Potting Compounds and Adhesives for Electrical Vehicles

Protection of Sensitive Charging Electronics

For the successful implementation of electromobility, not only the vehicles but also the associated charging infrastructure play a decisive role. Various technologies are currently used to charge electric vehicles. Wall boxes are used for private charging, while public charging is done mainly using cable-based charging stations incorporating DC (direct current) and AC (alternating current) technology operating at a wide range of power outputs. Wireless charging systems that utilize inductive technology are already in use – mainly, for now, in fork lifts, warehouse trucks and last-mile vehicles, although this technology would seem to have enormous potential, for buses and especially for taxi ranks. Aside from the charging process itself, an on-board-charger (OBC) in the vehicle authenticates the vehicle at the charging station, transforms alternating current into direct current, manages communication between the vehicle and the charging station, and manages the battery.

Wevo-Chemie has developed potting compounds and adhesives to reliably protect the sensitive electrical and electronic components in charging systems. According to the company, they meet the high requirements of these systems in terms of operating temperature and mechanical stress. The potting compounds and adhesives are offered based on polyurethane (PU), epoxy resin as well as silicone.

Because they are used outside, sensitive components are subject to changing and often challenging ambient conditions. The materials presented provide electrical insulation and prevent moisture from getting in. For instance, a water-repellent and flame-retardant potting compound has been developed with UL certification in order to protect charging plugs; it insulates the plug, which, among other things, protects users against electric shocks.

Thermal management also plays an important role, especially in fast charging stations that can have power outputs of up to 360 kW. Thermally conductive potting compounds and thermal interface materials based on polyurethane, epoxy resin and silicone help to channel heat quickly and safely away from transformers, capacitors and batteries to heat sinks and the surrounding environment. OBCs also contain power electronic components as well as transformers, chokes and capacitors, and these are getting hotter and hotter as they become smaller and more compact. Wevo has also developed special, thermally conductive potting compounds and gap fillers for these applications, which channel heat away quickly and can withstand temperatures of up to 160 °C.

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For the electronics of charging stations, Wevo offers temperature-stable adhesives and potting compounds based on silicone, epoxy resin and PU.© Adobestock; Goodluz