

## **For better process efficiency and product quality**

### *Optimized Dutch Weave from GKD*

by Hans Schlebusch

**The solid/liquid filtration sector is faced with major challenges. More demanding process requirements and growing cost pressures are forcing the industry to act. Filter media are becoming the decisive success factor in this area because of stricter environmental legislation and constantly increasing expectations regarding filtration times. Better and better solutions are expected, particularly in the < 25 µm filter media range. Multifunctional fine steel filter meshes are now an indispensable element in many applications. To exploit the potentials to the full and meet the stricter regulations, an examination of the differences between the currently available mesh types is required. The precision of filtration, increased filtration capacities and increased durability are the relevant levers for application-specific optimisation. Optimized Dutch Weave from GKD – Gebr. Kufferath AG has proven itself in many situations. It increases the filter performance of the system, resulting in correspondingly improved productivity and significantly lower production costs. Optimized Dutch Weave (ODW) is used in numerous applications, e.g. fine filtration of treated waste water, high-viscosity motor oils and polymer filtration. The pore size as well as the retention and filtration characteristics of the mesh design is tailored precisely to the specific application. GKD's SOLID WEAVE business unit**

**specialises in the customer-specific development and production of this mesh to create effective solutions for complex tasks.**

Optimized Dutch Weave is based on a plain weave pattern. Its basic design consists of a relatively low number of warp wires (longitudinal wires) and significantly more weft wires (horizontal wires). The warp wires have a considerably larger diameter than the weft wires. The precise optimisation of diameter and thread density to the particular application enables the creation of filter meshes that achieve a significantly higher permeability than comparable filter media at an equivalent retention rate. Optimized Dutch Weave from the SOLID WEAVE brand is characterised by rectangular pore geometries. This design defines the retention rate (based on a round particle) via the short side of the rectangle. In contrast to other filter media in which an individual pore can be completely closed by a particle directly touching the mesh surface the ODW design enables several particles to be arranged next to each other at the pore without completely blocking it. This means that the pore remains active, and because of the lower increase in pressure has a significantly higher dirt-holding capacity at comparable dirt load than other types of mesh of the same pore size. In practice this characteristic results in significantly longer filtration times without the need for replacement or regeneration of the filter medium. The combination of these design benefits, i.e. higher permeability together with improved dirt holding capacity, make Optimized Dutch Weave suitable as a particularly high-performance filter medium for numerous solid/liquid filtration tasks as well as for high-viscosity applications with retention rates < 25µm.

### **Efficient fine filtration of treated waste water**

The treatment of contaminated water is regulated by legislation in many countries. The requirements laid down for treated waste water are, however, constantly being raised. The permitted concentration of fine particles in waste water in the 10 to 50 µm range has been significantly reduced. Large-scale filter units that work with filter discs are used to separate these particles in the micrometer range in waste water filtration systems. In order to reduce energy consumption, they operate solely with the hydrostatic pressure within the tanks. The core element of the filter discs used in these systems are high-performance filter meshes. GKD's 10µm and 20µm ODW meshes have proven successful in many applications and offer an optimal relationship between flow rate and filter area. With retention and permeability characteristics tailored to the specific deployment conditions, they significantly improve filter performance. In addition to their high level of efficiency, the reliable cleaning behaviour of the installed filter media is vital for the long service life of the filter units. The filter systems work with integrated continuous cleaning based on backwashing. Because of the specific mesh design of the Optimized Dutch Weave the particles are directly separated at the surface and not within the mesh level. The result is even more outstanding cleaning, a continuing high level of filter performance and extended filter unit lifespan.

### **Robust fine filtration of high-viscosity motor oils**

To ensure the performance of modern motor oils, it is essential for the oil to be clean at all times. Combustion residues and abraded matter contaminate motor oil, which impairs the service life of the

motor. Large diesel engines, e.g. those used for ship propellers and emergency generators, benefit from the particular characteristics of Optimized Dutch Weave in filtering oils that are used in high volumes. In order to avoid machine failures and expensive downtimes, the oil is cleaned in a continuous filtration process with filter finenesses in the 10 µm to 20 µm range. This task is normally resolved with filter backwash systems working in 24-hour operations. Optimized Dutch Weave, which is tailored precisely to this application, is the filter mesh of choice even in such situations where space is restricted. In addition, the use of stainless steel ensures the temperature and corrosion resistance required in this environment.

#### **First-class polymer filtration**

The quality of extruded films and staple fibres depends to a large extent on high-quality polymer filtration. In the melt process hard particles can arise as a result of poorly dispersed additives or contamination, which if not filtered adequately will impair the quality of the end product. In addition, gels must be retained or divided when filtering in screen changers fitted with filter disks designed for the specific application. Where filtration is inadequate, performance defects ("specks") arise in the film manufacturing process, whereas with fibres the result is an increased rate of yarn breaks in the spinning process. The high viscosity of the melt in polymer filtration requires as fine a filtration as possible together with as low a differential pressure as possible. Too high a flow resistance increases the frequency of screen replacement. In addition to the associated increased consumption of filter media there is also the risk of short-term pressure peaks or abrupt changes in pressure conditions in the entire system. In order to minimise these risks, the

requirements in terms of the filter media used are correspondingly high. The required filter finenesses of  $< 20 \mu\text{m}$  severely limit the choice of suitable filter meshes. GKD Optimized Dutch Weave not only meets these requirements but with various polymers also significantly improves the processes. With the optimized mesh designs of the SOLID WEAVE brand it has been possible to significantly increase the filtration fineness while still retaining the differential pressure at the screen changer. The finer mesh structure has also considerably improved the filtration efficiency for gels since this significantly decreases the size and retained the gels without an extreme shear action by the filter medium.

