WACKER

CREATING TOMORROW'S SOLUTIONS

ELASTOSIL®

POWERSIL®

SEMICOSIL®

WACKER SilGel®

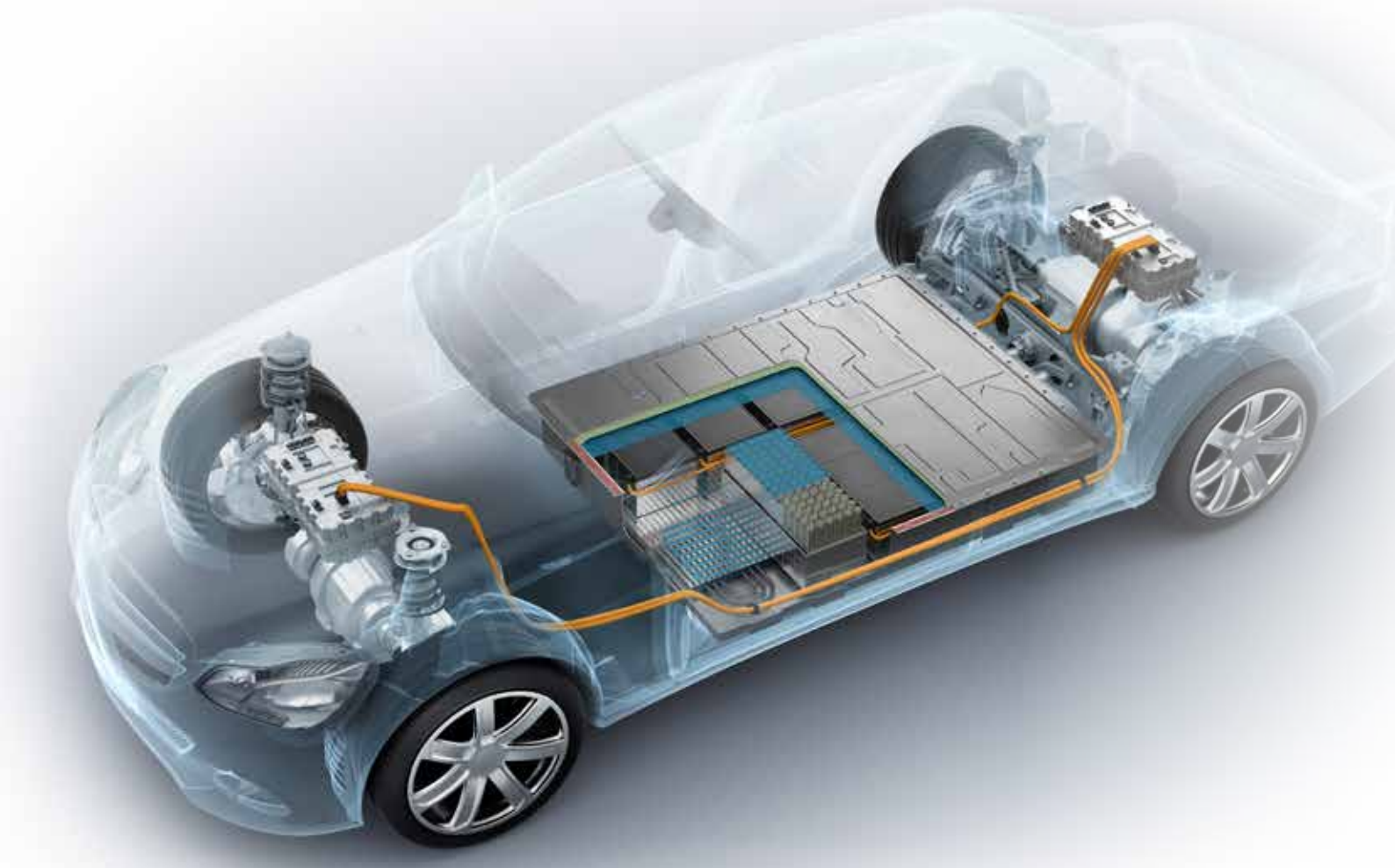
MOBILITY

e-NOVATION FOR BATTERIES
POWERED BY SILICONES

AT THE HEART OF E-MOBILITY:
SILICONE SOLUTIONS FROM WACKER

There is no e-mobility without batteries. With our long experience in the automotive, semiconductor and power electronics industry, we have developed a range of solutions to improve the functionality, performance and safety of batteries in e-mobility.

And we don't stop there: as one of the most research-intensive chemical corporations worldwide, we are constantly working on innovative materials and solutions. Talk to us about your ideas and projects! Together we can power up the future.



TACKLING THE CHALLENGES OF BATTERY ASSEMBLY AND SAFETY

As EV adoption grows, manufacturers are facing huge challenges in improving battery performance and safety. We support the electrification of vehicle drive trains with leading silicone-based product solutions.

Challenge 1:

Assembly and Series Production

Next-generation EV batteries must be compatible with large-volume, cost-effective series-production and assembly processes.

Challenge 2:

Thermal Heat Management

Innovative ways must be found to manage the greater heat generated by these lightweight and new battery designs, with their higher energy densities. The key to success is to keep the automotive battery cells at their optimum temperature, and so ensure optimal performance and power.

Challenge 3:

Battery Safety in Catastrophic Events

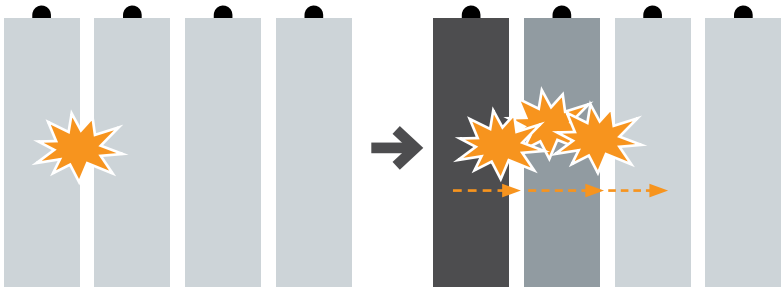
Ensuring battery safety even in catastrophic events, such as fire outbreak. Thermal stability is lost when an affected cell generates heat faster than it can be dissipated; this results in cell venting, fire, and thermal runaway, and in some instances ejection of the cell contents.

