970</b>	<b>16</b>
<b>Henkel Solutions for E-Drive Systems</b>	<b>17</b>
<b>Customer Use Case LOCTITE® PE 1000LV</b>	<b>21</b>
<b>Our Global Presence</b>	<b>22</b>

**eMOBILITY**

ENABLED BY HENKEL



# OUR AIM IS TO THOROUGHLY UNDERSTAND our customers' challenges and needs...

## 1. BATTERY SYSTEMS

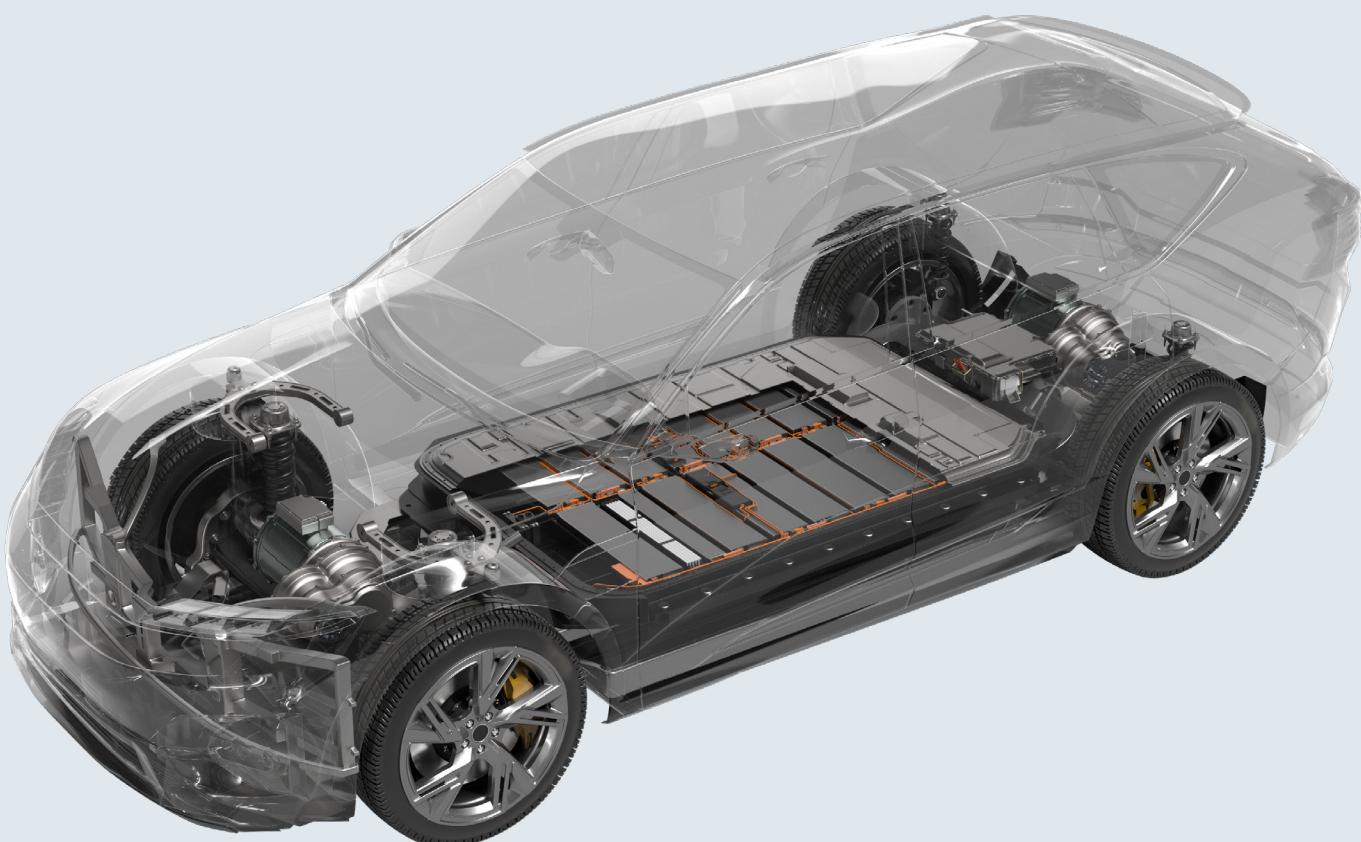
Battery systems are the most critical component of an electric vehicle, accounting for approximately 20% of the car by weight and 50% by cost. Cost efficiency, passenger safety, vehicle reliability and lightweighting are all important considerations for battery design, making efficient and secure component assembly as well as thermal management a priority.

## 2. POWER CONVERSION SYSTEMS

Power conversion systems are complex components that have to handle very high voltages as well as both DC and AC, while subjected to harsh electrical and environmental factors. Efficient sealing, electrical insulation and thermal management are essential for optimal performance of these components.

## 3. E-DRIVE SYSTEMS

Electric motors are subjected to the harshest vibrations and environmental conditions. It is one of the key systems in the EV architecture that has moving components, making structural integrity, sealing and thermal management key for reliable and optimal performance.



# ... AND TO RESPOND ACCORDINGLY

## with a full solution package.

We are committed to solving the engineering and commercial challenges through a combination of:

### 1. BROAD TECHNOLOGY PORTFOLIO

We have a market leading position in thermal interface materials, adhesives, sealants and functional coatings. In addition, we support our customers overcome engineering challenges by leveraging our strong R&D competences to develop customized solutions.