#### **Outstanding set of advantages**

In use throughout the world, SOLID WEAVE Optimized Dutch Weave combines high dirt-holding capacity with increased filtration time for applications in the  $< 25\mu\text{m}$  range. Thanks to its special geometry it enables significantly improved permeability, generates outstanding cleaning results and does not block up as easily as conventional meshes. With decades of experience in the customer-specific design of filter media, GKD is the ideal one-stop solution provider for challenging customer processes.

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#### **GKD – WORLD WIDE WEAVE**

As a privately owned technical weaver, GKD - Gebr. Kufferath AG is the world market leader in metal, synthetic and spiral mesh solutions. Four independent business divisions bundle their expertise under one roof:



WORLD WIDE WEAVE

Industrial Mesh (woven metal mesh and filter solutions), Process Belts (belts made of mesh and spirals), Architectural meshes (façades, safety and interior design made of metal fabrics) and Mediamesh® (Transparent media façades). 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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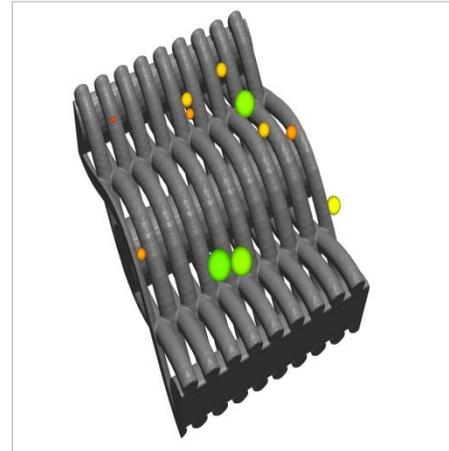
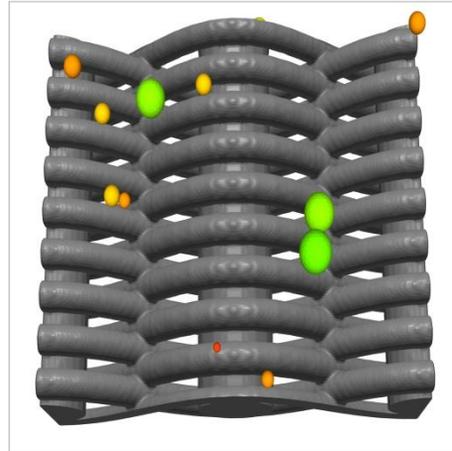
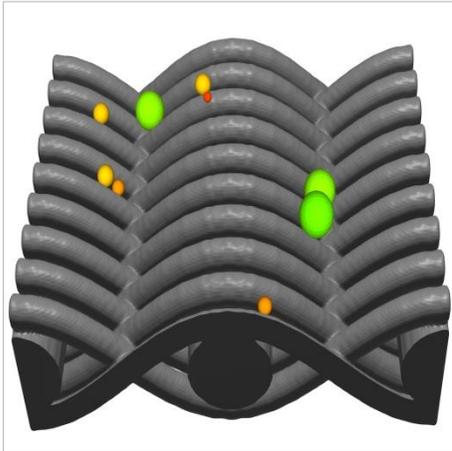
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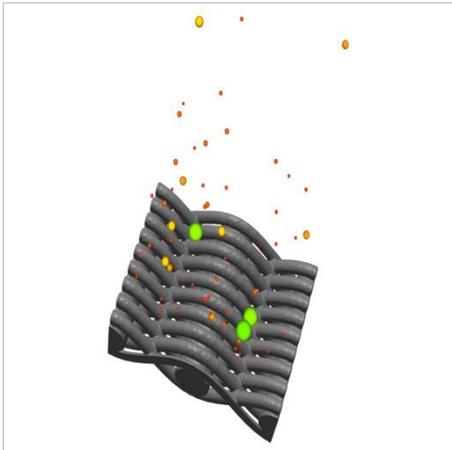


Pictures 1-3: Optimized Dutch Weave from GKD increase the filtration capacities of systems in the solid/liquid filtration.

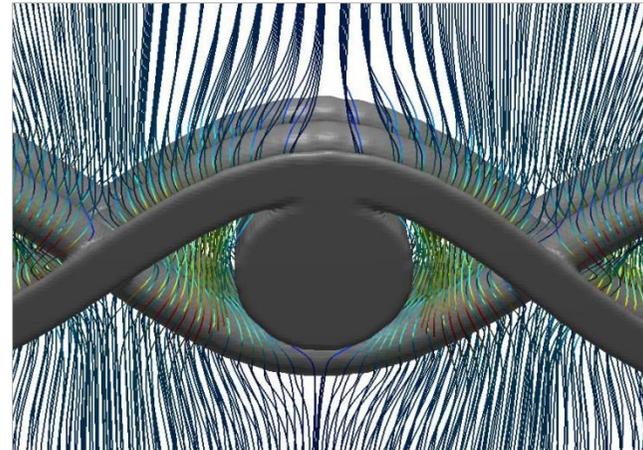
Pictures 1-5 © GKD

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Picture 4: Optimized Dutch Weave are characterised by high flow rates and a lower increase in pressure.



Picture 5: Side view of a simulation of Optimized Dutch Weave.

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