

Laufenberg and Wevo-Chemie develop process for the continuous production of flat hydrogen gaskets

Krefeld, Germany and Ostfildern-Kemnat, Germany. Currently, different concepts and materials are used for the reliable sealing of fuel cells and electrolyser stacks. These include prefabricated flat gaskets or O-rings that are predominantly manufactured by injection moulding or other moulding processes – methods that are both time- and cost-intensive. But now, coating experts Laufenberg GmbH and polyurethane, epoxy and silicone specialist WEVO-CHEMIE GmbH are introducing a process that enables the continuous, high-throughput, roll-to-roll production of flat elastomer gaskets. This offers manufacturers of fuel cells and electrolysers a scalable way to reduce costs, while also enabling efficient, automated production processes.

Sealing fuel cell and electrolyser stacks as well as redox flow batteries has until now required individual moulds and discontinuous manufacturing. A new process from Laufenberg and Wevo permits the continuous production of flat gaskets – significantly increasing manufacturing efficiency for hydrogen and battery components.

The process at a glance

Wevo's specially developed two-component elastomers are mixed and applied in liquid form to a carrier film using Laufenberg's coating equipment. Coating takes place in a roll-to-roll process and can be applied on one or both sides.

Curing takes place in a multi-zone tunnel oven, with the temperature of each zone individually adjustable to the material. Optional pre-curing using infrared (IR) emitters shortens the curing time and removes any air bubbles. Line speeds from 0.5 to 50 m/min allow flexible scaling. Customers receive the tack-free, fully cured material either as a roll or as precision-cut gaskets.

With this technique, layer thicknesses from 20 µm to 2 mm can be achieved for pure elastomer gaskets. Combined with carrier films, hybrid seals with a total thickness from 70 µm to up to 4 mm – depending on the core carrier – can be produced. This makes it possible to manufacture both very thin and highly durable seals.

Choice of carrier film and elastomer

The choice of elastomer and carrier film depends on the type of electrolyser, fuel cell or redox flow battery. Here, manufacturers of fuel cells and electrolyser stacks benefit from the many years of expertise of both of companies.

Laufenberg contributes its know-how in coating silicone materials. Where a pure elastomer seal is required, a carrier film is selected that can be removed after the curing of the Wevo material. Alternatively, the carrier film remains in place to produce a hybrid seal. This is advantageous, for example, with very soft sealants, to enhance dimensional stability and pressure resistance.

Wevo has been developing special silicones and modified polyurethanes with low hydrogen permeation for many years. These are already used successfully as liquid sealants and adhesives in fuel cells and electrolyser stacks. Application has typically involved dispensing sealing beads on to bipolar plates or flow frames using screen-printing or dispensing. The process developed jointly with Laufenberg now enables the production of prefabricated gaskets in a roll-to-roll process. Pot life, curing time and other material properties are specially adjusted and can be individually adapted upon request.

Meet the experts

Wevo will be exhibiting at hy-fcell in Stuttgart from 7–8 October, while Laufenberg will be at the Hydrogen Technology Expo in Hamburg from 21–23 October. Experts from both companies will answer questions on the new process, material selection and process integration.

Image description and source

Carrier film coated with elastomer for flat hydrogen seals (Image source: Laufenberg GmbH).
(Please note that the image may only be used in the context of this press release).

About Laufenberg

Laufenberg GmbH is a family-owned company based in Krefeld, Germany, with over 260 employees. Since 1947, Laufenberg has specialised in the production of silicone-coated paper and film as well as since over 10 years highly specialised components for hydrogen technology, including catalyst coated membranes (CCM) for PEM fuel cells and electrolyzers, and also in the production of silicone-based gaskets for both fields of application. The company deploys state-of-the-art, roll-to-roll coating technology to deliver tailor-made solutions for industrial applications at an international level.

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 electrical and electronic components. 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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