

# FILAMENT

GETTING FIBERS INTO SHAPE



**TRÜTZSCHLER**  
MAN-MADE FIBERS



# MAN-MADE FIBERS

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Experience interactive added values with our Trützschler Man-Made Fibers App



**1. Download the app**

You can use the Trützschler Man-Made Fibers App with Android devices as well as iPhone and iPad. Download the app free-of-charge from the Google Play Store (≥ Android version 4.1) or the Apple App Store (≥ iOS version 8).

**2. Use the Smartview function**

Open the Trützschler Man-Made Fibers App and activate Smartview in the drop-down side menu.



**3. Scanning and viewing additional information**

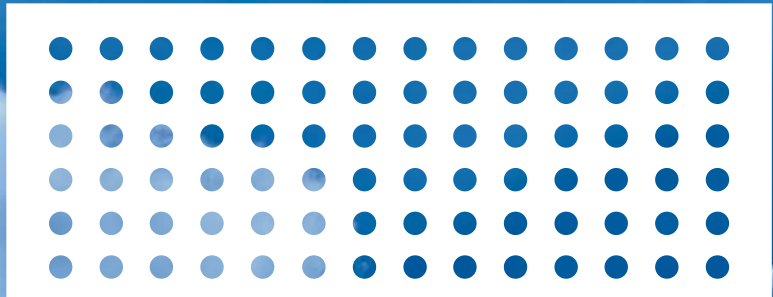
Scan the entire page that contains the scan icon with the Smartview function. Touch the screen to play the video. Get started.

[www.truetzschler.com/apps](http://www.truetzschler.com/apps)

# FARSIGHTED AND RESPON

We want you to be successful with the help of our technologies and services. However, our actions are not limited to economic aspects.

As family enterprise, we have experienced, accompanied and shaped the business and its specifics for decades. Thus we know that success is more than just numbers.



## **Business partner, with emphasis on partner**

Those who choose Trützschler will receive added values that cannot be taken for granted in view of the increasingly fierce competition. But in our opinion they are imperative.

## **Reliable and close**

For four generations we have demonstrated that our word carries the same weight as a contract elsewhere. Though business numbers are taken seriously by us, we will not bow to them. Instead, we rely on real customer proximity in the textile markets of this world through our international production and service network.

## **Always innovative**

Our actions, which are based on long-term success, ensure that you have a partner that is always available. But also the security to continuously profit from technical innovations that can only be provided by Trützschler in this quality.

In short: Trützschler attaches importance to commercial success, but even more to long-term partnerships.

# SIBLE ACTION

it's true

**Customer benefits, with emphasis on benefits**

What constitutes a good production installation? Definitely a low TCO (Total Cost of Ownership). The only response of some machine manufacturers is to lower investment costs. We use a different approach.

**Compact and secure**

The small footprint of our machine technology and its high safety level are good for nature and user. One results in lower building and operating costs, and the other protects the operator during his work.

**Long-term efficiency**

Our installations convince in terms of a well-known long service life and low energy consumption. At the same time they make the best possible use of valuable raw materials. Our intelligent technologies retrieve additional good fibers even from alleged production waste. The beauty of this particular type of environment protection and resource conservation lies in the fact that it benefits nature and your production equally.

Anyone who expects sustained added value from an installation throughout the entire production process is demanding – and a Trützschler customer.

## Filament spinning systems

Better machines. Better yarns.

Filament spinning is based on the extrusion of thermoplastic polymers. First, polymer chips or recycled flakes are melted. Forcing the material through the fine holes of a spinneret results in filaments. After cooling and drawing, the filaments are wound on bobbins. Producers of carpet and industrial yarns are supported by a broad range of proven solutions to assist them in becoming even more innovative, competitive and successful.



The experts of Trützschler Man-Made Fibers can look back on experiences gained from hundreds of spinning positions delivered for BCF and industrial yarn. Both systems – symTTex for spinning of carpet yarns and symTTec for industrial yarns – are fully developed, robust and valued throughout the world.

**symTTex**

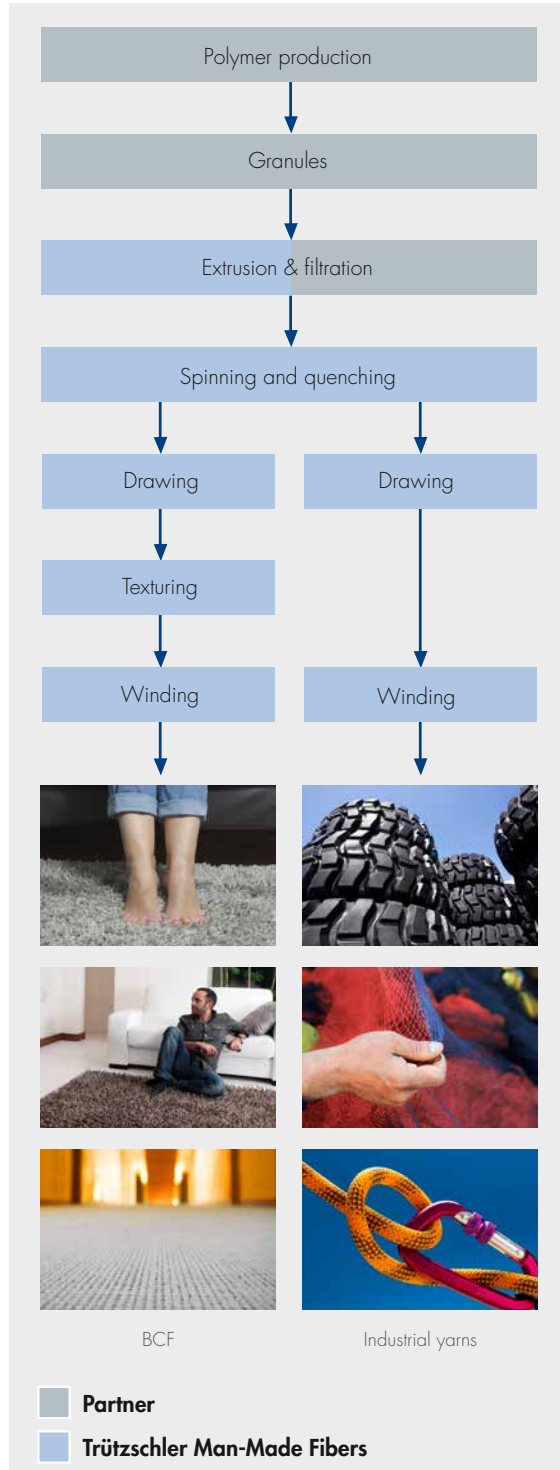
symTTex is a renowned name in the world of carpet manufacturers. In addition to the 2-end and 4-end system, there is now also a 3-end machine. This range of flexibility and product variety puts Trützschler Man-Made Fibers in a unique position. Now the optimal installation can be configured even more accurately in terms of product requirements, available space and other factors.

symTTex systems are available in 2-end, 3-end or 4-end design. They process a variety of polymers such as PP, PA6, PA6.6 as well as PET primary granules and recycled bottle material.

