

Innovation in medical textiles: why European filtration manufacturers are leaders in the field

European manufacturers are at the forefront of the technical textiles and nonwovens market. Reports predict that the European technical textile market is expected to witness growth at a rate of 10.5% in the forecast period of 2021 to 2028, while the medical filter market in Europe is predicted to grow from US\$1,12,166.63 thousand in 2021 to US\$1,45,156.91 thousand by 2028.

With medical textiles long emerged as a specialist field within the industry, along with the significant increase in the amount of research attention it has attracted over the past 20 years, the European market has been particularly focused on medical textiles based on biomaterials.

Biocompatible medical textiles – comprising fibrous and nonwoven nontoxic materials that are compatible with living tissue or systems – are regarded for their flexibility and strength. They have become fundamental to the successful function of a range of medical devices. And as healthcare needs evolve, demand for these types of textile-based products has increased across a wide range of applications, including within the pivotal role of filtration.

According to Jérémie Weber, regional market manager at leading global manufacturer of precision medical fabrics Sefar: “Filtration fabrics are mainly used in healthcare applications as security filters. The main fields are in infusion and transfusion applications, where the filter is used as a barrier for particles (e.g. glass or rubbers out of packaging) or blood cell clots.

“Another important application is dialysis. Here the filter is used in bicarbonate cartridges to avoid the outcome of powder particles. But no matter what the application, the key requirements in effective filtration products are a uniform pore size to ensure filtration efficiency and pass-thru level.”

Application innovation

End uses for filtration fabrics are far-reaching. Commonly, they are required during open-heart surgery, where a complex system of medical devices temporarily replace heart and lung functions. Vital components of this extra-corporal circuit are precise filters that are integrated into the venous/cardio reservoirs, oxygenator arterial filters and blood bags. Here, monofilament fabrics are used to ensure patient safety.

Woven filtration fabrics also play an essential role in infusion. The function of the filter is to retain large particles that might be present in the infusion solutions (e.g. aggregated nutrients and pharmaceutical compounds) or which may originate from the infusion bag or bottle. Standards require that the filter fabric must retain particles greater than 20 microns with an efficiency greater than 80%.

According to Weber: “The main products Sefar has developed for blood filtration are the fabrics used in transfusion with high open areas (e.g. PA6.6 fabric with 200µm pore size and 47% open area), as well as new high performance filters with a pore size of 40µm and a high open area (up to 40%) to increase pass-thru and reduce the pressure drop in the extracorporeal blood circulation.”

But filtration applications don't stop there.

Sefar, for example, converts its monofilament filtration product MEDIFAB® into a range of component pieces for the healthcare industry. MEDIFAB® is used as filtration, spreading, or drainage media in applications such as perfusion, cardiopulmonary filtration, diagnostics, and biopsies, as well as in eye surgery, air filtration, embolic protection, composite filters for bacteria and viruses (with additional nano-membranes), and fat filtration for cosmetic procedures. In all of these, monofilament fabrics provide the best results, reducing risks for patients and protecting them from the risk of an emboli or cerebral damage.

Some of the company's latest developments are high throughput fabrics for blood filtration in combination with hydrophilic, permanent, and biocompatible surfaces. This continuous innovation, customer focus and problem-solving philosophy has made Sefar one of Europe's leading suppliers of medical filtration and diagnostic solutions.

From customisation to lowering costs

Sefar MEDIFAB® open mesh fabrics are woven structures composed of monofilament yarns, typically polyester (PET) and polyamide (PA). The materials are FDA-compliant and pass all relevant biocompatibility tests.

The range can be custom tailored to meet the exact needs of the medical device manufacturer and since these fabrics are consistently tested to meet the highest of quality standards, the Sefar MEDIFAB® label also guarantees cleanliness and biocompatibility in the finished product.

Additional benefits include precise fabric dimensions, homogeneous material properties, an exceptional lot-to-lot consistency, well-defined surface characteristics, excellent particle retention efficiencies, high wicking rates due to specific weave constructions, good wettability thanks to a hydrophilic coating, and a low protein binding classification.

What's more, if textiles can deliver improved performance that results in less treatment time, it can translate to lower prices.

Setting new standards

Sefar set the new standard in arterial filtration when it introduced the MEDIFAB® 07-40/35. With 35% open filter area, the fabric reduces the pressure drop of the arterial line blood filter by more than 25%.

Meanwhile, the MEDIFAB® 07-40/40 High Performance fabric achieves a high open area of 40% with unaffected mesh opening of 40 µm. Using this fabric, the performance of an arterial filter can be increased by 60% without changing the design of the device.

In arterial filters, the fabric is typically pleated so that a high filter surface occupies a smaller volume. Sefar developed new pleating methods to enhance this effect. This allows the free space between filter surfaces to be maintained whilst significantly reducing the volume occupied by the filter element. The combination of the new capabilities results in a very important reduction in priming volume, as well as in extracorporeal blood volume.

Ensuring a patient's safety and the requirement set out in ISO 15675 requires a filtration efficiency of more than 80% of micro aggregates that exceed 40 µm. Sefar's arterial filter fabrics fulfill this requirement irrespective of the open area.

Market prospects

As a result of changes in demographics, including the ageing of the population in Western European, market growth rates here are above average, and the prospects for medical textiles are even better.

After all, we are living in an aging population and life expectancy is increasing, and with this increase comes a rise in the prevalence of long-term disease and other conditions. These factors all compound the demand for innovation and intervention in medical textiles to provide improved therapeutic benefits.

Sefar is at the heart of that innovation, offering a superior manufacturing process, global distribution system and short response time, to make it the leading supplier of filter components for medical devices. As such, major manufacturers across Europe – and the globe – choose Sefar for their filtration needs.

To learn more about biocompatible medical textiles, download the detailed technical information in [the download section](#).

For further questions please contact medical@sefar.com.