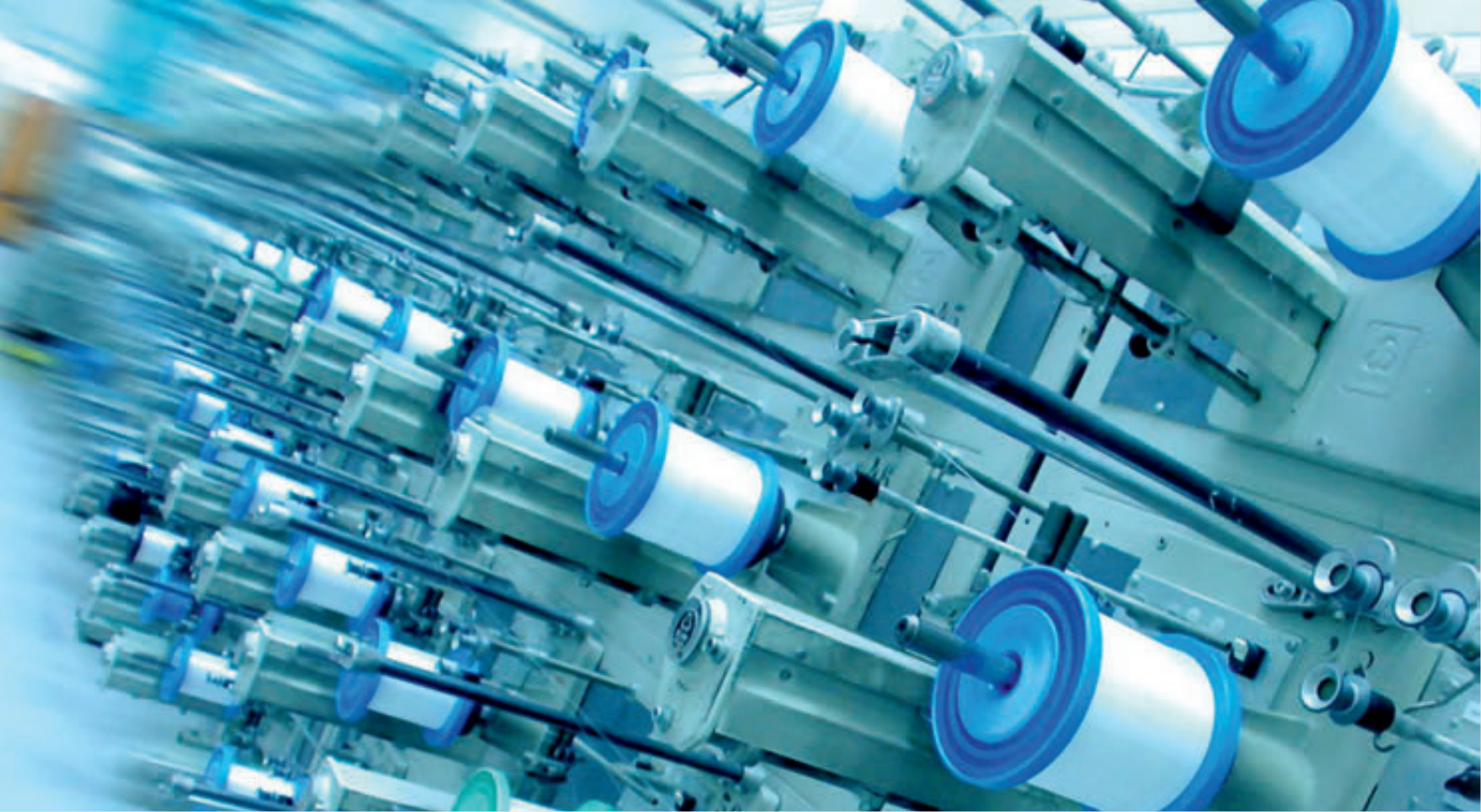




# Specialty PTFE yarns for Technical Textiles





## A reliable partner

Lenzing Plastics is a privately owned company with a very stable financial background and long term strategic orientation of its business units. With our broad technology platform we have proven over decades that we are able to adapt successfully to rapidly changing market needs.