**symTTec**

The symTTec extrusion line for industrial yarns made of polyamide and polyester is a globally recognised solution. Here the highlights are the double-shell godets with their uniform temperature profile and the fully automatic, robust and extremely reliable winders.

Based on decades of experience and continuous advancement, symTTec systems produce among others high-tenacity PA6 yarns, extremely low shrinkage PET SLS yarns and high-tenacity PET SHT yarns.



## Carpet yarn (BCF) lines

Proven symTTex systems for a cost-effective production

Carpet yarn solutions by Trützschler Man-Made Fibers combine high yarn qualities with flexible and economic operation.

symTTex BCF systems serve a broad range of applications:

- Mono-colour yarns for woven and tufted carpets
- Tri-colour yarns for tufted carpets
- Coarse yarns up to 5,000 denier
- Fine yarns down to 400 denier
- Spun-dyed yarns and qualities for automotive applications

A M20/T20 mono- and tricolour BCF plant





# HIGHLIGHT: HPc Texturing

For BCF yarns with unique crimp characteristics

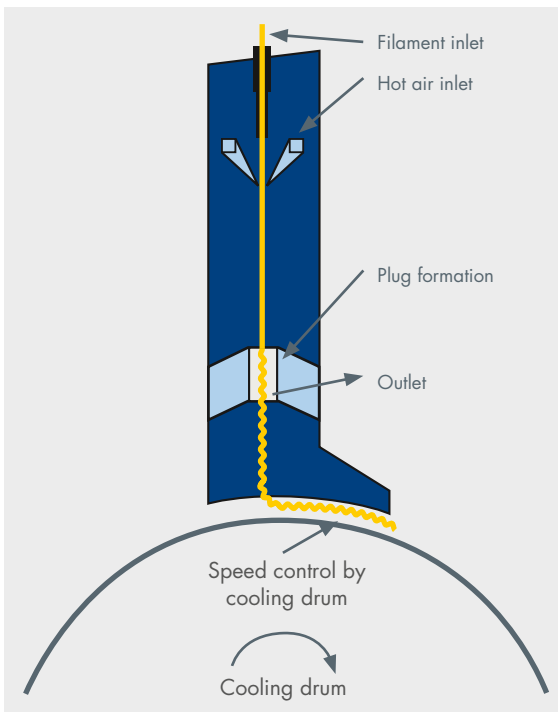
Thanks to lamellaless texturing, maintenance is reduced due to considerable less wear and tear on parts in contact with the yarn.

### HPc texturing

The HPc texturing unit is one of the most sophisticated components in all symTTex systems. Placed in a straight yarn path between the second godet duo and the cooling drum, the unit allows the production of yarn with unique crimp characteristics. The optimum cooling drum diameter guarantees excellent crimp fixation.

The compact and simple design of the HPc texturing system allows easy maintenance and cleaning of the jets without disassembling.

HPc textured yarns are distinctively even and strong. An extremely stable plug leads to better crimp retention, higher uniformity and better coverage in the carpet. Yarn quality is both reproducible and consistent from position to position.



HPc – frictionless texturing technology



HPc – frictionless texturing technology



HPTex with HPc jet

## HIGHLIGHT: BCF from R-PET

From post-consumer waste to quality yarns

Trützschler Man-Made Fibers and EREMA – Engineering Recycling Maschinen und Anlagen Ges.m.b.H. – team up to offer comprehensive and compact inline recycling and spinning solutions for R-PET BCF and mixtures with virgin materials.

The combined system by EREMA and Trützschler has been successfully realised thanks to the innovation spirit of both companies. Bringing up the VACUREMA® reactor to the melt pipe level resulted in a perfectly working system. The battery limit is situated between the filtration system and the inlet to the spin beam.

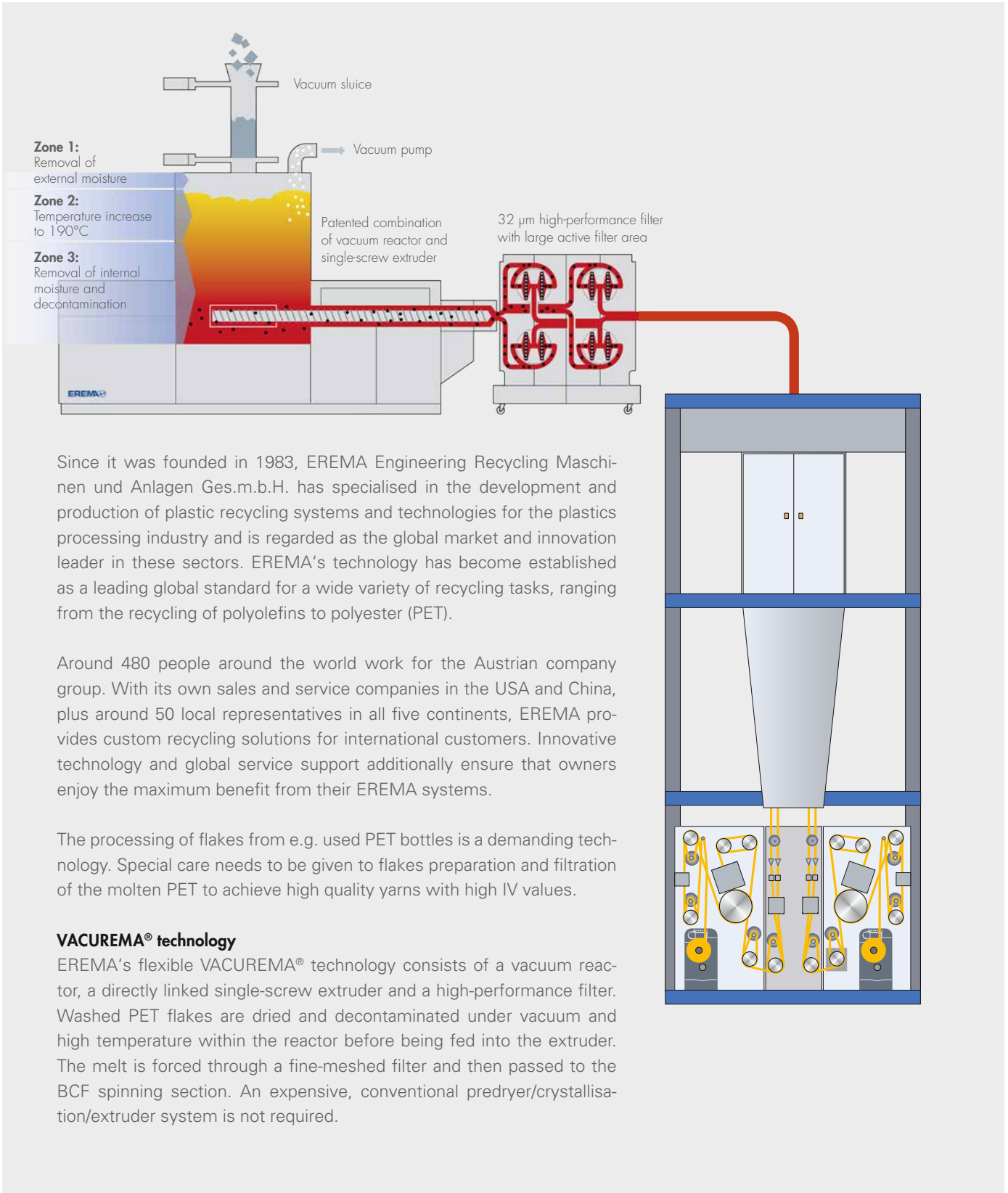
The strict melt specifications are fully achieved without needing a crystalliser and/or dryer. There is virtually no IV drop from the flakes to the yarn confirming the high technology level of the solution. Compared to standard R-PET systems, this inline-variant allows for significant production cost savings.

