

# PEEK

Precision Fabrics &  
Components made in  
PEEK for Demanding  
Applications

— SAATI

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Engage  
with SAATI





Perfecting the  
Art of Precision  
Woven Mesh

## Company Information

### Over Eighty Years of Innovative Action

SAATI is a multinational group with corporate headquarters that have been situated in northern Italy since 1935. Today SAATI is a leading force in the development, manufacturing and commercialization of high tech filter media & chemicals.

SAATI's passion and creativity are the foundation for an unsurpassed tradition of continuous innovation in the filtration markets. This endless pursuit is what drives SAATI's dedicated customer-centric R&D to functionalize products beyond simple filtration.

SAATI's wide range of synthetic textiles and fabricated parts in Polyester, Nylon, Polypropylene, PEEK and PPS are the ideal engineered solution for demanding microfiltration applications.

Through specialized processing and rigorous inspection, SAATI ensures consistent lot quality across tolerances, uniformity, strength, stability, and cleanliness for applications from 7 to 3,000  $\mu\text{m}$ .

### Perfecting the Art of Precision Woven Fabrics with Innovation Driven R&D and Strict Quality Controls

With about 1,000 employees worldwide, facilities and a strong established track record in innovation and manufacturing excellence, SAATI's mission is to improve the life of every person every day, through working with customers and partners to create a safer, healthier and cleaner world.

To guarantee product reliability, SAATI constantly runs tests and has all of the strictest and most up to date certifications that validate the consistency, performance, quality and characteristics of each item.

Specific SAATI fabrics are tested and certified in accordance with USP CLASS VI/ISO 10993 Regulations, and these fabrics are inspected and transformed into customized shapes in Class 10,000/ISO Class 7 Clean Rooms in accordance with UNI ISO 9001 regulations.



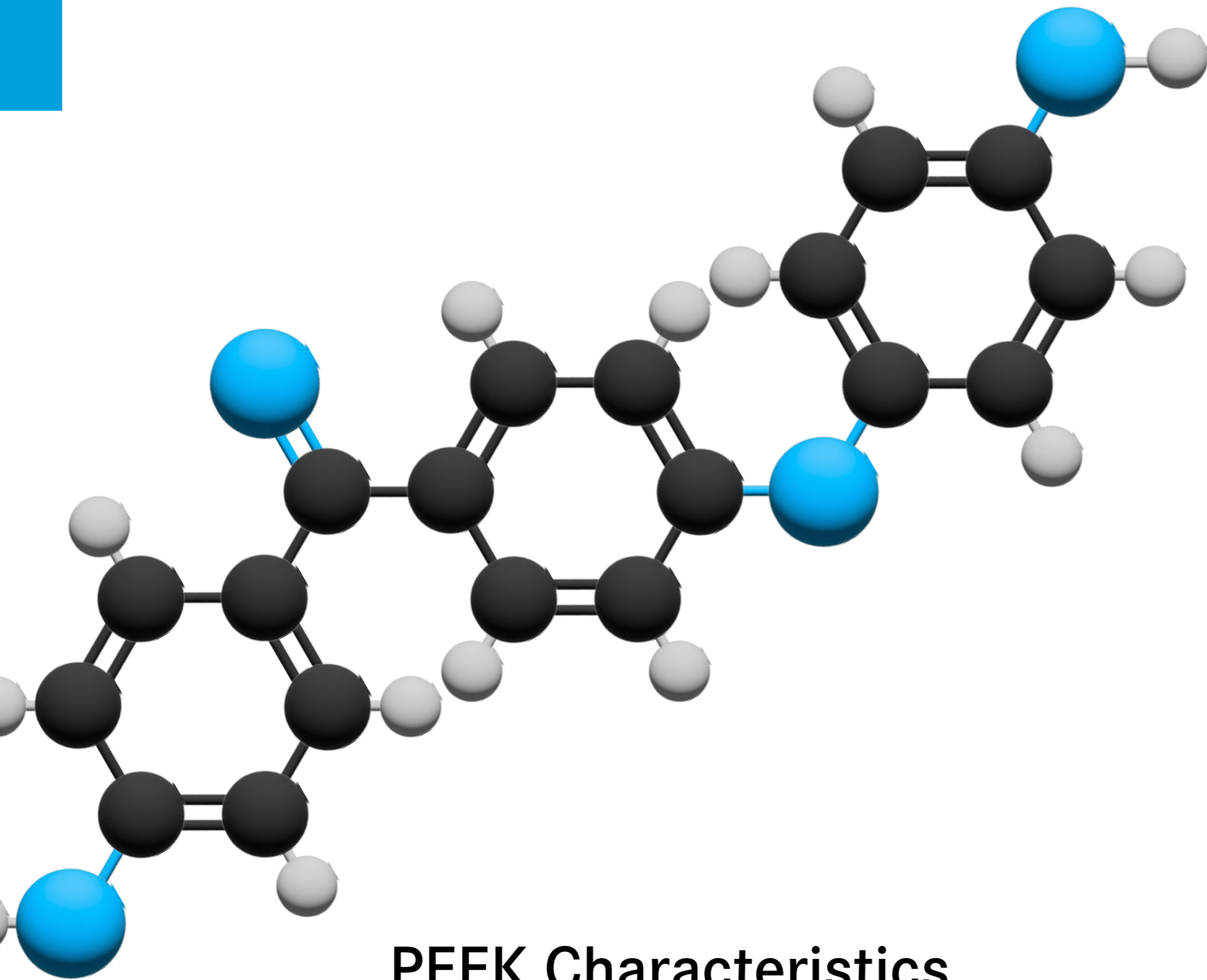
# Customer Focus

## Customer Driven Innovation

Thanks to a direct presence in many countries, it is easy for customers to reach out, wherever they are located, and the response is always prompt. SAATI staff has a high level of technical expertise and dedication, and is always aiming to find the best solution for the customer's requirements.

SAATI sales representatives and engineers understand customers' applications, and work closely with staff in the production and R&D departments to offer a customized solution in a form that best meets their needs.

The quality of SAATI's products is backed by the dedication and expertise of SAATI's customer service. Thanks to offices, warehouses, storage and fabrication facilities throughout the world, SAATI provides strong local support, expert responses to customer inquiries, strong engineering capability, technical support and fast delivery around the world.



## PEEK Characteristics

Poly ether ether ketone (PEEK) is a member of the Polyaryletherketone (PAEK) family of thermoplastic, semi-crystalline polymers renowned for their exceptional properties, which remain unaltered even under high temperatures. PEEK is widely used in various engineering applications due to its excellent mechanical and chemical resistance properties.

