

100%  
eXtrusion  
CAST FILM LINES

STRETCH WRAP

## LINES FOR STRETCH WRAP



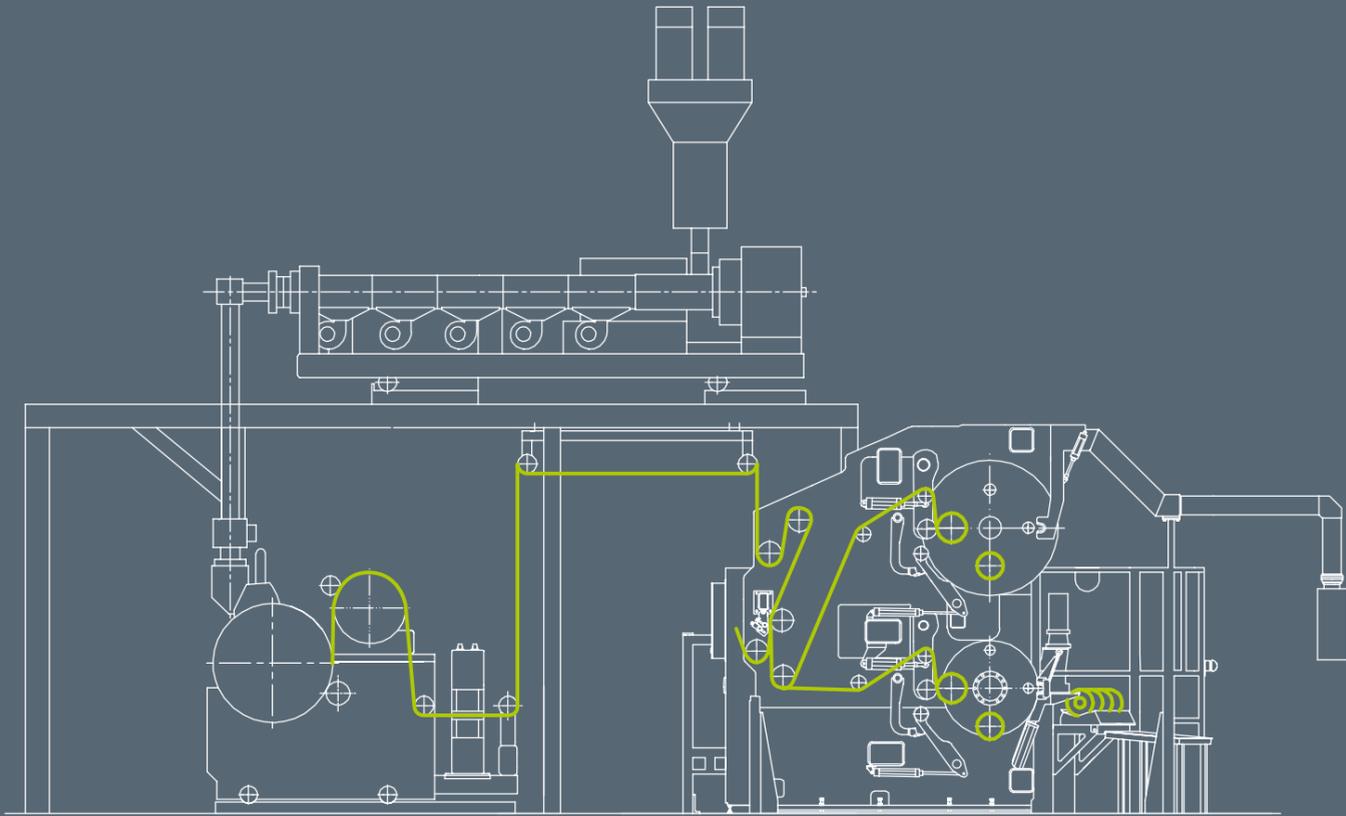
## INTRODUCTION

The cast film process is the most efficient method of producing top quality stretch wrap film in the high output range. Innovative detail engineering and the development of new core components for cast stretch film lines such as high-speed extruders and new types of winders help our customers to position themselves successfully in the highly competitive stretch film market.

SML offers attractive standard solutions in widths from 3 - 12up (1,500mm to 6,000mm), as well as customized lines based on these concepts. Features such as inline winding on 2-inch cores for hand stretch, coreless and shaftless winding systems, or thin core technology are all available, together with a diversity of numbers of layers and structures.

An additional device for the modification of edges allows the customer to upgrade the machine for light-weight handrolls with enforced and indistructable edges.