VACUREMA® Basic with vacuum reactor, extruder and filter



Flakes from recycled polyester bottles and R-PET BCF bobbin





Since it was founded in 1983, EREMA Engineering Recycling Maschinen und Anlagen Ges.m.b.H. has specialised in the development and production of plastic recycling systems and technologies for the plastics processing industry and is regarded as the global market and innovation leader in these sectors. EREMA's technology has become established as a leading global standard for a wide variety of recycling tasks, ranging from the recycling of polyolefins to polyester (PET).

Around 480 people around the world work for the Austrian company group. With its own sales and service companies in the USA and China, plus around 50 local representatives in all five continents, EREMA provides custom recycling solutions for international customers. Innovative technology and global service support additionally ensure that owners enjoy the maximum benefit from their EREMA systems.

The processing of flakes from e.g. used PET bottles is a demanding technology. Special care needs to be given to flakes preparation and filtration of the molten PET to achieve high quality yarns with high IV values.

**VACUREMA® technology**

EREMA's flexible VACUREMA® technology consists of a vacuum reactor, a directly linked single-screw extruder and a high-performance filter. Washed PET flakes are dried and decontaminated under vacuum and high temperature within the reactor before being fed into the extruder. The melt is forced through a fine-meshed filter and then passed to the BCF spinning section. An expensive, conventional predryer/crystallisation/extruder system is not required.

## HIGHLIGHT: Polyester BCF

### Yarns in a thousand colour hues

In the last years a new tendency to use PET for the production of BCF yarn arose. Trützschler Man-Made Fibers offers reliable solutions for processing this attractively priced but demanding BCF material.

Due to piece dyeing Polyester BCF yarn comes in a broad range of colours. Moreover, the polymer's excellent dyeability opens the door to printed carpets. The yarns have a soft and luxurious touch and a high stain resistance which is even higher than that of chemically treated polyamide BCF.

Processing PET in a BCF line requires special attention to chips processing since PET in molten state is highly sensitive to water. Ambient conditions have great influence on product quality and process stability. Therefore a special layout adjustment is needed for both spinning and drawing components.

Higher twist and higher weight PET BCF carpets are an excellent choice for residential and object applications. PET can offer as well an alternative for the demanding automotive applications.



Spun-dyed polyester yarn for automotive carpets



# symTTex – BCF spinning lines

A well-rounded product line

symTTex systems are optionally available with two, three or four ends per spinning position. Thus, a production line could comprise 3, 4, 6, 8, 9, 12 or 16 ends – depending on customer requirements.

To name but a few aspects, our systems can be configured according to available space, product characteristics, productivity and/or conversion cost issues.

## M20 / T20

The 2-end M20 is characterised by its compact design. Due to the low installation height and mirroring of the spinning positions, string-up is easy and quick. This increases efficiency and minimises downtimes and waste.

The T20 version of this machine is our system for the production of tri-colour yarns.



HPC texturing unit of a 2-end symTTex system

## M30

With 3 ends per winder, the M30 has been developed for the areas not optimally covered by M20 or M40. With its compact design, the M30 is designed for fast and easy operation – and offers a high productivity.



3-end winder

## M40

The symTTex system M40 stands for absolute symmetry. The result is a consistently high quality of mono-colour yarns due to the symmetrical and low-friction yarn path.

The 4-end design with 2 winders per spinning position achieves highest productivity and lowest conversion cost.



Quenching with 4 end per spinning position

## Industrial yarn lines

Designs for highest demands

Industrial yarns cover a wide spectrum of raw materials, yarn characteristics and applications.

The market is highly segmented with extreme requirements concerning tensile strength, elongation, shrinkage and homogeneity.

### Polyester yarns

symTTec systems for PET produce a broad range of yarns types from super high tenacity (SHT) to super low shrinkage (SLS) qualities. They are used for mechanical rubber goods, hoses, conveyor belts, broad wovens and various other applications.

### Polyamide yarns

Outstanding or even unique yarn qualities are achieved by symTTec systems for PA. Parameters of tire reinforcement yarn spun from commercially available polymers are above today's market benchmark. A special process developed for higher viscosity (RV) polymers results in a unique yarn quality beyond that of marketed products.

Tires, belts, ropes and nets – a choice of end uses for industrial yarns



**Total symmetry**

Developed by Trützschler experts, the 4-end industrial yarn extrusion concept symTTec stands for total symmetry. All yarns have the same angle, from the spinneret to the first yarn-guiding element, resulting in improved cohesion of the single filaments. Special focus is on keeping the geometry of each position exactly identical. This allows for a very homogeneous melt distribution and uniform single filament titer.

**Proven components**

All components - spinning beam, spin pack, annealer, quench, godets and winder - are designed for best yarn qualities. They are continuously refined to cover new market requirements.