## Thermal Properties

PEEK exhibits a high melting point of approximately 340-345°C and a glass transition temperature of around 145-150°C, making it a promising substitute for wire mesh in high-temperature applications where conventional synthetic fabrics fall short. PEEK is particularly advantageous in cases where process temperatures exceed the limitations of typical PA, PET, and PP fabrics, and a metallic media replacement is necessary. PEEK's low coefficient of thermal expansion also means it is less likely to experience dimensional changes due to temperature fluctuations compared to other materials.



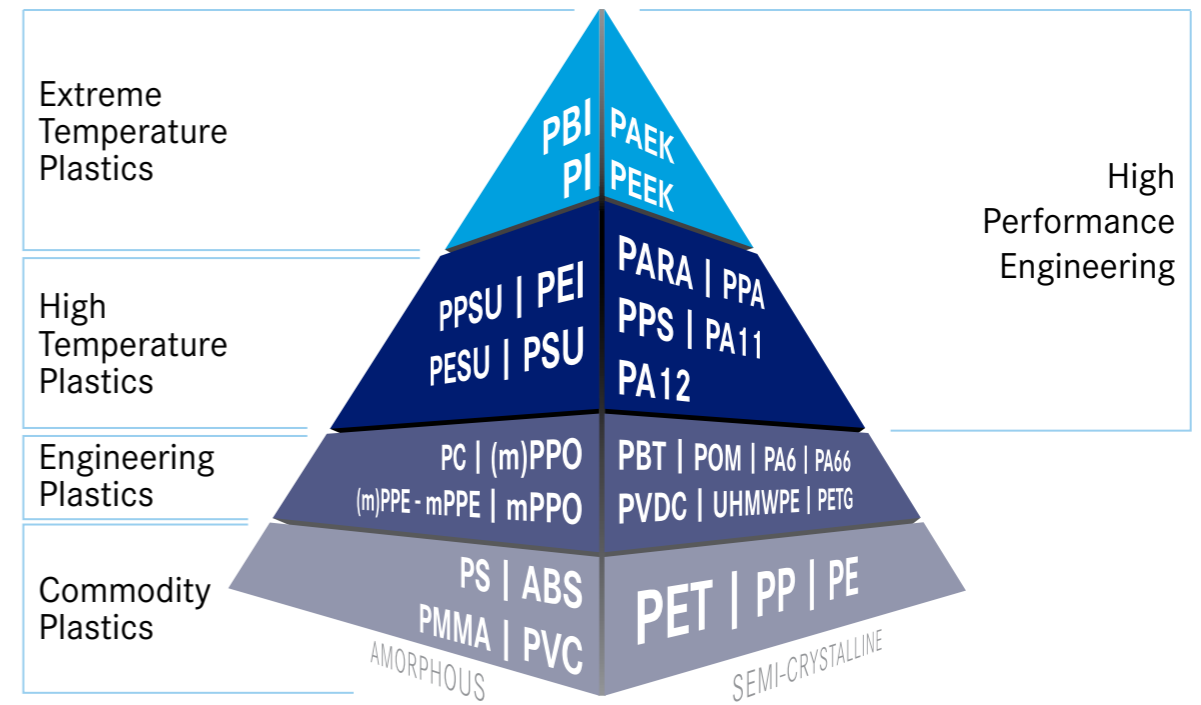
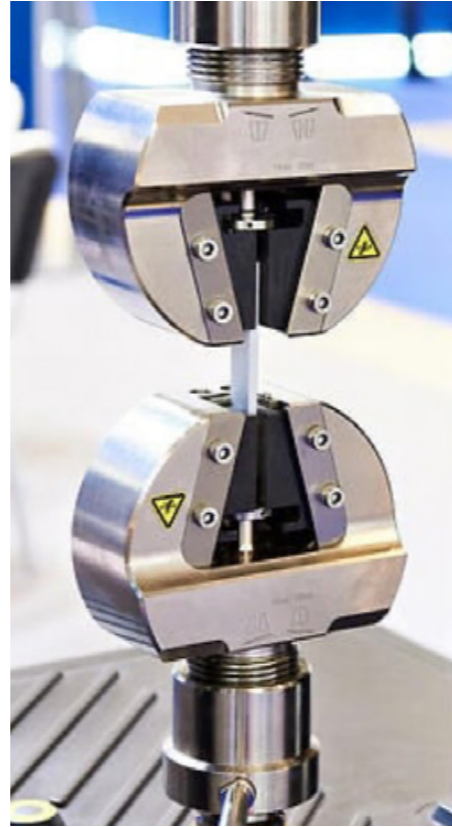
## Chemical Properties

PEEK is known for its superior chemical resistance, exhibiting excellent resistance to a wide range of chemical environments even at elevated temperatures. PEEK's exceptional performance in both basic and organic solvents makes it a preferred material in many demanding applications. Only highly concentrated strong acids, such as sulfuric and nitric acid, have the potential to dissolve PEEK, making it an excellent choice for use in corrosive environments. Additionally, PEEK is biocompatible, and is widely used in medical applications such as implants and surgical instruments.

## Mechanical Properties

PEEK is characterized by exceptional mechanical properties, particularly in terms of wear and friction resistance. The semi-crystalline structure of PEEK allows it to maintain its mechanical properties at temperatures beyond its glass transition temperature, providing a unique advantage over other thermoplastics. PEEK polymers have high tensile strength and low density compared to metals, making them an ideal material for use in a range of demanding applications. PEEK is also resistant to fatigue and can withstand repetitive stress cycles without degrading its mechanical properties. Additionally, PEEK exhibits excellent creep resistance, maintaining dimensional stability and mechanical properties even when subjected to long-term, continuous stress.

Furthermore, PEEK exhibits excellent dimensional stability and long-term stress performance, making it particularly well-suited for use in high-temperature environments where other materials may deform or break down.



