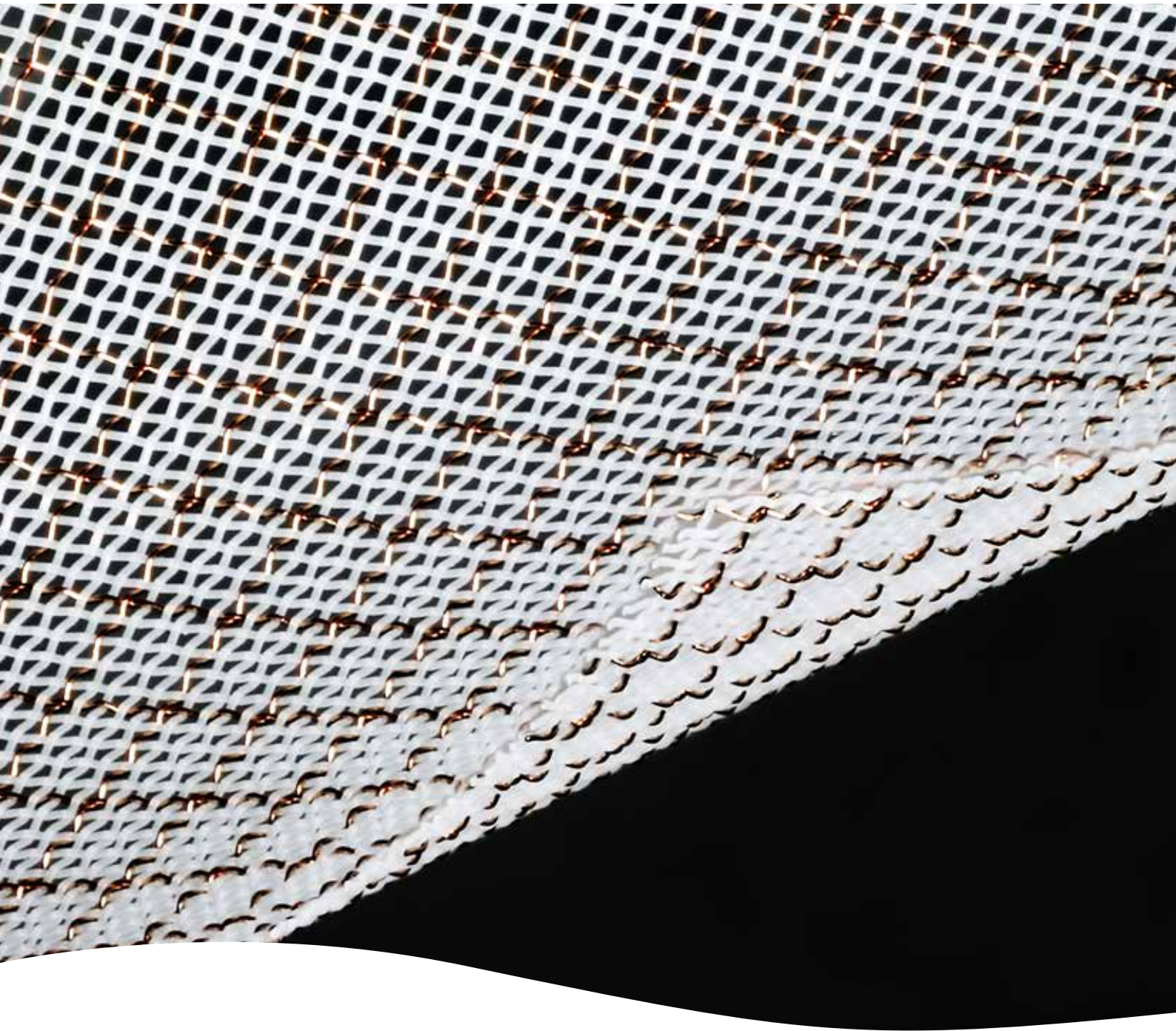


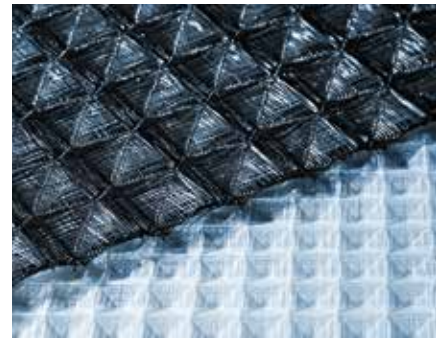
# Smart Fabrics

New Business



**S E F A R**  
■ ■ ■ ■





## Sefar

For over 180 years, Sefar has been a leading problem solver, providing technical woven solutions worldwide. Our technical experience and specialist knowledge of yarns, weaving, fabrics, converting and coating processes allows us to take the hard work away by developing innovative customized fabric solutions.

