

## Press release

**Date:** 7th November 2022

Make mould growth in the window rebate a thing of the past / Innovative sealing profile from Deventer successfully patented / Customer-specific design and production / Suitable for all profile systems and frame materials / Roto Sales provides advice about use

### **Ready for series production: diffusion-capable central gasket from Deventer**

**Leinfelden-Echterdingen** – Jürgen Daub is pleased that “Deventer has managed to get a sealing profile ready for series production that makes it possible for window manufacturers to avoid costly disputes with customers, homeowners and tenants in many cases.” His responsibilities include Research & Development at Deventer. Used as a central gasket, the new diffusion-open sealing profile improves moisture removal in the hardware rebate in such a way that it can be described as a “true revolution in the fenestration industry”. Daub explains that the problem of mould growth in the rebate may be a thing of the past if the new profile type gains traction as a central gasket.

### **Central gasket as the focus of the ift**

Back in 2009, ift Rosenheim set out a key fundamental rule for constructing a window with optimal structural physics: “The central gasket must be more diffusion-open than the overlap gasket on the room side.” Over the years, the institute has investigated cases where moisture in the window rebate caused damage. The institute is seeing an increasing number of cases where this moisture came from sources inside the building, instead of outside. “It’s therefore indisputable that the rule stipulated in 2009 makes sense. But it’s remarkable, to say the least, that this issue had been largely ignored until that point,” believes Daub. Against the backdrop of this fundamental rule, Deventer initiated an extensive research project which, due to clearly being highly relevant, received funding from the “Central Innovation Programme for Small and Medium-Sized Businesses” (ZIM) federal initiative.

### **A window with added value**

How does a sealing profile have to be designed so that a window is still protected against rain and wind, heat loss and noise yet so that moisture can diffuse out of the rebate via the central gasket? Deventer found the response to this question while working on the research project. The sealing profile innovation that was developed has since been protected by a patent and can be produced to be compatible with all common profile systems. “If window manufacturers have the confidence to charge customers a little bit more for the real added value that they explained to them, Deventer is ready to take on the role as a reliable supplier to them.”

### **Reducing moisture**

Mould can form when the air humidity on a surface is around 80% or more for three days. “After this time, fruiting bodies are formed, which look like a black bloom,” explains Daub. There is therefore a “critical moisture value” which promotes mould growth in the window rebate, for example. This is why Deventer simulated the effect of the seasons, temperature fluctuations and moisture formation in various window profiles using different gaskets on climate difference test rigs at the Fraunhofer Institute in Stuttgart. With a newly developed TPE gasket, the company ultimately managed to reduce the amount of moisture in the hardware rebate by up to 12%. It’s no exaggeration to say that this changes everything.

**Making diffusion possible**

Daub describes the development task as follows: "We had to ensure that our new gasket would keep the air humidity in the window rebate below 80% at all times if possible. This is the case when it's possible for the moisture to dry at all times, except for very wet weather conditions." The company was therefore looking for a central gasket that enables rebate ventilation provided that the natural requirements for diffusion are met, in other words when the outside air is drier than the air in the window design. Daub summarises the research work as follows: "Our research project achieved the best conceivable outcome, as we finally specified the properties of the optimal sealing profile in this context and managed to prove its effectiveness in a laboratory."

**Greater reliability for old and new buildings**

Manufacturers who want to protect their customers and end users from unpleasant discussions about "black spots" in windows are advised by many experts and specialists to, in future, equip their windows with a central gasket that is actually capable of diffusion. "With the perfect components, our industry can manufacture building elements that are more capable of tolerating homeowners' suboptimal ventilation habits," emphasises Daub. This is set to become even more important as, in future, most windows will continue to be installed when renovating buildings that cannot be retrofitted with an automatic ventilation system to prevent risks. "The aim should be to construct new windows with correct structural physics so that their gasket level does not have to be subsequently modified and interrupted to reduce vapour pressure."



Professor Ulrich Sieberath was appointed as head of ift Rosenheim in 2004 and advises its management to this day. He sits on many standardisation committees and to this day still wonders why so few window manufacturers have adopted the ift's recommendation from 2009.

"I still clearly remember the first cases of damage on timber windows, around the turn of the millennium, which were clearly caused by moisture from inside the building. We looked into the problem immediately and systematically investigated the cause of damage cases, which increased over subsequent years. Initial trials with just a circumferential overlap gasket on the room side resulted in improvements, but not the successful outcome we were after. By 2009, it was clear to us that a central gasket which is not capable of diffusion is one of the main causes of moisture build-up in a window. Simply notching the central gasket according to the principle of "more tightly sealed on the inside than the outside" brought technical drawbacks, however. We told the industry about this. Deventer has developed a promising solution. I've seen the examination reports and I think that the company has found a good solution here. A gasket that can do everything that a conventional gasket is capable of but without causing moisture to be trapped in the rebate. Window manufacturers often don't know which building the windows they have just produced will later be installed in. We should therefore take the opportunity to prevent complaints by using a central gasket that is actually diffusion-capable. However, I would also like to emphasise that even a good window design and the diffusion-capable gasket are not enough to prevent condensation and structural damage due to a lack of ventilation and poor planning with regard to structural physics."