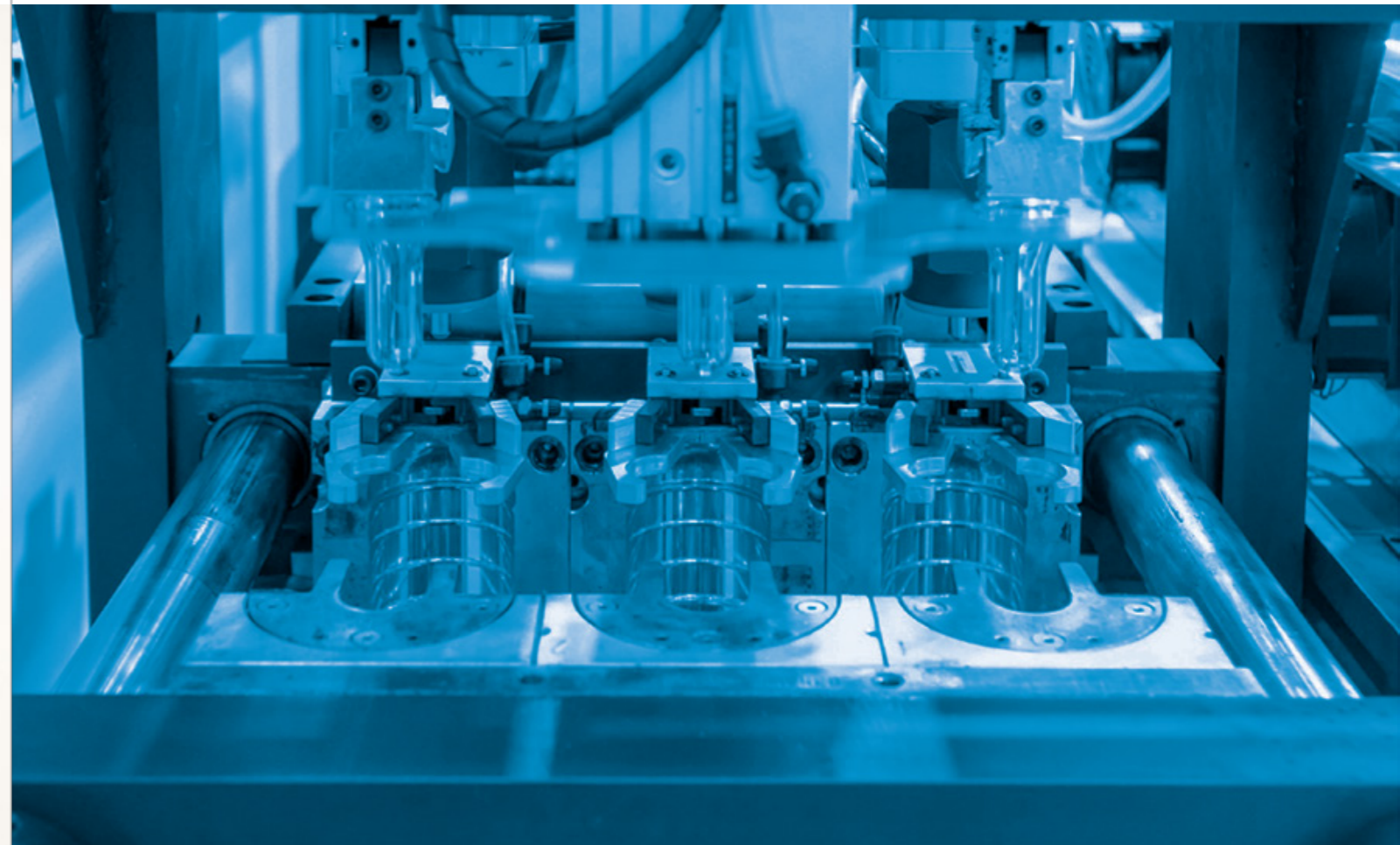
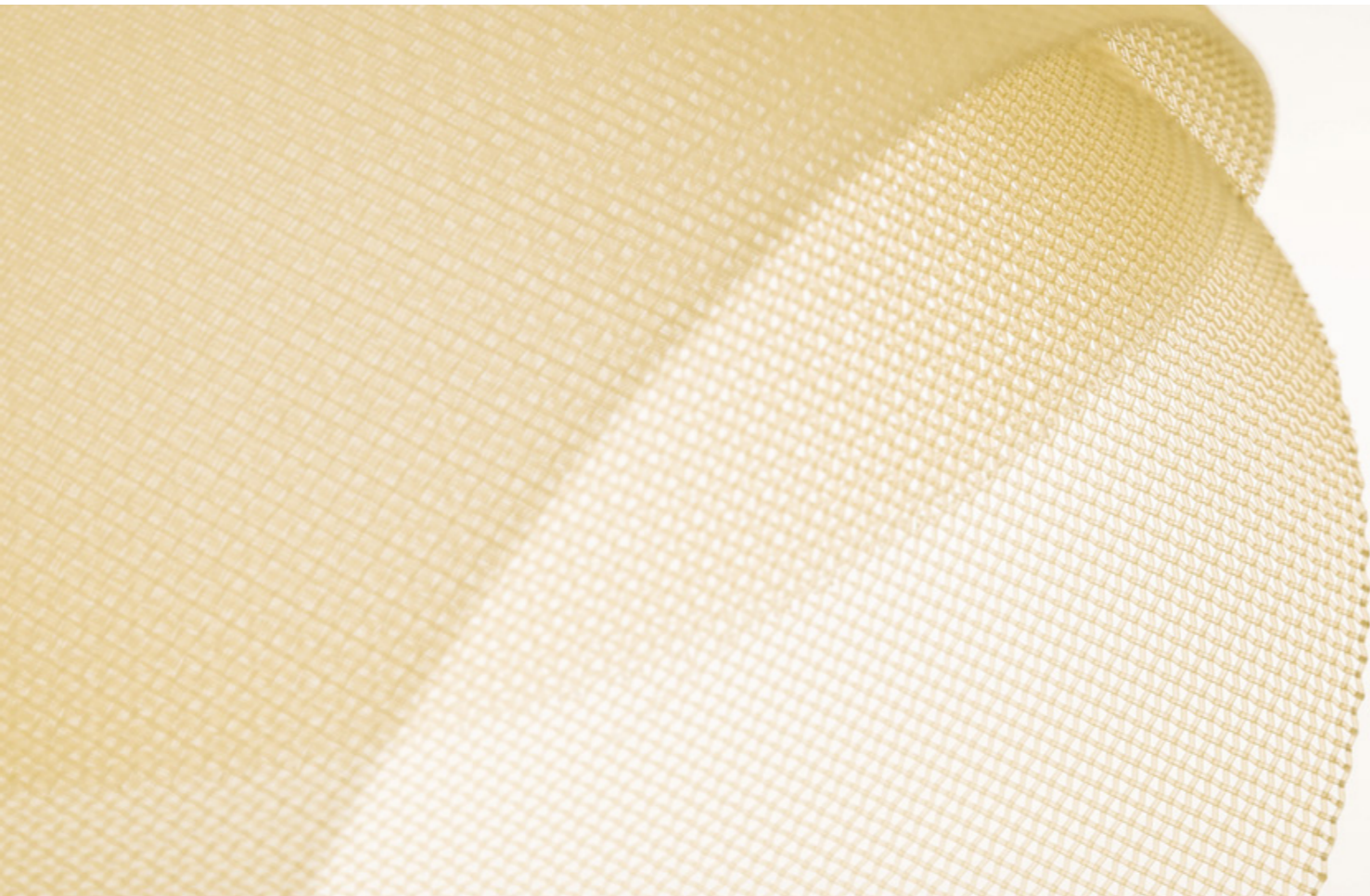
Attribute	PEEK	PPS	PA	PES	PP
Temperature Resistance	+++	+++	+	+	-
Chemical Resistance	+++	++	+	+	++
Dimensional Stability	+++	++	+	++	+
Gamma Radiation	+++	++	++	++	+
Flex Fatigue	++	+	+++	++	+
Abrasion Resistance	++	+	+++	+	-
Relative Tensile Strength	++	++	++	++	+
Specific Weight	++	++	++	++	+++

+++ = Excellent    ++ = Good    + = Fair    - = Poor

# PEEK Applications

Woven monofilament meshes made from PEEK have gained popularity over conventional filter media and metallic meshes due to their high filtration performance and superior mechanical properties. PEEK fabrics are composed of high tenacity monofilament yarns and possess exceptional mechanical properties such as high tensile strength, wear and friction resistance, and dimensional stability. These properties make PEEK fabrics ideal for filtration applications that require mechanical robustness, durability, and long-term performance.

