

Temperature-resistant and flame-retardant: new Wevo materials with high UL ratings

Ostfildern-Kemnat, Germany. Whether sensors, power electronics or transformers – lots of electrical and electronic components are exposed to high temperatures. This poses genuine challenges for the materials used, as they must not only be temperature-resistant, but also flame-resistant or self-extinguishing in the event of a fire. Several Wevo products have now been granted UL approvals and combine unusually high temperature resistance together with flame-retardant properties and high thermal conductivity. Wevo will be presenting details of these UL-approved products on Thursday, 15 April, at 3 p.m. (CET) in a webinar hosted by United Laboratories entitled “Fire-retardant polyurethane, epoxy and silicone resins for protecting and insulating E&E components”.

Increasing technical demands in terms of operating safety, higher energy density and therefore higher heat resistance combined with a decreased risk of fire are driving the electronic and electrical industry. Megatrends such as e-mobility, energy storage and smart grids require modern polymeric insulation materials. In the field of flame-retardant applications, approvals given by Underwriters Laboratories (UL) are considered a global and cross-industry prerequisite when it comes to selecting materials – the US organisation is known for its high standards with regard to ensuring product safety.

Wevo has sent a number of its potting compounds – some of which are totally new developed products – to UL for certification. The result: several of our flame-retardant polyurethanes have received RTI (Relative Temperature Index) approval, and one highly temperature-resistant epoxy resin has been certified to UL 94 V-0.

RTI certification refers to long-term temperature resistance. In the case of polyurethanes, this is usually a maximum of 130 °C, which corresponds to insulation class B – insulation classes are a system defined by international standards used to classify the maximum operating temperature of materials. For some time now, Wevo’s product range has included polyurethane potting compounds that exceed the RTI of 130 °C, among them WEVOPUR 403 FL with a certified RTI of 155 °C (insulation class F = min. 155 °C). However, the development of polyurethanes with such high temperature resistance requires a great deal of effort, which is why such products have to date been thin on the ground.

Wevo potting resin: exceptionally high RTI

Wevo is now gradually filling this gap in order to meet the demand for such products from the marketplace. Among the latest products to receive UL certification is WEVOPUR 60416 FL. The extensive testing programme the product was put through lasted more than 12 months and confirmed an RTI of 160 °C – an unusually high value rarely achieved with polyurethanes. In addition, WEVOPUR 60416 FL has a high thermal conductivity of 1.6 W/mK. Together with the very high temperature resistance, this results in the advantage that even at high ambient temperatures more heat can be permanently dissipated from the stressed components. This can then be useful, for example, in pottings of stators of electric motors as well as inductive components such as chokes or transformers for electrical applications.

In addition to temperature resistance, the product's flame-retardant properties also play an important role for many users with applications in areas with high temperature exposure. If UL certification in accordance with the UL 94 standard is required, this means, that the materials must be fire-resistant and rapidly self-extinguishing in order to delay or even prevent the spread of fire. The combination of flame retardancy and very high temperature resistance is extremely difficult to achieve as many additives used to achieve flame retardancy reduce a material's long-term temperature resistance. This poses a particular challenge to the development of epoxy resins – which can achieve very high temperature resistance thanks to their chemical composition – as it becomes increasingly difficult to achieve robust flame retardancy at higher application temperatures of up to insulation class H (180 °C).

Combination of high flame retardancy and temperature resistance

Wevo has succeeded in developing a highly resistant epoxy resin potting compound with high flame retardancy – while at the same time not using any halogenated flame retardants at all. WEVOPOX 36001 FL, in combination with the hardener WEVODUR 5001, has been certified to UL 94 V-0 for an application thickness of 2 mm. This means that the material burns for only a very short time after two flaming cycles and does not drip. As a special feature, the solution is the first epoxy resin from Wevo to offer temperature resistance up to 180 °C (insulation class H) combined with UL 94 V-0 approval.

The new polyurethane- and epoxy-based Wevo solutions are therefore suitable for use in electrical and electronic components that are operated continuously at higher temperatures and require flame retardancy. These include transformers, chokes, current and other sensors for electrical applications,

Press information

30 March 2021



power electronics components such as charging plugs, on-board chargers and electric motors for e-mobility and for automotive electronics in general.

Further information

Link to the webinar registration: <https://knowledge.ulprospector.com/11540/pe-webinar-fire-retardant-polyurethane-epoxy-and-silicone-resins/>

About Wevo

WEVO-CHEMIE GMBH is an international, independent, family-run company headquartered in Germany and with subsidiaries in Asia and the USA. Wevo develops and manufactures innovative potting applications as well as special bonding and sealing applications based on polyurethane, epoxy and silicone – primarily for applications in electrical and electronic components. Wevo products protect sensitive components against chemicals, vibration, foreign bodies, dust, moisture and high temperatures.

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