One Solution:

Silicones Help Solve the Major Challenges

They are ideal for use in cost-effective series-production and assembly processes. They are perfect for thermal management as they can efficiently dissipate heat – even from complicated shapes. And they maintain their properties over long periods of time and a broad range of temperatures. (-50 °C to +180 °C, special grades up to +230 °C).

Cascading Failures in a Battery Pack



The important safety criterion for batteries is to keep the temperature within the desired working range and preventing cascading failures from one cell to another in a battery pack. A cascading failure is typically accompanied by a sustained fire which further accelerates the battery failure. WACKER offers various silicone solutions aimed at keeping battery temperatures within the optimum range, increasing battery safety in general and, in particular, preventing fire propagation.

Even under extreme operating conditions where other organic materials often degrade, our silicones efficiently keep your batteries safe.

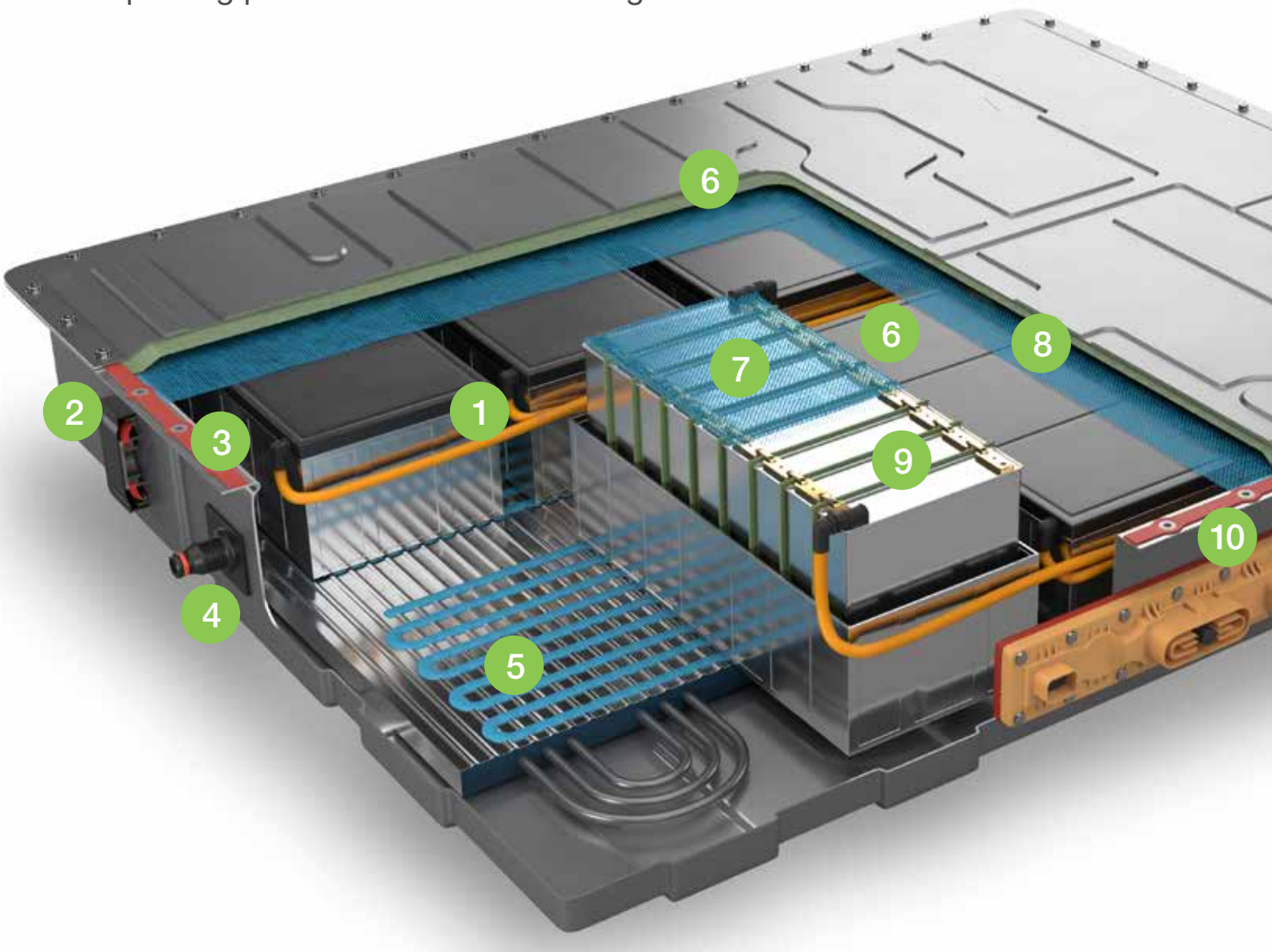
Silicones: the Right Choice for Batteries

Silicones are the products of choice where high-temperature resistance and permanent flexibility are top priorities. Other advantages comprise:

- Reliability (resistance to thermal shock, oxidation, moisture, and chemicals)
- Excellent electrical insulation (dielectric strength)
- Very low thermal resistance
- Excellent stress relief
- Thermal event isolation: silicones slow the spread of thermal events

BECAUSE BETTER BATTERIES WILL ACCELERATE CAR ELECTRIFICATION

Performance and safety of a battery pack are influenced by the battery pack design, pack topology, cell form factor, and various other factors. But silicones can also make a major contribution to improving performance and extending service life.