In addition to its superior mechanical properties, PEEK is well-suited for **injection molding** with plastics that possess high thermal properties. PEEK's exceptional thermal stability enables it to maintain its mechanical and chemical properties even at elevated temperatures, unlike traditional filter media made from polyethylene terephthalate (PET), which may suffer from thermal degradation under such conditions. As a result, PEEK filter media offer a valuable solution for applications requiring high thermal stability, especially in the automotive and aerospace industries where high temperatures and demanding operating conditions are common.



# Electrochemical Systems

## Suggested Items

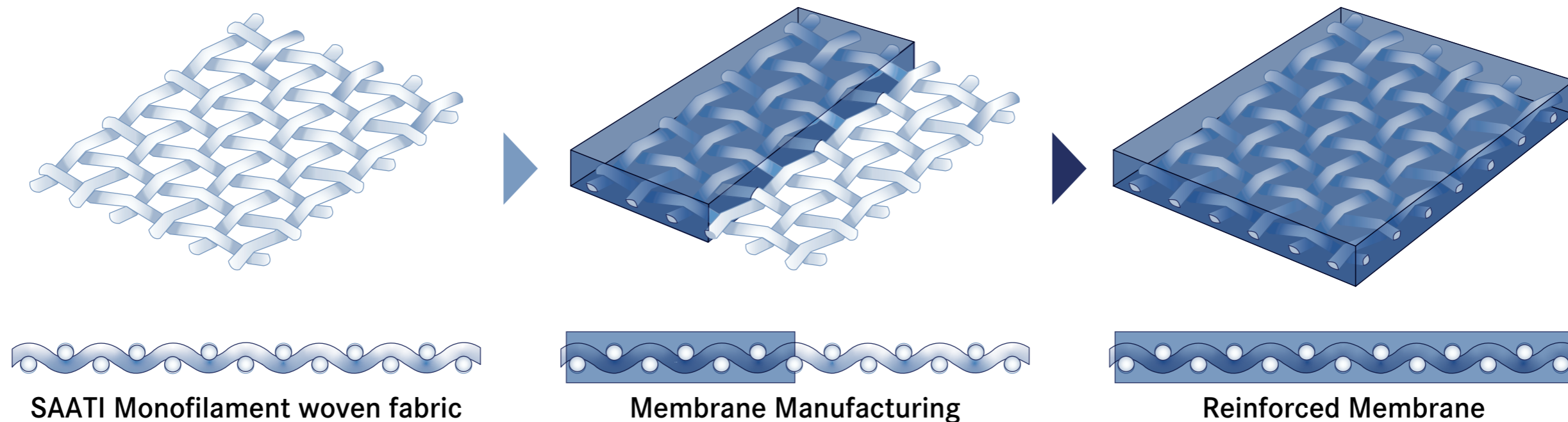
- SAATifil PEEK 105/55
- SAATifil PEEK 195/75

## Spacers

- PEEK woven monofilament mesh is utilized as a feed spacer or flow channel in membrane systems that operate in challenging chemical environments
- It facilitates mass transfer by promoting turbulence and providing a passage for the fluid, making it suitable for spiral wound membranes, reverse osmosis (RO) membrane systems and electrochemical stacks
- PEEK's chemical resistance and high mechanical strength make it suitable for the harsh environments typically encountered in RO membrane systems
- PEEK is used as a separator or support in fuel cells, batteries, and electrolyzers
- Its excellent mechanical strength, chemical resistance, and thermal stability make it the ideal material for such applications, ensuring long-term performance and durability