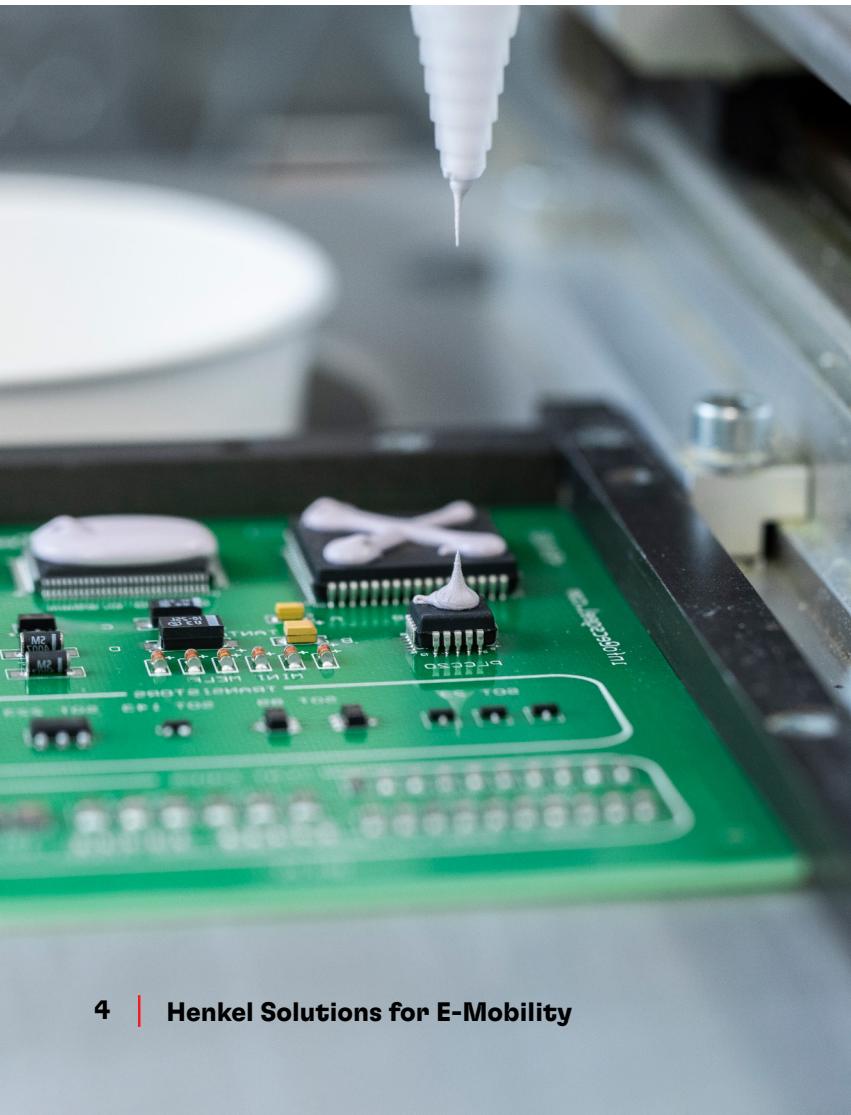
### 2. PROCESS EXPERTISE

With over 60 years of experience in the automotive industry, our global team of solution engineers has an unparalleled application and process understanding. Our team offers dedicated support to co-develop sustainable production processes that meet large-scale manufacturing requirements.

### 3. EQUIPMENT SUPPORT

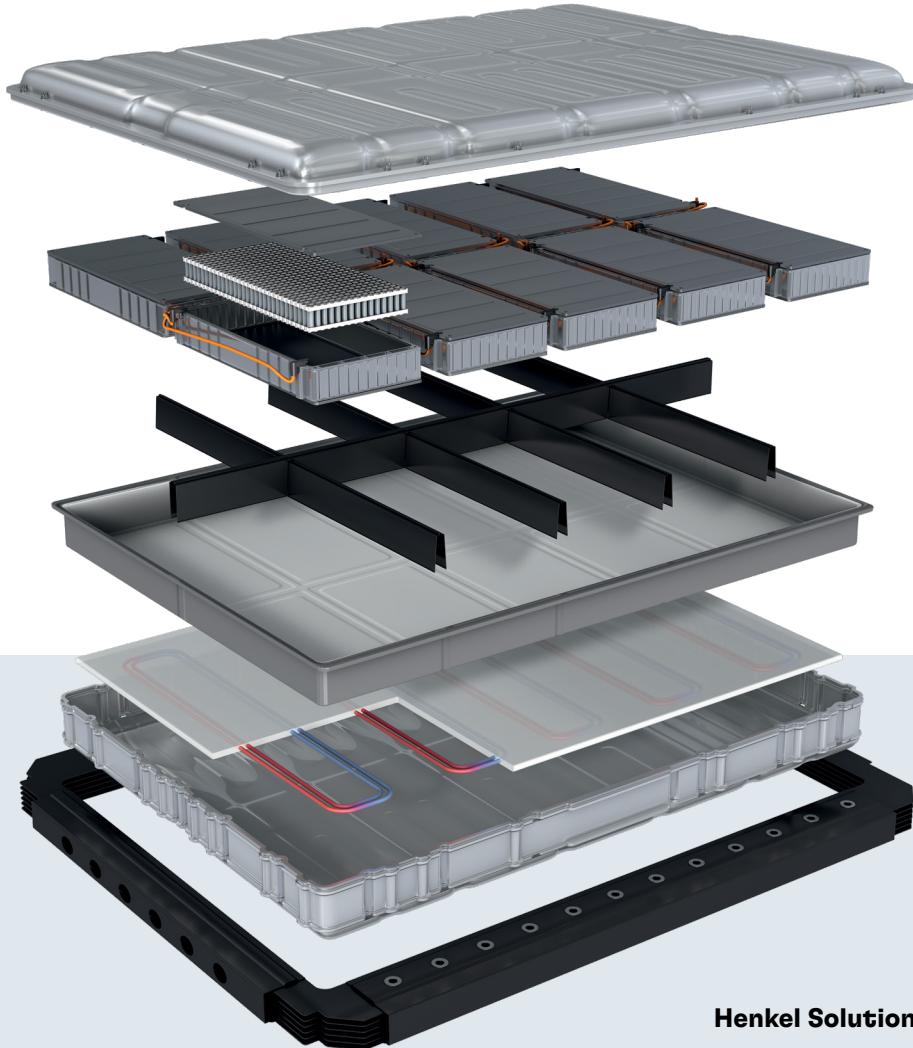
In addition to offering specialized dispensing equipment from Sonderhoff, we also partner with a global network of leading dispensing equipment suppliers, with which we collaborate to support our customer projects. Moreover, our labs are equipped with the latest technology and equipment for modeling, simulation and mechanical validation.

## INNOVATING FOR ZERO-EMISSION MOBILITY



# HENKEL SOLUTIONS FOR EV BATTERY SYSTEMS

<b>1. THERMAL PROPAGATION PREVENTION</b> Fire protection solutions	page 07
<b>2. BATTERY ASSEMBLY ADHESIVES</b> Cell-to-cell or cell-to-carrier	page 06
<b>3. STRUCTURAL BONDING</b> Module structure to module tray	page 06
<b>4. THERMAL INTERFACE MATERIALS</b> Battery module/cell to cooling plate	page 07
<b>5. GASKETING</b> Top cover to lower tray	page 08
<b>6. METAL PRETREATMENT</b> Battery pack housing	page 09
<b>7. IMPREGNATION SERVICE</b> Aluminum casted top cover	page 20
<b>8. ELECTRODE CONDUCTIVE COATINGS</b> Battery cell current collectors	