We offer the broadest selection of woven fabrics, backed up by experienced staff and application experts.

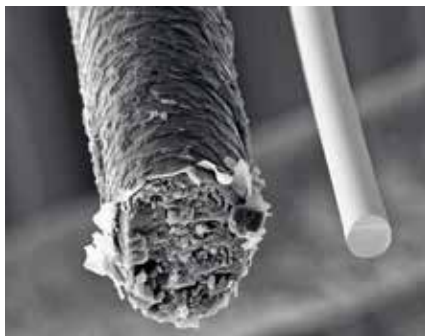
### Monofilament & multifilament

#### Polymers

PET, PA, PP, PEEK, PEN, ETFE, PTFE, PVDF, PBT, ...

#### Diameters

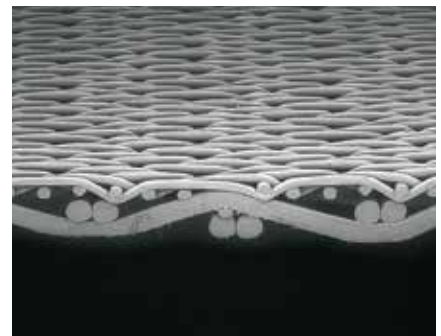
19  $\mu\text{m}$ ...2,000  $\mu\text{m}$

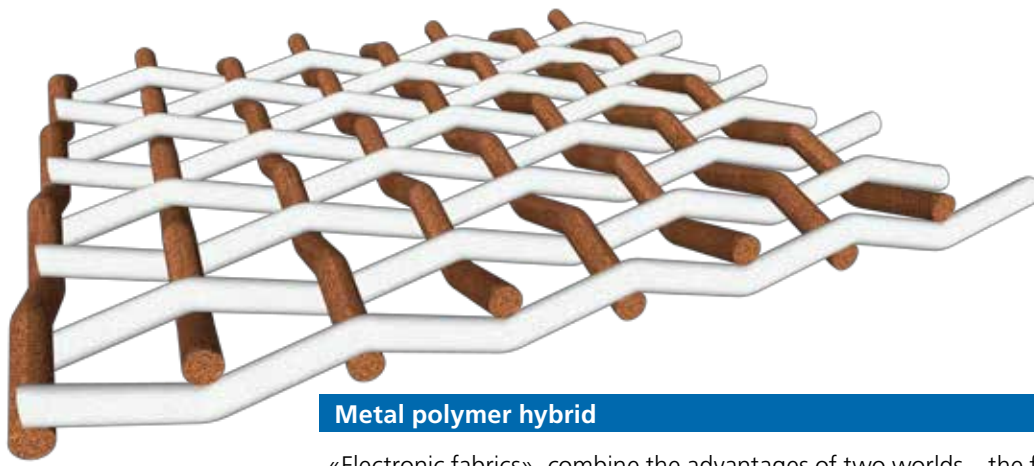


### Single layer & multilayer fabric

#### Weaving pattern

Plain weave, twill weave, Dutch weave, plain reverse Dutch weave, satin weave, ...