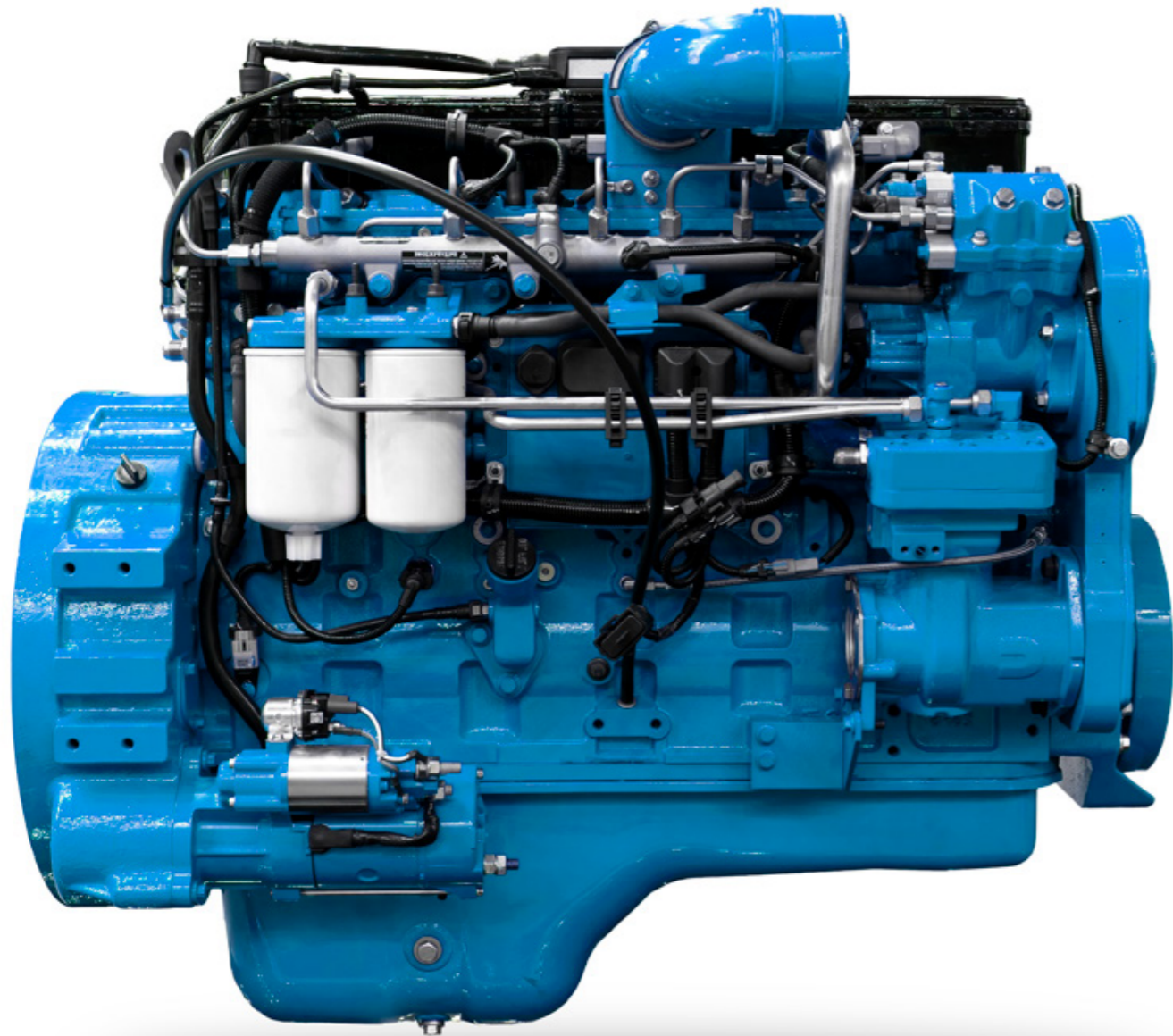
## Membrane Reinforcement

- PEEK mesh products are preferred for their exceptional mechanical properties, chemical resistance, and thermal stability
- The open weave structure of PEEK fabrics offers high burst strength and open area, making them suitable for membrane reinforcement
- PEEK mesh has regular pore size and thickness, which ensures consistent and uniform manufacturing of the membrane
- PEEK mesh is commonly used to reinforce proton exchange membranes (PEMs) in **hydrogen generation systems**, improving their durability and reliability
- The high strength and dimensional stability of PEEK mesh can prevent damage or failure of fragile membranes subjected to mechanical stress or pressure changes



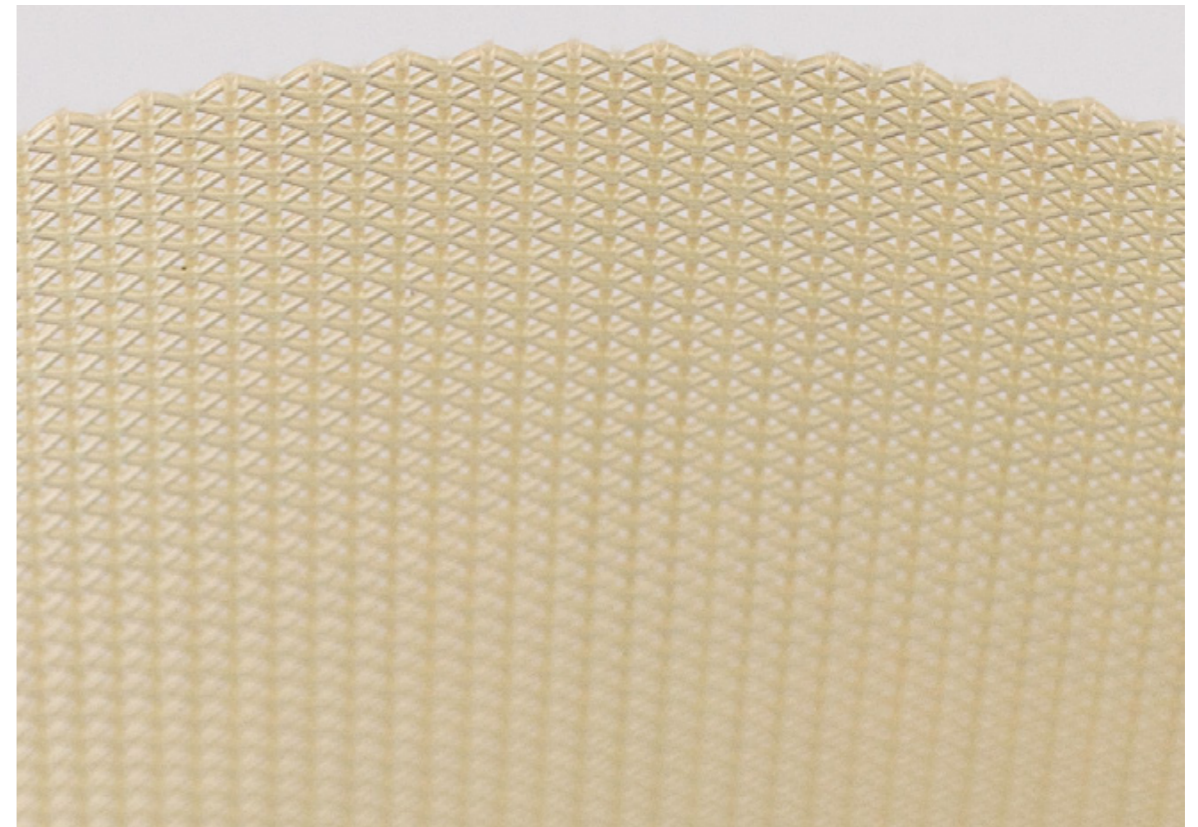


# Automotive



In the automotive industry, there is a growing demand for materials that can meet environmental and safety standards, offer extended durability for warranty and production cost savings, and provide improved fuel economy without sacrificing performance or comfort.

PEEK is a high-performance thermoplastic polymer, therefore it is an ideal solution for meeting these requirements. PEEK has consistent mechanical properties even at high temperatures, exceeding 150°C (302°F), making it suitable for automotive applications that demand high temperature resistance, durability, and reliability. As a result, PEEK is increasingly used in the automotive industry for components such as injectors, resonators and fuel system components.