### Cooperation

As a niche supplier we are constantly seeking partners along the value chain. In our point of view only with strong and honest cooperation with customers as well as suppliers, a long term success in specialty niches, including permanent innovations, is possible.

### Distribution network

Although our production facility is located in Austria we serve, beside our core market Europe, the whole world. Depending on the individual country, agents or distributors are supporting us in order to provide perfect service for the customer.



## We are organized in two production divisions

- Thermoplastics group producing films, tapes, fabrics and laminates out of polyolefin's
- Production of fluoropolymer (PTFE and others) yarns, films and fibers

# Introduction Lenzing Plastics

Lenzing Plastics is a specialized manufacturer of polyolefin and fluoropolymer products for over 40 years now. Main markets for all our products are insulation materials, cable industry, specialty packaging, technical textiles, functional textiles and medical applications.

## Fluoropolymer division – Lenzing PROFILEN® PTFE

Production of Lenzing PROFILEN® yarns and fibers started over 2 decades ago, when first tests were carried out with the exceptional polymer PTFE. Fascinated by the properties and possible applications of this raw material, processes for producing PTFE yarns, tapes and fibers were developed through continuous research work. Today we serve a very broad spectrum of applications and are still working to develop additional ones.

We can categorize 3 main markets: medical applications, cable industry and the focus of this brochure: technical textiles.

### Our strengths in all those markets

- Very broad product and technology range
- Ability and strategic interest to serve even small niches
- Flexibility to adapt to customers needs
- Certified quality systems (ISO 9001; ISO 13485)
- Long term support
- Network of partners along the textile value chain

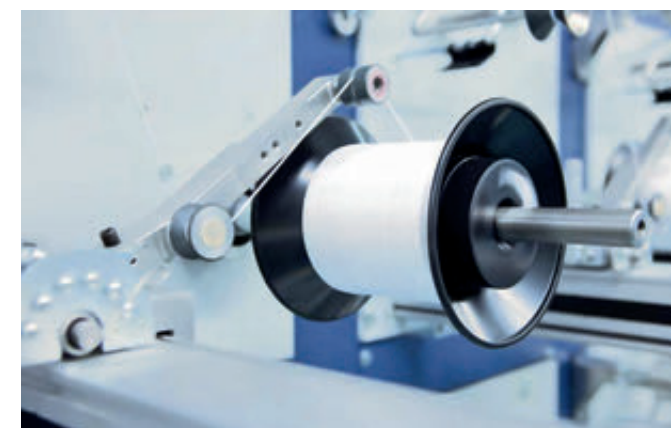
### Lenzing PROFILEN® PTFE – Service is our success

Through constant R&D we secure our business of tomorrow; additionally we are always willing to develop products on single customer request. We have a well equipped laboratory to start first testing also in lab scale quantities.

As our products are unique, using them sometimes requires special assistance; our sales force is trained and willing to support the customer in many technical questions concerning the use of Lenzing PROFILEN® yarns and fibers.

We try our best to describe our products in all details, however the best way to understand it is often to touch and use our fibers. Therefore we are prepared to ship small sample cones quickly to all parts of the world.

Our prices are usually offered ex works Lenzing; however we can organize the transport of our goods even to the most exotic destinations worldwide.





