



AUSTROFIL - FDY, MDY, POY MULTIFILAMENT

INTRODUCTION

LINES FOR FDY, MDY AND POY YARNS







SML delivers
high performance
continuous
filament spinning
solutions that
are fully geared
to customer
requirements.

The high standards of FDY, MDY, and POY yarn, manufactured with compact lines from SML, are the result of accumulated expertise and decades of experience in multifilament spinning. **Flexibility in production, long working lives, and reliable components** have all helped to make SML one of the market leaders in spinning lines for technical and textile yarns.

SML's AUSTROFIL® spinning lines are equipped with the **latest extrusion technology ensuring a top melt quality and colour uniformity**. The elaborated heat treatment process of SML's HT series, allows the production of yarns in the highest tenacity ranges.

Finally, it is SML's unique horizontal line concept in combination with an effective control system that keeps both the operation and maintenance simple, user-friendly and efficient.





AUSTROFIL MITHT 2x2/4 E7 75	6
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MT/HT 2x2/4 E/75

SML's compact entrymodel is particularly well suited to small batch sizes of FDY and MDY yarn, packing a persuasive punch with its high degree of flexibility and efficiency. Equipped with a high-performance extruder with a 75mm screw diameter and two stretching sections, the line's maximum output is 110 kg/h in its standard configuration. For the exclusive production of yarn with a medium tenacity, i.e. for upholstery or other home textile applications, SML recommends the MT line version.

EXCELLENT COOLING FOR THE HIGHEST YARN QUALITIES

Two spinnerets per yarn provide outstanding cooling conditions, which result in an elevated output and an excellent yarn quality. An optional hot air chamber characterises the HT essence of this series and can be installed to reach outstanding yarn tenacities. Depending on the titre range, the line is available in a 4 or 8 end configuration to optimise its output rates.

EASILY EXTENDIBLE INTO A 4x2/4 LINE

Both the MT and the HT version can be easily fitted with two additional stretching units and winders. The maximum production output of the extended lines is 160 kg/h. After extension, the line either is available with 16 ends for small titre ranges, or with 8 ends in the higher titre ranges. An optional conversion kit combines the two production modes – providing a maximum of flexibility.

After a small upgrade, all versions of this line can process both PP as well as PA6 filament.



Your Advantages

- Small yarn lots with a maximum efficiency and flexibility
- ✓ Extendible to 160 kg/h
- ✓ Highest tenacity

PERFORMANCE LEVEL

HT 2x2/4 E/ 75	
Products	Medium and high tenacity yarn
Polymer	Polypropylene, MFR 10 - 35
Titer range	165 - 4,400dtex
Output capacity	110 kg/h, 2.64 t/d
Extruder capacity	160 kg/h
Total number of ends	4 or 8

LINE CONFIGURATION

Dosing system	Volumetric dosing with 2 additives
Extruder	1 unit
Inverter controlled	75 / 28D
AC motor	Incl. static mixer
Feeding section	Water cooled, closed circuit
Spinning beam	Electrically heated
Spinning pumps	4 pcs. each with 2 outlets
Spinnerets	8 pcs., Ø 110mm
Godets	Ø 160mm, inductive heated, lifetime lubricated bearings
Intermingling	Heberlein, PolyJet

WINDING

Winder	Automatic turret winder
Mechanical winding speed	1,000 - 3,500 m/min
Bobbin diameter	Max. 320mm

SPACE REQUIREMENT

Length	8,100mm
Width	7,200mm
Height	Approx. 6,000mm (depending on the dosing unit)





MT/HT 4x2/4/75

AUSTROFIL® MT/HT/ 4x2/4/75 is equipped with four stretching and winding modules and has an output capacity of 160 kg/h. Especially developed for the production of technical and textile yarns with an extraordinary tensile strength, SML's AUSTROFIL® HT4x2/4/75 line has become a top seller with more than 250 machines in operation worldwide.

Low titre ranges up to 900dtex can be handled most efficiently with the 16-end configuration, while in the upper titre ranges, a 8-end configuration is recommended. For the highest flexibility, an optional extension set offers maximum output efficiency in the whole range from 165 - 4,400dtex.