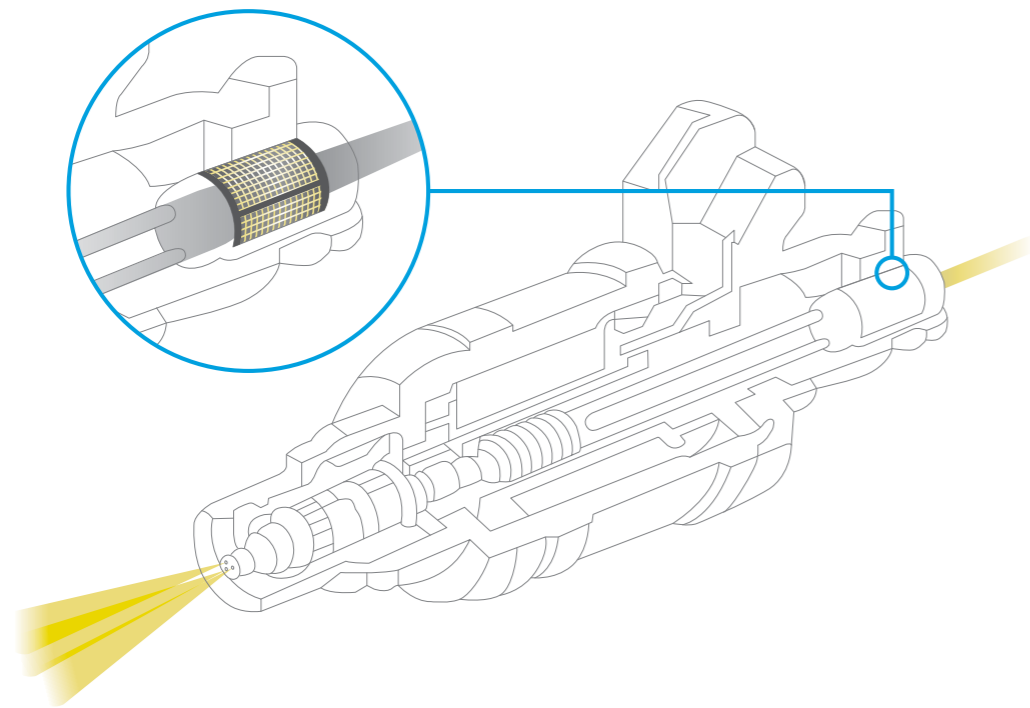


### Suggested Items

- SAATifil PEEK 36 / 24

## Injectors

- PEEK woven monofilament mesh is replacing traditional polyamide and wire mesh injector filters; wire mesh has poor fatigue resistance and requires expensive tooling while PA mesh swells and is not resistant to certain biofuel blends
- Filter fabrics made from PEEK offer superior filtration efficiency, high temperature and chemical resistance
- The dimensional stability of PEEK, wear and abrasion resistance help maintain filtration performance over time
- PEEK is versatile and can withstand exposure to a wide range of automotive fluids and chemicals, including gasoline, diesel fuel, and transmission fluids