DSR godets in an industrial yarn plant



Winding section in an industrial yarn plant

# symTTec – industrial yarn spinning lines

## High-tenacity and low-shrinkage yarns

The 4-end symTTec concept has been applied in various configurations covering main production areas:

- 4 duos per position:
  - PA6 high-tenacity (HT) yarns
  - PET high-tenacity HT and super-high tenacity (SHT) yarns
- 5 duos per position:
  - PET low shrinkage (LS) and super low shrinkage (SLS) yarns

Setting up an industrial yarn plant requires profound skills in process technology, engineering and project management. Beside the core components other units - process utilities, polymer handling systems, polymer and semi-finished goods storage - need to be planned for. Our team of experienced technicians stand by your side from the first idea until line start-up and commercial production.



Draw panel with 5 duos for one spinning position

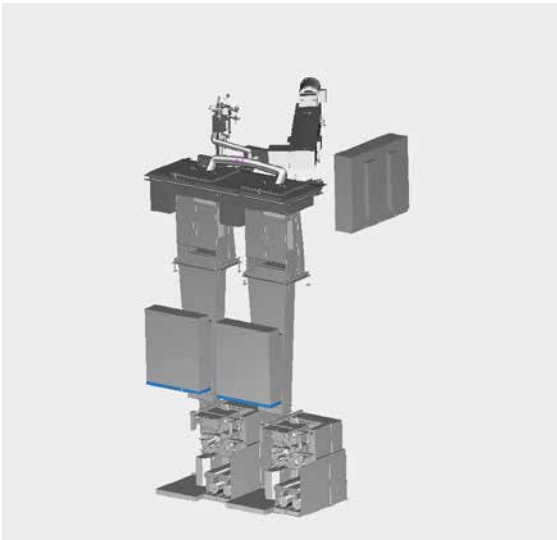
Draw panel with 4 duos for one spinning position



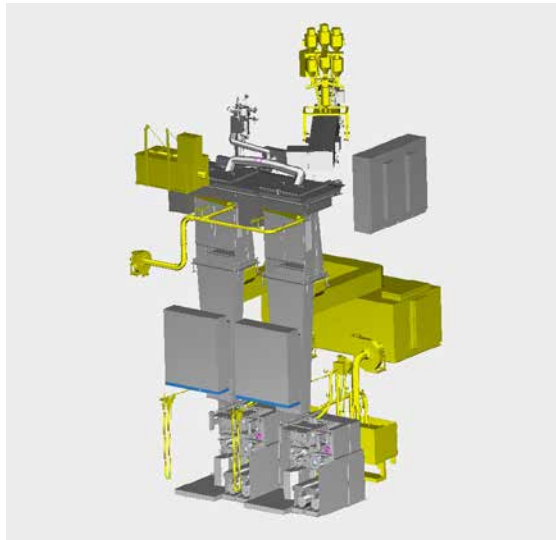
## Scope of supply

Freedom of choice as primary objective

Almost no investment is like any other. Therefore Trützschler Man-Made Fibers' modular process and system design is highly adaptable to your needs.



1st level – primary machinery with process-related components



2nd level – primary machinery with process-related components and auxiliary systems

### Three levels of supply

The scope of supply includes building-integrated designs as well as stand-alone frame-based systems. Due to standard sizes and pre-assembled modules, erection, start-up and maintenance is easy.



3rd level or FULL scope of supply including steel frame

## Key components

Quality down to the detail

An installation is more than the sum of its components. Their quality and fine synchronization result in first-class processes and products.

### Extruder

The design of extruders and extruder screws in BCF lines allows the multiple polymer strategy for PP/PA6 as well as for PET/PA66. To ensure best optimal mixing conditions, all screw designs feature a well-proven barrier profile. Main characteristics are the compact design, a special barrier screw design and a direct extruder drive without transmission belts. In industrial yarn plants, the heating zones of the extruders are air-cooled to allow optimal processing of high-viscosity polymers. The extruder screw is calculated individually for each project.

Extruder with gravimetric dosing system for perfect melt quality



or rectangular spinning packs and are optimized for excellent filtration, high throughput and ideal flow properties.



Spin packs for top BCF quality

### Quenching

The cross-flow quenching units are pulsation-free and allow adjustment to the required temperature, relative humidity, velocity and profile of the cooling air. The sturdy design with easy assembly and disassembly ensures optimal service and maintenance conditions.

### Spinning beam and spin pack

Absolutely identical heating conditions and mechanical treatment are crucial for the homogeneity of the filaments. All spinning beams are tailor-made concerning the requirements of the polymer, the spinning process and the plant.

An optimal spin pack design minimises the coefficient of the variation of the single filament diameter. Trützschler spinning installations feature either round



Turbulence-free quenching

**Godets**

More than 26,000 double-shell godets (DSR) are in operation worldwide and are evidence of the high performance standard. The DSR family has a wide spectrum of draw forces and working widths to meet the most demanding requirements of today's highly specialised tire cord, industrial yarn and BCF processes.



DSR godets during production

**Texturing**

It is the texturing process that gives multifilament yarns their bulkiness. Crimp formation and fixation is performed by the proven, lamellaless and easy-to-handle HPC texturing unit with the adjacent cooling drum.



M40's cooling drum below the HPC texturing unit

**Central Monitoring Unit (CMU)**

The Trützschler CMU system combines all the functions necessary to control the extrusion line. The simple, self-guiding, graphical user interface allows easy selection and manipulation of all process parameters. Language selection as well as recipe management, sophisticated alarm functions, free selection and combination of trends including operating data recording are standard features of the Trützschler CMU.

**Winders**

Trützschler offers a variety of winder configurations for BCF and industrial yarn plants. The 2-end and 3-end winders feature a fully automatic and compact design. They have a high change reliability, even when paper tubes are used multiple times.



Sturdy and reliable winder

## Modernisation and maintenance

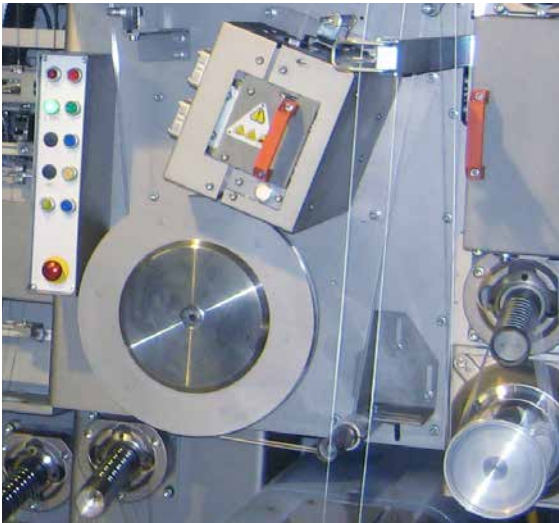
Partnership knows no boundaries

In mechanical engineering, technical innovations are not the exception but the rule. The integration of new developments into existing systems is complex and very challenging. To ensure the productivity of existing installations and increase service life, we offer different solutions for updating components.