SUPERIOR TENACITY FOR HIGH YARN TITRES

Owing to the well-designed hot air chamber in its stretching section, this line achieves superior tenacities especially at high speeds and for high yarn titres.

For the production of textile yarns, where high tenacities are not the issue, the MT configuration is the optimal choice.

After a small upgrade, the spinning line is able to process PA6 filament.



Your Advantages

1	Designed for medium to high-tenacity
V	varns

✓ Upgrades for PA6 yarn production

√ Wide titre range from 150 - 4,400dtex

PERFORMANCE LEVEL	
HT 4x2/4/75	
Products	Medium and high tenacity yarn
Polymer	Polypropylene, MFR 10 - 35
Titer range	165 - 4,400dtex
Output capacity	160 kg/h, 3.84 t/d
Total number of ends	8 or 16

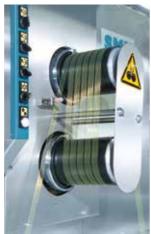
LINE CONFIGURATION	
Dosing system	Volumetric dosing with 2 additives
Extruder	1 unit
Inverter controlled	75 / 28D
AC motor	Incl. static mixer
Feeding section	Water cooled, closed circuit
Spinning beam	Electrically heated
Spinning pumps	4 pcs. each with 2 outlets
Spinnerets	8 pcs., Ø 110mm
Godets	Ø 160mm, inductive heated, lifetime lubricated bearings
Intermingling	Heberlein, PolyJet

WINDING	
Winder	Automatic turret winder
Mechanical winding speed	1,000 - 3,500 m/min
Bobbin diameter	Max. 320mm

SPACE REQUIREMENT	
Length	11,000mm
Width	7,200mm
Height	Approx. 6,000mm (depending on the dosing unit)









Austrofil®

MT/POY 2x8

SML's MT/POY 2x8 line is engineered to satisfy the most demanding requirements for the production of pre-oriented and medium tenacity yarns from PP.

The yarns are used for a variety of different applications, such as chenille yarns for knitted and woven fabrics, as well as exclusive sportswear and automotive interior products. Beside the outstanding textile yarn quality, the main characteristics of this line are its compactness in relation to its output, the broad titre range, best colour uniformity and a notable production stability.

HIGHEST FLEXIBILITY AND EFFICIENCY

SML's MT/POY 2x8 line is designed to produce a total of 16 yarns in the low and 8 yarns in the high titre range. Strict colour uniformity is guaranteed by both an accurate and simple to operate dosing system and highly precise melt mixing devices.

MEDIUM TO HIGH ELONGATION YARNS

Two inline stretching steps performed by 3 godet duos permit reproducible elongations in the yarn over a wide range. The precise temperature-control of the inductively heated godets allows finetuning with regard to elongation, tenacity and shrinkage values. Further air-texturing processes are a steadily growing application area for PP yarn manufactured by SML's MT/POY 2x8 lines.



Your Advantages

- Second to none in colour fastness and
- Wide range of yarn elongations, satisfying almost all textile requirements
- Fast colour and titre changes

PERFORMANCE LEVEL

MT/POY 2x8	
Products	Partially oriented and medium tenacity yarn
Polymer	Polypropylene, MFR 10 - 35
Titer range	110 - 1,100dtex
Output capacity	110 kg/h, 2.64 t/d
Total number of ends	8 or 16

LINE CONFIGURATION

Dosing system	Volumetric dosing with 2 additives
Extruder	1 unit
Inverter controlled	75 / 28D
AC motor	Incl. static mixer
Feeding section	Water cooled, closed circuit
Spinning beam	Electrically heated
Spinning pumps	4 pcs. each with 2 outlets
Spinnerets	8 pcs., Ø 110mm
Pre-intermingling	Heberlein, Migra-Jet
Godets	Ø 160mm, inductive heated, lifetime lubricated bearings
Intermingling	Heberlein, PolyJet

WINDING

Winder	Automatic turret winder	
Mechanical winding speed	2,500 - 3,500 m/min	
Bobbin diameter	Max. 420mm	

SPACE REQUIREMENT

Length	6,100mm
Width	7,400mm
Height	Approx. 6,000mm (depending on the dosing unit)





Austrofil®

"LINE BY LINE" 1x8

It has been especially developed to produce several independent production batches of MT and POY at high speed levels without compromising on yarn

FLEXIBLE OUTPUT VOLUMES, FAST PRODUCT AND COLOUR CHANGES

Starting with small production capacities, AUSTROFIL® MT / POY "LINE BY LINE" 1x8 can be extended gradually to very high output volumes. Due to the use of small extruders for each winding position, SML's line by line concept allows the production of a variety of different yarns on a single line with fast product and colour changes. Each module of the line can work completely independently. Via the line's control system, SMILE, the different machine modules can be merged and operated with comfort, even as one single unit.