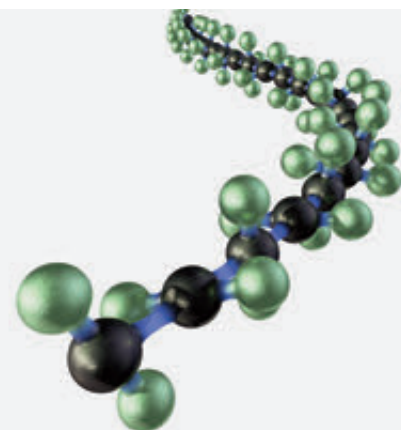


## PTFE – master in chemistry and physics

Owing to their purity, all Lenzing PROFILEN® products possess the excellent chemical and physical properties which make PTFE unique:

### PTFE is chemically inert

PTFE is virtually chemically inert. Acids, alkalis, alcohols, even aqua regia cannot attack PTFE. The reason is that within the PTFE-molecule there is an extremely strong bond between the carbon- and the fluorine atoms which makes the molecule very inert. These bonds can only be broken by a few substances: PTFE swells reversibly from fluorinated carbons; it can only be destroyed by elementary alkali metals, e.g. sodium



### Extremely low friction coefficient

PTFE has a very low friction coefficient. The sliding properties can be compared with wet ice on wet ice. Another characteristic of this plastic is the fact that the sliding friction is exactly equal to the static friction. This explains why the transition from stationary to sliding motion takes place without a jerk.

### Totally repellent

Hardly anything sticks to PTFE due to the high surface tension. All Lenzing PROFILEN® yarns and fibers are anti-adhesive, water- and dirt repellent.

### Temperature resistant

The polymer has a crystallite melting point of 327°C with long-term exposure values from minus 200°C up to +260°C. Short term temperature peaks up to 300°C are possible.



Water repellent properties

### Flammability

The „Limiting Oxygen Index“ (LOI) of PTFE is approximately 95% O<sub>2</sub>. If PTFE is subjected to a hot flame it disintegrates by glowing. PTFE is non-flammable.

### Weather and UV resistant

Lenzing PROFILEN® products are totally weather resistant. PTFE will neither rot nor degrade and is resistant to micro-organisms and pests.

### Physiologically safe

Fibers and yarns of 100% PTFE (fully sintered) are ideally suited for the food and medical field. They have also been approved by the US FDA for these purposes.

### Total heat insulation

PTFE is an excellent thermal and electrical insulator.

### No limit to the lifespan

Lenzing PROFILEN® fibers and yarns are virtually indestructible in most applications – for a very long product service life.

# Fluoropolymer division

## Lenzing PROFILEN® PTFE

## Product portfolio – Technical textiles

Beside medical and functional textile applications and the cable industry we are highly focused on technical textiles using our Lenzing PROFILEN® PTFE yarns. We are active in this market segment since several decades serving well known

markets with excellent service but also steadily work on new product ideas together with our customers around the world. A general overview of markets, applications and products is shown below.

Lenzing PROFILEN® / Lenzing LENOFIL®						
PRODUCTS / MARKETS	SPLIT PEELING YARNS	PTFE-FG MULTI-FILAMENT	PVDF MULTI-FILAMENT	STAPLE FIBERS	HIGH TENACITY TAPE YARNS	SEWING THREADS
Compression packings	Filament, hybrid sandwich yarns					
Friction management	Heavy ropes	Woven fabrics		Spun yarns for bearings		
Filtration			Woven fabrics	Felts for Hot Gas filtration		Filter confection
Outdoor fabrics		Small sun sails	Small shading and tent objects		Big umbrellas and flexible roofs	Confection
Other specialties		Braided fishing lines				Safety shoes, Airbags, ...

### COLORS

Most of our yarns are available also in a broad range of colors. We even do customized colors for single clients. Please contact us for further details on possibilities and minimum batch sizes.







## ePTFE yarns

Expanded PTFE yarns provide you with a softer packing for higher seal ability as well as higher shaft speed. We can also add graphite as well as talcum to influence thermal conductivity. Our ePTFE yarns are also available with FDA compliant raw materials for use in food contact and other critical applications.

