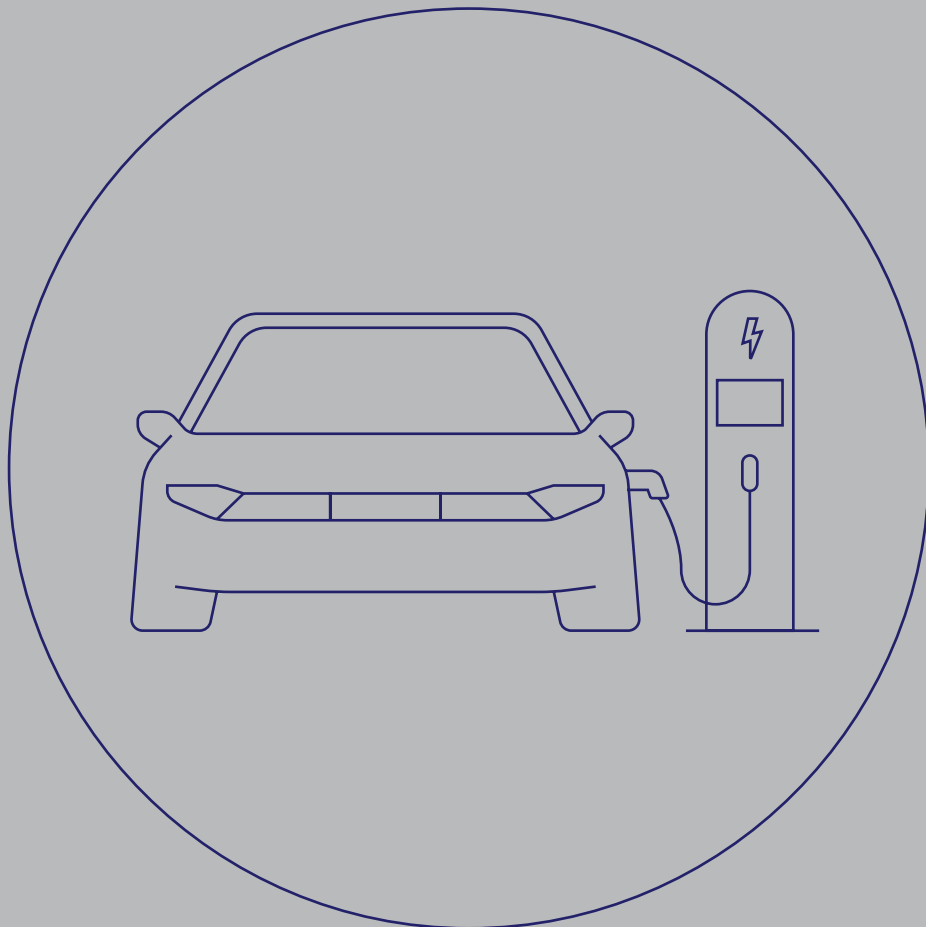


wevo

E-MOBILITY



WEVO OFFERS SOLUTIONS FOR ALL ASPECTS OF E-MOBILITY

For the mobility of tomorrow the electric powertrain will 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.

Tailor-made 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.

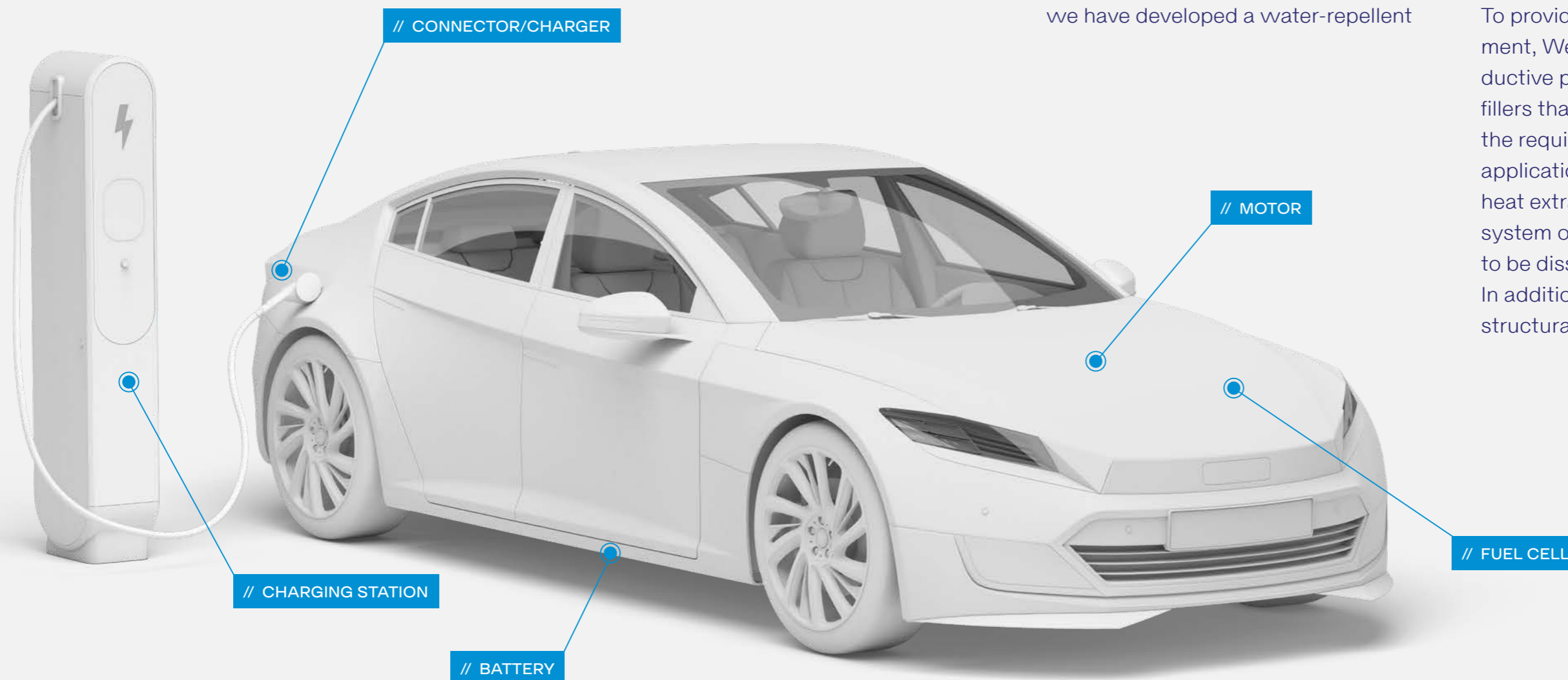
WEVO PROTECTS AND INSULATES YOUR TECHNOLOGY