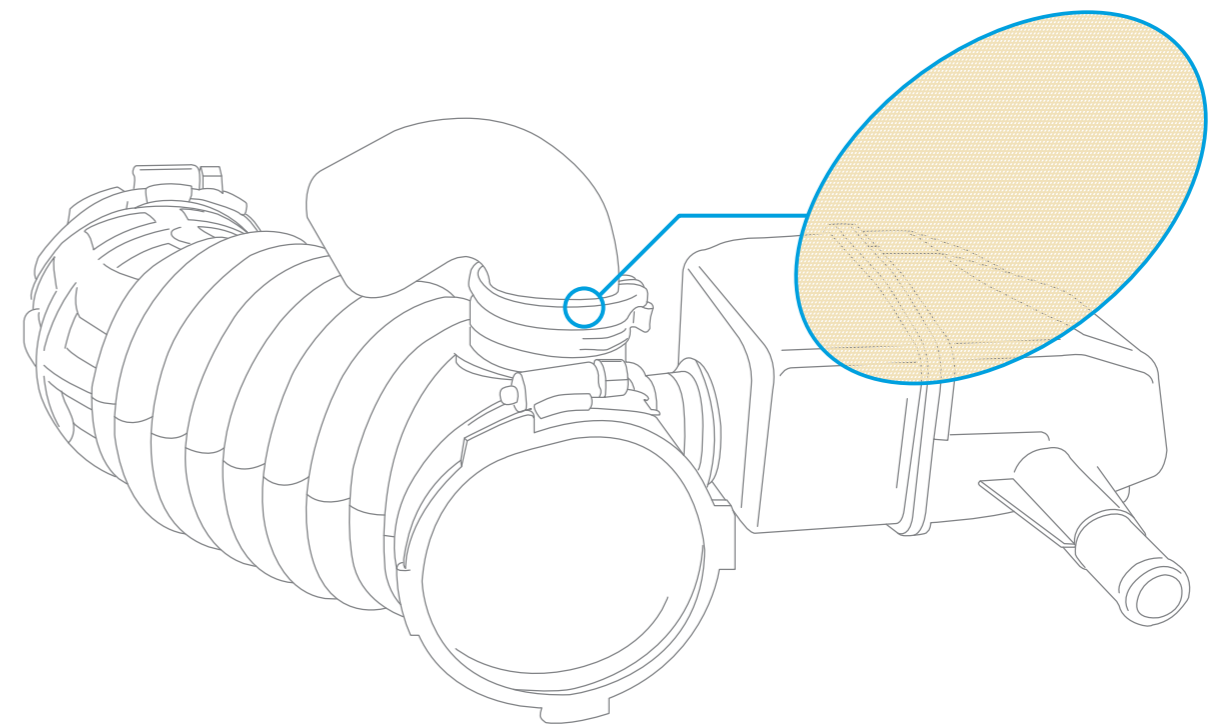


### Suggested Items

- SAATifil PEEK 36 / 24

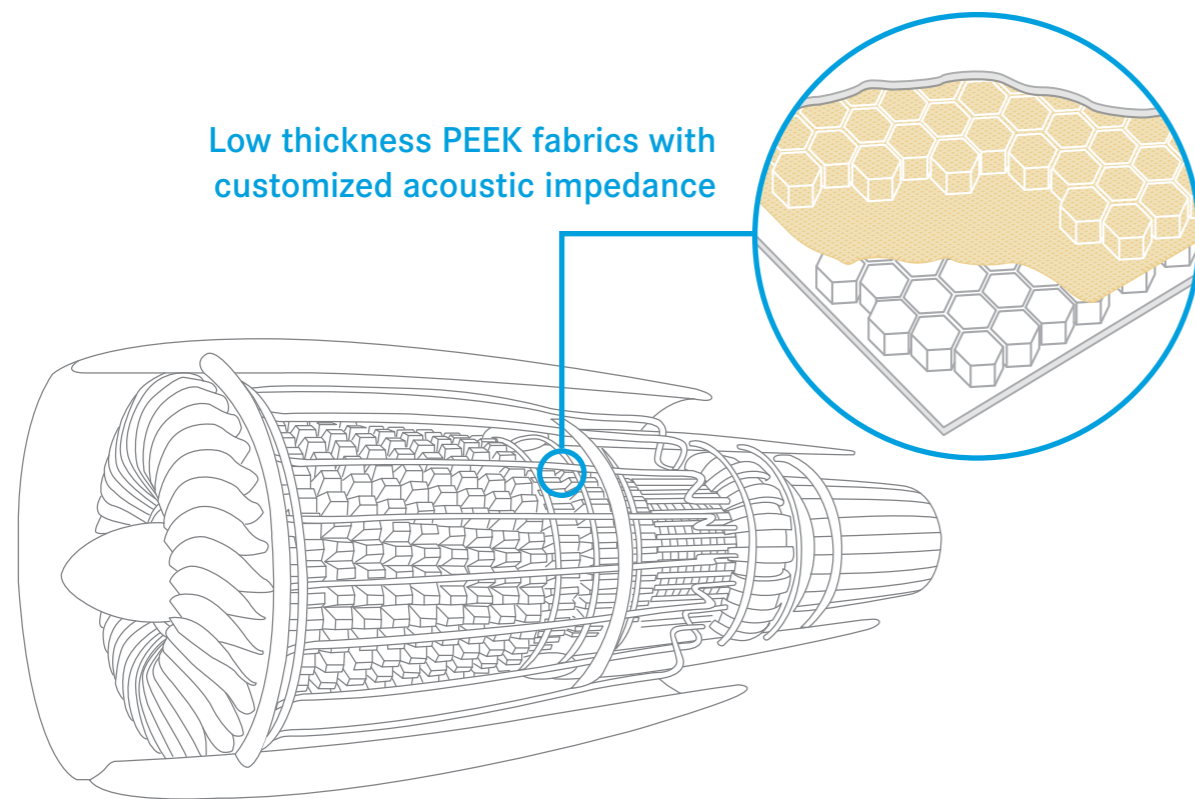
## Intake Resonator

- PEEK woven monofilament mesh is used for intake resonators in automotive applications to reduce engine noise during operation
- PEEK's exceptional chemical resistance makes it ideal for harsh under-hood environments
- PEEK protects the intake sound dampening system from exposure to automotive fluids and chemicals
- PEEK's high mechanical strength and resistance to wear and abrasion make it suitable for use in intake resonators, as it can withstand the vibrations and stresses generated by the engine



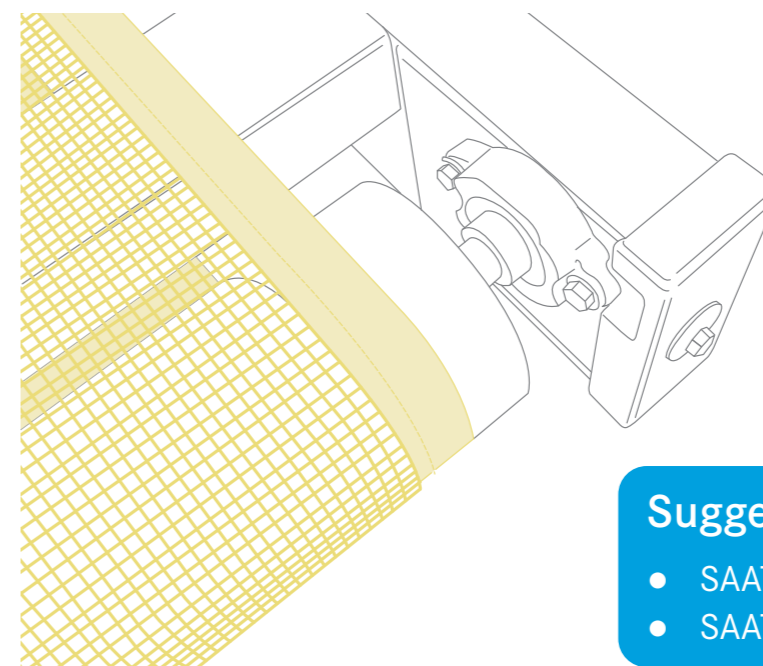
# Aerospace

- Aerospace sound suppression is important to reduce the noise generated by aircraft during takeoff and landing. These sound suppression systems employ a range of technologies, materials, and designs to absorb, dampen, or redirect sound waves
- One method used to achieve sound suppression is the use of woven fabrics as sound-dampening elements, either alone or in combination with other structural components in noise-reducing devices. As these structures may be exposed to considerable variations in temperature, heat-resistant materials such as PEEK fabrics are a suitable choice
- The noise-reducing properties of these materials are not only determined by their structure and composition but also by the fabric itself. Air permeability or acoustic impedance is an important factor to be considered during the material selection stage



# Dryer Belt

- PEEK mesh is an ideal material for dryer belts in the food industry
- Dryer belts are essential components in many drying plants for the production of pastes, granules and powders
- PEEK mesh has exceptional properties including high temperature resistance and chemical inertness
- Vacuum belt dryers are becoming more common and require a material with higher temperature resistance and inertness to hydrolysis
- PEEK mesh provides a longer-lasting and more reliable solution for food dehydration processes compared to traditional materials
- PEEK mesh maintains the same level of shrinkage and physical characteristics as PET, but with increased service life



## Suggested Items

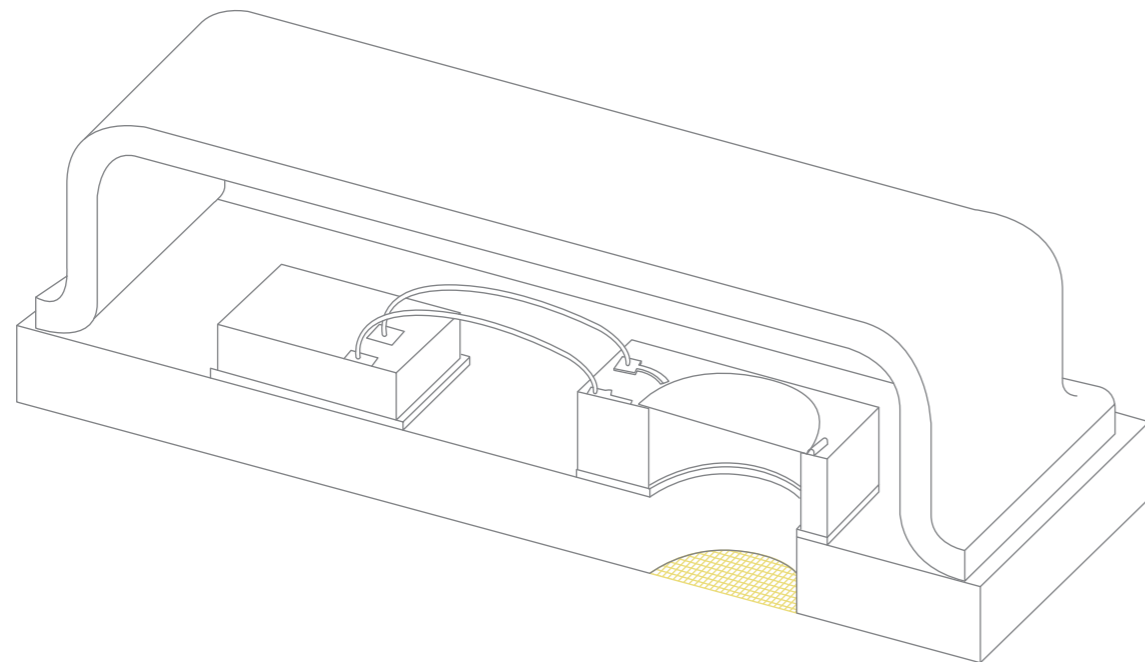
- SAATibelt PEEK 1025/45
- SAATibelt PEEK 740/50