## Hybrid yarns

Hybrid yarns combine the great advantages of PTFE with the strength and stability of other high performance yarns. Our range includes white as well as graphited PTFE-yarns reinforced with

- High strength P-Aramid
- PPS
- Basalt



# Yarns for compression packings

Since more than 40 years we are serving this industry as the only supplier focused on yarns only. We are also proud member of FSA and ESA, the worlds leading industry organizations for the fluid sealing market. Our portfolio is the broadest among all competitors, offering PTFE filament yarns, ePTFE yarns, hybrid – as well as impregnated yarns.

## PTFE filament yarns

- Compact PTFE has superior pressure and extrusion resistance compared to ePTFE
- Special types for FDA applications and oxygen service
- Enable tight packing with excellent sealability
- High chemical resistance (PH range 0-14)
- Good dimensional stability – less cold extrusion
- Up to 260°C, short term 300°C
- Self lubricating



## Impregnated HPF yarns

In order to complete our broad range of PTFE yarns for the compression packing industry, we impregnate different high performance yarns with PTFE dispersion to make them "braider ready" for our customers. Currently we offer three product families:

- P84® Polyimide yarns
- Kynol® yarns
- Tencel® yarns





## Yarns and fibers for filtration applications

Due to their outstanding properties filter media made out of Lenzing PROFILEN® or Lenzing LENOFIL® is particularly suitable in filtration applications where critical and aggressive conditions prevail, especially high load of chemicals combined with high temperatures.

### Advantages

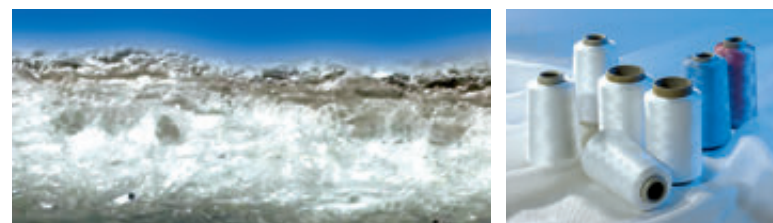
- Highest operational safety and reliability
- More economical due to longer operating life
- Easy cleaning

### Nonwovens

Staple fibers of PTFE are used since many years for needle felts for hot-gas filtration. We offer special grades for food contact as well as very fine fibers to enable you to serve also more sophisticated niches. Our patented crimp technology also helps to produce high end Nonwovens with very fine fibers.

### Woven fabrics

We offer a broad portfolio of different PTFE as well as PVDF yarns for weaving and knitting. Whether you are looking for flexible Multifilaments, very fine "Monofilament-like" yarns, or high strength tapes, we have a suitable product for your application.