COMPACT DESIGN, IDEAL FOR LOW BUILDING HEIGHTS

Apart from an excellent yarn quality, its flexibility and the readiness for highvolume production, the AUSTROFIL® MT / POY "LINE BY LINE" 1x8 is characterised by its small machine footprint. Due to its thoughtful design, this line can be installed in buildings with extraordinary low ceiling heights - always guaranteeing optimal space utilisation.



Your Advantages

- Compact modular design, suitable for small and big production demands
- Production capacity very easily
- Independent yarn production in each winding position

PERFORMANCE LEVEL

MT/POY "LINE BY LINE" 1x8		
Products Partially oriented yarn		
Polymer	Polypropylene, MFR 25 - 35	
Titer range	78 - 167dtex	
Output capacity	20 kg/h, 0.48 t/d	
Total number of ends	8 per module	

LINE CONFIGURATION

Dosing system	Volumetric dosing with 2 additives
Extruder	1 unit
Inverter controlled	30 / 28D
AC motor	Incl. static mixer
Feeding section	Water cooled, closed circuit
Spinning beam	Electrically heated
Spinning pumps	1 pc. with 8 outlets
Spinnerets	8 pcs., Ø 56mm
Pre-intermingling	Heberlein, Migra-Jet
Godets	Ø 160mm, inductive heated, lifetime lubricated bearings
Intermingling	Heberlein, PolyJet

WINDING

Winder	Automatic turret winder
Mechanical winding speed	2,500 - 3,500 m/min
Bobbin diameter	Max. 420mm

SPACE REQUIREMENT

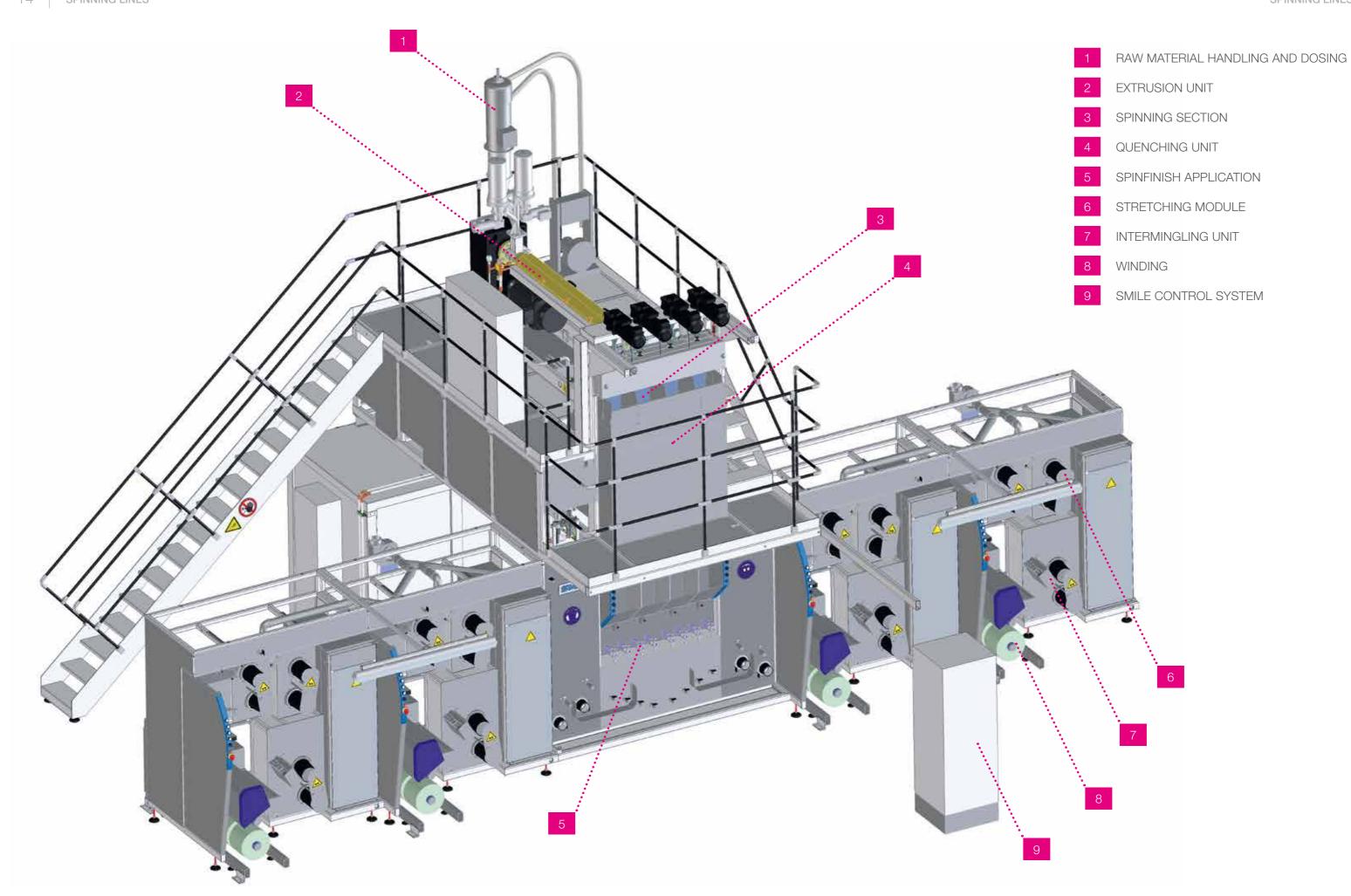
Length	6,100mm
Width	7,400mm
Height	Approx. 6,000mm (depending on the dosing unit)