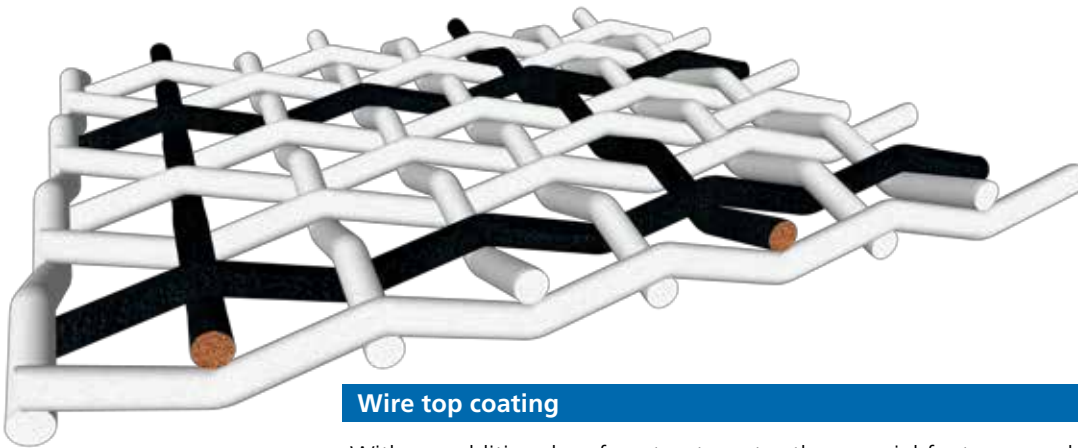
### Metal polymer hybrid

«Electronic fabrics», combine the advantages of two worlds – the flexible shape of standard fabrics and the functional flexibility of electronics. Our Smart Fabrics often consist of a polymer fabric as a basis with woven-in electrically conductive filaments. The filaments may be pure copper wires, steel wires, twisted yarn, conductively plated yarn and many more.

**Type:** plain wire, twisted yarn, tinsel, coated multifilament, stranded wire

**Material:** Cu, Cu-alloys, Ag, Au, Al, Mo, Ti, W, ...

**Diameters:** 20 µm...2,000 µm



### Wire top coating

With an additional surface treatment, other special features, such as corrosion protection, better contact resistance, higher chemical resistance, electrical isolation and others, can be achieved with one product.

