

▶ **Austrofil® –
MDY, FDY,
POY and BCF
multifilament**

Spinning Lines



One technology,
many applications

SML delivers high-performance spinning solutions that are fully tailored to customer requirements. Our Austrofil® CF spinning lines enable the production of yarns with outstanding properties.

No matter which yarn you need, we at SML can always supply the **ideal process** to guarantee **efficient production**. It is the accumulated expertise and decades of experience in **multifilament spinning line** engineering that have **made us market leaders** in this field.

The multifaceted world of spinning

Austrofil® CF (continuous filament) lines by SML are designed to produce fully-drawn, medium-drawn or bulk continuous filament yarns. All of them provide impressive results in terms of tenacity, elongation, and rest shrinkage – resulting in an endless variety of high-quality yarns that meet all kinds of requirements and trends.

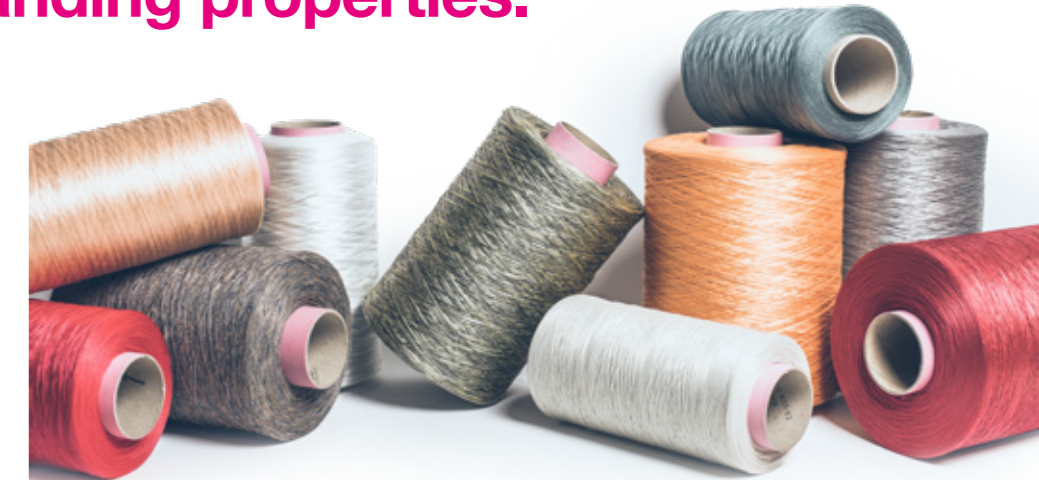
Technical and textile industry

Medium-drawn yarns (MDY) are often used in home textiles such as curtains, carpet backings or seat upholstery.

Fully-drawn yarns (FDY) are - due to their high-tenacity - the ideal solution when it comes to belts, safety netting, ropes or sewing thread for various types of bags.

Bulk continuous filament yarns (BCF) are widely used for carpets, but also for window seals and even for water filters.

Partially oriented yarn (POY) is an ideal for textiles or sport cloths.



Creating a customised experience

At SML, we hardly shy away from new ideas. On the contrary, we appreciate being surprised by our customers' creativity. Our design team already made extraordinary applications possible, such as for artificial hair or dental floss. Thanks to SML's technology center at the headquarters in Austria, we are very flexible and can check specific requests for their feasibility.

Comfortable to control

Every line can be comfortably operated and controlled by SML's advanced control system SMILE, a software solution that supports complete remote control and easy maintenance. SML's digital data generation and analysing tool bitWise provides a wide range of entirely new opportunities for data-driven decisions with a clear focus on optimisation of production processes.