# DISCOVER OUR PORTFOLIO FOR EV Battery Systems

## BATTERY ASSEMBLY & STRUCTURAL ADHESIVES

Product	Chemistry	Curing / Initial Strength	Bond Strength / Shear Strength (psi)	Key properties
<u>TEROSON® MS 9399</u>	Silane- modified polymer	RTV after mixing / 10 min at 60°C Handling time: 2 hrs at RTV	290	Non-silicone, NCO-free, solvent-free, good adhesion to multiple substrates, high elasticity
<u>LOCTITE® AA 3963</u>	Acrylic	UV / Visible light / ≤ 10 sec	3,336	Quick cure, high strength, flexible open time
<u>TEROSON® EP 5065</u>	Epoxy	RTV / 15 min at 80°C Handling time: 8 hrs at 23°C	3,625	Adhesion to multiple substrates, crash resistance
<u>TECHNOMELT® PS 1573E</u>	Synthetic- rubber	RTV / fast cure, sec to min	52	Pressure-sensitive adhesive
<u>LOCTITE® AA 3525</u>	Acrylic	UV / Visible light / < 30 sec	1,420	Quick cure, easy to handle, flexible open time
<u>LOCTITE® AA H8000</u>	Acrylic	RTV / 30 min	3,140	Flexible open time, good adhesion to multiple substrates
<u>TEROSON® PU 6700ME/6800</u>	Polyurethane	RTV / 120 min	1,450	Improves system overall stiffness (e-modulus > 500MPa), compatible with spot welding, Micro-Emission PU (label free)
<u>LOCTITE® UK 2015</u>	Polyurethane	RTV after mixing / 10 min at 20°C	2,900	Provides incremental stiffness, excellent adhesion to non-metallic surfaces

## THERMAL INTERFACE MATERIALS

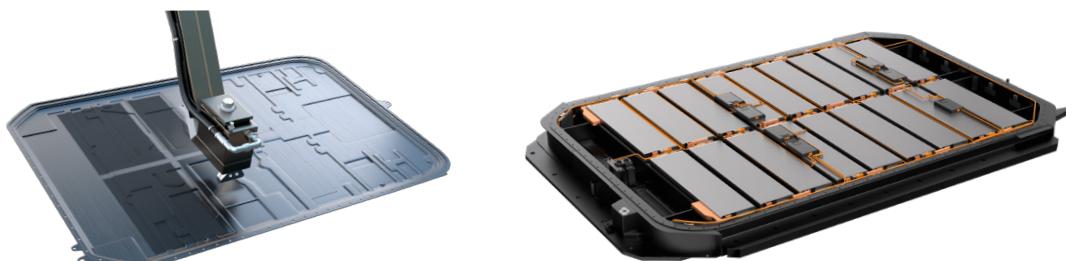
Product	Chemistry	Curing	Thermal conductivity	Key properties
<u>BERGQUIST® TGF 2010 APS</u>	Silane-modified polymer	RT or heat	2.0 W/mK	Non-silicone gap filler, high dispense rate (> 60 cc/sec), compressible (shore OO 60)
<u>BERGQUIST® TGF 3010 APS</u>	Silane-modified polymer	RT or heat	3.0 W/mK	Non-silicone gap filler, high dispense rate (> 80 cc/sec), UL94 V0, compressible (shore OO 75)
<u>BERGQUIST® TGF 2200 APS</u>	Silicone	RT or heat	2.2 W/mK	Low density gap filler, UL94 V0, compressible (shore OO 55)
<u>BERGQUIST® TGP 1350</u>	Silicone	Pre-cured	1.4 W/mK	GAP PAD®, compressible (shore OO 30), UL94 V0, high durability
<u>LOCTITE® EA 9497</u>	Epoxy	RT	1.4 W/mK	Thermally conductive adhesive, high stiffness and strength, multi-substrate bonding
<u>LOCTITE® TLB 9200 APS</u>	Polyurethane	RT or heat	2.0 W/mK	Thermally conductive adhesive for bonding battery cells or modules. Two-component, moderate viscosity, excellent electrical isolation and mid-range thermal conductivity
<u>LOCTITE® TLB 9300 APS</u>	Polyurethane	RT or heat	3.1 W/mK	Thermally conductive adhesive for bonding battery cells or modules. Two-component, moderate viscosity, excellent electrical isolation, high thermal conductivity and bonding strength

## THERMAL PROPAGATION PREVENTION

Product	Chemistry	Curing	Thermal conductivity	Key properties
<u>LOCTITE® EA 9400</u>	Epoxy	RTV or heat	0.2 W/mK	Fire and heat shielding coating, intumescent, flat streaming and spray coating, coating thickness of 0.7 mm
<u>LOCTITE® FPC 5060</u>	Water-based inorganic	RTV or heat	0.7 W/ mK	Fire and heat shielding coating, no chemical reaction during thermal abuse, no smoke formation during thermal abuse
<u>LOCTITE® CR 6127/LOCTITE® CR 4300</u>	Polyurethane	RTV or heat	0.6 W/ mK	Thermal propagation protection potting, applicable between cells

RT = Room temperature curing

### Fire protective coating applied to the battery pack lid



# DISCOVER OUR PORTFOLIO FOR EV Battery Systems

## GASKETING

Product	Chemistry	Curing	Serviceability	Flame retardancy (UL94 V0)	Key properties
LOCTITE® SI 5486	Silicone foam	FIPFG	Yes	Yes	Low compression set with excellent sealing and aging performance, exceeds UL94 V0
LOCTITE® SI 5970	Silicone	RTV / FIPG	Yes	Yes	High performance silicone gasket, MEKO-free, UL94 V0, high elongation to withstand joint movement, low volatility
TEROSON® MS 939 FR	Silane-modified polymer	RTV / FIPG	Yes*	No	Good moisture barrier, good elongation
LOCTITE® ESB 5100	Butyl	Non-reactive	Yes	No	Non-curing, permanent tacky, pumpable
TEROSON® MS 9320 SF	Silane-modified polymer	RTV / FIPG	No	No	Non-silicone, sprayable, low viscosity, weld sealant
TEROSON® MS 930	Silane-modified polymer	RTV / FIPG	Yes*	No (only UL94 HB)	High viscosity, weld sealant, non-silicone, paintable
SONDERHOFF FERMAPOR K31 SERIES	Polyurethane foam	RTV / FIPFG	Yes	No	Customizable, compressible, fast-cure, tolerance adaptable, complete system solution with dosing equipment
SONDERHOFF FERMASIL SERIES	Silicone foam	RTV / FIPFG	Yes	No	Customizable, compressible, water-resistant, tolerance adaptable, complete system solution with dosing equipment

FIPG = Formed-in-place gasket, CIPG = Cured-in-place gasket, RTV = Room-temperature-vulcanizing

\*Tools required

## Gasketing for battery pack housings



## SURFACE TREATMENT

Tailor-made products for cell cases, battery modules, cooling plates, battery packs