1 **High voltage cable**
Made with solid silicone rubber

2 **Pressure control and battery emergency vent valve**
Made with liquid silicone rubber

3 **Battery gasket**
- Dispensable silicone lid sealing, CIPG
- Flame-retardant solid silicone rubber

4 **Battery coolant connectors**
Made with liquid silicone rubber

5 **Thermal management**
Thermally conductive gap filler or adhesive

6 **Battery lid / module protection**
Sprayable/dispensable silicone coating/potting

7 **Cell module protection**
Thermal and electric insulation coating or sheet

8 **Cover protection sheet for thermal runaway**
- Based on solid silicone rubber
- Fiber composite based on silicone resin as matrix system

9 **Module assembly**
- (Thermally conductive) adhesive
- Insulation sheet

10 **Connector seals**
Made with liquid silicone rubber

Our Portfolio for You

Silicones for Battery Modules and Pack Systems

- **Thermally conductive (TC) grades for thermal management**
  - TC gap fillers for efficient heat transfer
  - TC adhesives if defined adhesion is needed
  - TC pastes if no curing is needed

- **Automotive bonding and sealing grades**
  - Couple cells with heat sink elements (bonding)
  - Couple cells for vibration control (bonding)
  - Couple modules to active cooling
  - Seal modules (CIPG – cured-in-place gasket)
  - Battery lid sealing with ceramifying sealants
  - Solid silicone rubber grades
  - High-voltage cable insulation and connector sealing
  - Battery gaskets with flame-retardant silicone rubber
  - Silicone coating
    - Battery lid and module protection via sprayable or dispensable coatings

- **Liquid silicone rubber**
  - Connector seals
  - Battery coolant connectors
  - Pressure control and battery emergency vent valves

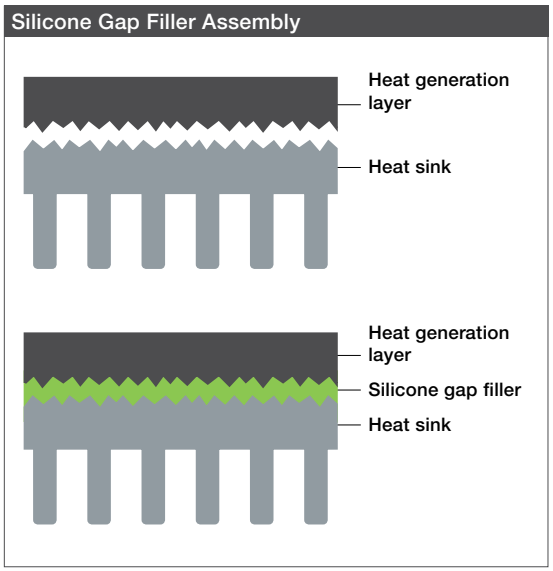
- **Cover protection sheets**
  - Based on solid silicone rubber
  - Based on silicone resin (fiber) composites

Silicones for Battery Management System

- **(Thermally conductive) potting and encapsulation grades to protect electronic components**

SEMICOSIL® GAP FILLER – THE ANSWER TO A BURNING QUESTION

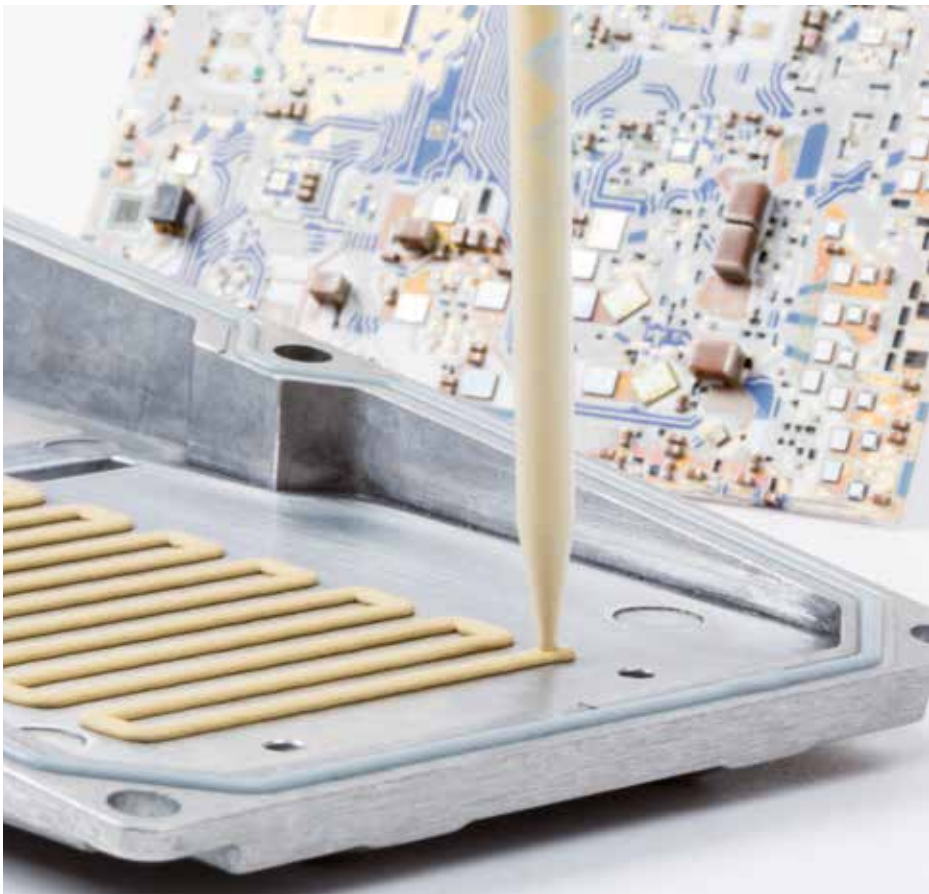
Whether during charging or use, batteries generate and release levels of heat that need to be kept within an optimal range to ensure safety and help extend their lifetime. Soft, flexible, thermally conductive silicones dissipate this heat. With its highly innovative SEMICOSIL® 96x TC series, WACKER has developed a range of thermally conductive gap fillers that are not only cost-effective and easy to process, but also offer safe functionality and high durability.



