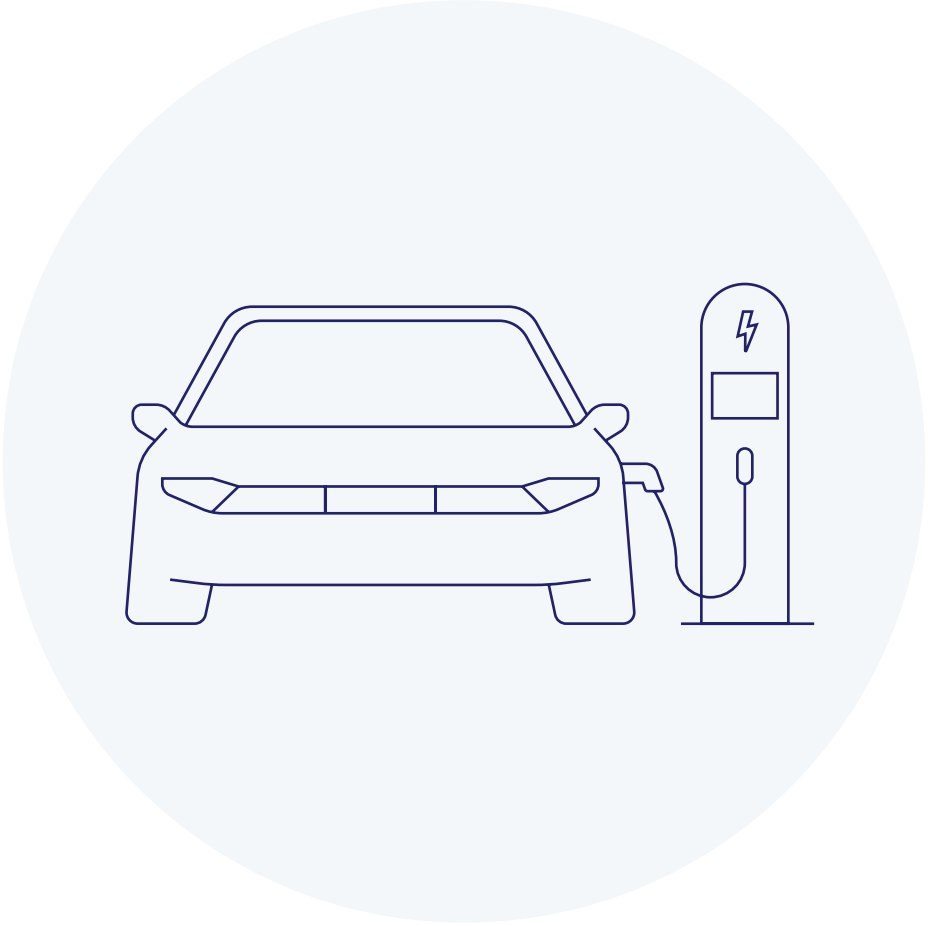
wevo

E-MOBILITY

ADVANCED SOLUTIONS BASED ON
POLYURETHANE, EPOXY AND SILICONE

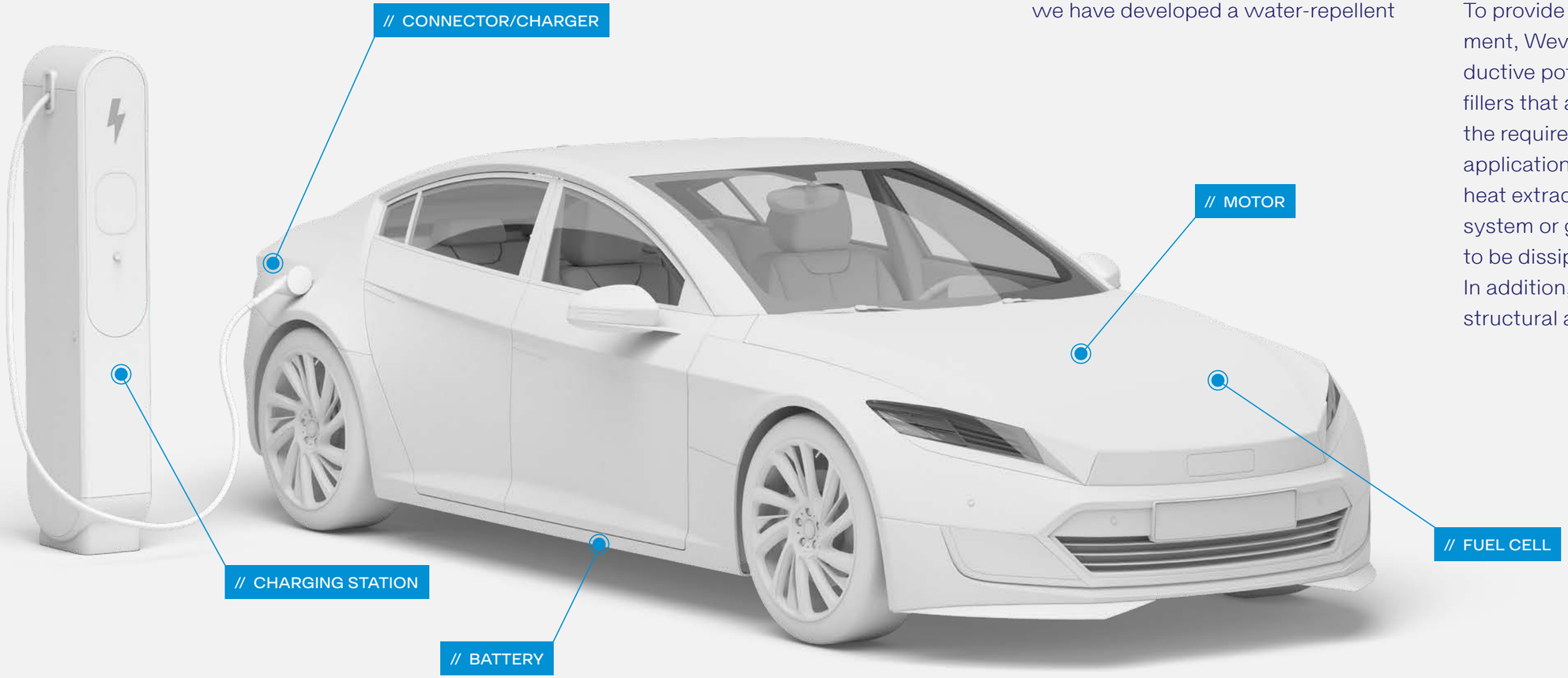


WEVO OFFERS SOLUTIONS FOR ALL ASPECTS OF E-MOBILITY

For the mobility of tomorrow the electric powertrain will continue to play a key role. Demand for electric cars is growing continuously, a fact that is also driving expansion of the charging infrastructure that is so crucial to the mobility transition. What's more, new concepts are being developed in the field of fuel cells. The components required for these systems are high-tech elements and therefore highly sensitive – and require special potting and adhesive solutions to protect them.

Advanced Wevo potting compounds, thermal interface materials and adhesives protect and insulate electrical and electronic components such as batteries and rapid-charging stations. At the same time, the solutions ensure steady heat dissipation from live parts, helping to improve efficiency and extend service life.

WEVO PROTECTS AND INSULATES YOUR TECHNOLOGY



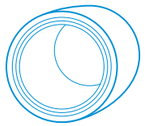
Wevo's polyurethane-, epoxy resin- and silicone-based potting compounds ensure optimum heat dissipation and insulate sensitive components such as stators, transformers and power electronics. In this way, they help protect charging-infrastructure components, such as fast-charging stations and wallboxes, as well as on-board-chargers and the batteries themselves. For charging connectors, for example, we have developed a water-repellent and UL-certified, flame-retardant potting compound that protects users from electric shocks.

At the same time, the customisable Wevo products ensure protection against challenging environmental conditions that impact the components due to outdoor use, such as humidity, dust, salty air or bad weather.

To provide efficient thermal management, Wevo develops thermally conductive potting compounds and gap fillers that are customised in line with the requirements of the particular application. These products enable the heat extracted by the battery cooling system or generated in the transformers to be dissipated quickly and safely.
In addition, they can also be used as structural adhesives.

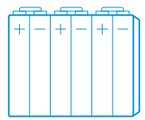
APPLICATIONS IN DETAIL

Regardless of their intended use, electronic components used in e-mobility applications require appropriate protection against environmental influences to ensure safe operation and a long service life.



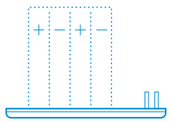
ELECTRIC MOTOR STATOR

State-of-the-art electric motors achieve an immense power density that leads to generation of heat that needs to be dissipated. Our high-performance, low-viscosity potting systems are designed to withstand the harshest conditions and protect the stator and windings.