MT/POY

If flexibility is a priority, SML's line by line concept is the perfect solution.

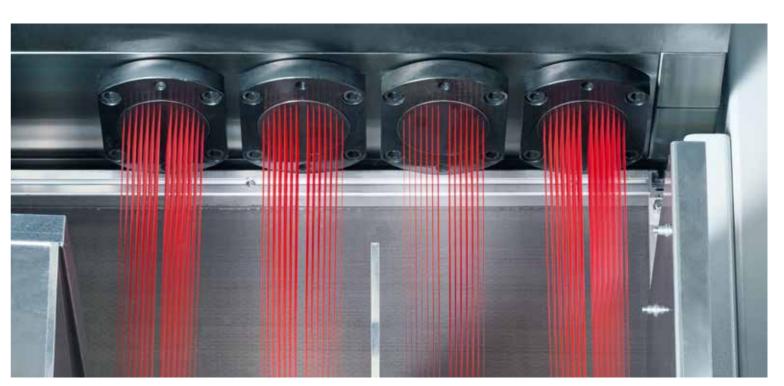
SPINNING LINES 15



SPINNING LINES SPINNING LINES







SPINNING SECTION A

Raw material handling and dosing

For exact and reproducible colour effects, a very accurate volumetric dosing system is integrated in all of SML's multifilament spinning lines as a standard. 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 with regard to colour uniformity.



Extrusion unit

SML's spinning lines are equipped with highly efficient single screw extruders with a 75mm screw diameter and an L/D ratio of 28. The only exception is the flexible MT / POY "LINE BY LINE" system, which incorporates high performance extruders with a 30mm screw diameter.

EXTRAORDINARY MELT QUALITY

A high output, a barrier screw design and a subsequent static melt mixer in the adapter pipe ensure top melt quality and a high colour uniformity. The extruders are driven by an air-cooled AC motor, coupled to a water-cooled gearbox. Continuous melt filters are available as an option.

Your Advantages

√ Top melt quality and colour uniformity

Easy access to the extrusion unit, positioned on an elevated platform

Spinning section

In the spinning sections of its continuous filament (CF) lines, SML exclusively uses full metal spinning beams equipped with electrical plate heaters that stand for robustness and proven durability. The remarkable temperature evenness around the melt channels contributes enormously to the outstanding stability of filament production.