For use in batteries in both EVs and HEVs, SEMICOSIL® 96x TC series are two-component silicone gap fillers with thermal conductivities in the range from 2 W/mK to 4 W/mK, which are applied directly to the heat sink. Once pressed into place, the gap filler cures to form a soft, cushioning silicone layer that dissipates the heat. While curing to form a reliable bond can occur at room temperature, it is faster at higher temperatures.

Benefits of the SEMICOSIL® 96x TC Series

- Low-density gap filler available
- Remains soft and tacky between -50 °C and +180 °C
- High dispensing speed and fast cure for reduced cycle times
- Low modulus allows assembly of very fragile devices
- Excellent conformability to complex surfaces and geometries
- One solution for different applications (no coordination and storage of different pad or die-cut shape sizes)
- Low volatiles, D4-D8 < 350 ppm
- UL 94 V-0 rating (WACKER in-house testing)
- Processing approved by leading equipment manufacturers
- Dielectric insulation
- Available in 200 L drums and pails



SILICONES –
PROVEN SOLUTIONS TO A HOT ISSUE

As yet, there is no industry standard for e-vehicle batteries. Their designs vary but the basic components are the same: cells of different shapes, sizes and chemistry are stacked together to form modules, which are then assembled into a pack: the "battery." During storage, operation and charging of the battery, thermal management is needed.

Temperature impacts the lifetime, performance, reliability, safety and cost of a battery. Heat dissipation to establish a uniform temperature has to occur at a rate that enables the battery to operate optimally within a desired temperature range and this requires a cooling mechanism.

While air cooling is relatively effective, it requires large gaps between the cells for air circulation. This has led to alternatives being developed. Liquid coolants can absorb more heat, are good conductors and require less space. As an active coolant and insulating fluid, WACKER's POWERSIL® Fluid TR 50 dissipates the thermal energy to a heat exchanger and is a well proven and reliable solution that has been used in high-voltage transformers for decades.
However, when it comes to cooling in the battery stack, thermally conductive silicone can be applied to the cells to dissipate internal heat, to bond them to each other or to the module casing, and to form a larger pack. The silicone also provides additional damping and vibration control and can be used as a soft, flexible gap filler between uneven surfaces across broad temperature ranges.

Silicone Based Cooling Liquids Have Been Successfully Used in HV Applications (Transformers) for Decades

Products	POWERSIL® Fluid TR 50	WACKER® AK 20
Viscosity 23 °C	50 mm^2/s	20 mm^2/s
Viscosity 50 °C	35 mm^2/s	10 mm^2/s
Viscosity -40 °C	150 mm^2/s	70 mm^2/s
Flash point	> 240 °C	> 240 °C
Ignition temperature	> 340 °C	> 340 °C
Breakdown voltage	> 40 kV	> 40 kV
Relative permittivity, 90 °C / 50 Hz	2.55 (± 0.05)	2.55 (±0.05)
Specific volume resistance, 90 °C	> 10^{13} Ω·cm (> 100 GΩ·m)	> 10^{13} Ω·cm (> 100 GΩ·m)
Thermal conductivity	0.15 W / m·K	0.15 W / m·K
Specific heat capacity	1.7J / (g·K)	1.7J / (g·K)

Advantages

- Excellent insulation properties
- Superior heat stability
- High chemical inertness
- High flash point, no toxic combustion products, self-extinguishing
- Environmental friendly, biocompatible and physiologically inert:
  – Riskless handling in production and servicing
  – Riskless disposal at end of lifetime
- High viscosity temperature index; liquid down to -50 °C without additives: optimal cooling (even at cold start and under maximum load)

PRODUCT OVERVIEW
SILICONES FOR xEV BATTERIES

Battery: Thermal Management Thermally Conductive Silicone Encapsulants

Tough encapsulation materials with good resistance to mechanical and environmental stress

Product	Features	Thermal Conductivity [W/mK]	Curing Type	Curing Initiated
ELASTOSIL® RT 607	General-purpose potting	0.5	Addition	Heat
ELASTOSIL® RT 743 LV-K	General-purpose potting, low viscosity	0.5	Addition	Heat
ELASTOSIL® RT 733 TC (KR)	Self-leveling, good flow and adhesion properties	3.0	Addition	Heat
ELASTOSIL® RT 739 TC (KR)	Self-leveling, good flow and adhesion properties	2.2	Addition	Heat
ELASTOSIL® RT 7612 F TC CN	Low viscosity, high flowable, low modulus encapsulant	1.2	Addition	Heat
ELASTOSIL® RT 7612 AD TC CN	Room-temperature curing, self adhesive	1.4	Addition	Heat
ELASTOSIL® RT 7620 TC CN	High flowable, low modulus encapsulant	2.0	Addition	Heat
ELASTOSIL® RT 7640 TC CN*	Next-generation high conductive encapsulant	4.0	Addition	Heat

Battery: Thermal Management Thermally Conductive Dispensable Silicone Gap Fillers & Pastes

Soft, flexible gap filling between uneven surfaces across broad temperature range; non-curing, low-stress paste solutions

Product	Features	Thermal Conductivity [W/mK]	Curing Type	Curing Initiated
WACKER® Silicone Paste P12	Standard thermal heat sink paste	0.8	Non-curing	-
SEMICOSIL® Paste 40 TC	High performance paste	4.0	Non-curing	-
SEMICOSIL® 961 TC	High dosing-rate, UL 94 V-0, low volatiles	2.3	Addition	RT or fast cure at elevated temp.
SEMICOSIL® 962 TC	High dosing-rate, soft tacky gel, UL 94 V-0, low volatiles	3.0	Addition	RT or fast cure at elevated temp.
SEMICOSIL® 9629 TC CN	Low density, electronics gap filler	2.0	Addition	RT or fast cure at elevated temp.
SEMICOSIL® 963 TC*	High dosing-rate, soft tacky gel, low volatiles	3.0	Addition	RT or fast cure at elevated temp.
SEMICOSIL® 9620 EV TC	Low density, next-generation gap filler	2.0	Addition	RT or fast cure at elevated temp.
SEMICOSIL® 967x TC series*	Low density, next-generation gap fillers	2.5 – 3.2	Addition	RT or fast cure at elevated temp.