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.

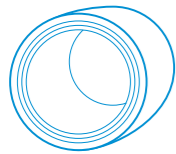
At the same time, the tailor-made Wevo products ensure protection against challenging environmental conditions that impact the components due to outdoor use, such as humidity, dust, salty air or bad weather.

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.



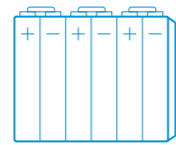
A CLOSER LOOK AT THE APPLICATIONS

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.



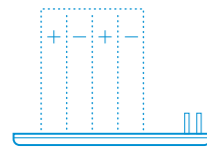
ELECTRIC MOTOR STATOR

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.



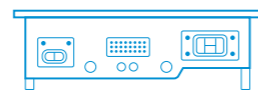
BATTERY CELLS

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.



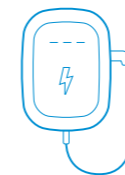
CHARGING CONNECTORS

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.



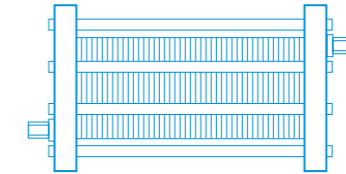
INDUCTIVE CHARGING

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.



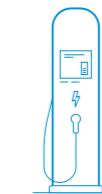
FUEL CELLS

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 customised thermally conductive potting resins protect the electronic components and help to dissipate the heat they generate.

WEVO SOLUTIONS IN DETAIL

The requirements of power engineering 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	<ul style="list-style-type: none"> Low coefficient of thermal expansion, high E modulus Insulation class F or higher High glass transition temperature 	<ul style="list-style-type: none"> Good adhesion to plastics and metals Thixotropy setting Fast curing 	<ul style="list-style-type: none"> High thermal conductivity Self-extinguishing in acc. with UL 94 V-0 Good adhesion to plastics and metals 	<ul style="list-style-type: none"> Good impregnation Low shrinkage Self-extinguishing in acc. with UL 94 V-0 	<ul style="list-style-type: none"> Fast curing Good flow properties High rigidity Self-extinguishing in acc. with UL 94 V-0
Possible solutions	WEVOPOX/ WEVODUR <ul style="list-style-type: none"> 2513 with 1003/07 36001 FL with 5001 34020 with 5001 WEVOSIL <ul style="list-style-type: none"> 27015 FL (A/B) 	WEVOPUR/ WEVONAT <ul style="list-style-type: none"> 895 with 600 78901 with 385 PD 52 with 385 	WEVOPUR/ WEVONAT <ul style="list-style-type: none"> 68389 FL with 600 56005 FL with 900 WEVOSIL <ul style="list-style-type: none"> 26009 FL (A/B) 26020 FL (A/B) 	WEVOPUR/ WEVONAT <ul style="list-style-type: none"> 9251 FL with 300 RE 67210 FL with 507 WEVOSIL <ul style="list-style-type: none"> 22005 FL (A/B) 	WEVOPUR/ WEVONAT <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Gas tightness High chemical resistance High ion purity Good adhesion 	<ul style="list-style-type: none"> Electromagnetic compatibility Good dielectric properties Good flowability 	<ul style="list-style-type: none"> Thixotropy setting Good adhesion to plastics and metals Fast curing 	<ul style="list-style-type: none"> Electromagnetic compatibility Good dielectric properties Self-extinguishing in acc. with UL 94 V-0 	<ul style="list-style-type: none"> Low glass transition temperature Good flowability Self-extinguishing in acc. with UL 94 V-0
Possible solutions	WEVOPUR/ WEVONAT <ul style="list-style-type: none"> PD 79952 with 385 WEVOSIL <ul style="list-style-type: none"> 28002 (A/B) WEVOPOX/ WEVODUR <ul style="list-style-type: none"> 32702 with 5008 	WEVOPUR/ WEVONAT <ul style="list-style-type: none"> 512 FL with 900 PD 445 with 385 56992 with 300 RE WEVOSIL <ul style="list-style-type: none"> 20201 (A/B) 22006 FL (A/B) 22002 FL (A/B) 	WEVOPUR/ WEVONAT <ul style="list-style-type: none"> PD 52 with 385 895 with 600 78901 with 385 	WEVOPUR/ WEVONAT <ul style="list-style-type: none"> 56093 FL with 600 56992 with 300 RE 512 FL with 900 WEVOSIL <ul style="list-style-type: none"> 20201 (A/B) 22006 FL (A/B) 	WEVOPUR/ WEVONAT <ul style="list-style-type: none"> 56992 with 300 RE 56093 FL with 600 56003 FL with 900 WEVOSIL <ul style="list-style-type: none"> 20201 (A/B) 22006 FL (A/B) 22002 FL (A/B)

