Thermal interface materials for EV batteries – low-density, low-abrasive, silicone-free

Application note

Custom-tailored thermally conductive materials for electric and hybrid vehicle batteries

Responding to a strong and increasing demand in innovative manufacturing concepts for electric and hybrid vehicle batteries, we provide adhesives, pottings and pastes with high thermal conductivities that are customized with regard to processing parameters, thermal and mechanical properties, as well as service durability.

Force-fitted and heat-conductive at the same time

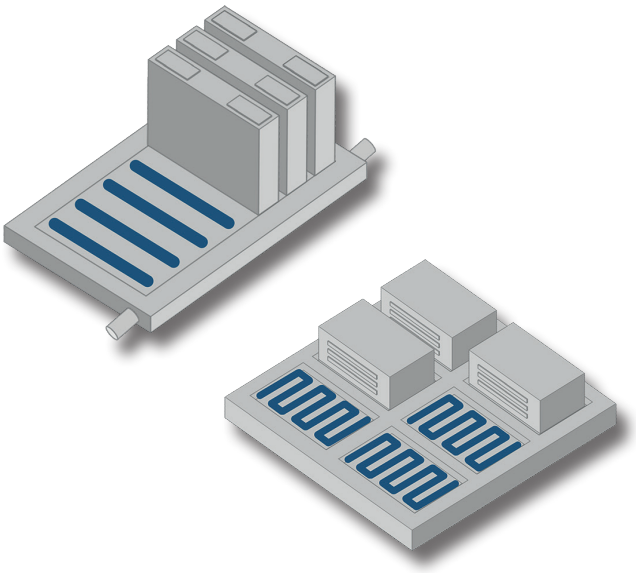
In order to build a secure and durable battery system, the assembly and integration of single hard-case (prismatic) or pouch cells requires reliable mechanical fixing, thermal management, and vibration damping. Our thermally conductive, epoxy-based adhesives provide structurally strong and durable joints.

Thermal connections that are easy to rework

In case thermally bonded parts must later be separated or replaced without being damaged, we supply paste-like thermal interface materials, either curing or non-curing. They will securely bridge any insulating air gap, as long as additional mechanical fixing is provided.

Low-density, low-abrasive, silicone-free

Our specialty is adhesives that offer more than just bonding things together. All of our thermal interface materials are silicone-free and mostly cure at room temperature. They feature high thermal conductivities, high dielectric strength, very low abrasion and low specific gravity in order to reduce vehicle weight.



A broad range of dedicated solutions

Polytec PT provides thermally conductive adhesives and silicone-free thermal pastes, all designed for ease of use and durability. In coordination with customer and market requirements, we are constantly developing new, improved materials, customized to the particular application. If you are interested in how we will accomplish your individual solution, please contact us at info-pt@bostik.com

Adhesive bonding and sealing of motors, power modules and more

Please visit www.polytec-pt.com to see our thermally and electrically conductive as well as UV-curing and additional products for other electric and hybrid vehicle parts like motors, converters, control units, housings and power electronics devices.

Thermally conductive adhesives and pottings

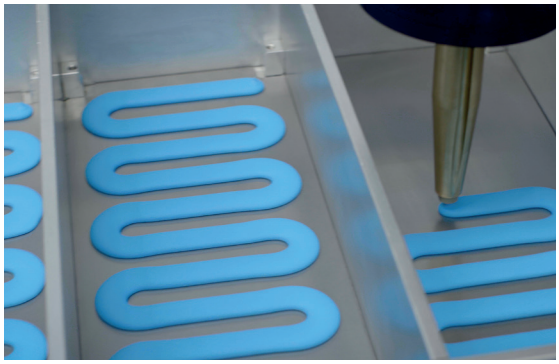
Our epoxies for battery mounting feature good thermal conductivity, very good dielectric strength, high mechanical strength, and excellent adhesion to aluminum. They cure at room temperature or slightly above and they are flexible in order to maintain a good adhesion even under varying temperature conditions. Please contact us for product selection and customized versions.

