

New silicone sealant from Wevo for AEM electrolyzers and flow batteries

Ostfildern-Kemnat, Germany. With WEVOSIL 20000 A/B, WEVO-CHEMIE GmbH presents a silicone sealant designed for use in the alkaline environments of AEM electrolyzers and flow batteries. In addition to its chemical resistance, the material offers mechanical stability and optimised electrical properties. Application can be manual, semi- or fully automated. Together with the coating expert Laufenberg GmbH, it is also possible to manufacture flat gaskets with different property profiles.

Alkaline electrolytes, elevated operating temperatures, sustained compression – in AEM (anion exchange membrane) electrolyzers and certain flow batteries (such as organic redox flow batteries), conditions for sealants and adhesives are highly demanding. WEVOSIL 20000 A/B has been specially developed for these environments and ensures the reliable sealing of stack components. The product can also be used as an adhesive if required.

Liquid application by dispensing or screen printing

For initial testing and manual applications, WEVOSIL 20000 A/B can be applied in liquid form with standard twin-cartridge systems thanks to its 1:1 mixing ratio. In series production, the material is usually applied directly to cell components such as bipolar plates, the gas diffusion layer, the flow frame or the membrane electrode assembly (MEA). Depending on the groove configuration and component design, different sealing geometries with variable widths and heights can be achieved. Due to its low viscosity, WEVOSIL 20000 A/B can also flow into undercuts.

Processing via dispensing or screen printing also supports an efficient, scalable production process. Moreover, curing at elevated temperatures of 100 to 140 °C in a convection oven or in combination with an IR (infrared) heater can shorten cycle times. The material then cures tack-free within 1 to 2 minutes.

Manufacturing prefabricated flat gaskets

Together with Laufenberg, flat gaskets made from WEVOSIL 20000 A/B are manufactured using a continuous roll-to-roll (R2R) process, with or without a carrier film. The coating process makes it possible to produce very thin and flexible gaskets. The material is applied in a layer approximately 50–500 µm onto either an adhesive or a non-adhesive carrier film.

Adhesive carrier films can be coated on both sides with the silicone sealant, which allows for greater layer thicknesses. If a non-adhesive film is used, for example a fluorine-based one, the WEVOSIL layer can be peeled off the film after curing. This creates a flat gasket without a carrier film.

Users can cut individual seals in the required design from this prefabricated sheet material and install them in the stack, making it a simple matter to produce test cells and short stacks. On request, Laufenberg also manufactures flat gaskets according to individual customer and component requirements.

Sealant for AEM electrolysis and organic redox flow batteries

Alongside the processing characteristics and chemical resistance, the mechanical properties contribute to long-term sealing performance. In order to withstand the continuous compression within the stack, WEVOSIL 20000 A/B exhibits a low hardness of approximately 50 Shore A, high elasticity (elongation at break >100 per cent), a low compression set of 2 per cent at room temperature and <10 per cent at 100°C.

The good dielectric properties support both electrical insulation and voltage resistance. These include a dielectric strength of >20 kV/mm and a high volume and surface resistivity of $>10^{14} \Omega \cdot \text{cm}$. The silicone sealant therefore helps to reduce unwanted creep and shunt currents. In addition, the formulation is free from per- and polyfluoroalkyl substances (PFAS).

Material solutions for hydrogen and energy storage applications

WEVOSIL 20000 A/B expands Wevo's product portfolio for hydrogen and energy storage applications with a silicone sealant designed for alkaline environments. Specially developed materials based on polyurethane and epoxy resin are already available. These three product chemistries enable the

development of precise solutions for different application and processing requirements. Collaboration with partners from the worlds of industry and science also plays an important role in this context.

Image description and source

WEVOSIL 20000 A/B: silicone sealant for stack components in AEM electrolyzers and organic flow batteries (Image: © WEVO-CHEMIE GmbH, AI-generated).

(Please note that the image may only be used in the context of this press information).

About Wevo

WEVO-CHEMIE GmbH is an independent manufacturer in the field of customised potting and casting compounds as well as adhesives and sealants based on polyurethane, epoxy and silicone – primarily for use with electronics and electrical engineering. Wevo products protect sensitive components against chemicals, vibration, foreign matter, dust, humidity and high temperatures. We supply to more than 1,250 customers in over 50 countries from our headquarters near Stuttgart, Germany, and through companies in Asia, China and the USA.

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