Battery: Thermal Management Thermally Conductive Silicone Adhesives

Silicone adhesives to couple cells with heat sink element/coupling of modules to active cooling; also for application in PTC heaters

Product	Features	Thermal Conductivity [W/mK]	Curing Type	Curing Initiated
ELASTOSIL® TC 9800 CN	General-purpose potting, self-bonding	0.85	Condensation	Rt
SEMICOSIL® 971 TC*	Stir cartridges	2.0	Addition	Heat
SEMICOSIL® 975x TC series**	High thermally conductive 1-part adhesive, tailor made to your needs	3.0 – 4.0	Addition	Heat

* Under development

** Base component to be combined with ELASTOSIL® CAT PT or ELASTOSIL® CAT PT-F to allow curing at room temperature or under heat (for details, please refer to the respective technical datasheet)

Product Type	Viscosity D = 10 1/s [mPa·s]	Hardness	Tensile Strength [MPa]	Elongation at Break [%]	Density [g/cm³]	Lap Shear Strength [N/mm²]	Curing
2-part, 9:1	10,000 (D = 0.5 1/s)	55 Shore A	3.5	100	1.4	-	20 min/70 °C
2-part, 1:1	1,100 (D = 0.5 1/s)	20 Shore A	3	150	1.5	-	60 min/120 °C
2-part, 1:1	15,000/12,000	30 Shore A	N.d.	N.d.	2.9	N.d.	60 min/120 °C
2-part, 1:1	9,000/5,000	40 Shore A	1.3	60	2.8	0.6	60 min/120 °C
2-part, 1:1	1,300/1,400	15 Shore 00	N.d.	N.d.	2.3	N.d.	30 min/80 °C
2-part, 1:1	3,000/2,000	60 Shore 00	N.d.	N.d.	2.4	N.d.	120 min/25 °C
2-part, 1:1	5,500/9,000	50 Shore 00	N.d.	N.d.	2.6	N.d.	30 min/80 °C
2-part, 1:1	14,000/12,000	55 Shore 00	N.d.	N.d.	2.8	N.d.	30 min/80 °C

Product Type	Viscosity D = 10 1/s [mPa·s]	Hardness	Tensile Strength [MPa]	Elongation at Break [%]	Density [g/cm³]	Lap Shear Strength [N/mm²]	Curing
1-part, ready-to-use	Non-slump	Paste-like	N.a.	N.a.	2.1	-	-
1-part, ready-to-use	Non-slump	Paste-like	N.a.	N.a.	3.27	-	-
2-part, 1:1	130,000	25 Shore A	N.d.	N.d.	2.9	-	4 – 6 h/23 °C
2-part, 1:1	150,000	50 Shore A	N.d.	N.d.	3.1	-	4 – 6 h/23 °C
2-part, 1:1	200,000	60 Shore A	N.d.	N.d.	1.9	-	12 h/23 °C
2-part, 1:1	160,000	Pen 20 mm/10	N.d.	N.d.	3.1	-	4 – 6 h/23 °C
2-part, 1:1	200,000	60 Shore A	N.d.	N.d.	1.9	-	12 h/23 °C
2-part, 1:1	160,000 – 200,000	60 – 80 Shore A	N.d.	N.d.	2.0 – 2.2	-	12 h/23 °C

Product Type	Viscosity D = 10 1/s [mPa·s]	Hardness	Tensile Strength [MPa]	Elongation at Break [%]	Density [g/cm³]	Lap Shear Strength [N/mm²]	Curing
1-part, RTV-1	120,000	73	2.8	85	1.6	>1	Skin forming: 5 min/23 °C
1-part	100,000	80	5	70	2.7	>2.5	30 min/125 °C
1-part	150,000 – 300,000	75 – 95	2.8	-	3.1 – 3.3	-	-

N.d.: No data, N.a.: Not applicable

PRODUCT OVERVIEW
SILICONES FOR xEV BATTERIES

Battery Assembly Adhesives / Foam

Couple cells for vibration control, module sealing, battery housing sealing (compressible / non-compressible), electric insulation of cells

Product	Features	Thermal Conductivity [W/mK]	Curing Type
ELASTOSIL® E4	CIPG, FIPG	0.2	Acetoxy
SEMICOSIL® 811	Low-energy cure adhesive, low-temperature cure, oven-free, fast adhesion build-up at moderate temperature, FIPG	0.2	Addition
SEMICOSIL® 986 / 1K	Sealing adhesive, FIPG, thixotropic, specified ion content, UV tracer	0.2	Addition
SEMICOSIL® 987 GR	Sealing adhesive, CIPG, FIPG	0.2	Addition
SEMICOSIL® 988 / 1K gray / tran	Sealing adhesive, CIPG, FIPG	0.2	Addition
SEMICOSIL® 9882	Fast curing, designed for large part CIPG and for ovenless IR curing	0.2	Addition
SEMICOSIL® 989/1K	Sealing adhesive, FIPG	0.2	Addition
ELASTOSIL® N9111	Multipurpose sealant & adhesive, CIPG	0.2	Alcoxy
ELASTOSIL® RT 705 (F)	Self-leveling adhesive	0.2	Addition
ELASTOSIL® RT 722	Low-energy cure adhesive, low volatile, excellent mech. properties	0.2	Addition
ELASTOSIL® RT 725 LV	Low-energy cure adhesive, low volatile, UV tracer	0.2	Addition
ELASTOSIL® SC 870	Silicone foam, CIPG, high LOI	0.2	Addition