### Texturing upgrade kit HPc

For BCF spinning, Trützschler offers the HPc texturing unit. The new jet improves crimp characteristics, uniformity and retention and opens up the working area for coarse yarns up to 3,600 denier. HPc is a compact unit with a one piece jet design for reduced maintenance and easy cleaning.



Texturing upgrade kit HPc

### Winder and electrical upgrade

Well-maintained older spinning plants have specific financial advantages, particularly when using robust technology. A tailor-made upgrade with latest winder technology and electro-technology preserves their value and improves performance characteristics.



Winder and electrical upgrades



Plasma coating for godets

### Reconditioning and plasma coating for godets

Godets have a significant impact on filament quality. To ensure gentle yarn treatment, regular maintenance and uniform coating are a prerequisite. Trützschler Man-Made Fibers is capable of coating all godets and rotating parts up to a diameter of 350 mm, a length of 1,500 mm and a maximum weight of 100 kg.

## Maximise value creation

Be confident before investing

For trials in BCF and industrial yarn the technical center of Trützschler Switzerland in Winterthur is at your service.

The M30 at Technical Center Winterthur



Making use of our test facility help customers to develop new yarn qualities, test new processes and raw materials. The entire chain of processes from polymer to bobbin can be validated at production scale.

We will find the optimal arrangement and parameter settings of the system's components in regard to your requirements. Our experts will be pleased to assist you with their profound knowledge and expertise. Thus it can be assured that production lines for today's and tomorrow's market demands can be realized most successfully.

**Pilot lines**

The Winterthur Technical Center hosts full-scale spinning positions of the both a symTText extrusion system for BCF and a symTTec line for industrial yarns. The trial lines are equipped for spinning PP, PA6, PA66 and PET yarns.

**Yarn laboratory**

Trützschler Man-Made Fibers' Technical Center is completed by a laboratory equipped with state-of-the-art measuring systems. All yarn characteristics gathered during trials can be measured and evaluated in this facility.



Top loading the spin packs



Stringing-up the BCF position



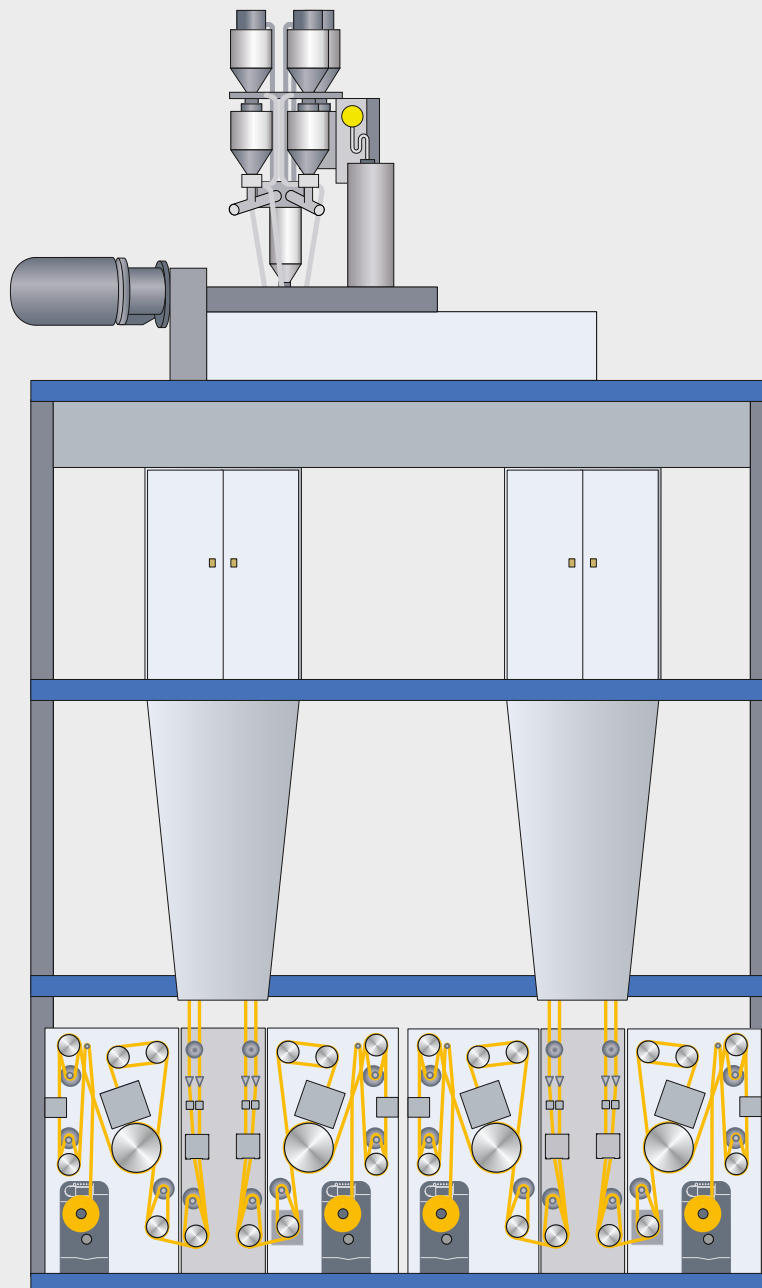
The symTTec trial line

## symTTex M20

The proven 2-end, mono-colour BCF process

Several hundred M20 spinning positions are doing service all over the world. A high yarn quality combined with easy handling makes this machine to an ideal choice for newcomers, small lot and specialty yarn producers.