BATTERY CELLS

Depending on the design of a battery, it is increasingly common to use polyurethane adhesives to assemble battery modules. Our adhesives, which are optimised to the specific process, help battery manufacturers to solve design challenges and increase safety and reliability.



BATTERY COOLING

Thermal management is a crucial element of all modern-day electric vehicle batteries. Particularly during charging, efficient heat dissipation is vital. Our customised, thermally conductive materials can act as both a heat-conductive medium and a structural bonding material.

ON-BOARD CHARGERS

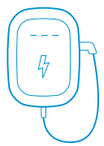
On-board chargers (OBCs) are charger units that are permanently installed in electric vehicles. OBCs convert AC current into a DC current and allow electric car users to charge their vehicles from any AC power supply, not just at charging stations. Wevo's potting resins are used to encapsulate electronic components in the OBCs and protect them against vibration, humidity, dust and thermal shocks.

CHARGING CONNECTORS

The charging connector and vehicle charging inlet form an interface between the charging infrastructure and the electric car. Charging connectors are plugged in and unplugged many times during the lifetime of a vehicle. Our fast-curing polyurethane compounds reinforce the connector assembly and encapsulate cables and other components inside the connector, providing reliable protection against high thermal loads and humidity.

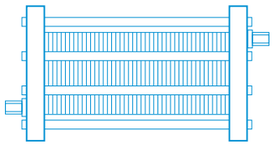
INDUCTIVE CHARGING

Inductive charging is seen as the key technology for the future of the e-mobility energy management. Wevo's polyurethane potting compounds provide reliable protection for electronic components in the charging stations, such as AC/DC converters or DC/HF-AC converters.



WALLBOX

Wallbox chargers installed in buildings offer much faster charging speeds than conventional power sockets, helping electric-car drivers get back on the road with a full charge much quicker. Wevo's polyurethane systems reliably protect the electronic components inside the wallboxes, such as AC/DC converters.



FUEL CELLS

Our gas-tight polybutadiene resins and addition-curing silicones are used as sealants and adhesives in the stack assembly as well as in the production of humidifier modules and various filters. Our advanced thermally conductive polyurethane and epoxy potting compounds are used in the air compressor, the anode recirculation blower and the power electronics.

BATTERY TENSION BARS

The structure of the majority of cell modules needs to be reinforced with tension bars. Our polyurethane compounds, which have excellent adhesive properties, can be used to replace screwed connections. This shortens production times and reduces the overall weight of the cell modules and of the battery as a whole.

CHARGING STATION

Charging stations supply already converted DC power directly to the vehicle, bypassing the vehicle's on-board converter. In order to facilitate higher-power charging, much larger AC/DC converters are used for charging stations. Our reliable thermally conductive potting resins protect the electronic components and help to dissipate the heat they generate.

WEVO SOLUTIONS IN DETAIL

The requirements of e-mobility applications can differ greatly and call for special or customised solutions.

Applications	ELECTRIC MOTOR STATOR	BATTERY CELLS	BATTERY COOLING	ON-BOARD CHARGERS	CHARGING CONNECTORS
Requirements	• Low coefficient of thermal expansion, high E modulus • Insulation class F or higher • High glass transition temperature	• Good adhesion to plastics and metals • Thixotropy setting • Fast curing	• High thermal conductivity • Self-extinguishing in acc. with UL 94 V-0 • Good adhesion to plastics and metals	• Good impregnation • Low shrinkage • Self-extinguishing in acc. with UL 94 V-0	• Fast curing • Good flow properties • High rigidity • Self-extinguishing in acc. with UL 94 V-0
Possible solutions	**WEVOPOX/ WEVODUR** • 2513 with 1003/07 • 36001 FL with 5001 • 34020 with 5001 **WEVOSIL** • 27015 FL (A/B)	**WEVOPUR/ WEVONAT** • 895 with 600 • 78901 with 385 • PD 52 with 385	**WEVOPUR/ WEVONAT** • 68389 FL with 600 • 56005 FL with 900 **WEVOSIL** • 26009 FL (A/B) • 26020 FL (A/B)	**WEVOPUR/ WEVONAT** • 9251 FL with 300 RE • 67210 FL with 507 **WEVOSIL** • 22105 FL (A/B)	**WEVOPUR/ WEVONAT** • 403 FL with 300 RE • 552 FL with 300 • 7210 FL with 507