Line Description Austrofil® CF MT/HT ▶ 8



Line Description Austrofil® BCF ▶ 14



Line Description Austrofil® Vertex CF MT POY/FDY ▶ 20



Component Description ▶ 26

Products CF FDY ▶ 9



Products BCF ▶ 15

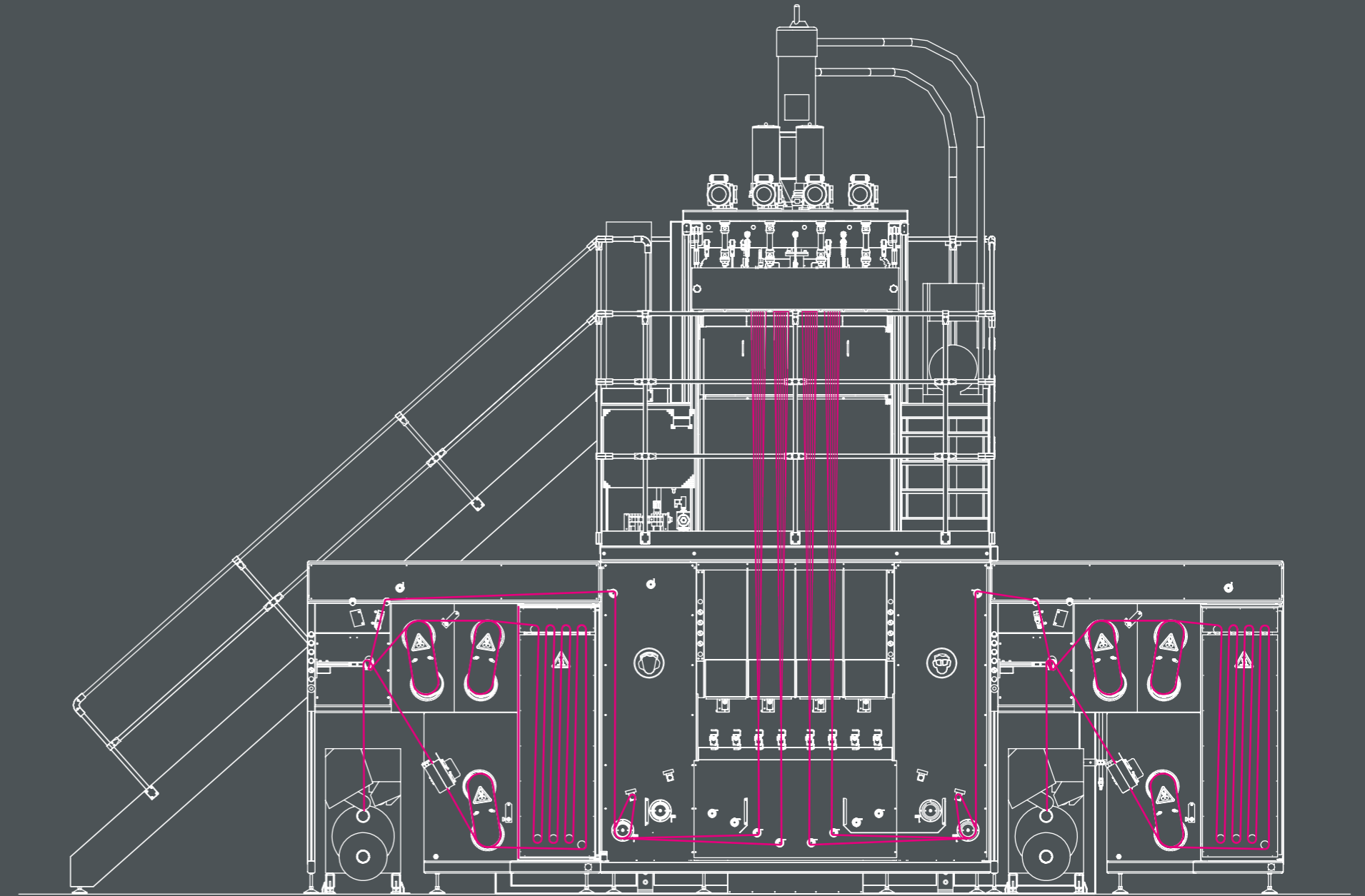


Products POY/FDY ▶ 21



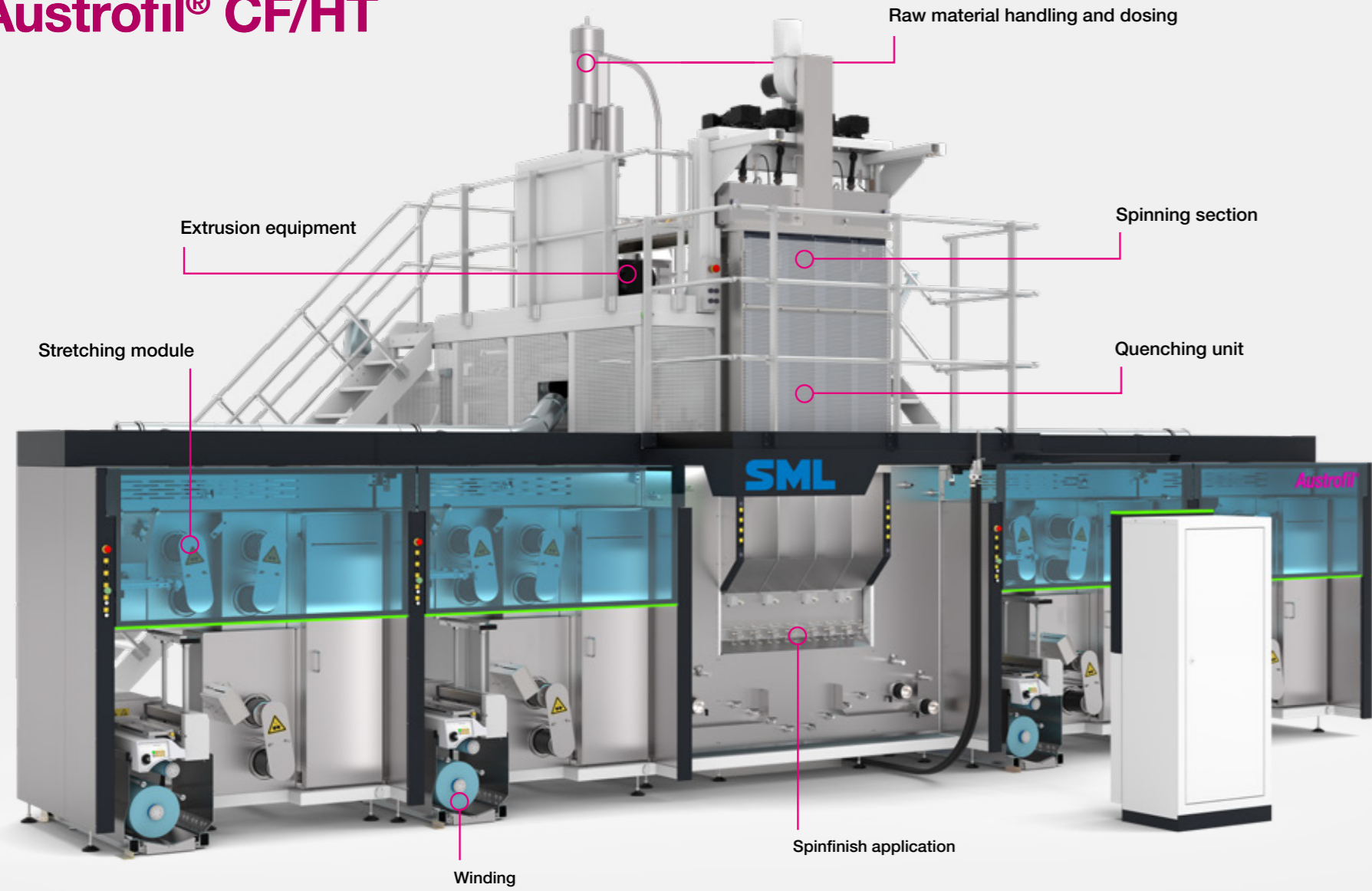
**Spinning lines
for MDY, FDY
and BCF yarns**

The core of our idea: Spinning lines for technical and textile yarns



Line description

Austrofil® CF/HT



Typical FDY Products





High performance and flexibility Austrofil® CF MT/HT extrusion lines

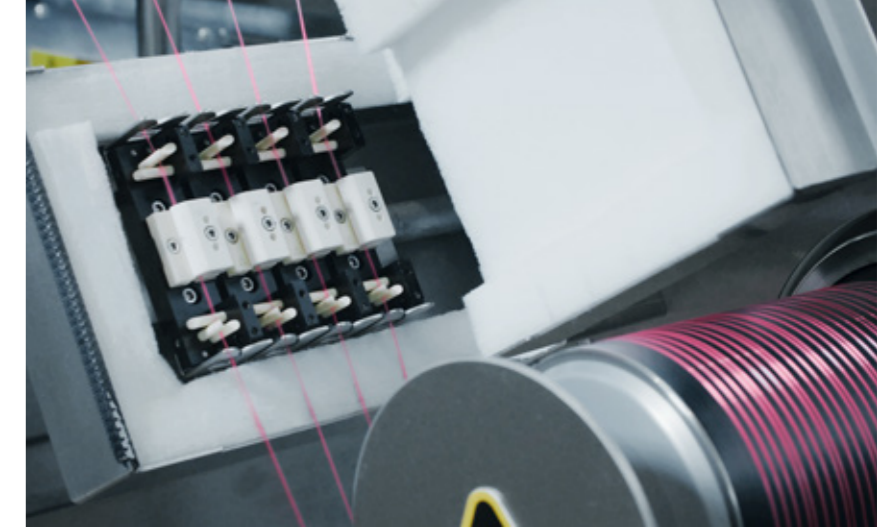
With different line configurations, our Austrofil® CF MT/HT lines offer solutions for individual challenges.

The outstanding characteristics of spinning lines developed and manufactured by SML are technical precision and reliability. Years of experience have enabled the fine-tuning of every core component that produces yarns from the granule to the finished bobbins.

Flexibility and reliable components

SML's CF lines are very compact and easy to operate, whether to produce medium tenacity (MT) or high tenacity (HT) yarns. Even quick product changes are possible, which gives our customers maximum flexibility in production.

Austrofil®
CF HT 4x(2|4)



Equipment that is fully geared to the market

All Austrofil® lines are equipped with the latest extrusion technology ensuring a top melt quality and colour uniformity. Of course, the lines include high-speed winders, which reliably guarantee automatic bobbin changes.

Elaborated heat treatment process

The HT series features a hot air oven in which the yarn is gently and evenly heat-treated, so that it can be stretched as far as possible. This enables customers to produce yarns in the highest tenacity range.

Equipment that works immediately

SML's engineering experience makes it possible to get systems up and running quickly at the customer's site. A big advantage is that local material qualities - no matter where you are in the world - can be tested in advance at our headquarters in Austria. This allows us to tailor the system precisely to high quality results.