Components	Henkel Solutions	Benefits
Battery Pack & Module	<ul style="list-style-type: none"><li>Mild, non-etching aluminum cleaners</li></ul>	<ul style="list-style-type: none"><li>Clean and homogeneous surfaces, does not impact surface appearance</li></ul>
	<ul style="list-style-type: none"><li>Single stage etch-passivation as welding promoter</li></ul>	<ul style="list-style-type: none"><li>Stable surface resistance</li><li>Improves first pass rate of welding operations</li></ul>
	<ul style="list-style-type: none"><li>Pretreatment and conversion coatings for painting processes</li></ul>	<ul style="list-style-type: none"><li>For excellent paint adhesion and corrosion performance</li></ul>
Cooling Plate	<ul style="list-style-type: none"><li>Alkaline cleaners, etchants and conversion coatings</li></ul>	<ul style="list-style-type: none"><li>Removes residues from forming or brazing processes</li><li>Clean and homogeneous surfaces for power paint or e-coat</li><li>Provides excellent paint adhesion and corrosion resistance</li></ul>
Cylindrical Cell	<ul style="list-style-type: none"><li>Lubricants, cleaners and coatings for Ni-coated cylindrical cells</li></ul>	<ul style="list-style-type: none"><li>High production speed, clean surfaces and corrosion protection</li></ul>
Prismatic Cell	<ul style="list-style-type: none"><li>Lubricants, cleaners and coatings for Aluminum prismatic cells</li></ul>	<ul style="list-style-type: none"><li>High production efficiency, remove particles and forming residues, corrosion protection</li></ul>

Henkel's Surface Treatment Solutions for EV Systems are globally available. BONDERITE® products are specified by major OEMs and are typically available in 25 kg, 200 kg or 1000 kg packaging sizes.



# CUSTOMER USE CASE

## BERGQUIST® TGF 2010 APS

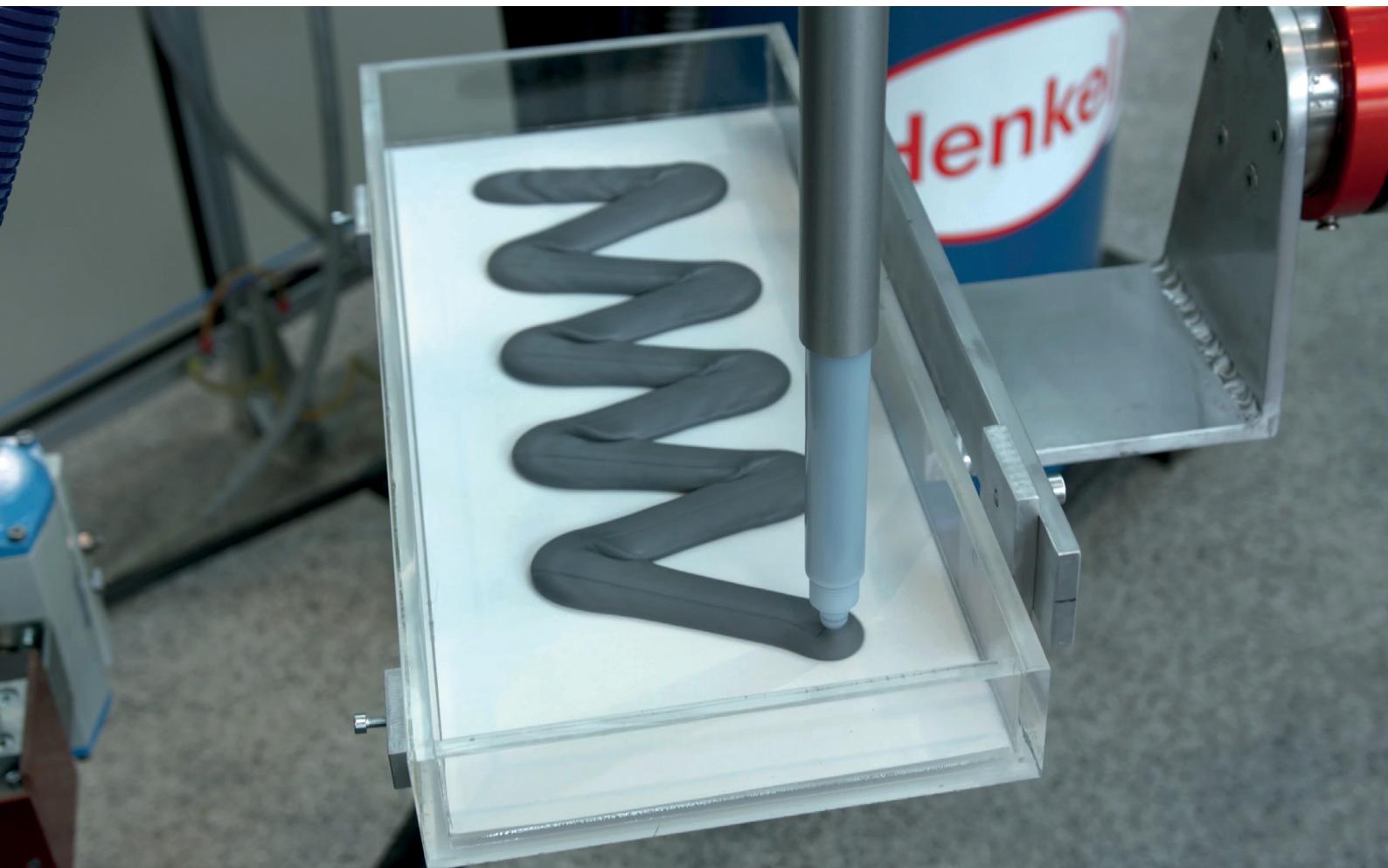
### Silicone-free, Fast-dispensable Battery Thermal Management Solution

#### CUSTOMER CHALLENGES

- » Key global automotive OEM required a fast dispensable Gap filler solution that allows for optimizing the equipment maintenance cost.
- » To avoid the impact of any potential silicone outgassing, a silicone-free formulation was required.
- » To enable the reduction of cycle time, a low squeeze flow was required.

#### RECOMMENDED TECHNOLOGY

- » Henkel developed a two-component, silicone-free, liquid gap filler: BERGQUIST® TGF 2010 APS.
- » The product has a dispensing speed of >80 cc/second and is easily compressible.
- » The product has an optimal filler load and provides a thermal conductivity of 2.0 W/mK, allowing ample heat dissipation.



## MASS PRODUCTION PROCESS SET-UP

- » Henkel's E-mobility experts provided the OEM with close technical support and on-site engineering support, helping them scale up quickly and efficiently with the new solution.
- » With an application time of < 60 seconds, the OEM has the capability to produce > 800 battery packs a day on one production line.
- » Through trustful collaboration with the OEM and the dispensing equipment supplier, Henkel ensured the successful implementation of the solution in accordance with all the customer requirements.