Battery Assembly Cell Pack / Battery Management System Potting

WACKER Silgel® 612	Very soft, clear, low bleed, general purpose, UL 94 HB	0.2	Addition
WACKER Silgel® 612 EH	Higher hardness & reactivity grade of Silgel® 612	0.2	Addition

* Speed of adhesion build-up depends on substrate

	Curing Initiated by	Product Type	Viscosity D = 0.5 1/s [mPa·s]	Hardness	Tensile Strength [MPa]	Elongation at Break [%]	Density [g/cm³]	Curing*
	RT	1-part, RTV-1	Non-slump	15 Shore A	1.7	900	1.02	120 h / 23 °C
	Room temperature, heat or UV	2-part 10:1	Non-slump	30 Shore A	3.3	330	1.08	BKS**, see extra table
	Heat	1-part	Non-slump	50 Shore A	5	200	1.1	30 min / 130 °C; 10 min / 150 °C
	Heat	1-part	Non-slump	55 Shore A	5	200	1.1	60 min / 130 °C; 10 min / 150 °C
	Heat	1-part	Non-slump	35 Shore A	4.5	350	1.1	60 min / 130 °C; 10 min / 150 °C
	Heat or IR light	2-part, 1:1	Non-slump	30 Shore A	7	500	1.1	CIPG IR / heat cure 60 – 130 °C: > 30 min / 60 °C; > 10 min / 100 °C
	Heat	1-part	Non-slump	55 Shore A	5	200	1.1	60 min/130 °C; 10 min/150 °C
	Moisture, RT	1-part	Non-slump	30 Shore A	2.2	500	1.3	Skin forming 20 – 45 min
	Heat	2-part, 1:1	Non-slump	42 Shore A	3	180	1.24	10 min/140 °C; 2 min/200 °C
	Heat	2-part, 1:1	Non-slump	45 Shore A	6	300	1.1	45 min / 90 °C; 15 min / 125 °C
	Heat	2-part, 1:1	Non-slump	50 Shore A	7	250	1.1	10 min / 100 °C; 30 min /60 °C
	Moisture, RT	2-part	Non-slump	10 Shore A			0.35	
	RT or heat	2-part, 1:1	1,000	300 1/10 mm	-	-	0.97	8h/25 °C, 15 min/100 °C
	RT or heat	2-part, 1:1	1,000	150 1/10 mm	-	-	0.97	2h/23 °C, 10 min/70 °C

PRODUCT OVERVIEW
SILICONES FOR xEV BATTERIES

Battery Connectors **Encapsulants**

Product	Features	Thermal Conductivity [W/mK]	Curing Type
SEMICOSIL® 949 UV A SEMICOSIL® 949 UV B	Very low viscosity, UV tracer, primerless bonding	0.2	Addition
SEMICOSIL® 949 UV A SEMICOSIL® 950 UV B	Low hardness, transparent, UV tracer, shadow curing, primerless bonding	0.2	Addition
ELASTOSIL® RT 743 LV-K	General-purpose potting, low viscosity	0.5	Addition

Battery Connectors **Adhesives**

Sealing of battery connectors

SEMICOSIL® 988/1K gray/tran	Non-slump thixotropic	0.2	Addition
SEMICOSIL® 989/1K	Sealing adhesive, FIPG	0.2	Addition

** BKS = Batch-Kit System: base component to be combined with ELASTOSIL® CAT PT, ELASTOSIL® CAT PT-F or ELASTOSIL® CAT UV to allow curing at room temperature, under heat or by UV light (for details, please refer to the respective technical datasheet)

	Curing Initiated by	Product Type	Viscosity D = 0.5 1/s [mPa·s]	Hardness	Tensile Strength [MPa]	Elongation at Break [%]	Density [g/cm³]	Curing
	Room temperature, heat or UV	2-part, 10:1, BKS** with 949 UV B	200	35 Shore 00	-	-	0.97	See extra table
	UV	2-part, 10:1, BKS** with 950 UV B	200	35 Shore 00	-	-	0.97	See extra table
	Heat	2-part, 1:1	1,100	20 Shore A	3	150	1.5	60 min/120 °C
	Heat	1-part	Non-slump thixotropic	35 Shore A	4.5	350	1.1	60 min/130 °C; 10 min/150 °C
	Heat	1-part	Non-slump	55 Shore A	5	200	1.1	60 min/130 °C; 10 min/ 150 °C

PRODUCT OVERVIEW
SILICONES FOR xEV BATTERIES

High Voltage Cables

Long-term heat resistant high consistency rubber (HCR) for high voltage cables offers safety benefits in electric cars

Product	Features	Hardness Shore A ISO 48-4	Specific Gravity [g/cm³] ISO 1183-1A
ELASTOSIL® R *plus* 4305/60	High tear resistance, platinum cure	60	1.15
ELASTOSIL® R *plus* 4305/70	High tear resistance, platinum cure	70	1.18

Pressure Control and Battery Emergency Vent Valve

The unique properties of silicone elastomers enable reliable pressure management solutions and battery safety

ELASTOSIL® LR 3003/40	Multi purpose	40	1.13
ELASTOSIL® LR 3003/50	Multi purpose	50	1.13
ELASTOSIL® LR 3003/60	Multi purpose	60	1.13
ELASTOSIL® LR 3011/50 FR	Flame retardant, low inflammability, short curing times	50	1.13
ELASTOSIL® LR 3170/40	Flame retardant, self-adhesive	45	1.12

Battery Coolant Connectors

Dedicated coolant resistant silicone elastomers are the solution for battery thermal management

ELASTOSIL® LR 3023/60	Coolant resistant, low comp. set, npc	60	1.12
ELASTOSIL® LR 3074/60	Coolant resistant, self-adhesive	60	1.13