The proven SMILE control system and different grades of automation in terms of roll and core handling enable customers to operate SML lines with a minimum of manpower at maximum efficiency.



## LINES FOR STRETCH WRAP



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# MiniCast®

## STRETCH FILM EXTRUSION LINE

On a minimum floor area of less than 100sqm, the *MiniCast*® stretch film line can be equipped with up to four extruders, which facilitate a combined extrusion throughput of 1,050 kg/h. The machine incorporates a single roll casting station with a chill roll diameter of 1,200mm and an optical thickness measuring system for translucent films, or an X-ray version for opaque films. Customers can select between edge trim re-feeding via a scraptruder for fluff, or a repelletising system.

With a single turret version of the well-known W4000-4S winder, the *MiniCast*® stretch film line guarantees top quality winding of hand rolls on 2-inch cores, as well as machine and jumbo rolls on 3-inch cores.

*MiniCast*® stretch film lines are pre-manufactured in lots and are therefore available within short delivery periods at very competitive prices.

### TECHNICAL DATA:

|                      |  |            |
|----------------------|--|------------|
| Products             | super power stretch, machine stretch, hand stretch, cling film |            |
| Film thickness range | (8) 10 - 50µm  |            |
| Film final width     | 3 x 500mm  |            |
| Film structure       | 3 or 5 layers  |            |
| Production speed     | up to 650 m/min  |            |
| Net output value     | 12µm   | 600 kg/h   |
|                      | 17µm   | 845 kg/h   |
|                      | 23µm / <i>MiniCast 3L</i>                                      | 900 kg/h   |
|                      | 23µm / <i>MiniCast 5L</i>                                      | 1,050 kg/h |

| <i>MiniCast</i> ® 3L: |
|-----------------------|
| Slip layer            |
| Core layer            |
| Cling layer           |

| <i>MiniCast</i> ® 5L: |
|-----------------------|
| Slip layer            |
| Sandwich layer        |
| Core layer            |
| Sandwich layer        |
| Cling layer           |

### LINE CONFIGURATIONS:

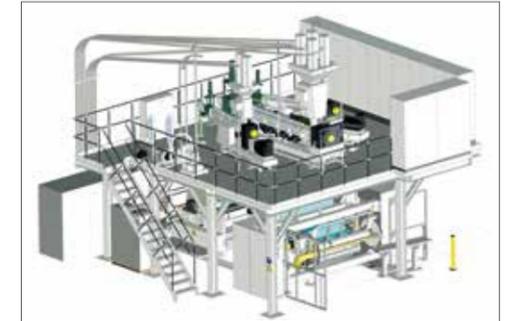
| <i>MiniCast</i> ® 3L  |              | <i>MiniCast</i> ® 5L |              |
|---|--------------|----------------------|--------------|
| Gravimetric batch dosing system with 2 components.<br>Option: 3 or 4 components |              |                      |              |
| 3 extruders   |              | 4 extruders          |              |
| 1 x 90/33   | 800 kg/h     | 1 x 90/33            | 800 kg/h     |
| 2 x 60/28   | 2 x 200 kg/h | 3 x 60/28            | 3 x 200 kg/h |
| SML advanced heaters for the extruder barrels                                   |              |                      |              |
| 3-layer feedblock   |              | 5-layer feedblock    |              |
| Automatic flat die: 2,000mm   |              |                      |              |

### CHILL ROLL UNIT:

- Chill roll Ø 1,200mm, width 2,100mm
- Optical thickness measurement
- Alternative: X-ray or beta sensor
- Oscillating frame

### EDGE TRIM RE-FEEDING SYSTEM:

Vertical scraptruder (fluff re-feeding system).  
Alternative: recycling unit with reel feeder for the pelletising of edge trim and start-up rolls.



### WINDER:

Depending on the customer's requirements the winders W4000-2S or W4000-4S can be integrated in the *MiniCast*® line.



# EcoCompact®

## STRETCH FILM EXTRUSION LINE

The *EcoCompact*® line is a standard model in SML's portfolio for efficient stretch film production in 2m-width (4-up) with extruder outputs of up to 1,600 kg/h and a small footprint of only 140sqm, including a recycling system.

For many customers, the *EcoCompact*® line represents the ticket to top quality stretch film production, while for others, as compared to their larger production lines, it is simply the most flexible line with regard to product changes.

As a rule, SML delivers the *EcoCompact*® in a three- or a five-layer version. And as far as winding technology is concerned, all three of SML's stretch film winders can be integrated into the line in order to achieve the best and most cost-efficient solution for every product requirement.