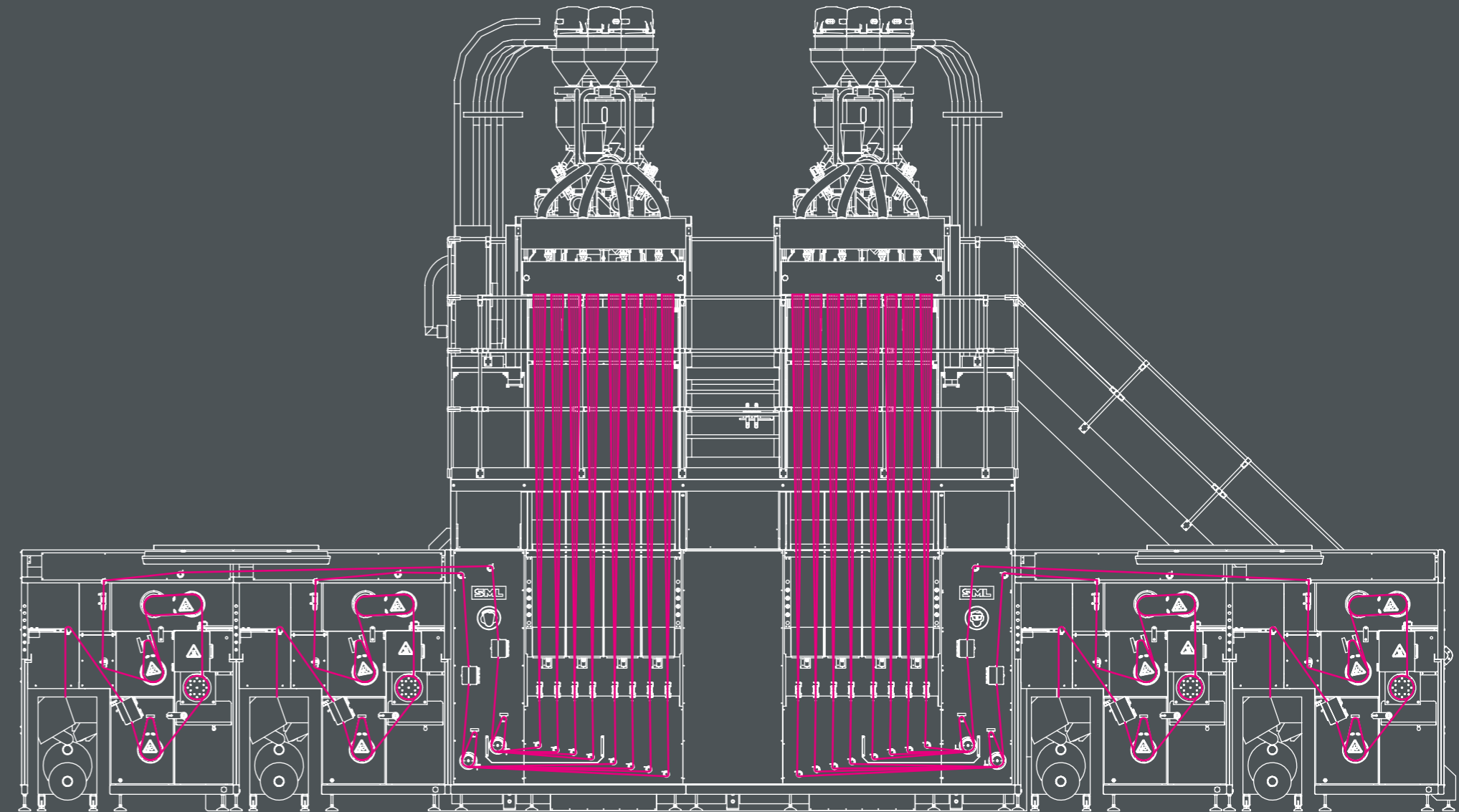
Technical data

Products	Medium and high tenacity yarn
Polymer	Polypropylene, MFR 10 – 35
Titre range	150 - 4,000 den 165 - 4,400 dtex

Line configuration

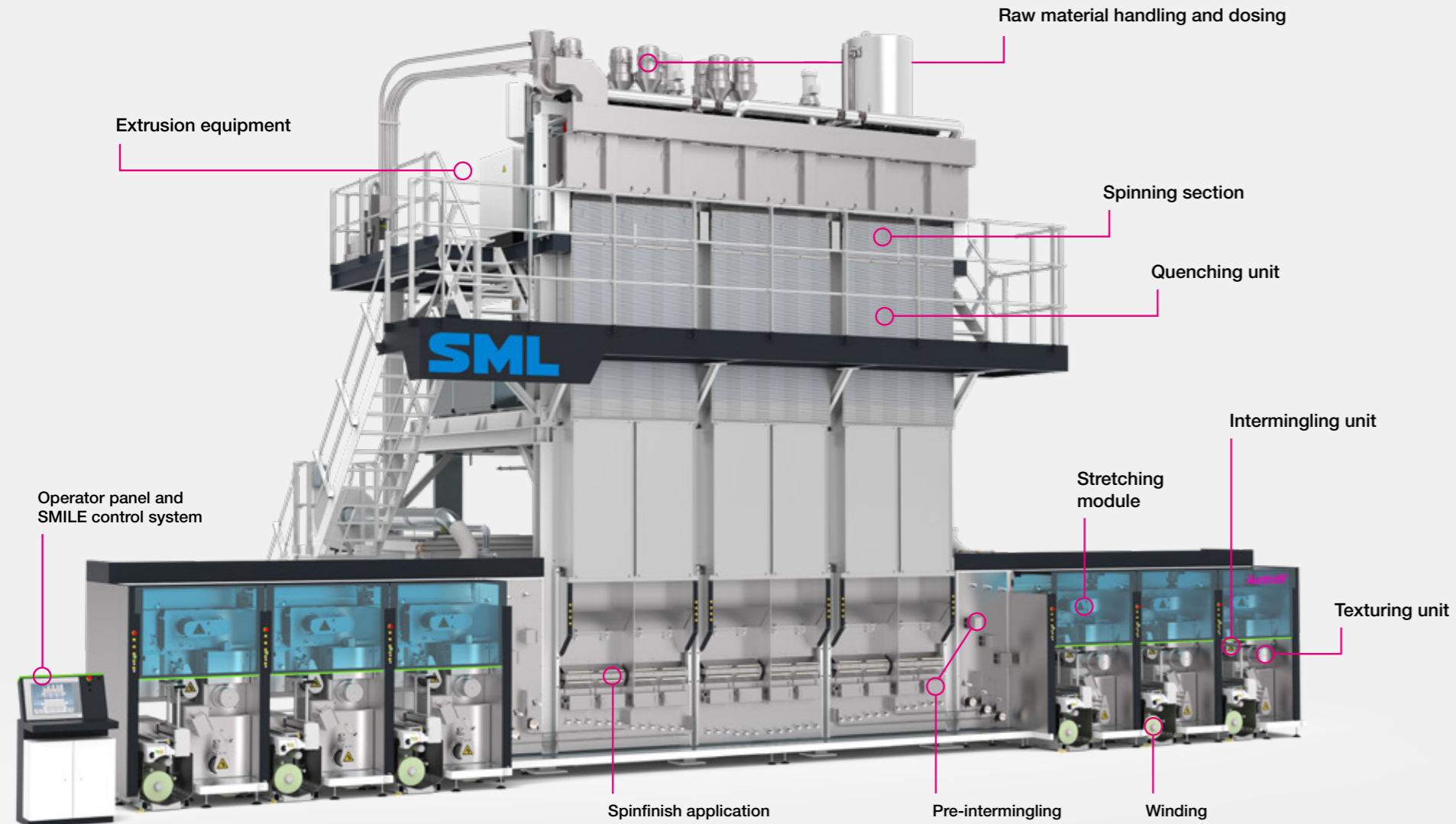
	Austrofil® CF MT/HT 2x(2 4)	Austrofil® CF MT/HT 4x(2 4)
Output	Max. 110 kg/h 2.6t/d	Max. 160 kg/h 3.8t/d
	The actual maximum output depends on the raw materials used and the tenacity or titre desired	
Total number of ends	4 or 8	8 or 16
Extruder	1 x 75/28	1 x 75/28
Winding speed	1,000 - 3,500 m/min	