symTTec M20

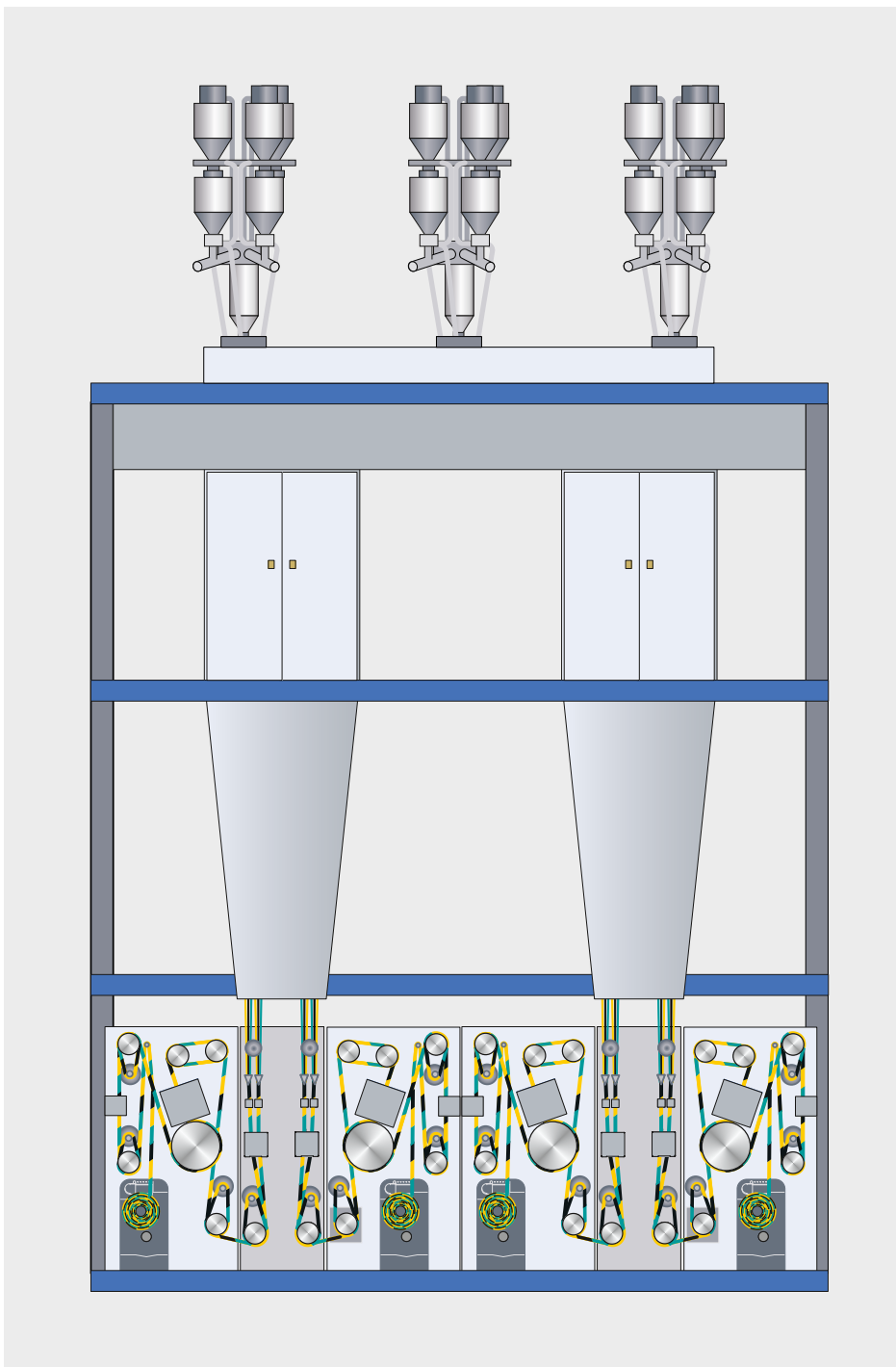




## symTTex T20

The specialist for tri-colour yarns

BCF yarns from the tri-color T20 system come with in-built colour effects. As the name implies, the yarn is composed of three strands of different colour giving the finished carpet a classy or contemporary melange effect.



Besides the standard process Trützschler Man-Made Fibers offers two other technologies – FLEX and ecoFLEX – for spinning a wide variety of tri-colour BCF types.

### **FLEX and ecoFLEX technology**

With the patented BCF tri-colour FLEX and the newly developed and patented ecoFLEX technologies, tri-colour yarns for sprinkled carpets can be produced in one step directly during the extrusion process.



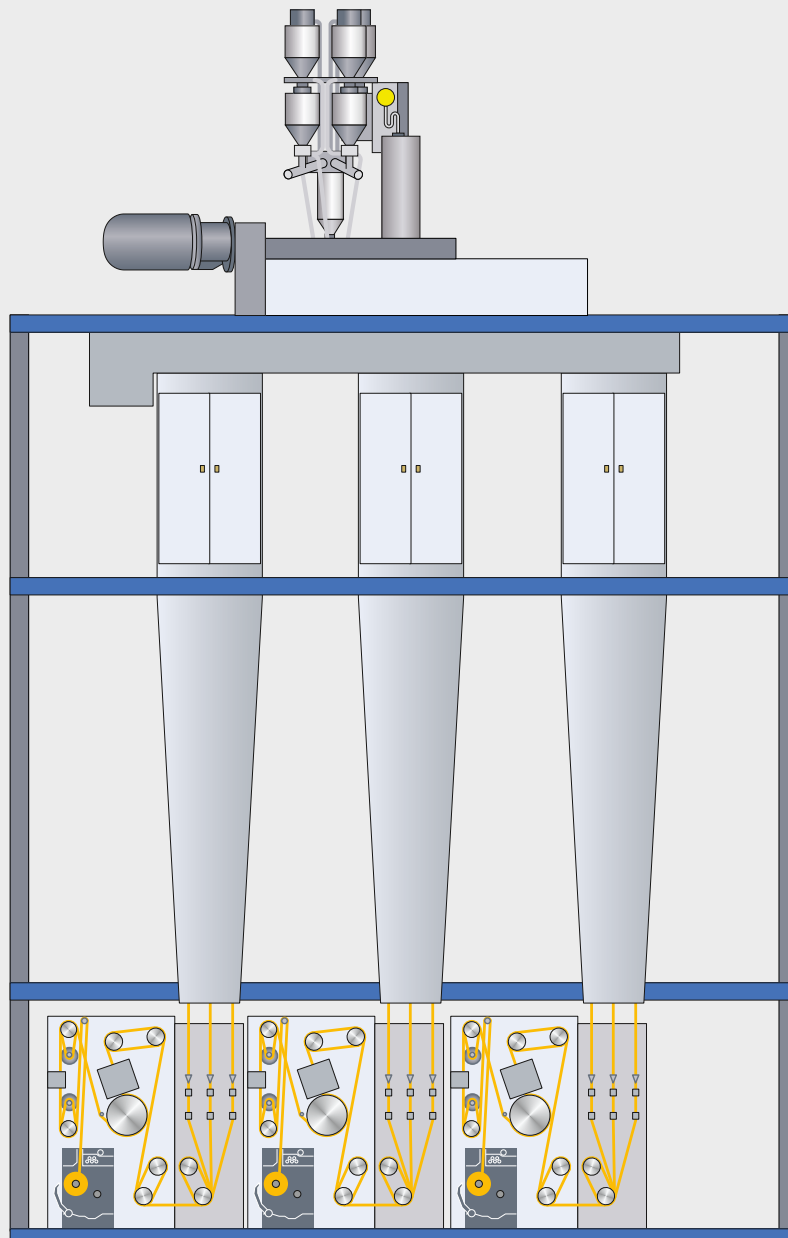
Standard tri-colour (top) and ecoFLEX (below)