## CUSTOMER BENEFITS

- » High dispense rate of 80 cc/second and application time < 60 seconds
- » Silicone free formulation to avoid impact on optical, electrical contact for surface painting functionality
- » Optimized filler package with low abrasion characteristics



# HENKEL SOLUTIONS FOR Power Conversion Systems

## **1. POTTING MATERIALS**

**page 14**

PCB/induction coils

## **2. GAP PAD®**

**page 13**

Heat source or heat sink

## **3. GAP FILLER**

**page 14**

Component/PCB to housing or heat sink

## **4. THERMAL CONDUCTIVE ADHESIVES**

**page 13**

Printed circuit board

## **5. GASKETING**

**page 15**

Top cover to lower tray



# DISCOVER OUR PORTFOLIO

## Power Conversion Systems

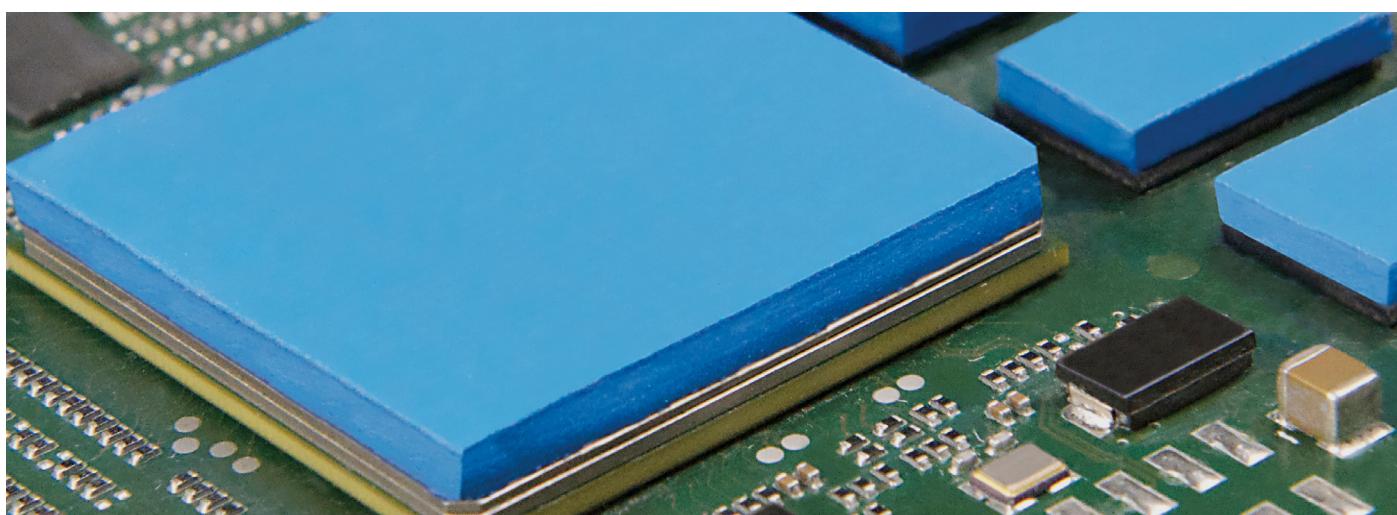
### THERMALLY CONDUCTIVE ADHESIVES

Product	Chemistry	Curing	Thermal conductivity	Key properties
<u>BERGQUIST® TLB SA2005RT</u>	Silicone	RT or heat	2.0 W/mK	High elongation, UL94 V0 compliance
<u>BERGQUIST® TLB SA3500</u>	Silicone	Heat (125°C 20 min; 150°C 10 min)	3.5 W/mK	Good flexibility, UL94 V0
<u>BERGQUIST® TLB EA1800</u>	Epoxy	Heat	1.8 W/mK	UL94 V0, high strength, chemical stability

### GAP PAD®

Product	Thermal conductivity	Dielectric breakdown voltage	Hardness / Young's Modulus	Key properties
<u>BERGQUIST® TGP 1000HD</u>	1.0 W/mK	5,000 V at 0.5 mm	Shore 00 = 15 / YM = 16 psi	For high-voltage application. Robust polyimide carrier provides excellent voltage breakdown, puncture and tear resistance
<u>BERGQUIST® TGP 1000VOUS</u>	1.0 W/mK	6,000 V at 0.5 mm	Shore 00 = 5 / YM = 8 psi	Ultra soft, self-tacky one side
<u>BERGQUIST® TGP HC3000</u>	3.0 W/mK	> 10,000 V at 0.5 mm	Shore 00 = 15 / YM = 16 psi	High compliance, low compression stress, fiberglass reinforced for shear and tear resistance
<u>BERGQUIST® TGP HC5000</u>	5.0 W/mK	5,000 V at 0.5 mm	Shore 00 = 35 / YM = 17.5 psi	Highest compliant, low volatility resin

### GAP PAD®



# DISCOVER OUR PORTFOLIO

## Power Conversion Systems

### GAP FILLERS

Product	Chemistry	Curing	Thermal conductivity	Key properties
BERGQUIST® TGF 2210	Silicone	Heat	2.2 W/mK	Low volatility for out-gassing-sensitive, easy to dispense, low density (2.06 g/cm <sup>3</sup> ), excellent mechanical and thermal stability from -40°C up to 150°C
BERGQUIST® TGF 1500	Silicone	RT or heat	1.8 W/mK	Low siloxane volatility, high temperature resistance
BERGQUIST® TGF 3500LVO	Silicone	RT or heat	3.6 W/mK	Low Young's Modulus, high dielectric isolation
BERGQUIST® TGF 3600	Silicone	RT or heat	3.6 W/mK	High thermal conductivity, ultra low Young's Modulus
BERGQUIST® TGF 4000	Silicone	RT or Heat	4.0 W/mK	High performance, soft and vibration dampening, operating temperature – 60°C to + 200°C

RT = Room temperature curing

### POTTING MATERIALS

Product	Chemistry	Thermal conductivity	Viscosity (mixed)	Key properties
LOCTITE® SI 5631	Silicone	1.0 W/mK	5,000 mPa·s	Excellent cavity filling, flexible and robust
LOCTITE® SI 5643	Silicone	1.5 W/mK	6,000 mPa·s	Ultra soft, excellent flow performance
LOCTITE® SI 5636	Silicone	2.1 W/mK	5,500 mPa·s	Low stress, increased thermal conductivity
LOCTITE® EA 9496	Epoxy	1.7 W/mK	15,000 – 40,000 mPa·s	Room temperature and warm cure, low shrinkage
SONDERHOFF FERMADUR SERIES	Polyurethane	0.2 – 0.9 W/mK	500 – 200,000 mPa·s	Room temperature and warm cure, customizable, UL94 VO, multi-substrate adhesion