**Coated wires material:** Ag, Sn, Ni, Pt, PEDOT, carbon, ...

**Isolated wires material:** PU, PET, PI, PA, ...



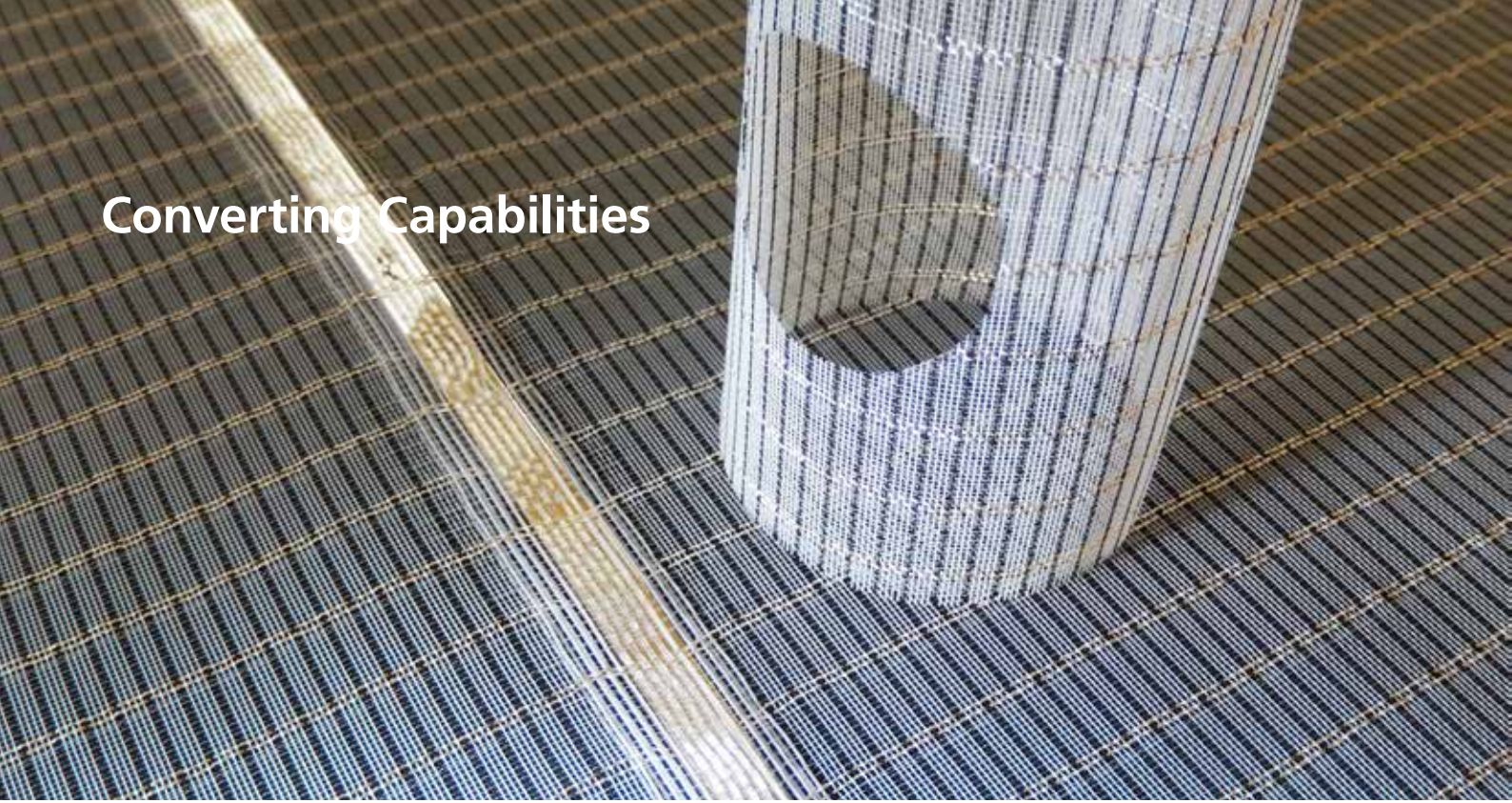
### Fabric top coating

Sefar has the ability to fully coat their fabrics. Thus, e.g. with a polymer-based fabric, a sheet resistance of approximately 1.0 ohm/sq is conceded or the optics are changed so that you have a full metallic look

**Material:** Al, Ag, Cu, Au, Cr, Mo, Ti, TiO<sub>x</sub>, Sn, SiO<sub>x</sub>, alloys, ...



# Converting Capabilities



## Choosing the best configuration

### **Pleated elements**

- Monofilament and multilayered pleated elements
- Unlimited pleat counts
- Various pleat heights
- Endless pleated elements

### **Ribbons**

Heat or ultrasonically slit.

### **Stamped discs, shapes**

Cold stamping provides standard tolerance pieces.

Laser cutting assures high-tolerance pieces with fray-resistant edges.

### **Tubes, continuous rolls**

Single or multilayer, can be heat-slit or ultrasonically welded into tube configurations.

### **Tubes, cut to length**

Tube segments can be cold or laser-cut.

### **Ultrasonic bonding calender**

Ultrasonic calendering combines up to four layers together.



# Laboratory and Technical Consulting



## Laboratory

To analyze the behavior of our products, Sefar has specially designed equipment that replicates our customers' processes.

Testing and Qualification equipment for fabrics (REM with beam deceleration, stereo and light microscope, IR-spectroscopy, air permeability, pore size, spectrophotometer, shrinkage test, transmission, contact angle, HPLC, thickness, tensile strength, melting point, climate chamber, ...)



## Technical consulting

Sefar is equipped with the latest technology of drawings in 3D to be perfectly adapted to each type of product or customer's process.



## Quality

We work with all necessary standards like ISO, DIN, REACH and RoHS to make sure that Sefar fabrics are accepted worldwide in the appliance industry.

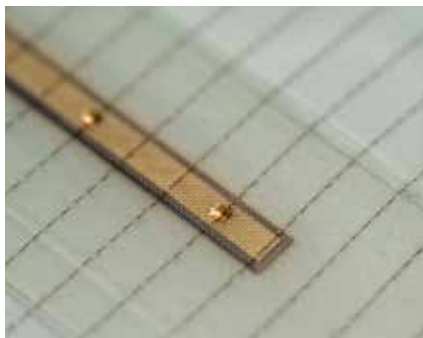
# Smart Fabrics

## Industries and Applications



Many application areas  
– one solution provider

To cope with the demanding environment of the various industries, Sefar has developed a Smart Fabric range in order to maximize the customer's value. Our fabrics not only satisfy a single purpose, e.g. filtration, but can also, for instance, be made to generate heat, used as transparent electrodes, to illuminate or sense physical parameters.