Spinning lines for BCF yarns

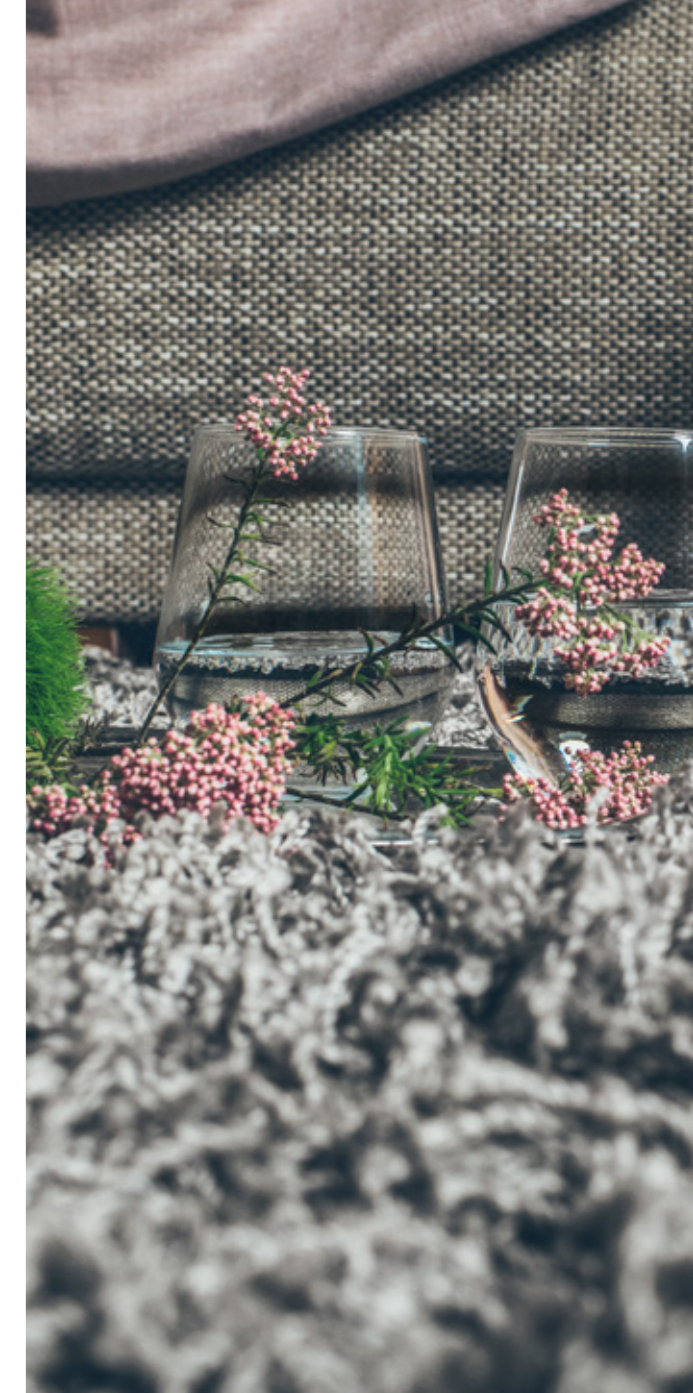


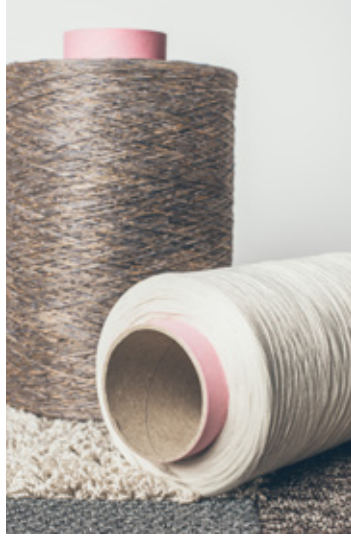
Line description

Austrofil® BCF Tricolour 6x2



Typical BCF Products





Technology that pays off quickly

The **Bulked Continuous Filament** process is the most efficient method of producing yarn for the carpet industry.

A special feature for the carpet making process is the uniquely high crimp that can be achieved with our machines, making it possible to reduce material usage by as much as 20 %. Fact is: an investment in an SML spinning line is an investment that pays off quickly!

SML's patented BCF texturing units set global standards for high yarn crimp, longevity and the efficient use of raw materials. The outstanding quality of the yarns created with our high-tech spinning machines has led us to receiving a huge positive response from the market in this area.

They are one of the clearest examples of SML's innovative detail engineering with the continuous further development of core components. SML integrates high performance single-screw extruders with a 75 mm screw diameter in all of its BCF spinning lines. They guarantee, above all, top melt quality, the highest reliability and substantial productivity.

Monocolour or tricolour

Within our **Austrofil® brand portfolio**, we build **four different types** of lines based on bulk continuous filament technology.

They are the ideal way to process today's most popular synthetic carpet materials, such as PP. Our spinning lines can be set up with monocolour or tricolour technology, depending on the yarn that is required.



