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The future of filtration: greater efficiency and cost-effectiveness

GKD presents latest developments at FILTECH

GKD – Gebr. Kufferath AG will present not just one, but four key topics in the run-up to FILTECH in Cologne. What's more, the leading international specialist for mesh filter and process belt technology will introduce two of these topics in presentations at the accompanying conference: the latest findings on numerical simulation of the bubble point and the Porometric mesh family developed using simulation. The single-layer mesh structure of ODW6 for water management and the results of current studies on cleaning behavior in filtration processes are also key features of their trade fair appearance.

This array of practical issues once more underlines GKD's role as preferred solution partner for filtration tasks in municipal and industrial water processing.

Numerical simulation of the bubble point

For cylindrical pores, the pore diameter is calculated on the basis of the pressure value that was determined with the standard bubble point test in accordance with BS 3321 and ISO 2942. As mesh pores are not cylindrical, time-consuming lab tests have until now been required to determine a capillary pressure constant for calculating the pore diameter. GKD has succeeded in determining these capillary pressure constants with numerical tools using a multiphase simulation model. For each mesh, the Düren-based filtration expert uses the simulation and the bubble point pressure measured to determine the largest pore with great speed and precision. At FILTECH, GKD presents newly discovered dependencies. Starting with the bubble



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point value and taking the capillary pressure constant that was calculated individually for each mesh, the company can use these dependencies to derive the mesh aperture. This makes it possible to check the geometric pore aperture or correct pore aperture distribution quickly and accurately during the production process.

Porometric mesh

Another result of the virtual development procedure at GKD is the Porometric mesh family. The three-dimensional weave meets key requirements of industrial filter processes. With constant volumetric flow, it reduces local pore velocity by up to 40 percent. The significantly lower abrasion that this entails means considerable efficiency improvements in oil and gas exploration. This property won Porometric the accolade of world's best filter medium of 2016 with the renowned *AFS New Product of the Year Award*. The three-dimensional slit structure with rectangular pores enables high porosity – with the same separation rate, permeability is three times greater than that of conventional meshes. At FILTECH, GKD presents **Porometric 25 µm** for water filtration as the latest product of this mesh family, which is unparalleled in its ratio of pore aperture to permeability. GKD also sets new standards with another product: a highly permeable sea-water-resistant mesh with a pore aperture of 24 µm – that's 10 µm finer than all other known filtration meshes for ballast and sea water filtration. And it can be used in any cartridge filter.

ODW6 for high throughput with extreme separation rates

As a surface filter with unequalled separation rates and permeability, the single-layer mesh structure of the ODW6 made from stainless steel reliably separates particles > 6 µm. Significantly more stainless steel wires across the surface area than conventional meshes lend it mechanical strength and exceptionally high pore stability. This robustness of material and structure



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qualifies it for the high throughput that is typical in water management. Slot-shaped pores on the mesh surface and larger pores inside the fabric ensure secure particle retention, strong dirt-holding capacity, and minimal tendency to block. Long service life and greater process efficiency are clear evidence of this. Thanks to simple cleaning through backwashing, the ODW6 mesh is also incredibly easy to maintain. As a considerably higher-performance replacement for the synthetic filters that have been used commercially in water management to date, this innovative mesh type can be used in all common disc filtration systems. As such, ODW6 mesh is predestined for use in the fight against microplastics finding their way into urban waters. When used in sewage plants, filters fitted with ODW6 successfully retain microplastic particles $> 6 \mu\text{m}$ with no reduction in flow rate. At the required flow rates, previous filter media only permitted particle retention $> 20 \mu\text{m}$.

Optimized cleaning in filtration processes

In cartridge and disc filters in industrial solid/liquid separation, the cake discharge with particles $< 10 \mu\text{m}$ is a key factor in system and process efficiency. In suspensions with low solids content, the interaction between release and cohesion of the filter cake at an optimum backwashing rate is a major challenge. The Karlsruhe Institute of Technology KIT therefore examined the release properties of thin particle layers with different filter media from a variety of manufacturers. As a result of the pressure pulse, a thin filtrate film removes the first particle layer so that the filter cake slides off. The better the filter medium regenerates, the greater the improvement in process performance. At the same time, a reduction in the required backwashing volume improves the filtrate and system efficiency. In the comparison of the different filter media with $25 \mu\text{m}$ separation rate, the stainless steel optimized dutch weaves from GKD enable a considerably lower backwashing volume than the polymer filters they were tested against. By far the best release properties and backwashing volumes of all the metal



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and synthetic meshes tested at KIT, however, were achieved by the newly developed Porometric mesh. Both mesh structures, optimized dutch weaves and Porometric, are mechanically robust, can be continuously regenerated, and do not become blocked, meaning that they provide longer service lives and greater efficiency than conventional synthetic meshes. At the same time, the lower pump performance required reduces energy consumption and increases the durability of the components. This considerable advance in efficiency also qualifies optimized dutch weaves and Porometric meshes for every other filter application. The experts from GKD will be on hand for the specialist audience at FILTECH to answer any further questions on the latest findings and products from the company.

Presentations by GKD – Gebr. Kufferath AG at FILTECH 2018

- **Dominik Herper:**
Simulation-enhanced bubble point testing for woven wire meshes
Session: F2 - Filter Media - Quality Control and Pore Size Analysis II
March 13, 2018, 2:45 pm - 4:00 pm

- **Markus Knefel:**
Engineering an ultra-high flow weave – Latest achievements in woven wire mesh technology
Session: F4 - Filter Media - Numerical Methods for Optimized Media Design I
March 14, 2018, 4:45 pm - 6:00 pm



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GKD – Gebr. Kufferath AG at FILTECH 2018

March 13 – 15

Kölnmesse

Hall 11.1

Stand D38

7.008 characters incl. spaces

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As a privately owned technical weaver, GKD - Gebr. Kufferath AG is the world market leader in metal, synthetic and spiral mesh solutions. Three independent business divisions bundle their expertise under one roof: Industrial Mesh (woven metal mesh and filter solutions), Process Belts (belts made of mesh and spirals) and Architectural meshes / Transparent media façades (façades, safety and interior design made of metal fabrics). With its headquarter in Germany and five other facilities in the US, South Africa, China, India and Chile – as well as its branches in France, Spain, Dubai and worldwide representatives, GKD is close to markets anywhere in the world.

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