* Compression set [%] (22 h/125 °C) DIN ISO 815-1

** Determined in internal flame retardancy test, not listed at UL

	Tensile Strength [N/mm²] ISO 37 Typ 1	Elongation at Break [%] ISO 37 Typ 1	Tear Resistance [N/mm] ASTM D 624 B	Compression Set [%] (22 h/175 °C) DIN ISO 815-1	Flame Retardancy – UL 94 Listing	Appeareance
	9.8	660	37	12	HB (0.5 mm)**	Transparent
	9.1	600	39	14	HB (0.5 mm)**	Transparent
	10	610	30	11	HB (0.5 mm)	Transparent
	10.3	490	26	13	HB (0.5 mm)	Transparent
	9.8	340	27	16	HB (0.5 mm)	Transparent
	10	510	28	13	V-0 (0.7 and 3 mm)	Dark gray / black
	9.2	590	23	34*	V-0 (3 mm); HB (0.5; 0.8 mm)	Dark gray / black
	5.9	300	15	11	HB (0.5 mm)**	Opaque
	6.8	360	14	19	HB (0.5 mm)**	Opaque

PRODUCT OVERVIEW
SILICONES FOR xEV BATTERIES

Connector Seals

Silicone elastomers offer a very reliable sealing performance and guaranteee a long operating lifetime

Product	Features	Hardness Shore A ISO 48-4	Specific Gravity [g/cm³] ISO 1183-1A
ELASTOSIL® LR 3003/30	Multi purpose	30	1.09
ELASTOSIL® LR 3003/40	Multi purpose	40	1.13
ELASTOSIL® LR 3003/50	Multi purpose	50	1.13
ELASTOSIL® LR 3003/60	Multi purpose	60	1.13
ELASTOSIL® LR 3005/30	Low comp. set, npc, fast cure	30	1.1
ELASTOSIL® LR 3005/40	Low comp. set, npc, fast cure	40	1.13
ELASTOSIL® LR 3005/50	Low comp. set, npc, fast cure	50	1.12
ELASTOSIL® LR 3005/60	Low comp. set, npc, fast cure	60	1.13
ELASTOSIL® LR 3065/30	Low coefficient of friction, low comp. set, npc	30	1.12
ELASTOSIL® LR 3065/50	Low coefficient of friction, low comp. set, npc	50	1.12
ELASTOSIL® LR 3675/30	Self-adhesive, low coefficient of friction	30	1.12
ELASTOSIL® LR 3675/50	Self-adhesive, low coefficient of friction	50	1.12
ELASTOSIL® LR 3072/30	Self-adhesive, oil-bleeding	30	1.11
ELASTOSIL® LR 3072/40	Self-adhesive, oil-bleeding	40	1.12
ELASTOSIL® LR 3072/50	Self-adhesive, oil-bleeding	50	1.12
ELASTOSIL® LR 3841/50	Oil-bleeding, low comp. set, npc	50	1.13
ELASTOSIL® LR 3842/40	Oil-bleeding, low comp. set, npc	40	1.12
ELASTOSIL® LR 3842/50	Oil-bleeding, low comp. set, npc	50	1.13
ELASTOSIL® LR 3842/60	Oil-bleeding, low comp. set, npc	60	1.14
ELASTOSIL® LR 3842/70	Oil-bleeding, low comp. set, npc	68	1.14
ELASTOSIL® LR 3843/30	Oil-bleeding, low comp. set, npc	30	1.12
ELASTOSIL® LR 3844/30	Oil-bleeding, low comp. set, npc	30	1.1
ELASTOSIL® LR 3844/40	Oil-bleeding, low comp. set, npc	42	1.13
ELASTOSIL® LR 3844/50	Oil-bleeding, low comp. set, npc	50	1.13
ELASTOSIL® LR 3846/30	Oil-bleeding, low comp. set, npc	30	1.11

* Compression set [%] (22 h/125 °C) DIN ISO 815-1

** Determined in internal flame retardancy test, not listed at UL

	Tensile Strength [N/mm²] ISO 37 Typ 1	Elongation at Break [%] ISO 37 Typ 1	Tear Resistance [N/mm] ASTM D 624 B	Compression Set [%] (22 h/175 °C) DIN ISO 815-1	Flame Retardancy – UL 94 Listing	Appeareance
	7	610	21	10	HB (0.5 mm)	Transparent
	10	610	30	11	HB (0.5 mm)	Transparent
	10.3	490	26	13	HB (0.5 mm)	Transparent
	9.8	340	27	16	HB (0.5 mm)	Transparent
	6	610	16	13	HB (1.5 mm)	Transparent
	7.8	600	22	16	HB (1.5 mm)	Transparent
	8.7	500	24	15	HB (1.5 mm)	Transparent
	9.5	380	28	15	HB (1.5 mm)	Transparent
	7.5	650	24	17	HB (0.5; 1.5; 3 mm)	Transparent
	9	460	31	15	HB (0.5; 1.5; 3 mm)	Transparent
	8	760	25	54	HB (0.5 mm)**	Transparent
	7.8	410	33	27*	HB (0.5 mm)**	Transparent
	7.4	710	17	21*	HB (0.5 mm)**	Opaque
	8.8	620	21	12*	HB (0.5 mm)**	Opaque
	8.6	510	23	31	HB (0.5 mm)**	Opaque
	9	490	30	13	HB (0.5 mm)**	Opaque
	8	610	25	13	HB (0.5 mm)**	Opaque
	8.5	460	37	12	HB (0.5 mm)**	Opaque
	9.2	420	38	13	HB (0.5 mm)**	Opaque
	8.5	380	28	16	HB (0.5 mm)**	Opaque
	8	680	22	16	HB (0.5 mm)**	Opaque
	7.2	700	22	17	HB (0.5 mm)**	Opaque
	8.5	580	24	15	HB (0.5 mm)**	Opaque
	8.5	500	36	14	HB (0.5 mm)**	Opaque
	7	750	19	15	HB (0.5 mm)**	Opaque

PRODUCT OVERVIEW
SILICONES FOR xEV BATTERIES

Battery Management System/PCB Protection Conformal Coatings

Solvent-free, 100% silicone, UV initiated products available, fast reaction, shadow cure, no volatile by-products (addition-cure)

Product	Features	Thermal Conductivity [W/mK]	Curing Type	Curing Initiated by	Product Type
SEMICOSIL® 942 UV A/B	Soft gel, sprayable, UV tracer	0.2	Addition	UV	2-part, 10:1

Product	Viscosity D = 0.5 1/s [mPa·s]	Hardness	Density [g/cm³]	Curing
SEMICOSIL® 942 UV A/B	2,500	Pen 60 mm/10	0.98	15 min/70 °C no UV act., 20 s/UV act. for 20 sec.