**Image:** ift

**Ulrich\_Sieberath.jpg**



Sven Gallmann is an internationally certified expert in accordance with DIN EN ISO / IEC 17024 and managing director of SHG Sachverständigenbüro in Hochrhein. Together with his colleagues at Swiss company fensterinform gmbh , he wrote a comprehensive report about the causes of condensation in window designs. "Getting rid of moisture" is, in his opinion, a crucial first step in resolving the problem.

"Moisture in the window rebate causes problems like mould and ice formation, ultimately leading to corrosion. Moisture used to come mostly from outside, but nowadays in modern, tightly sealed buildings, excess pressure causes damp air to be pushed right into the rebate when the windows are closed. If we can transport at least the majority of the moisture that enters the rebate in this way to the outside with a diffusion-capable central gasket, that already represents clear progress. However, I won't stop telling homeowners about the causes of moisture ingress into the rebate and the condensation caused by this. In very tightly sealed new buildings, we need systems which continuously reduce the increasing pressure in the sealed building. According to the old rule of thumb, no moisture should be expected in the window rebate at an indoor room temperature of 22 °C and air humidity of 50%. However, in my experience, this only holds true down to an outside temperature of 0 °C. What's more, vapour pressure in tightly sealed homes with an open staircase increases from one floor to the other. As a result, we find moisture in the window design, for example in attic rooms on cold winter days, even when hardly any air humidity is produced there."

**Image:** SHG Sachverständigenbüro Hochrhein

**Sven\_Gallmann.jpg**



Master glazier Jürgen Sieber owns a window construction company in Stetten am kalten Markt, is state guild director of the Association of Glazing - Windows - Facades, is a publicly appointed and sworn expert and a freelancer lecturer at the Window Academy in Karlsruhe. He says that he has been dealing with complaints relating to moisture in the window design for almost 20 years.

“The energy-efficient houses that we build today are a little bit like a pressure cooker: a lot of moisture and high vapour pressure on the inside; low pressure and sometimes more, sometimes less moisture on the outside. In a low-energy house, if you don’t have an automatic ventilation system installed or turn it down in winter, the warm, damp room air is practically forced to find a way out. Insulated masonry, in other words an external wall that is 30, 40 or 50 cm thick, is not suitable for this. By contrast, the joint between the frame and window sash is a possible “way out” despite the gasket. This mostly becomes a problem when the air humidity can no longer “move on” because the central gasket acts as a barrier and the moisture turns into condensation in the rebate. Window rebate vents can exacerbate the problem because they significantly reduce the temperature in the rebate even more on cold winter days. This leads to the familiar issues of mould growth or, even worse, rotting of timber windows and corrosion on the hardware. This is especially the case when their surfaces do not meet the requirements of corrosion class 5. I hope that as many system suppliers as possible will choose to use a diffusion-capable central gasket. That would save us a lot of hassle and do away with the need to write so many reports.”

**Image:** Fensterbau Werner Sieber

**Juergen\_Sieber.jpg**



Jürgen Daub, Head of Application Technology, Research and Development at Deventer GmbH, is happy with the successful completion of a research project which lasted several years. The diffusion-capable central gasket from Deventer for windows of all frame materials is now patented and ready for series production. "Using a diffusion-capable central gasket to reduce moisture in the window rebate reduces the risk of corrosion and mould, which are problems that occupy many experts and judges. Differential pressure measurements must be performed to establish the impact our gasket has on the air pressure in the building. However, there is no test set-up suitable for this purpose at present."

**Image:** Roto

**Juergen\_Daub.jpg**



After renovating existing buildings to high energy performance standards, more damp room air can be pushed into the window rebate, leading to problems with condensation and mould there.

**Image:** Adobe Stock

**House\_renovation.jpg**



The dashed line shows where exactly the material properties of the patented sealing profile have been optimised to allow moisture to diffuse out of the window rebate.

**Image:** Deventer

**Timber\_profile\_with\_patented\_gasket.jpg**



Deventer can produce a diffusion-capable central gasket to match any profile system. A contractual agreement regarding a minimum purchase quantity is required.

**Image:** Deventer

**Diffusion\_capable\_sealing\_profile.jpg**

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