## symTTex M30

The new 3-end solution

Introduced at ITMA 2015, this new machine completes the symTTex product family. 3 bobbins on the winder offer a high level of productivity as well as a fast and uncomplicated string up process.

symTTec M30

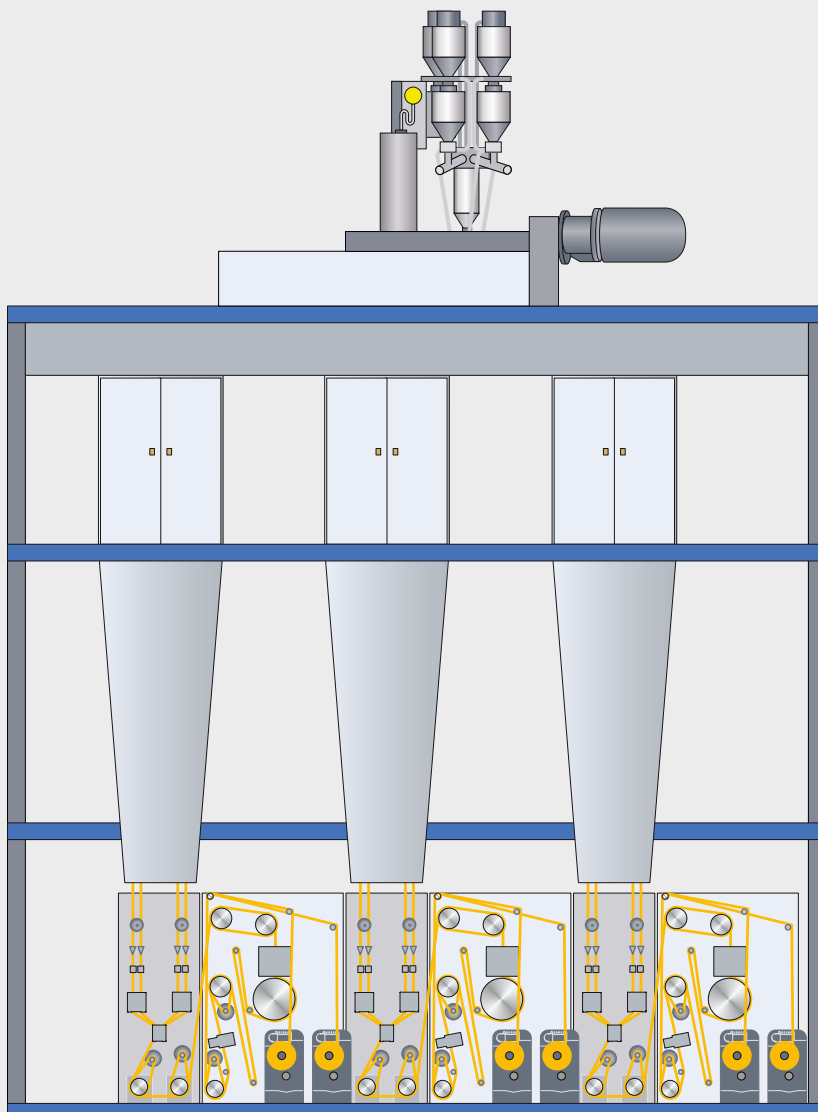


## symTTeX M40

4-ends per position for highest productivity

In the M40 design one spinning position serves two 2-end winders. The large throughput is achieved by top-loading, rectangular spin packs with a high filtration area. Installing or removing two spin packs at the same time assures shortest downtime during pack change.

symTtec M40



# Nonwovens: from fibers to nonwovens

Turnkey solutions for all nonwovens applications

The product range of Trützschler Nonwovens covers standard machines and special-purpose solutions, as well as complete lines that are tailor-made to customer specifications.

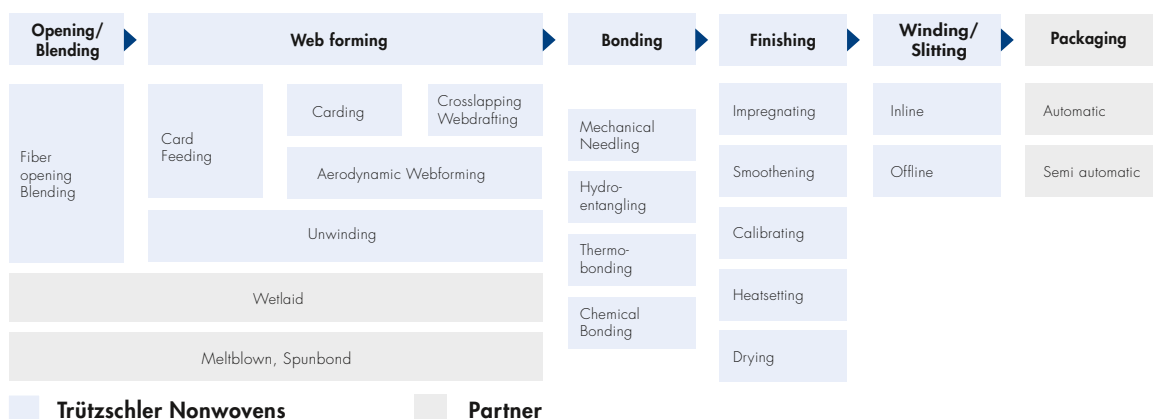
Random card  
EWK 413, e.g. for  
hygiene products



### Extensive expertise

Our product range for the initial process stages comprises the entire fiber preparation, i.e. opening and blending, web formation with roller cards or aerodynamic web formers, crosslappers and web drafters for a number of required web weights and web widths.

Our core competence in the downstream processes are needling, hydroentangling, thermal or chemical bonding, drying and finishing equipment as well as winding concepts.