## GASKETING

Product	Chemistry	Curing	Serviceability	Key properties
<u>LOCTITE® SI 5970</u>	Silicone	RTV / FIPG	Yes*	High temperature stability, good moisture barrier, multi-substrate bonding
<u>LOCTITE® SI 5421</u>	Silicone	RTV / FIPG	Yes*	EMI gasketing, high temperature stability, good moisture barrier, multi-substrate bonding
<u>LOCTITE® AA 5884</u>	Polyacrylate	UV / CIPG	Yes	Quick cure, durable for heavy duty applications, compressible for good sealing capability, ATF and high temperature resistance, non-silicone
<u>BERGQUIST® TLB 400SLT</u>	Silicone	RTV or heat / FIPG	Yes*	Highly elastic, water glycol-resistant, multi-substrate bonding, compatible with additional cure materials due to room temperature cure kinetics
<u>LOCTITE® AA 5820</u>	Polyacrylate	RTV / FIPG	Yes*	Durable for heavy duty applications, ATF and high temperature resistance, compatible with BERGQUIST® GAP FILLER
<u>LOCTITE® SI 5039</u>	Silicone	UV + Moisture / CIPG	Yes	Flexible cure mechanism, durable for heavy duty applications, multi-substrate bonding, compressible for good sealing capability, high temperature resistance
SONDERHOFF FERMAPOR K31 SERIES	Polyetherane foam	RTV / FIPFG	Yes	Customizable, compressible, fast-cure, tolerance adaptable, complete system solution with dosing equipment
SONDERHOFF FERMASIL SERIES	Silicone foam	RTV / FIPFG	Yes	Customizable, compressible, water-resistant, tolerance adaptable, complete system solution with dosing equipment

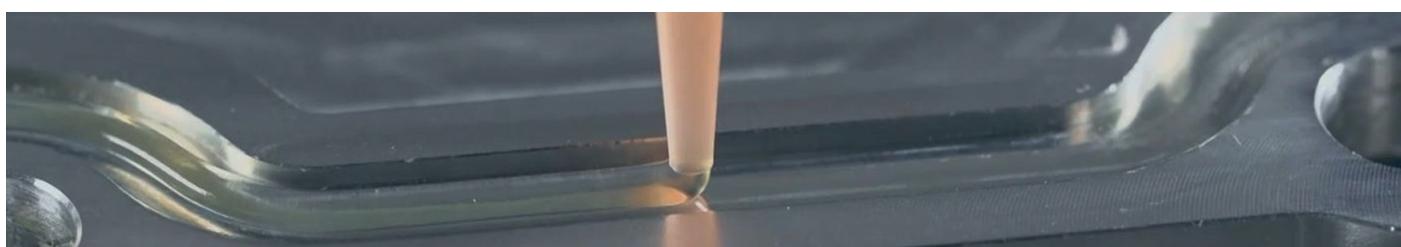
FIPG = Formed-in-place gasket, CIPG = Cured-in-place gasket, RTV = Room-temperature-vulcanizing

\*Tools required

## GAP FILLER



Cured-in-place gasketing material



# CUSTOMER USE CASE

## LOCTITE® SI 5970, BERGQUIST® TGF 3600, BERGQUIST® TGP 1000VOUS

### CUSTOMER REQUIREMENT

- » A Tier 1 automotive supplier designed a new high-voltage EV inverter, which required reliable thermal management for safe and efficient function over lifetime.
- » Due to this nature of the inverter, which was designed to handle very high voltages, the Thermal Interface Materials (TIM) needed to be electrically insulating to avoid electrical hazards.
- » The compatibility of the gasketing and TIM chemistry was important, as multiple chemistries in the same component can cause contamination issues which could lead to curing and operational issues.

### RECOMMENDED TECHNOLOGY

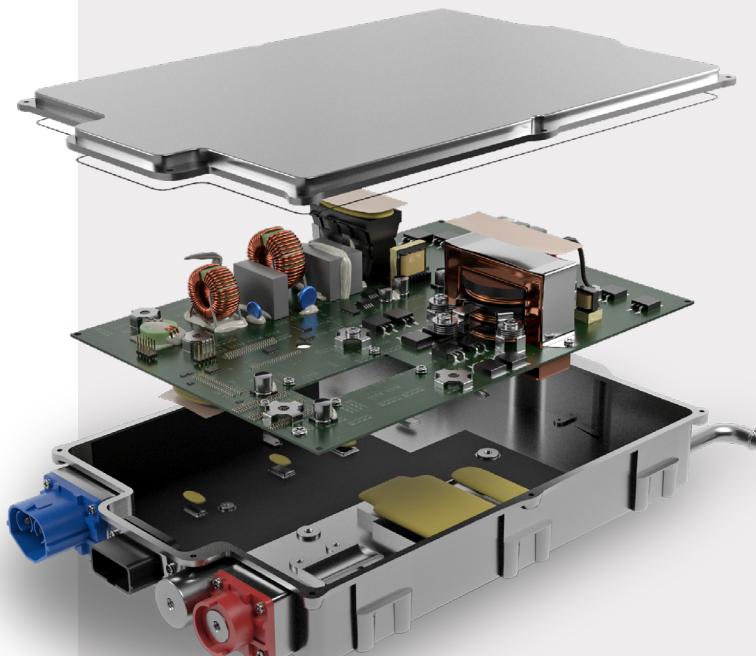
- » To fill larger, multi-level gaps, BERGQUIST® GAP FILLER TGF 3600 with 3.6 W/mK and 0.9 to 5.4 g/sec dispense rate was selected, as it was proven to perform reliably for an existing application.
- » Ultra-soft, conformable BERGQUIST® GAP PAD® TGP 1000VOUS was chosen as the solution for various components to provide thermal management along with providing high voltage breakdown strength to protect against high voltage surge.
- » LOCTITE® SI 5970 was recommended for sealing the inverter, as it is approved by multiple OEMs and Tier 1 Suppliers for its compatibility with other chemistries of gap filler and potting compounds.

### PROCESS DESIGN/ PRODUCTION SET-UP

- » Leveraging Henkel's partnerships with multiple dispensing equipment suppliers, the customer was able to select the best dispensing equipment for the liquid gap filler.
- » To ensure GAP PAD® integrity, Henkel initiated an additional testing phase with a third-party laboratory to verify material cleanliness and purity in order to exclude any possibility of electrical shorts due to particle contamination.
- » This multi-material solution helped bring one of the EV industry's highest voltage inverters to commercialization, allowing an annual production capacity of > 500,000 inverters.