Potlife and Cure Times for BKS* Grades (10:1 Mix)

Product	Potlife [min] 10:1 with ELASTOSIL® CAT			Curing Time [min] 10:1 with ELASTOSIL® CAT		
	CAT PT [min] 25 °C	CAT PT-F [min] 25 °C	CAT UV [h] 25 °C	CAT PT [min] 100 °C	CAT PT-F [min] 100 °C	CAT UV** [min] 100 °C
SEMICOSIL® 811	45	30	> 48	–	–	< 10***
SEMICOSIL® 949	20	< 15	> 24	15	10	< 2****

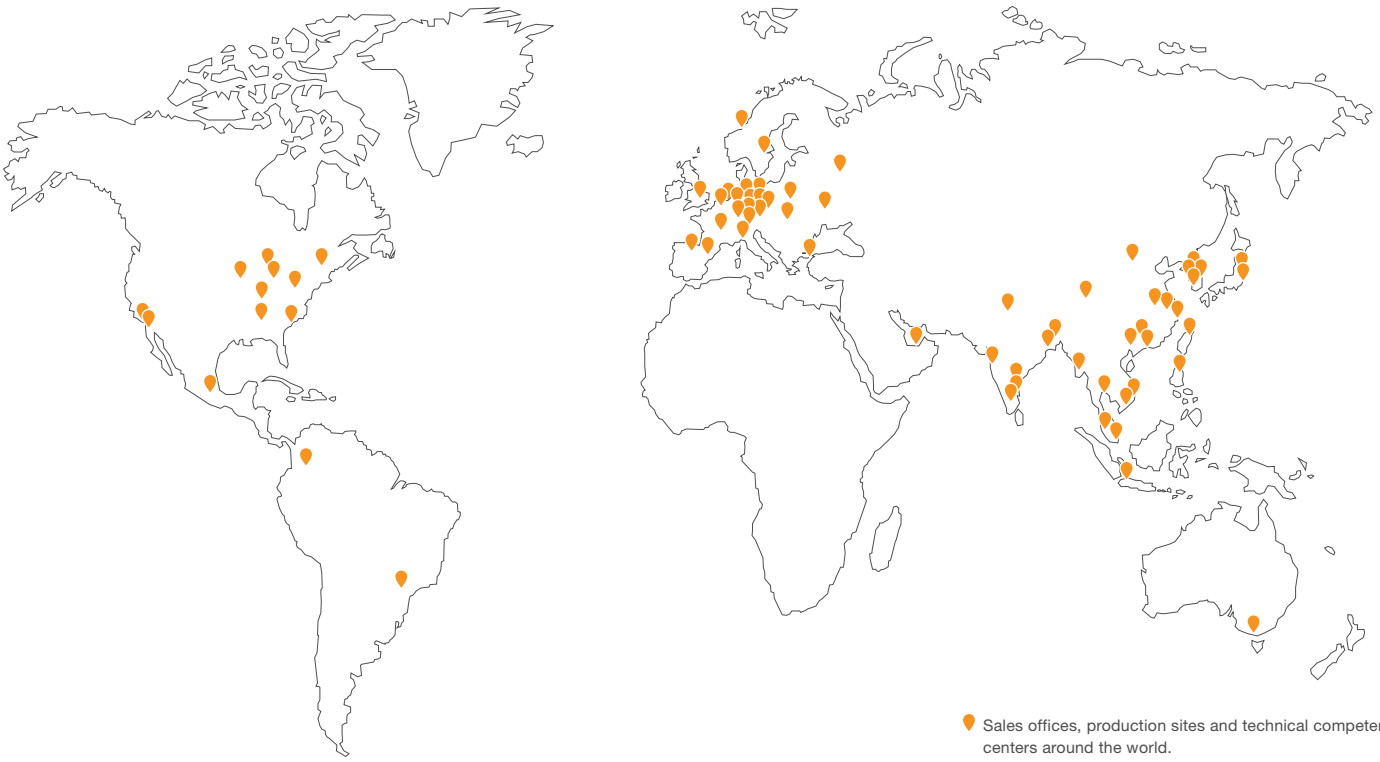
* BKS = Batch-Kit System: base component to be combined with ELASTOSIL® CAT PT, ELASTOSIL® CAT PT-F or ELASTOSIL® CAT UV to allow curing at room temperature, under heat or by UV light (for details, please refer to the respective technical datasheet)

** Curing time under UV irradiation depending on substrate, layer thickness, UV intensity and dose. Ozone-free Fe-discharge lamp (emission > 250 nm) is recommended

*** Typically 40-60 sec open time (time to bond), cure at 25 °C after 30 min. Adhesion: 25 °C (PBT/Al): > 45 min; Adhesion: 80 °C (PBT /Al): < 5 min

**** As encapsulant an intensity between 100 and 400 mW/cm² can be chosen. At high intensity, material is cured almost immediately after irradiation (10 sec)

EXPERTISE AND SERVICE NETWORK ON FIVE CONTINENTS



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All figures are based on fiscal 2021.

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