Depending on the economic and qualitative properties of the end product, we are able to select and apply the perfect solution.

This combination of machines from a single source is unique in the nonwovens world and guarantees smooth and trouble-free operation after only a short installation period.

**Two technical centers**

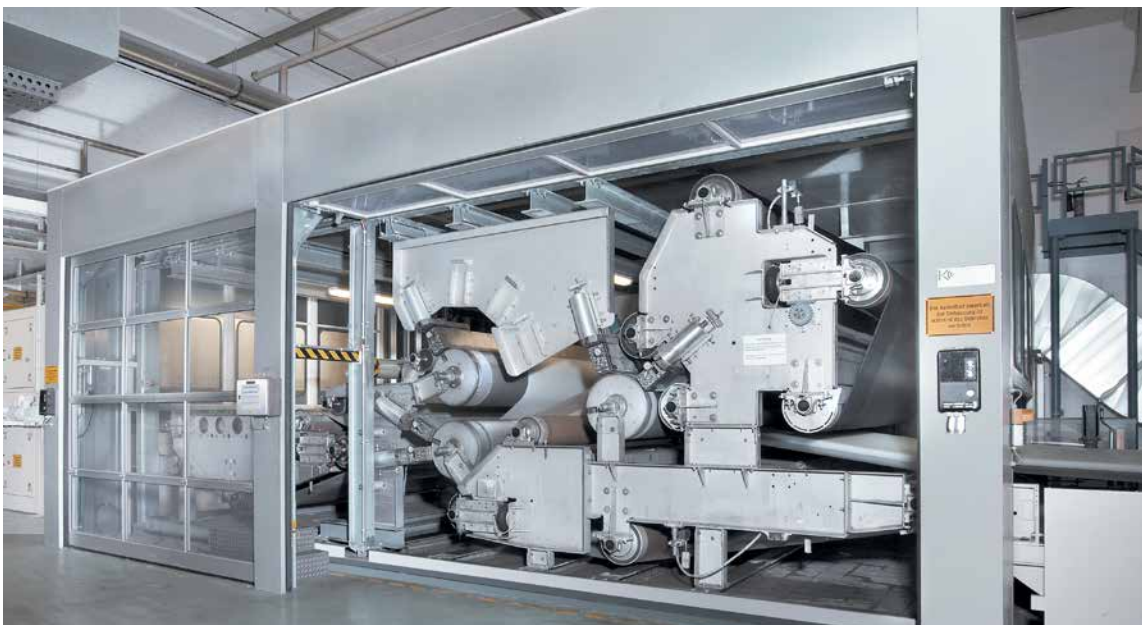
The two technical centers of Trützschler Nonwovens in Dülmen and Egelsbach are equipped to meet the specific requirements of our customers who have the opportunity to test all production methods on a large industrial scale. This is of course also possible with material provided by the customers. On a total area of more than 5,000 m<sup>2</sup> we are able to demonstrate all technologies, from fiber preparation and web formation to web bonding and web finishing. Furthermore, our laboratory is available for detailed material analyses. This way you will find out exactly what advantages the production methods of Trützschler Nonwovens have to offer.



Needling machine installation for filter material



Turret disc winder BWT 202-02 based on Bastian know-how



Fleissner Aquajet

# Technical data

symTTex M20/T20, M30, M40 – BCF application 2, 3, 4-end

		M20/T20	M30	M40
<b>Polymer</b>		PP, PA6, PA6-6, PET, PBT	PP, PA6, PA6-6, PET, PBT	PP, PA6, PA6-6, PET, PBT
<b>No. of ends per position</b>		2	3	4
<b>Position pitch</b>	mm	1500	2000	2350
<b>Max. no. of filament per spinneret</b>		360	360	360
<b>Titre range<sup>1)</sup></b>	dtex	500 – 3600	500 – 4600	500 – 3600 up to 6000
<b>Dpf range<sup>2)</sup></b>	dpf	3 – 28	3 – 28	3 – 28
<b>Dosing system</b>		Gravimetric	Gravimetric	Gravimetric
<b>Spin pack design</b>		Round	Rectangular	Rectangular
<b>No. of heated draw rolls</b>		3 <sup>3)</sup> , 4	3 <sup>3)</sup> , 4, 5	3 <sup>3)</sup> , 4
<b>Heating system draw rolls</b>		Dual shell roll	Dual shell roll	Dual shell roll
<b>Texturing unit</b>		HPc	HPc	HPc
<b>Cooling drum diameter<sup>4)</sup></b>	mm	400	400	400
<b>Max. winder speed</b>	m/min	3600	3600	3600
<b>Max. package diameter Ø</b>	mm	300	320	300

<sup>1)</sup> Depending on polymer and no. of filament

<sup>2)</sup> Depending on polymer and no. of filament and texturing jet

<sup>3)</sup> Standard, DUO 1 optional depending on polymer

<sup>4)</sup> Cooling hood optional



[www.machines-for-textiles.com/blue-competence](http://www.machines-for-textiles.com/blue-competence)

**Trützschler Nonwovens & Man-Made Fibers GmbH**  
 Wolfsgartenstraße 6 · 63329 Egelsbach, Germany  
 Telephone: +49 (0)6103 401-0 · Fax: +49 (0)6103 401-440  
 E-Mail: [info-fleissner@truetzschler.de](mailto:info-fleissner@truetzschler.de)

**Trützschler Switzerland AG**  
 Schlosstalstrasse 45 · CH-8406 Winterthur, Switzerland  
 Telephone: +41 52 268 69 69 · Fax: +41 52 268 69 68  
 E-Mail: [info@truetzschler.ch](mailto:info@truetzschler.ch)

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# GETTING FIBERS INTO SHAPE – SINCE 1888

## **TRÜTZSCHLER** SPINNING

Fiber preparation installations: Bale openers · Mixers · Cleaners/Openers  
Foreign Part Separators · Dust separators · Tuft blenders  
Waste cleaners | Cards | Draw frames | Combing machines

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## **TRÜTZSCHLER** NONWOVENS

Bale openers/Mixers | Card feeders | Cards/Crosslappers | Wet laying lines  
Hydroentangling, needling, thermo- and chemical bonding lines  
Finishing, drying, winding, slitting machinery

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## **TRÜTZSCHLER** MAN-MADE FIBERS

Filament lines: Carpet yarns (BCF) · Industrial yarns

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## **TRÜTZSCHLER** CARD CLOTHING

Metallic wires: Cards · Cards long staple · Cards nonwovens · Open-end spinning  
Flat tops | Fillets  
Carding segments | Service machines | Service 24/7