EQUAL MELT DISTRIBUTION

Well established spinning pumps from reputed manufacturers divided the internal melt flows into two or more smaller ones as well as providing the mounted spinnpacks. Due to its specific design, melt residence times in each melt channel are equal. In combination with an absolutely vertical yarn path, all of the filaments in the spinnerets are taken up in as similar a way as possible.

Your Advantages

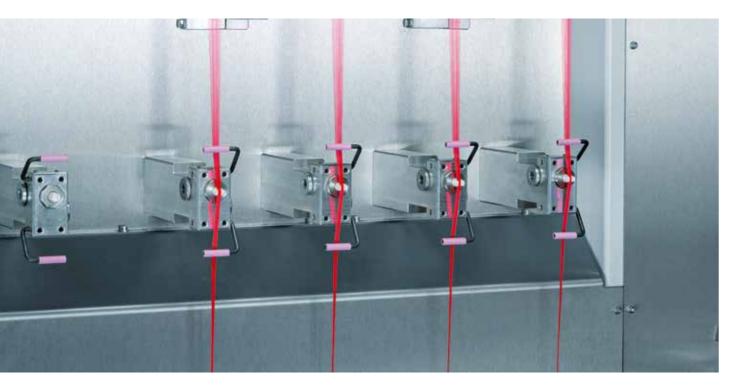
- Absolutely vertical yarn path for equal filament take-up
- Equal residence time of the polymer meltwinding position

Quenching unit

SML's efficient quenching units supply cooling air very accurately and uniformly to the filaments - the temperatures and airspeeds are controllable. This facilitates the easy manufacturing of different resin types and makes the whole cooling process reproducible. In the last step in the formation phase of the filaments, enhanced finetuning in the horizontal air speed profile can be done through individually adjustable horizontal quenching zones.

- ✓ Robust high-quality components

SPINNING LINES 1







SPINNING SECTION A

Spinfinish application

The SML spinfinish system is based on precision metering pumps. When the yarn first enters into contact with a solid substance, special ceramic applicators apply the lubricant uniformly around all of the filaments.

There is one application unit for each yarn, fed by a single pump outlet. This guarantees the gentle treatment of the yarns and the precise control of the quantity of the spinfinish applied to the yarn. The spinfinish tank is equipped with a level sensor. A filter prevents supply system blockages.

Your Advantages

- Highest accuracy in terms of application quantities and uniformity
- ✓ Gentle yarn treatment
- Failure-free production due to the use of informatory level sensor technology

6 Stretching unit

SML's multifilament lines provide a sophisticated stretching system in which a high yarn tenacity is achieved by profoundly protective methods. Owing to the well-designed yarn path in the special hot air chamber (only HT lines), high tenacity values can be easily reached even at high speeds and with coarse yarns.

ADJUSTABLE STRETCHING RATIOS

Three pairs of stretching rolls facilitate stretching ratios of up to 1:8, while the positioning of the hot air chamber in the second stretching section ensures an excellent yarn tenacity. An efficient yarn production is also possible with lower quality resins. For other requirements with regard to specific textile applications, the draw ratios and temperatures can of course also be adjusted with a focus on desired and reproducible yarn elongations.

Your Advantages

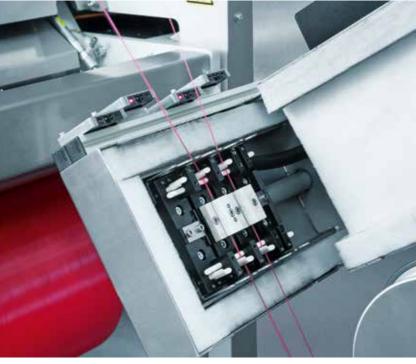
- Inductively heated and temperature controlled godets
- Highest yarn tenacity achieved in combination with a hot air chamber
- Best achievable properties from lower quality resins

Pre-intermingling

ONLY MT 2x8 AND MT/POY "LINE BY LINE"

In the pre-intermingling stations of SML's MT 2x8 and MT/POY "line by line" units, the single yarns are compacted by means of air jets. This provides an enhanced processing performance throughout the lines as a whole.