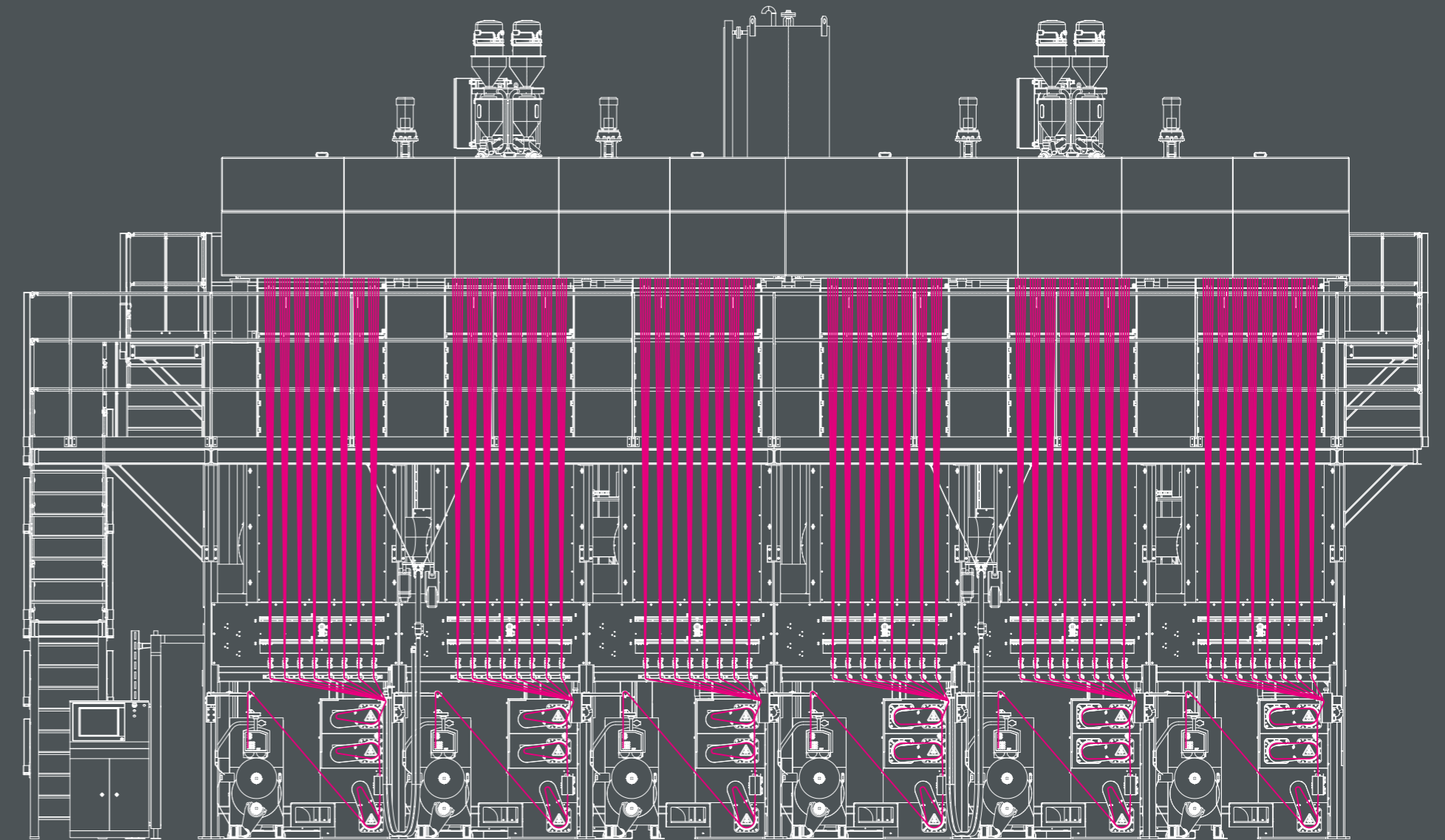
Technical data

Products	Carpets, rugs, door and window seals Carpets and rugs: mono- or multi-colored
Polymer	Polypropylene, MFR 18 – 27
Titre range	900 - 4,500 den 1,000 - 5,000 dtex

Line configuration

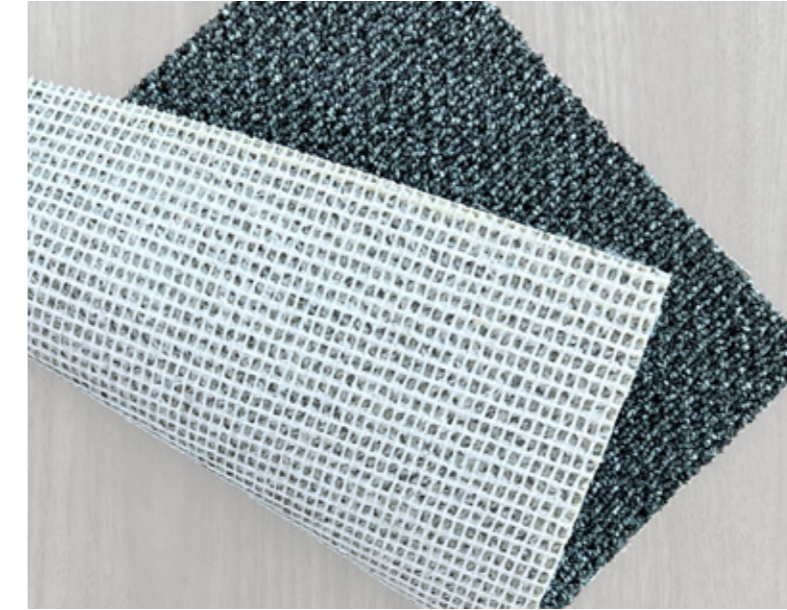
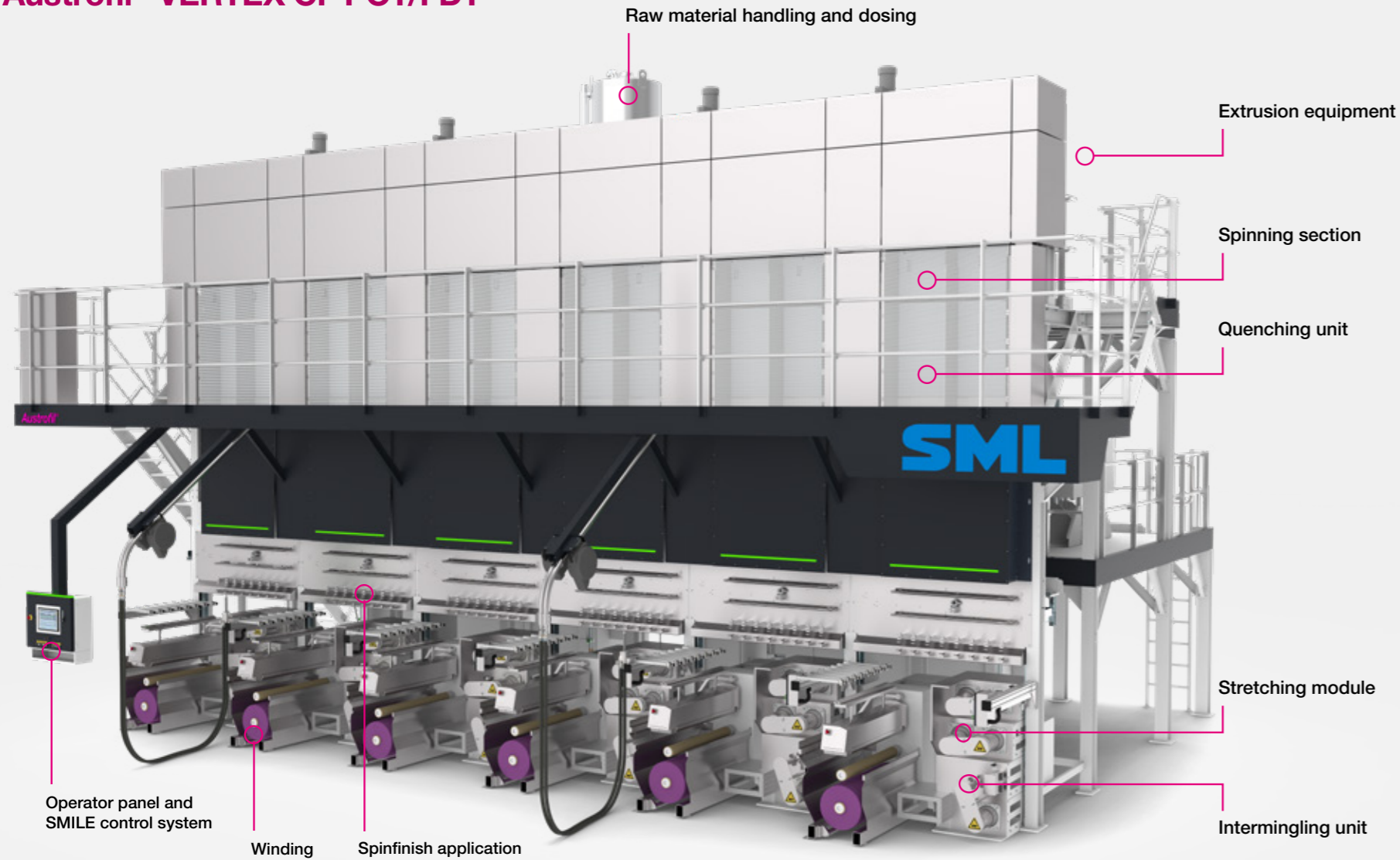
	Austrofil® BCF Monocolour Compact 2x2	Austrofil® BCF Monocolour Twin 4x2	Austrofil® BCF Tricolor 4x2	Austrofil® BCF Tricolor 6x2
Output	Max. 160 kg/h 3.8 t/d	Max. 320 kg/h 7.6 t/d	Max. 320 kg/h 7.6 t/d	Max. 480 kg/h 11.5 t/d
	The actual maximum output depends on the raw materials used and the titre			
Total number of ends	4	8	8	12
Extruder	1 x 75/28	2 x 75/28	3 x 75/28	3 x 75/28
Winding speed	1,000 - 3,500 m/min	1,000 - 3,500 m/min	1,000 - 3,500 m/min	1,000 - 3,500 m/min