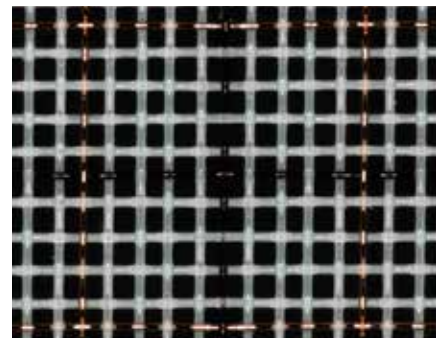


### Heating

Our heating fabrics are one of the thinnest heating fabrics on the market. They are made of PET monofilaments and conductive fibers. The conductive fibers are available with insulation and in various qualities. Our PowerHeat NT fabrics are the only woven heating fabrics on the market which can be cut into almost any shape by the customer himself.

### Applications

Heated filter elements, car interiors, medical blankets, floor heating, heated seats, deicing, ...



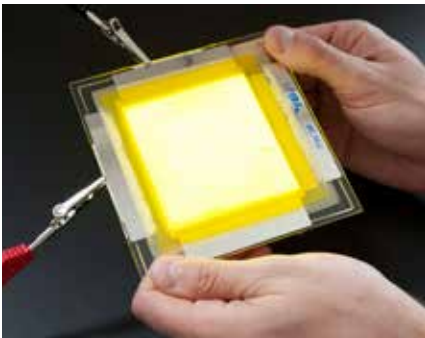
### Shielding

Sefar supports its customers with durable and efficient shielding fabrics with an electromagnetic field attenuation up to 40 dB. Our hybrid woven PowerShield fabrics have an insulated surface, are light weight, thin and have a high air permeability so that they can be easily laminated into the customer's product near to the surface.

### Applications

Shielding of PC cases, protecting sensitive measuring and control equipment, protection against eavesdropping in areas of military and government agencies

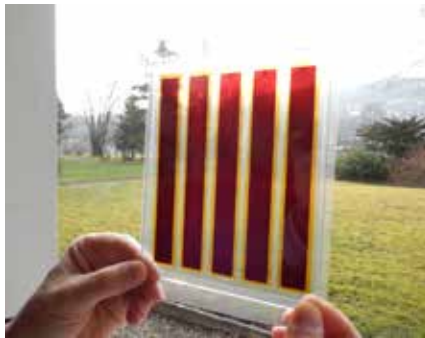




**Lighting**

Panel lights shall become larger and more flexible. Sefar has the answer to the need of a highly conductive, transparent electrode. A foil-like substrate containing fine metallic wires, which can be processed by common wet or vacuum methods.

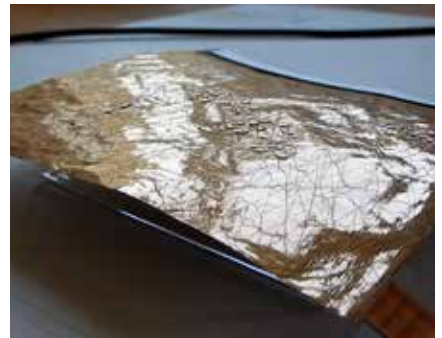
**Applications**  
 OLED, LEC, electroluminescence



**Photovoltaic**

Whether as a substrate to coat or as a fabric which is laminated on top of solar cells, Sefar's fabric-based electrodes work excellent as highly efficient current collectors. Larger cell sizes become a reality, cost and time consuming processes can be simplified or even eliminated.

**Applications**  
 c-Si, CIGS, organic solar cells (OSC), dye-sensitized solar cells (DSC), perovskite solar cells (PSC), others



**And many more**

With the given toolbox of several different conductive elements, that we can weave in and the additional possible top coatings, Sefar is capable of developing products for almost any application our customer needs.

**Applications**  
 Electrical stimulation for wound healing, electroosmotic membranes, electrostatic filtration, electrochromic cells, fabric-based circuit boards, ...

# Sefar worldwide

Sefar is the leading manufacturer of precision fabrics from monofilaments for the screen printing and filtration market. Sefar products are used in a wide variety of industries, reaching from electronics, graphics, medical, automotive, food and pharmaceutical applications to aerospace, mining & refining, architecture and smart fabrics. With its profound understanding of the applications, Sefar helps its customers to achieve optimum results in their industrial processes. Subsidiaries and fabrications centers around the world provide local technical service for the broad range of solutions offered by Sefar.

## Headquarters

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