Applications	FUEL CELLS	INDUCTIVE CHARGING	BATTERY TENSION BARS	WALLBOX	CHARGING STATION
Requirements	• Gas tightness • High chemical resistance • High ion purity • Good adhesion	• Electromagnetic compatibility • Good dielectric properties • Good flowability	• Thixotropy setting • Good adhesion to plastics and metals • Fast curing	• Electromagnetic compatibility • Good dielectric properties • Self-extinguishing in acc. with UL 94 V-0	• Low glass transition temperature • Good flowability • Self-extinguishing in acc. with UL 94 V-0
Possible solutions	**WEVOPUR/ WEVONAT** • PD 79952 with 385 **WEVOSIL** • 28002 (A/B) **WEVOPOX/ WEVODUR** • 32702 with 5008	**WEVOPUR/ WEVONAT** • 512 FL with 900 • PD 445 with 385 • 56992 with 300 RE **WEVOSIL** • 20201 (A/B) • 22006 FL (A/B) • 22102 FL (A/B)	**WEVOPUR/ WEVONAT** • PD 52 with 385 • 895 with 600 • 78901 with 385	**WEVOPUR/ WEVONAT** • 56093 FL with 600 • 56992 with 300 RE • 512 FL with 900 **WEVOSIL** • 20201 (A/B) • 22006 FL (A/B)	**WEVOPUR/ WEVONAT** • 56992 with 300 RE • 56093 FL with 600 • 56003 FL with 900 **WEVOSIL** • 20201 (A/B) • 22006 FL (A/B) • 22102 FL (A/B)

		PUR					POX	SIL						
Material		POLYURETHANE					EPOXY	SILICONE						
Resin / component A		WEVOPUR 60910 FL	WEVOPUR 56003 FL	WEVOPUR 56005 FL	WEVOPUR 60515 FL/40	WEVOPUR 68389 FL	WEVOPOX 2513	WEVOPOX 36001 FL	WEVOPOX 34020	WEVOPOX 32702	WEVOSIL 22006 FL A	WEVOSIL 28001 A	WEVOSIL 22102 FL A	WEVOSIL 22105 FL A	WEVOSIL 26010 FL A
Resin / component B		WEVONAT 900	WEVONAT 900	WEVONAT 900	WEVONAT 507 L	WEVONAT 600	WEVODUR 1003/07	WEVODUR 5001	WEVODUR 5001	WEVODUR 5008	WEVOSIL 22006 FL B	WEVOSIL 28001 B	WEVOSIL 22102 FL B	WEVOSIL 22105 FL B	WEVOSIL 26010 FL B
Mixing ratio (parts by weight)		100 : 10	100 : 13	100 : 9	100 : 10	100 : 10	100 : 13	100 : 10	100 : 10	100 : 10	1 : 1	1 : 1	1 : 1	1 : 1	1 : 1
Mixed viscosity at 22 °C [mPa·s]	Rotational viscometer	2,500 – 5,000	3,000 – 4,500	60,000 – 75,000	5,000 – 9,000	170,000 – 200,000	3,000 – 6,000	3,500 – 6,500	8,000 – 15,000	2,000 – 3,500	2,000 – 2,800	30,000 – 60,000	1,700 – 3,300	3,000 – 5,000	paste-like
Reactivity at 22 °C [min.]*	Rotational viscometer / rheometer	30 – 50	40 – 60	40 – 60	25 – 40	20 – 30	30 (120 °C)	180 – 240	100 – 150	60 – 80	90 – 120	hot curing > 100 °C	50 – 70	50 – 70	50 – 60
Shore hardness 00/A/D	DIN ISO 7619-1:2012-02	-- / -- / 35 – 45	-- / -- / 30 – 40	-- / -- / 45 – 55	-- / -- / 70 – 80	-- / -- / 70 – 80	-- / -- / 90 – 95	-- / -- / 85 – 90	-- / -- / 85 – 95	-- / -- / 80 – 90	-- / 47 – 55 / --	-- / 60 – 70 / --	50 – 70 / 10 – 20 / --	50 – 70 / 10 – 20 / --	60 – 80 / -- / --
Operating temperature [°C]		-40 up to +135	-40 up to +130	-40 up to +130	-40 up to +130	-40 up to +135	-40 up to +180	-40 up to +180	-40 up to +180	-40 up to +130	-60 up to +180	-60 up to +200	-60 up to +180	-60 up to +200	-60 up to +165
E modulus [N/mm²]	DIN EN ISO 527-2:2012-06	55	15	50	300	480	11,000	6,000	6,100	6,200	4	4.5	0.5	0.4	1.2
Thermal conductivity [W/m·K] (pressureless)	DIN EN ISO 22007-2:2015-12	1	1	1.55	1.6	1.4	1.4	1.1	0.81	0.33	0.5	0.35	1	1.5	3
Glass transition temperature [°C]	TMA ISO 11359-2:1999-10	-20	4	-3	22	17	52	51	48	76	-50	-55	-50	-45	-55
Coefficient of expansion [ppm/K]	TMA ISO 11359-2:1999-10	50 < -30 °C 115 > -10 °C	48 < -10 °C 130 > 20 °C	51 < -10 °C 122 > 20 °C	42 < -20 °C 100 > 30 °C	49 < -10 °C 99 > 20 °C	29 < 40 °C 91 > 80 °C	40 < 30 °C 110 > 90 °C	46 < 20 °C 150 > 80 °C	56 < 60 °C 155 > 90 °C	240 > -30 °C	210 > -30 °C	181 > -30 °C	220 > -30 °C	110 > -30 °C
Flammability	UL 94	V-0 6 mm**	V-0 1.5 mm	V-0 1.5 mm**	V-0 1.5 mm	V-0 4 mm	HB	V-0 2 mm**	HB	HB	V-0 4 mm**	V-1	V-0 1 mm	V-0 6 mm	V-0 1 mm
Tensile strength [N/mm²]	DIN EN ISO 527-2:2012-06	2	3	4	13	15	81	40	54	57	1.3	4.5	0.3	0.5	0.3
Elongation at break [%]	DIN EN ISO 527-2:2012-06	28	80	34	15	13	0.9	1.0	3.1	1.4	90	100	100	150	25
Dielectric strength [kV/mm]	DIN EN 60243-1:2014-01	27	29	29	> 20	> 20	20	25	30	25	33	> 30	> 25	> 20	> 15
Comparative tracking index	UL 746A IEC 60112	600	600	600	600	600	600	600	600	600	600	600	600	600	600
Target application		Battery potting	Thermally conductive for battery potting	Thermally conductive for battery potting	Thermally conductive for battery potting	Thermally conductive adhesive for battery cells	Motor (stator) potting	Motor (linear) potting	Winding heads (stator) potting	Chemical resistant battery adhesive	All purpose potting	All purpose potting	All purpose potting	All purpose potting, OBC and DC/DC converter	Gap filler