Spinning lines for POY and FDY yarns



Line description

Austrofil® VERTEX CF POY/FDY



Typical POY/FDY Products





High throughput by low titre

With **different line configurations**, our Austrofil® VERTEX POY/FDY lines for your **individual solution**.

The **brand-new Austrofil®** spinning plant that is especially designed to manufacture POY and FDY yarns. The modular, vertical machine character stands for unlimited extendibility and can cover all sizes of yarn demands. During the ITMA2023 SML presents a plant version for up to 48 yarn ends of high-quality CF yarn production.

Fine titre

Our new vertical design is at the latest stand of the art. We are able to produce a wide range of titres with high throughputs. The new alignment allows us to guarantee a high output capacity even with the finest titre. Our latest godets provide together with our automatic turret winder the highest production speeds to accomplish high outputs. The RAMP UP function facilitates the start up process and makes the operation child's play.

One step follows the next one

The line is easily expandable, you can start with 24 ends and 3 automatic winders. If you want to increase the daily production, we expand the machine up to 48 ends without interfering your production and double the capacity.



Cooling System

Our new quenching chamber provide a constant cooling air flow with even a stable humidity by a very compact design. Also, higher temperature processed materials can be cooled down at a very short length of the chamber. With our 3 unique cooling zones we can provide the ideal amount of cooling air for your products.

Winder

With the new automatic turret winder we are able to produce up to 8 bobbins at the same time. These technique facilitate a higher output in less production time and need few supervising time by the operator so he can concentrate at other themes.

Technical data

Products	Fully drawn yarn, partially oriented yarn
Polymer	Polypropylene, MFR 10-25 Polyethylenterephalat IV 0.62 - 0.67 Polyamid RW 3.3
Titre range	75 - 800 den 80 - 890 dtex

Line configuration

	Austrofil® VERTEX [PP]	Austrofil® VERTEX [PP]	Austrofil® VERTEX [PET]	Austrofil® VERTEX [PET]
Output	160 kg/h	320 kg/h	270 kg/h	540 kg/h
	The actual maximum output depends on the raw materials used and the titre			
Application	FDY/POY			
Total number of ends	24	48	24	48
Extruder	1 x 75/28	2 x 75/28	1 x 75/28	2 x 75/28
Winding speed	2,000 – 4,000 m/min			
Dimension LxWxH	8 x 11 x 8 m	14 x 11 x 8 m	8 x 11 x 8 m	14 x 11 x 8 m

Raw material

Dosing and handling with great accuracy

CF spinning lines from SML are equipped as standard with very precise volumetric dosing systems for exact and reproducible colour. The dosing system consists of a main unit and two ancillary components for additives such as colour masterbatch or UV stabilisers.

As an option, gravimetric systems are also available for the highest accuracy in terms of colour uniformity.

Your Advantages

- ▶ Top melt quality and colour distribution
- ▶ Volumetric dosing system for high and reproducible colour effects
- ▶ Easy access to the extrusion unit, positioned on an elevated platform



3-components dosing system



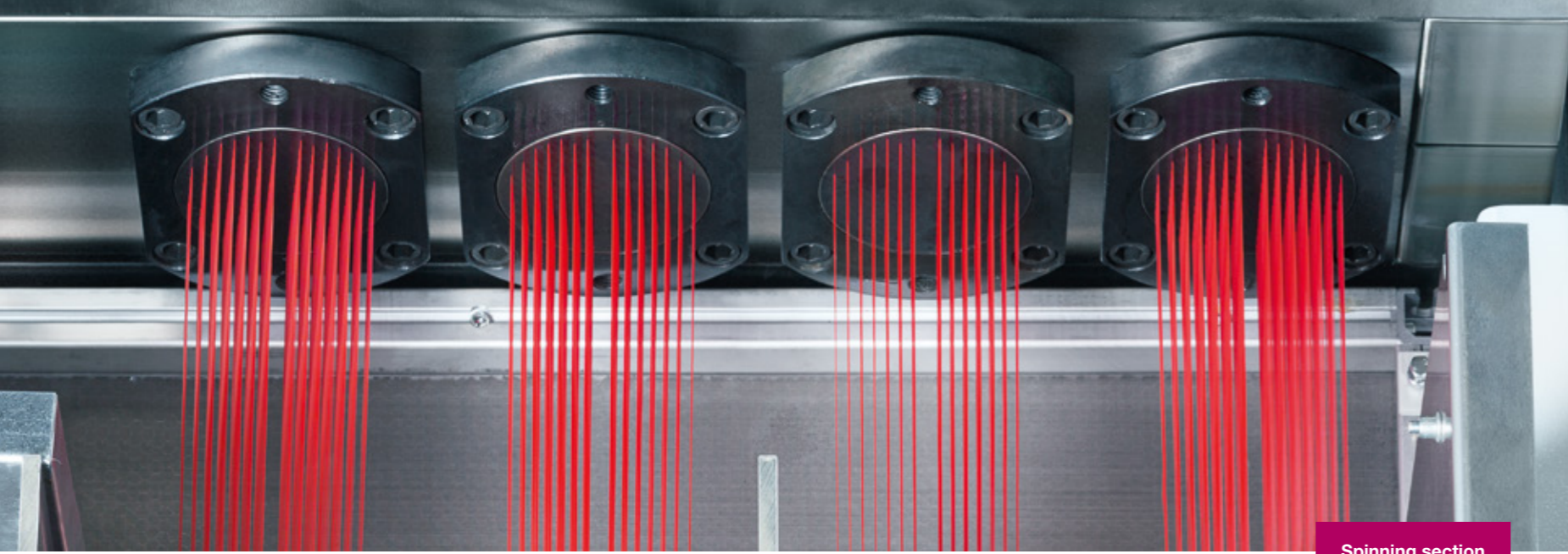
Extrusion units 75/28D

Always state-of-the-art

Extrusion unit

SML's CF spinning lines are equipped with highly efficient single-screw extruders with a 75 mm screw diameter and a L/D ratio of 28. A barrier screw design and a subsequent static melt mixer in the adapter pipe ensure high output, extraordinary melt quality and high colour uniformity.

The extruders are driven by an air-cooled AC motor, coupled to a water-cooled gearbox. In addition, continuous screen belt filters for melt filtration are available as an option.



Spinning section

Spinning head

The CF spinning lines from SML exclusively use full metal spinning beams which are equipped with electrical heaters that stand for robustness and proven durability.