Consistency	flowable …. thixotropic
Curing schedule	24 h @ 23 °C … 60 min @ 80 °C
Thermal conductivity	0.8 …. 2 W/mK*
Young's modulus	100 … 9,000 MPa
Lap shear strength**	5 … 15 MPa
Elongation at break	up to ~20 %

* up to 3 W/mK upon request (compromising other properties)
** on untreated Al surface

Thermally conductive pastes and gap fillers

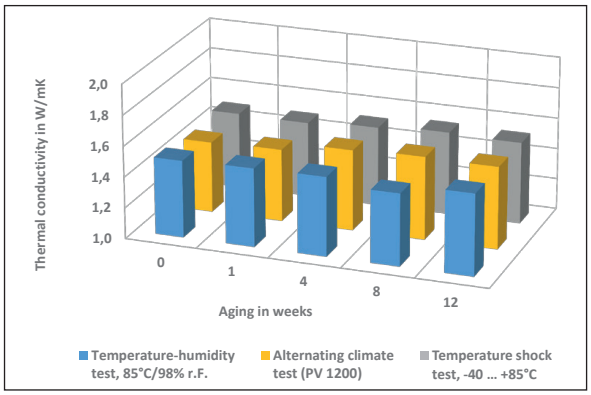
Thermally conductive pastes are easy to apply and to remove. They compensate for high tolerances, and they feature a permanent thermal contact to the substrate surface due to good intrinsic wetting properties. Part of our gap fillers are curable by humidity resulting in increased resistance against thermo-mechanical loads. Please contact us for product selection and customized versions.

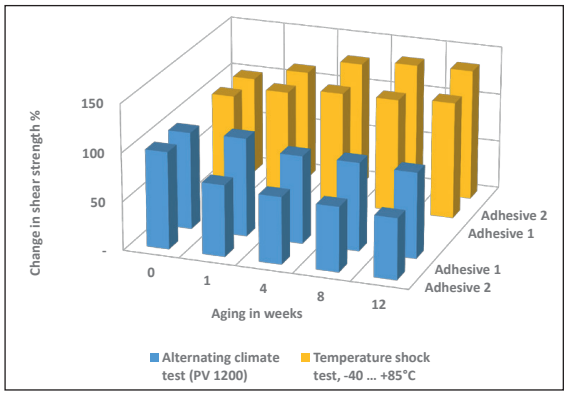


Consistency	thixotropic
Viscosity @ 40 °C	50 … 250 Pa s
Gap width	0.15 … 5 mm
Curing schedule	non-curing // curing at RT
Thermal conductivity	1.5 …. 3.0 W/mK
Specific gravity	1.8 … 2.2 g/cm³

Typical performance of thermal interface materials

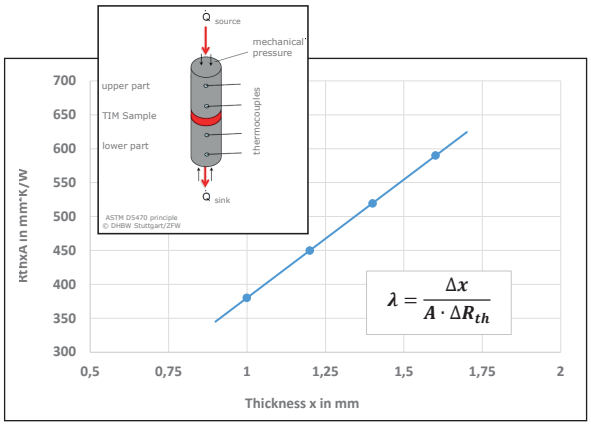
Thermally conductive adhesives and pottings

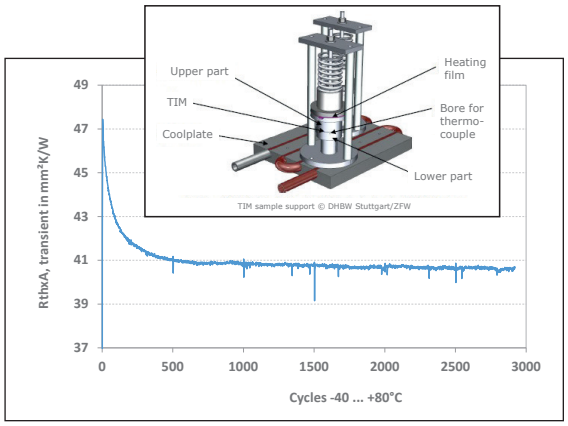




Thermal conductivity (left) and shear strength (right) of adhesives vs. various aging conditions

Thermally conductive pastes and gap fillers





Thermal resistivity of gap filler vs. thickness (left) and vs. no. of power cycles (right)

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