### CUSTOMER BENEFITS

- » Reliable potting material performance
- » Process optimization by removing need for vacuum de-airing
- » Complete coverage of the coils and filling of all gaps



# HENKEL SOLUTIONS FOR E-DRIVE SYSTEMS

## 1. GASKETING

E-Drive housing/ ECU housing

page 18

## 2. THERMAL POTTING

Induction coil

page 19

## 3. MAGNET BONDING

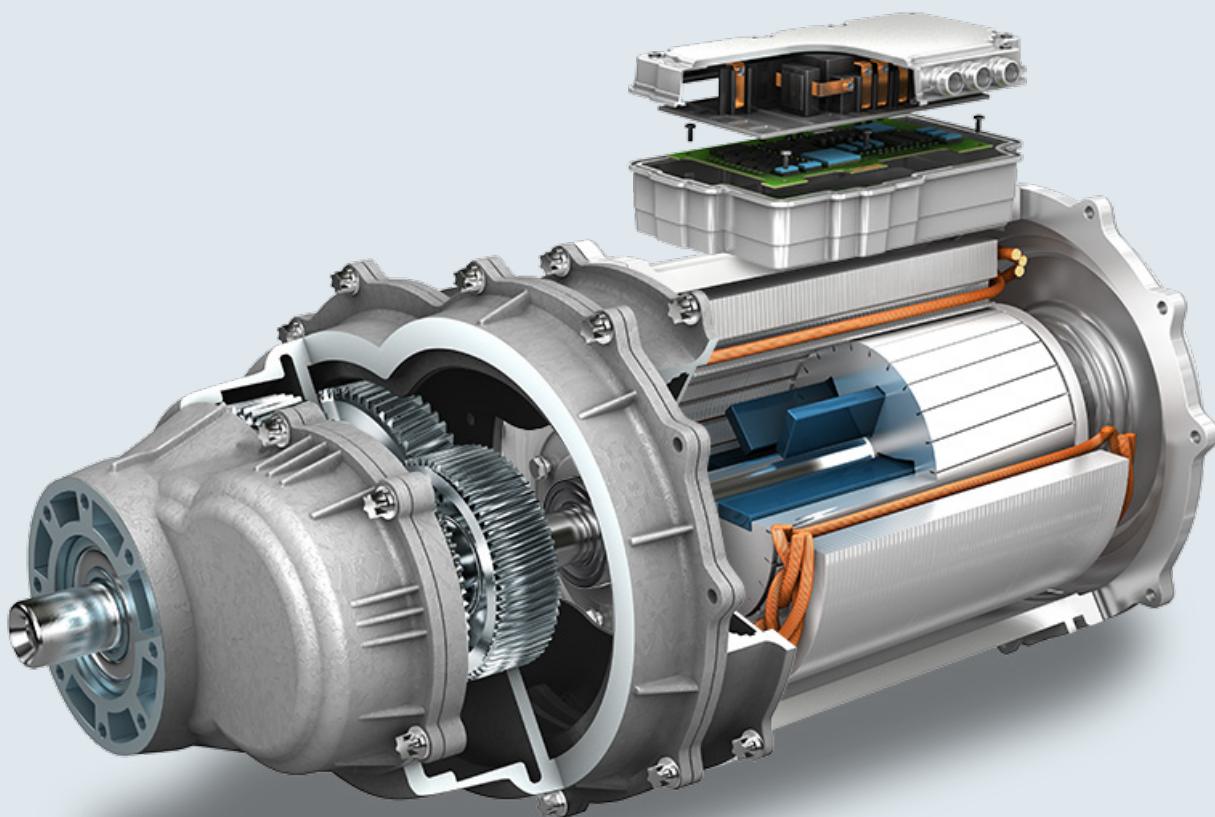
Magnet to stator

page 19

## 4. IMPREGNATION SERVICE

Aluminium casted housing

page 20



# DISCOVER OUR PORTFOLIO FOR E-DRIVE SYSTEMS

## GASKETING

Product	Chemistry	Curing	Serviceability	Processing time	Key properties
LOCTITE® AA 5821	Polyacrylate	RTV	No	25 - 45 min	Silicone-free, superior hot oil / ATF resistance, joint movement tolerant for sealing of flexible joints, non-sagging, easy to automate
<u>LOCTITE® AA 5884</u>	Polyacrylate	UV / CIPG	Yes	30 sec at 270 mW/cm <sup>2</sup>	Durable for heavy duty applications, ATF and high temperature resistance, compatible with BERGQUIST® GAP FILLER
LOCTITE® SI 5970 BM	Silicone	RTV / FIPG	No	< 25 min	High temperature stability, good moisture barrier, multi-substrate bonding, bubble minimized, excellent oil resistance
<u>BERGQUIST® TLB 400SLT</u>	Silicone	RTV or heat	No	Yes	Highly elastic, water glycol-resistant, multi-substrate bonding, compatible with additional cure materials due to room temperature cure kinetics

## POTTING MATERIAL

Product	Chemistry	Thermal value	Viscosity (mixed)	Key properties
LOCTITE® PE 1000LV	Epoxy	—	9,500 - 12,500 mPa·s at 60°C	Excellent oil resistance, good thermal shock resistance, good rheology performance
LOCTITE® PE 8083	Epoxy	1.0 W/mK	15,000 - 25,000 mPa·s at 60°C	High lap shear strength (20 MPa), high decomposition temperature (350°C)
LOCTITE® PE 8086	Epoxy	1.5 W/mK	1,400 mPa·s at 60°C	Thermal stability (180°C), excellent crack resistance
LOCTITE® SI 5631	Silicone	1.0 W/mK	5,000 mPa·s	Low viscosity at room temperature, high elongation rate (> 180%)
LOCTITE® STYCAST 2850FT CAT 27-1	Epoxy	1.1 W/mK	150,000 mPa·s at 60°C	Small filler size to fill small gaps, good physical and chemical properties at high temperatures

## MAGNET BONDING

Product	Chemistry	Thermal value	Viscosity (mixed)	Key properties
LOCTITE® 638	Acrylic	3 min at 60°C, then rest at RTV for 2 min	4,500	ATF resistance, high temperature resistance up to 200°C, multi-substrate bonding, 4,500 psi
LOCTITE® 648	Acrylic	3 min at 60°C, then rest at RTV for 2 min	3,900	ATF resistance, high temperature resistance up to 200°C, multi-substrate bonding, 3,900 psi
LOCTITE® STYCAST A 316-48	Epoxy	30 min at 100°C, or 5 min at 120°C	2,500	ATF resistance, high temperature resistance up to 180°C, good gap filling performance, high viscosity (50,000 mPa·s)

FIPG = Formed-in-place gasket, CIPG = Cured-in-place gasket, RTV = Room-temperature-vulcanizing

# DISCOVER OUR PORTFOLIO FOR E-DRIVE SYSTEMS

## HENKEL IMPREGNATION SERVICE

To impregnate porosities in aluminum casted components, Henkel offers **two main service solutions**:

### 1. ON-SITE IMPREGNATION

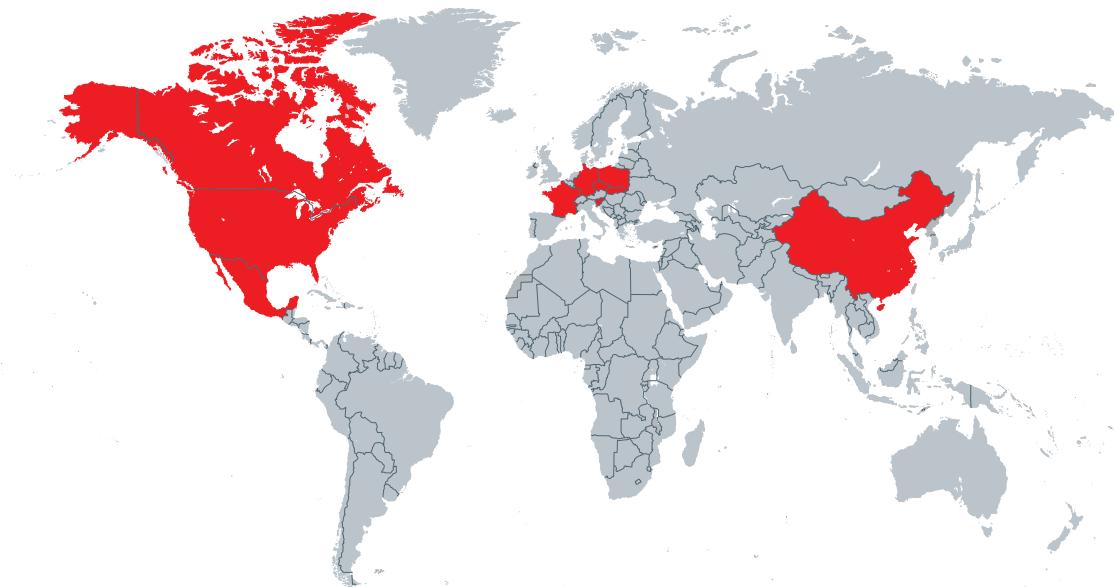
Temporary installation of a small but customized impregnation service center.

### 2. CLOSE-BY IMPREGNATION

Enjoy the advantages of our sealing solutions from an external impregnation service center located close-by your manufacturing plant.

### LOCATIONS WORLDWIDE

- » Canada
- » China
- » Czech Republic
- » France
- » Germany
- » Mexico
- » Poland
- » Slovakia
- » Slovenia
- » USA



### STEP 1



- » Dry vacuum
- » Wet vacuum
- » Sealant fills porosities, shrinkage cavities, capillary pores & cracks

### STEP 1



- » Dry vacuum
- » Wet vacuum
- » Sealant fills porosities, shrinkage cavities, capillary pores & cracks

### STEP 2



### STEP 2

- » Drip-off and spin
- » Centrifuge removes excess sealant from part surfaces

### 2. CLOSE-BY IMPREGNATION

Enjoy the advantages of our sealing solutions from an external impregnation service center located close-by your manufacturing plant.

### STEP 3

### STEP 3

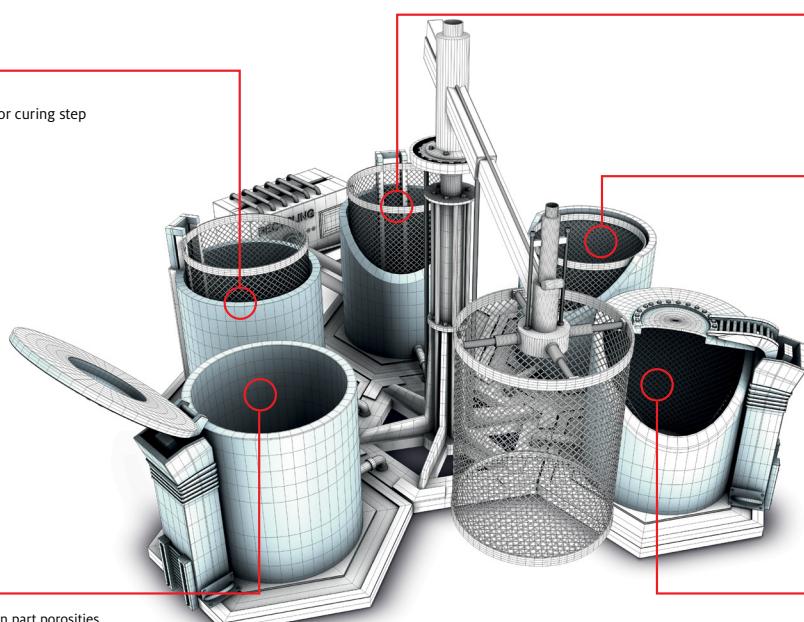


- » Washing of parts
- » Centrifuge prepares for rinsing step

### STEP 4



- » Rinsing of parts
- » Centrifuge prepares for curing step



### STEP 5



- » Curing of sealant within part porosities
- » Centrifuge removes surface water and dries parts

# CUSTOMER USE CASE

## LOCTITE® PE 1000LV

### E-MOTOR CONNECTOR RING POTTING PROTECTION AND STREAMLINED PRODUCTION

#### CUSTOMER CHALLENGES

- » A leading automotive supplier required a reliable potting solution for the stator of its new hybrid electric motor.
- » The material had to protect the ring's internal coils from physical damage, electrical shorts, moisture, automotive fluids and thermal shock.
- » The application process had to be optimized by removing the need for vacuum de-airing before dispensing and curing.

#### RECOMMENDED TECHNOLOGY

- » Henkel developed a new potting formulation, LOCTITE® PE 1000LV, which passed thermal shock testing without any cracks, exhibits excellent resistance to automatic transmission fluids and provides robust vibration endurance.
- » The rheology of the potting material strikes the right balance between self-leveling and thixotropic behavior.
- » As a result, it provides optimized filling of all spaces with deep penetration of the coils without any voids.

#### MASS PRODUCTION PROCESS SET-UP

- » Henkel formulated LOCTITE® PE 1000LV with significantly less bubbles, eliminating the need for vacuum de-airing before dispensing.
- » This new optimized application process allows to save approximately 40 minutes to one hour per shift.
- » The material allowed the Tier 1 supplier to increase the yield and successfully produce > 100,000 electric motors annually.

[READ MORE](#)



#### CUSTOMER BENEFITS

- » Component protection against environmental factors
- » Complete coverage of the coils and filling of all gaps
- » Process optimization by removing need for vacuum de-airing

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The data contained herein is intended as reference only. Some products/package sizes may not be available in your country or region or may have a lead time. Please contact your local Henkel subsidiary for assistance and recommendation on specifications and applications of these products.



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