SPINNING LINES





INTERMINGLING UNIT

WINDING A

7 Intermingling unit

First class ceramic intermingling jets are used in all of SML's spinning lines, and only two different sets are needed to cover the whole titre range. The jets are mounted in a sound-insulated box made of stainless steel. Air pressure is employed to control the number of intermingling knots (compacted zones of the yarn).

Your Advantages

✓ Adjustable number of intermingling knots

✓ Use of well-established ceramic nozzles

8 Winding

SML's CF lines are available with fully automatic turret winders for 1, 2, 4 and even 8 end operation. An excellent class winding quality at top speeds delivers perfect yarn bobbins. Depending on the yarn product, SML offers different winding technologies for high tensile and/or for high elongated CF production.

STANDARD WINDER DATA FOR CF LINES

No. of yarns	2/4	
Core diameter	75mm	
Traverse length	250/120mm	
Bobbin diameter	Max. 320mm	
Mechanical winding speed	Max. 3,500 m/min	

Your Advantages

- Perfect winding quality for low and high yarn elongations
- Fully automated winders with a separate user interface





E-CONTAINER A

9 SMILE control system

SPINNING LINES

SMILE is SML's generic machine control and operation concept. It stands for all-encompassing automatisation, providing machine control systems with the highest usability in combination with outstanding capacities for profound process management and monitoring.

The end-to-end integration of third-party systems, overall line effectiveness, operator-friendliness as well as tailor-made and flexible software solutions are the key elements of SMILE.

SMILE is developed as a whole in-house and is integrated one hundred percent in SML's extrusion lines. It is the highly precise, centralised control and synchronisation of all components in an extrusion system, which is blazing the way to new manufacturing concepts as well as delivering product properties, line efficiency and output volumes.

INTUITIVE MACHINE CONTROL CONCEPT

SMILE is an integral part of SML's coherent and user-friendly overall line concept; machine control and operation is highly intuitive and self-explanatory:

- 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, less personnel required
- Remote control, remote update and remote service for minimised maintenance-costs, multi-client / multi-user capability

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 customisable assistant for product changes



Control panel



SYSTEMATISED 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 copy production parameters
- Documentation and detailed reporting of production processes
- Automatised alarm functions via e-mail or text message for quick debugging

INTERCONNECTIVITY AND THIRD-PARTY INTEGRATION

SMILE has 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 UPC-UA
- Complete end-to-end process control beyond SML extrusion lines

INTEGRATED ALL-IN-ONE CONCEPT

It is SMILE's all-in-one concept that helps to create completely new types of extrusion solutions, making one single operator-friendly step out of the most complex production processes. The control of temperatures, speeds and pressures on SML extrusion lines is highly centralised. All of the line modules and motors are perfectly interconnected and synchronised with each other.

CENTRAL CONTROL STATION SYSTEM

SMILE's central control station system allows the management of all of the production processes from the wide touch screen attached to the line. As SMILE is web-based, all of the production and maintenance processes can be entirely remote controlled, i.e. 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.

OPEN FOR CUSTOMISATION

Developed in close consistency with the hardware components of SML's extrusion lines, SMILE is highly customisable. It is SML's flexibility that offers a wide range of opportunities if customer-specific solutions are required.

SOFTWARE 100 % DEVELOPED IN-HOUSE

SPINNING LINES

Above all, it is SML's long-standing in-house competence in the field of automatisation and machine control that provides loads of innovative functions tailored to specific customer requirements. In-house developed, state-of-the-art and dynamic controller systems always allow running the machines at their very best performance-level – considering both economic and environmental aspects. All of SMILE's software solutions are developed by SML technicians. Last but not least, it is SML's concentrated know-how in any aspect of automation, that helps to create the extrusion solutions of tomorrow.