Material		PUR					POX	SIL							
		POLYURETHANE					EPOXY	SILICONE							
Resin / component A		WEVOPUR 60910 FL	WEVOPUR 56002 FL	WEVOPUR 56005 FL	WEVOPUR 60515 FL/40	WEVOPUR 68389 FL	WEVOPOX 2513	WEVOPOX 36001 FL	WEVOPOX 34020	WEVOPOX 32702	WEVOSIL 22006 FL	WEVOSIL 28001	WEVOSIL 22002 FL	WEVOSIL 22005 FL	WEVOSIL 26010 FL
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	WEVOSIL 28001	WEVOSIL 22002 FL	WEVOSIL 22005 FL	WEVOSIL 26010 FL
Mixing ratio (parts by weight)		100 : 10	100 : 8	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	10,000–15,000	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	2,500–4,000	4,000–8,000	paste-like
Reactivity at 22°C [min]*	Rotational viscometer / rheometer	30–50	20–30	40–60	25–40	20–30	30 (120°C)	180–240	100–150	60–80	90–120	hot curing > 100°C	50–60	50–70	50–60
Shore hardness 00/A/D	DIN ISO 76191:201202	-- / -- / 35–45	-- / -- / 40–50	-- / -- / 45–55	-- / -- / 70–80	-- / -- / 70–80	-- / -- / 90–95	-- / -- / 85–90	-- / -- / 85–95	-- / -- / 80–90	-- / 47–55 / --	-- / 60–70 / --	-- / 35–45 / --	-- / 55–65 / --	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 +180	-60 up to +165
E modulus [N/mm²]	DIN EN ISO 5272:201206	55	40	50	300	480	11,000	6,000	6,100	6,200	4	4.5	2	15	1.2
Thermal conductivity [W/m·K] (pressureless)	DIN EN ISO 220072:201512	1	2.1	1.55	1.6	1.4	1.4	1.1	0.81	0.33	0.5	0.35	1.0	1.5	3
Glass transition temperature [°C]	TMA ISO 113592:199910	-20	-31	-3	22	17	52	51	48	76	-50	-55	-45	-50	-55
Coefficient of expansion [ppm/K]	TMA ISO 113592:199910	50 < -30°C 115 > -10°C	32 < -10°C 108 > 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	100 < -70°C 240 > -30°C	140 < -70°C 210 > -30°C	80 < -70°C 200 > -30°C	60 < -70°C 160 > -30°C	60 < -55°C 110 > -30°C
Flammability	UL 94	V-0 6 mm**	V-0 2 mm	V-0 2 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 2 mm	V-0 4 mm	V-0 1 mm
Tensile strength [N/mm²]	DIN EN ISO 527-2:2012-06	2	4	4	13	15	81	40	54	57	1.3	4.5	0.6	1	0.3
Elongation at break [%]	DIN EN ISO 527-2:2012-06	28	22	34	15	13	0.9	1.0	3.1	1.4	90	100	55	20	25
Dielectric strength [kV/mm]	DIN EN 602431:201401	27	25	29	> 20	> 20	20	25	30	25	33	> 30	19.5	30	> 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 power electronics	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	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

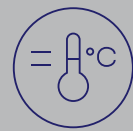
For a more detailed technical description of our systems please refer to the corresponding data sheets which are available for all products.

ADDED BENEFITS BY WEVO PRODUCTS

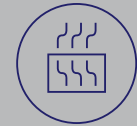
Our wide range of products offers a variety of benefits in addition to solving classic problems such as providing insulation and moisture protection for electrical installations.



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 offer customer support 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.

The manner in which you use and the purpose to which you put and utilise our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether our products, technical assistance and information are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale which are available upon request. All information, in particular all technical data and assistance, is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance and information. Any statement or recommendation not contained herein is unauthorised and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with any claim of any patent relative to any material or its use. No licence is implied or in fact granted under the claims of any patent.



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