All application parameters refer to processing at room temperature. All mechanical, thermal and electrical properties are based on complete curing.
* The indicated range of pot life corresponds with current standard versions. Adjustment of pot life is possible.
** UL listing under file No. E108835
For a more detailed technical description of our systems please refer to the corresponding data sheets which are available for all products.

ADDED BENEFITS BY WEVO PRODUCTS

Our wide range of products offers a variety of benefits in addition to solving classic problems such as providing insulation and moisture protection for electrical installations.

Ask us about our materials compliant with the stringent fire and safety standard EN 45545-2 in hazardous levels HL2 and HL3 for requirements R22 and R23. A wide variety of products have self-extinguishing properties in line with UL 94 V-0.

Wevo materials are temperature-resistant up to +180 °C. Our portfolio includes polyurethane resins of insulating classes B and F as well as epoxy and silicone resins of insulating classes F and H.

Some of our materials have increased thermal conductivities of up to 4 W/m·K and can be used as thermally conductive potting compounds or gap filler materials.

Wevo materials can be adjusted in terms of their reaction times, flow behaviour and to the individual needs of the production process. Thixotropic versions are available on request.

Wevo solutions exhibit outstanding electrical properties with CTI 600, high dielectric strength greater than 20 KV/mm as well as other outstanding dielectric properties.

In addition to standard materials produced to withstand temperatures of up to +180 °C, we offer materials suitable for even higher temperatures. Several resins have undergone accelerated aging tests and have been certified to UL 746 B, with listed RTI values up to 160 and CTI values of 600 (UL file No. E108835).

WE ARE MUCH MORE THAN A SUPPLIER

From development to volume production – we support our customers every step along the way.

WE PIONEER PROGRESS

We are a proven partner in project-driven innovation with a decades-long track record.

WE INITIATE INNOVATION

We develop new ideas for every area of electrical component potting, bonding and sealing.

wevo

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