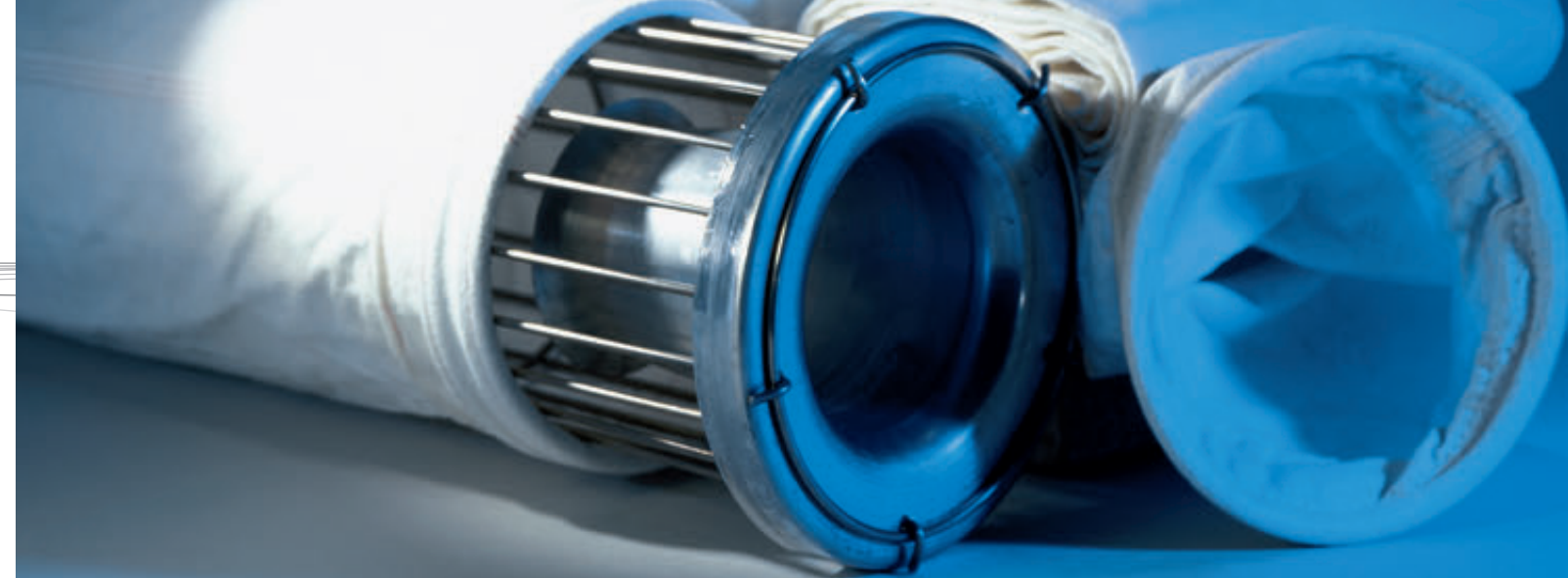
### Demister/coalescer

With our PTFE protected wire we developed a product especially for the Demister industry. In combining the strength of wire and PTFE we created a product with excellent stability and tenacity as well as perfect chemical resistance. Lifetime e.g. in sulphuric acid application can be increased tremendously with using our Lenzing PROFILEN® PPW yarn.



### Sewing thread

The seam of filter media is the most critical part to fail. Therefore in many filtration fabrics the best solution to prevent high risk of failure is using Lenzing PROFILEN® PTFE sewing thread. Temperature up to 280°C as well as high chemical load is not damaging the thread, even after very long time of exposure. So it is the best choice not only for confection of PTFE media but as a Multi-use thread for many high performance filter fabrics.



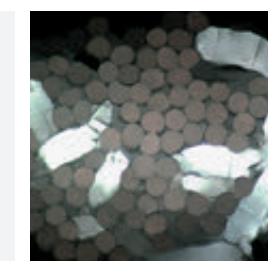
## Yarns for friction management applications

PTFE is known for its extremely low coefficient of friction since many years. Lenzing Plastics is offering many different solutions in the field of friction management.

A Polyester / PTFE spun yarn was developed for lowest friction combined with excellent durability due to irregular fiber distribution. But also 100% pure PTFE Multifilaments as well as staple fibers are supplied into this market.

End-use examples:

- Filament wound bearings
- Fabrics for belts/bushings
- Ropes

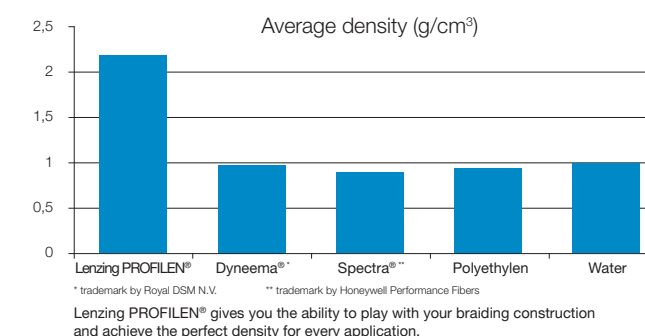


## Yarns for braided fishing lines

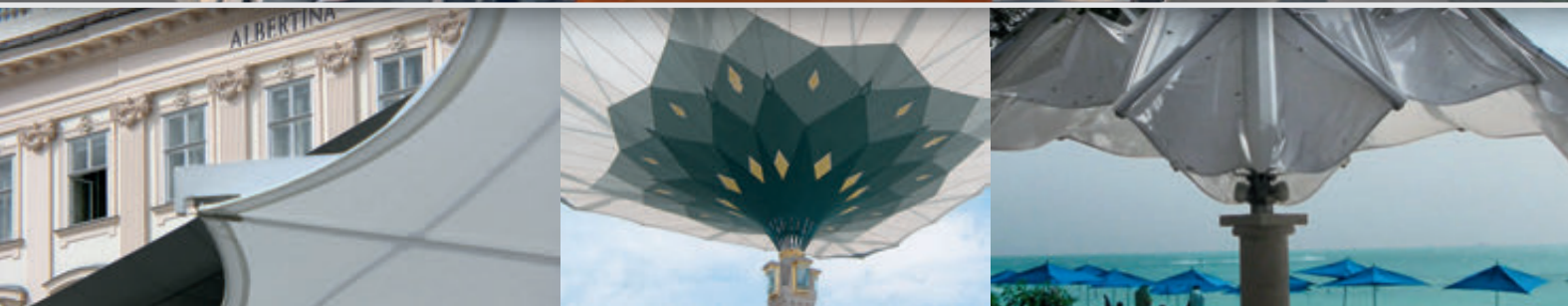
Beside the great advantages of PTFE there is one negative aspect for many markets: the high density of 2,2 g / cm³. However we found a market that is taking advantage of this high density: manufacturers of braided fishing lines. Our yarns enable you to construct a braided fishing line that is sinking

in the water. So it is possible to combine the great flexibility and the direct line profile from rod to lure of braided lines with sinking properties only known from monofilaments so far. And the excellent resistance to UV light and salt water is a highly welcome side benefit of the fibers.

### Density comparison







## Sewing threads

The weakest part of umbrellas, canvas and awnings is always the stitch. UV light attacks the conventional sewing thread and reduces its tenacity over time tremendously. With a rather low investment compared to the total value of a fabric, the confec-tion and installation, you can reduce the risk of a failing sewing

thread close to zero. With our 100% inherently UV resistant Lenzing PROFILEN® threads you are always on the safe side! A range of different threads for different sewing applications is available. Please ask for more details!



## Yarns for textile architecture fabrics

Textiles for architectural applications have the tremendous limitation, that the exposure to UV light limits their lifetime. With our Lenzing PROFILEN® and Lenzing LENOFIL® yarns we provide unique solutions, especially for retractable uses.

### Fabric

Lenzing Plastics is a yarn manufacturer – however we work constantly to establish a production chain till the end-user by bringing together interested parties along the value chain. So we can offer contacts to possible fabric manufacturers working with our yarns.



### Yarns

Also in this application we offer a broad range of yarn types: High strength Lenzing PROFILEN® yarns with low density for very big constructions in different sizes. Lenzing LENOFIL® Multifilaments for smaller installations, avail-able in bright colors and different sizes.



### Lenzing PROFILEN® benefits

- Permanent 100% UV and weather resistance without additives
- High light transmission (up to 60%)
- Dirt and water repellent ("lotus-effect")
- Extreme resilience/ flexibility, even at low temperatures
- Cooling effect

### Environmental aspects

- Resistance to UV-sunlight without additives
- Long service life will preserve resources
- Colling effect saves energy
- Free of heavy metals and other hazardous additives
- Inert and physiologically safe (FDA listed – used in medical applications)
- Dust – free (especially compared to glass fiber)

### Safety aspects

- Non flammable (LOI 95%)
- B1 classification
- Does not drip
- Does not splitter
- Resistance to chemicals and pollution

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