# Consumer Electronics

- PEEK woven mesh is useful in Integrated Component (IC) assembly for printed circuit boards (PCBs) in acoustics and consumer electronics
- The reflow soldering process - the most widely used process to attach surface mount devices to PCBs - can reach temperatures as high as 260°C (500°F) or higher, which PEEK can withstand
- Meshes woven from PEEK are also suitable for protecting acoustic components during high-temperature manufacturing processes such as injection molding with high melting polymers
- The ability to maintain its physical properties at high temperatures makes PEEK a reliable material for use in the manufacturing of consumer electronics

## Suggested Items

- SAATifil Acoustex® HT 006
- SAATifil Acoustex® HT 050
- SAATifil Acoustex® HT 160

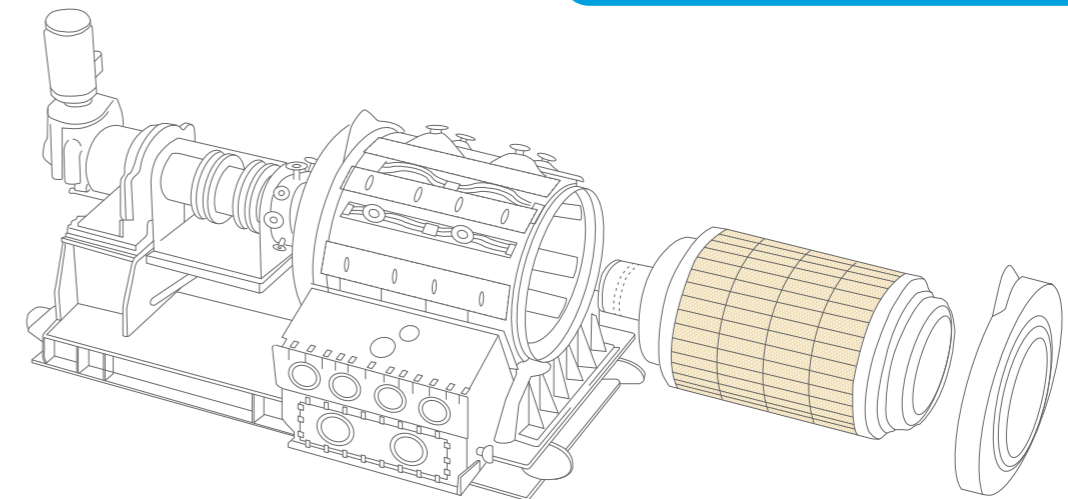


# PTA Filtration

- Purified Terephthalic Acid (PTA) serves as a crucial precursor for polyester (PET) production. The filtration process during PTA manufacturing is vital, as it separates the chemicals from the mother liquor in a slurry. Filtration technology employs either rotary pressure filters or rotary vacuum filters
- Rotary pressure filters consist of a pressurized case and a drum covered by a filtering device, such as a cloth. Instead, rotary vacuum filters are equipped with rotating drum filters inside a case, and vacuum is applied at the center of the drum
- The main purpose of these filters is to effectively separate the required chemicals from the mother liquor in the slurry
- PEEK monofilament woven meshes play a pivotal role as the primary filtering medium in both rotary pressure filters and rotary vacuum filters. Their exceptional efficiency enables them to handle the challenging task of chemical separation during PTA preparation, ensuring a refined and high-quality end product
- Operating under harsh conditions characterized by high temperature, abrasion and mechanical stress, PEEK monofilament woven meshes prove to be a reliable and long-lasting filtration solution for the PTA production process

## Suggested Items

- Ecofiltra PEEK 47.200



# Fabricated Components

SAATI not only designs and produces precision woven fabrics but has the ability to engineer them into finished or partly finished products. Thanks to processing equipment and long experience, SAATI provides fabrics cut-to-fit, lot-to-lot consistency and high quality custom fabricated parts, in almost any requested shape.

Some examples of SAATI fabrication capabilities are:

## Ribbon

SAATI motion fabrics can be economically slit using heat or, if a tighter tolerance and improved edge quality are needed, the fabrics can be ultrasonically slit.

Production Technology involved: heat, ultrasonics.



## Tubes - Cut to Length

For all applications requiring molded cylindrical filters, SAATI offers fabrics tubes and rectangles with two open ends, cold or laser cut to length.

Many applications can accept the quality of a cold cut tube in view of its economic advantage.

On the contrary, if the component must have one end sealed and one end open, SAATI is able to combine the two technologies in the same process and supply tubes with one ultrasonically sealed end.

Ultrasonic technology is also applied to the realization of rectangle filters.

Production technology involved: cold, heat, ultrasonic.



## Continuous Tubes

Two layers of filter media are simultaneously slit with heated blades to form a continuous tube.

Ultrasonically welded tubular ribbons, although similar in construction to heat slit items, can be produced in a wide range of sizes, including very small ones.

Two or more narrow layers can be attached using ultrasonic slitting, a fine filtration media can be supported or protected with a coarser one.

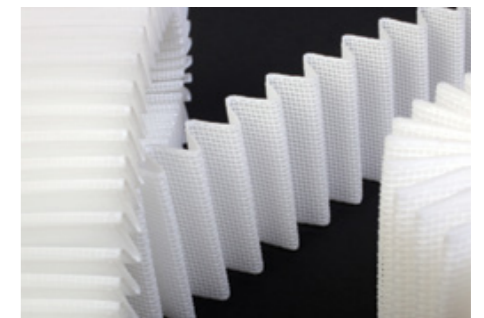
Production Technology involved: heat, ultrasonics.



## Pleated Components

Mono or Multi-layer pleated components such as pack, ribbon and cartridges, can be manufactured for all applications requiring high filtration capacity in a narrow space.

Production technology involved: heat and ultrasonics.



## Shapes

Cold or Laser cut parts can be provided in almost any shape or size with nominal dimensional quality.

One or more layers of fabrics can be ultrasonically cut or sealed into virtually any shape using a CNC plotter, assuring a faithful reproduction of design.

Production Technology involved: cold (die-cut), ultrasonics, laser.





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