In addition to the remarkable temperature uniformity, the equal length design of the melt channels, which results in an equal residence time of the melt in the channels and ensures excellent stability of the filament production.

The spinning pumps divide the internal melt flow into two or more smaller ones as well as feeding the mounted spinpacks. An absolute vertical yarn path ensures an excellent spinning quality and a reliable production.

Your Advantages

- ▶ Absolutely vertical yarn path for equal filament take-up and reliable production
- ▶ Equal melt residence time in the electrically heated spinning beam

Quenching Unit

SML's efficient quenching units supply cooling air with an ideal temperature and airspeed to the filaments for proper cooling. The temperature and horizontal airspeed are individually adjustable, which facilitates the easy processing of different resin types and makes the whole cooling process reproducible.

Your Advantage

- ▶ Individually adjustable horizontal quenching zones

Spinfinish application

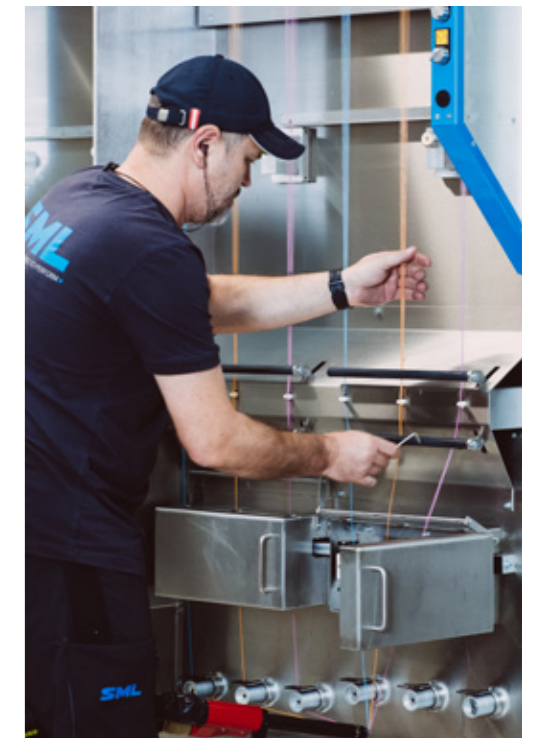
To lubricate the surface of fibres, spinfinish oil is used which has the effect of increasing the suppleness and gentle treatment of the yarn. The oil is supplied very accurately to ceramic applicator nozzles by means of precision metering gear pumps. A single oil pump outlet for each yarn ensures that an equal amount of oil is applied to the yarns. The spinfinish tank is equipped with a level sensor to ensure a continuous oil supply for the yarn and a filter that prevents blockage in the supply system.

Your Advantages

- ▶ Gentle treatment of the yarn
- ▶ Application of the exact required amount of spinfinish oil for each yarn
- ▶ Easy handling due to a level sensor and filter



Spinfinish application



Texturising unit

The patented texturing unit ensures BCF production with unique quality and high crimp, enabled through a state-of-the-art nozzle. Caused by a lamella free design, the complex texturing jets can handle yarns of the whole titre range. Another reason why the texturing unit of SML remains unmatched on the market is that in course of production up to 20 % of the raw materials can be saved.

Your Advantages

- ▶ BCF with high crimp and outstanding quality
- ▶ Production within all titre ranges
- ▶ Effective use of raw materials



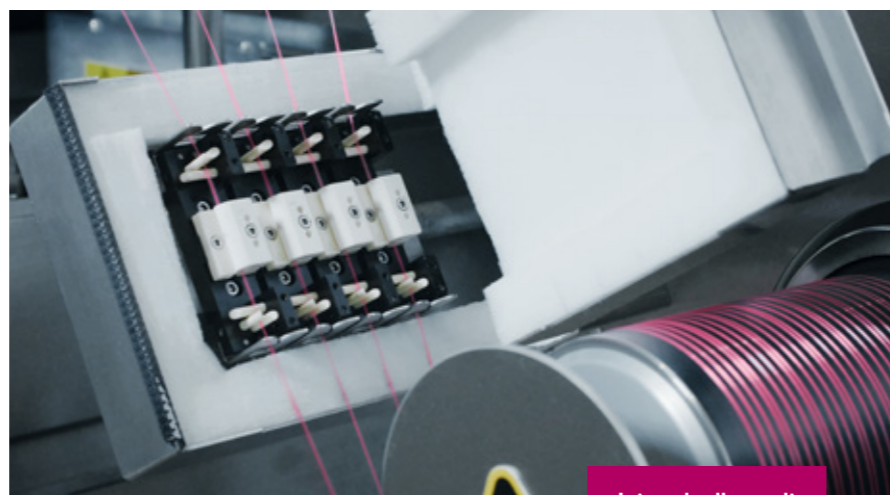
Texturising unit

Intermingling unit

For SML's CF spinning lines, first class ceramic intermingling jets are used which are mounted in a noise-insulated box made of stainless steel to cover the whole titre range only two different sets of intermingling jets are required. The number of intermingling knots (compacted zones of yarn) is determined by the pressure of the air supply with low air consumption.

Your Advantages

- ▶ Only two different intermingling jets cover the whole titre range
- ▶ Adjustable number of intermingling knots
- ▶ Low air consumption and reduced energy costs



Intermingling unit



Winding

Winding

All SML's CF spinning lines are available with fully automatic turret winders for 1, 2, 4 and even 8 end operations. Depending on the yarn product, SML offers different winding technologies for high tenacity and/or high elongated CF production. Perfect yarn bobbins are also achieved at the highest winding speeds due to the excellent winding quality.

Standard winder data for CF lines

No. of yarns	1 / 2 / 4 / 8
Core diameter	75 / 94 / 110 mm
Traverse length	250/120 mm
Bobbin diameter	Max. 420 mm
Winding speed	1,000 - 4,000 m/min

Your Advantages

- ▶ Production of 1, 2, 4 and 8 ends possible
- ▶ High performance automatic winders with a separate user interface
- ▶ Perfect winding quality for low and high elongation and tenacity

Proven technology – **new design**

When it comes to line performance, high quality and precise interaction of the internal components are particularly important. But why **extrusion lines** shouldn't **look great too**?



Technology that makes you smile

SMILE control system

Not sure if a technology can really make you smile? Now, let the facts about **our ingenious machine** control systems **convince you.**

SMILE is SML's machine control and operation concept, that allows the **highly precise synchronisation** of all the components in an **extrusion system**. If an extrusion system is the powerful body, then SMILE is the **driving soul that brings that body to life.**

100 % developed in-house

The dynamic controller system is entirely developed in-house and has undergone significant further development in recent years. SML's long-standing competence in the field of automation and machine control provides loads of innovative and exceptional features.

Centralised all-in-one concept

SMILE's central control station system allows the management of each production process with a wide touch screen attached to the Austrofil® multifilament spinning line.

This data includes sensory measurements like temperatures, speeds and pressures as well as actuator readings from valves, hydraulics, drives and positions. Thanks to SMILE, all of these components are interconnected and can be perfectly synchronised with each other. This fine-tuning allows customers to run their multifilament spinning lines at the very best performance level.



E-container

Intuitive machine control

At SML, we believe machine control and operation should be highly intuitive and self-explanatory. SMILE is therefore an integral part of our coherent and user-friendly overall line concept.

- ▶ A central control station system for the highest operating comfort and the visualisation of all processes
- ▶ Reduced training efforts and error rates at operator level
- ▶ Remote control, remote update and remote service (from a PC or even a smartphone)
- ▶ The system is fully multi-client and multi-user capable, different types of users can log-in simultaneously

Optimised production efficiency

One key purpose of SMILE is the increase in the Overall Equipment Effectiveness (OEE) through optimised production processes.