SMILE SOFTWARE FEATURES

- Central control station system for all production processes
- ► Full interconnectivity global UPC-UA, programmed on HTML5, open interface to other machines and systems
- Remote access for operators and service teams – worldwide via the internet, from any PC, laptop or most smartphones
- Multi-client / multi user capability simultaneous access for different type of users, simple assignment of permissions
- Highest comfortability visualisation of all production processes on a wide screen
- Worldwide possibility of remote update for customisation and technical support

SMILE HARDWARE FEATURES

▶ The hardware components of SMILE are supplied by B&R Industrial Automation GmbH, a member of the ABB group, a global leader in automation.



bit. Wise data analytics

bitWise is SML's digital transformation solution for extrusion lines. It breathes life into the buzzword "Industry 4.0". bitWise provides for a wide range of entirely new opportunities for data driven decisions with a clear focus on the optimisation of production processes and the final product. Completely developed in-house, it incorporates SML's decades of experience in automation with the latest technologies in data analytics and visualisation.

IN-DEPTH PROCESS INSIGHTS

SML extrusion lines are equipped with hundreds of data-generating sensors. Following the principle of "stop guessing – start knowing", bitWise collects, records and visualises this data up to 10 times per second. This gives manufacturers a 360 degree in-depth view of all of the details involved in a production process, both in the present and in the past.

OPTIMISING QUALITY

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

- In-depth monitoring of all quality-related process parameters, allowing quick corrective action
- Comprehensive tracking and documenting of product quality
- Making quality reproducible





MAXIMISING OUTPUT

Data recorded, aggregated and visualised by bitWise helps 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 productionrelated costs. It forms a strong and reliable basis for the continuous cost-optimisation of production processes.

- 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

ON-PREMISE SOLUTION

bitWise is a 100 % on-premise solution. Your data stays in your company, on dedicated and secured hardware, no cloud services required.

CUSTOMISATION AND RETRO-FIT

As with most technologies developed by SML, bitWise is highly customisable. bitWise can be retro-fitted to many existing SML extrusion lines optimising production processes, cutting costs, raising the OEE and ROI of existing investments.

OPEN FOR VERTICAL INTEGRATION

Extrusion lines are a key part in a wider production chain. For end-to-end optimisation, bitWise supports data exchange and vertical integration with third-party systems, e.g. Manufacturing Execution Systems (MES), Enterprise Resource Planning (ERP) or Quality Assurance (QA).

	HT 2x2/4 E/ 75 4/8 ENDS	HT 4x2/4/ 75 8/16 ENDS	MT/POY 2x8 16 ENDS	MT/POY "LINE BY LINE" 1x8 8 ENDS
GENERAL TECHNICAL DATA				
Polymer	Polypropylene, MFR 10 -	35		Polypropylene, MFR 25 - 35
Titer range	165 - 4,400dtex	165 - 4,400dtex	110 - 1,100dtex	78 - 167dtex
Output capacity	110 kg/h 2.64 t/d	160 kg/h 3.84 t/d	110 kg/h 2.64 t/d	20 kg/h 0.48 t/d
Dosing unit	Volumetric dosing system with 2 additives (alternatives as option)			
Extruder [mm] L/D	75/28	75/28	75/28	30/28
Spinning beam	Electrically heated with plate heaters	Electrically heated with plate heaters	Electrically heated with plate heaters	Electrically heated with cartridge heaters
Spinning pumps	4 pcs. each 2 outlets	4 pcs. each 2 outlets	4 pcs. each 2 outlets	1 pc. 8 outlets
Spinnerets	8 pcs., Ø 110mm	8 pcs., Ø 110mm	8 pcs., Ø 110mm	8 pcs., Ø 56mm
Pre-intermingling	no	no	Heberlein, Migra-Jet	Heberlein, Migra-Jet
Godets	Ø 160mm, induction heated, lifetime lubricated bearings			
Intermingling	Heberlein, PolyJet			
Winder Winding speed Bobbin diameter	Automatic turret winder 1,000 - 3,500 m/min 320mm	Automatic turret winder 1,000 - 3,500 m/min 320mm	Automatic turret winder 2,500 - 3,500 m/min 420mm	Automatic turret winder 2,500 - 3,500 m/min 420mm

MAIN DIMENSIONS				
Length	8,100mm	11,000mm	6,100mm	6,100mm
Width	7,200mm	7,200mm	7,400mm	7,400mm
Height with standard dosing unit	6,000mm	6,000mm	6,000mm	6,000mm



NOTES:



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ANALYSES I DEVELOPMENT

PRE-TESTED PERFORMANCE I DELIVERY ON TIME

SERVICE SUPPORT I CUSTOMER SATISFACTION

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