- ▶ Optimised use of raw materials, preventing waste
- ▶ Faster start-up of production
- ▶ Minimised times for product change-overs

Systematic quality control

In close interaction with SML's data collection and analysis system bitWise, SMILE is an efficient tool to keep output quality stable and to optimise output properties.

- ▶ Formula recipe system to store production parameters
- ▶ Documentation and detailed reporting of production processes
- ▶ Automatic alarm functions via e-mail or text message for quick debugging

Interconnectivity and third-party integration

SMILE has many open interfaces that allow the web-based data exchange with third-party machines and systems.

- ▶ Open to interconnecting with systems like Enterprise Resource Planning (ERP), Quality Assurance (QA) or SML's data analysis tool bitWise
- ▶ Based on open standards like HTML5 and OPC-UA, complete end-to-end process control beyond SML extrusion lines

Tailored to specific requirements

SMILE can be tailor-made to client's specific requirements. This is blazing the way to new manufacturing concepts as well as delivering product properties.



Stop guessing, start knowing with bit.Wise data analytics

With bitWise, SML's customers can **analyse the entire process history** of a spinning line with a **single click**, rather than relying on **current snapshots**.

BitWise incorporates decades of experience in automation with the **latest technologies in data analytics** and provides for a wide range of **completely new opportunities** for data-driven decisions.

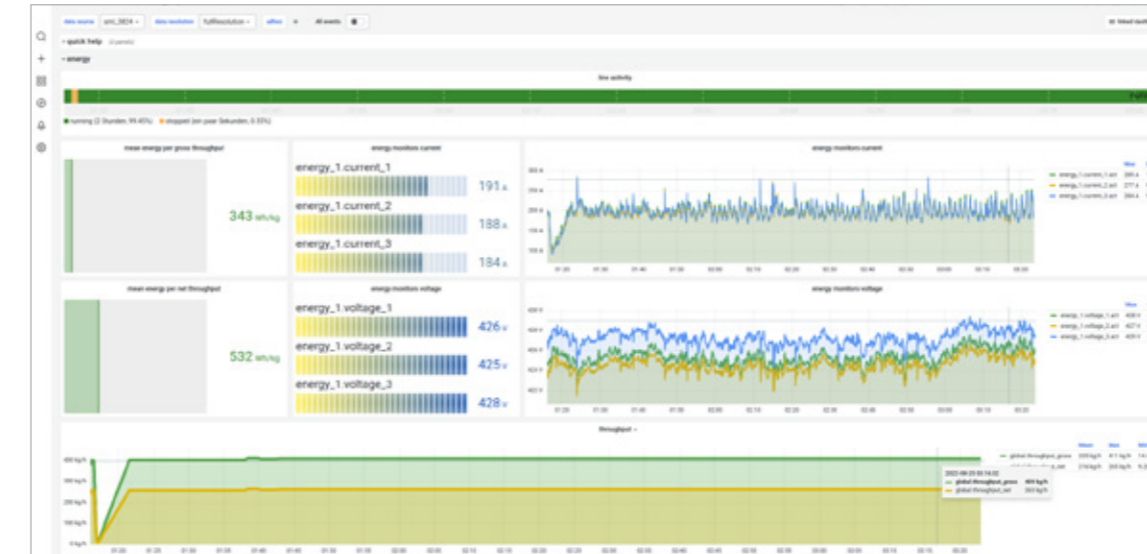
In-depth view of all details

SML's spinning lines are equipped with hundreds of data-generating sensors. BitWise records and visualises this data up to 10 times per second. In addition, each manufactured roll is provided with a QR code, which serves for identification. Putting everything together, manufacturers get an in-depth view of all the details involved in a production process – both in the present and in the past.

With bitWise, customers can look back at pressures within the system components and check whether there is a correlation with other measured values such as temperature or laboratory results of a finished product roll.

Always connected, even on the go

BitWise is an 100 % on-premises-solution. This means that the data remains in-house on dedicated hardware, no cloud services are required. Nevertheless, customers can access bitWise in their company network via their VPN or a remote desktop solution.



Optimising quality

BitWise is a powerful tool to precisely optimise any aspect of the production process with a direct effect on product quality.

- ▶ Monitoring of all quality-related process parameters, allowing quick corrective action
- ▶ Comprehensive tracking and documenting of product quality
- ▶ Making quality reproducible

Maximising output

Recorded, aggregated and visualised data by bitWise help to raise overall line utilisation and deliver a faster return on investment (ROI).

- ▶ Discovering hidden or unused output capacities
- ▶ Preventing downtimes by detecting potential problems at an early stage
- ▶ Minimising maintenance times through optimised scheduling and structured access to documentation and service support

Minimising production costs

bitWise is the central tool to measure and visualise all production related costs. It forms a strong and reliable basis for the continuous cost-optimisation.

- ▶ Detailed monitoring and reporting of energy and raw material consumption
- ▶ In-depth optimising, tracking and reporting of Overall Equipment Effectiveness (OEE)
- ▶ Full end-to-end cost transparency through third-party integration

Open for vertical integration

At SML we understand that spinning lines represent a key part in a wider production chain. For end-to-end optimisation, bitWise therefore supports data exchange and vertical integration with third-party systems such as Manufacturing Execution Systems (MES), Enterprise Resource Planning (ERP) or Quality Assurance (QA). Customers can simply retrieve the data from the system.



Choose your perfect interface

As with most technologies developed by SML, bitWise is highly customisable. The remote system can be retrofitted to all existing SML spinning lines.

Outstanding end-to-end service support. Reliable assistance – around the globe, at all times.

Always at your disposal.

Our dedicated customer service team offers reliable assistance to ensure the continuous operation of any SML extrusion line at all times. Regardless of how long a system has been in operation, we offer service to every customer.

- ▶ Long term experienced SML service technicians
- ▶ Support in all ways – via telephone, video call, chat, email and in person
- ▶ On-call service from 7 am to 10 pm CET
- ▶ Remote maintenance system
- ▶ Visual assistance via smart glasses as an option
- ▶ SML service technicians on call worldwide
- ▶ Quick on-site service

Immediate assistance.

The remote maintenance system, which is available for every SML extrusion line, makes it easier to identify potential problems and provide a quick diagnosis. In order to find solutions, our service team works closely together with other departments at SML. This way, nearly all malfunctions can be solved remotely.



Our highly-skilled technicians are at your service within 24 hours throughout Europe and within 48 hours in the rest of the world.

Up-to-date knowledge and experience.

Our service team consists of technicians who know SML's extrusion lines inside out, having installed them themselves for many years. In order to keep their know-how up to date, all service employees continue to work regularly in everyday production. Their competence is reflected in the short reaction times to our customers' enquiries.

Visual assistance in real time.

Through the use of smart glasses, our service team can provide real-time assistance worldwide. Whether our customers have technical problems, need help with product changes or maintenance work - they are guided step by step. This service is available for every extrusion line from SML.

Analyses Development Pre-tested Performance Delivery on Time Service Support Customer Satisfaction

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The image shows a large, modern industrial building with a white facade. The SML logo is prominently displayed on the upper part of the building, rendered in a light blue, three-dimensional font. The building has large glass windows and a dark lower section. The sky is clear and blue.

► **SML - Head Office**

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choose SML!**