### TECHNICAL DATA:

|                      |  |            |
|----------------------|--|------------|
| Products             | super power stretch, machine stretch, hand stretch, cling film |            |
| Film thickness range | 8 - 50µm   |            |
| Film final width     | 4 x 500mm  |            |
| Film structure       | 3 or 5 layers  |            |
| Production speed     | up to 650 m/min  |            |
| Net output value     | 12µm   | 800 kg/h   |
|                      | 17µm   | 1,125 kg/h |
|                      | 23µm   | 1,200 kg/h |



| <b>EcoCompact® 3L:</b> |
|------------------------|
| Slip layer             |
| Core layer             |
| Cling layer            |

| <b>EcoCompact® 5L:</b> |
|------------------------|
| Slip layer             |
| Sandwich layer         |
| Core layer             |
| Sandwich layer         |
| Cling layer            |



### LINE CONFIGURATIONS:

| <b>EcoCompact® 3L</b>  | <b>EcoCompact® 5L</b>   |
|--|-------------------------|
| Gravimetric batch dosing system with 2 components    Option: 3 or 4 components |                         |
| 3 extruders  | 4 extruders             |
| 1 x HSE 90/33 950 kg/h   | 2 x 90/33 each 600 kg/h |
| 1 x 75/33 480 kg/h   | 2 x 60/28 each 190 kg/h |
| 1 x 60/28 190 kg/h   |                         |
| SML advanced heaters for extruder barrel                                       |                         |
| 3-layer feedblock  | 5-layer feedblock       |
| Automatic flat die 2,550mm   |                         |

### CHILL ROLL UNIT:

- Primary chill roll Ø 1,000mm, width 2,700mm
- Secondary chill roll Ø 400mm, width 2,700mm
- IR thickness measurement
- Alternative: X-ray or beta sensor
- Oscillating frame
- Cut-resistant guiding rolls

### WINDER:

Depending on the customer's requirements the winder W4000-2S, winder W4000-4S and also the winder W3000-4S can be integrated in the *EcoCompact*® line.

### EDGE TRIM RE-FEEDING SYSTEM:

Recycling unit with reel feeder for the pelletizing of edge trims and start-up rolls.

Alternative: Vertical scraptruder (fluff re-feeding system)



# SmartCast®

## STRETCH FILM EXTRUSION LINE

The name *SmartCast*® stands for SML's new 3m-wide (6-up) machine concept for the production of enhanced stretch film qualities at top performance level. A modular system consisting of four pre-configured extrusion units with throughputs ranging from 1,900 kg/h to 3,000 kg/h and a choice between five or seven layers, guarantees easy customizing to meet individual requirements.

Using the optional edge encapsulation system, production speeds of up to 750 m/min are feasible, which provides an output on the winder of over 1,400 kg/h of 12µm film.

Apart from a new generation of standard and high-speed extruders, SML has also upgraded the chill roll unit by adding additional functions, avoiding vibrations and making operation easier.

Depending on product requirements, the *SmartCast*® line can be equipped with all three of SML's stretch film winders to achieve the best and most cost-effective solution.

### TECHNICAL DATA:

|   |  |            |
|---|--|------------|
| Products                                  | super power stretch, machine stretch, hand stretch, cling film |            |
| Film thickness range                      | 8 - 50µm   |            |
| Film final width                          | 6 x 500mm  |            |
| Film structure                            | 5 or 7 layers  |            |
| Production speed                          | up to 750 m/min  |            |
| Net output value<br><b>SmartCast® XL:</b> | 12µm   | 1,400 kg/h |
|   | 17µm   | 2,000 kg/h |
|   | 23µm   | 2,400 kg/h |



| <b>SmartCast® 5L:</b> |
|-----------------------|
| Slip layer            |
| Sandwich layer        |
| Core layer            |
| Sandwich layer        |
| Cling layer           |

| <b>SmartCast® 7L:</b> |
|-----------------------|
| Slip layer            |
| Side layer            |
| Sandwich layer        |
| Core layer            |
| Sandwich layer        |
| Side layer            |
| Cling layer           |



### LINE CONFIGURATIONS:

| <b>SmartCast® S 5L</b>   | <b>SmartCast® M 7L</b>  | <b>SmartCast® L 5L</b>      | <b>SmartCast® XL 7L</b>     |
|--|-------------------------|-----------------------------|-----------------------------|
| Gravimetric batch dosing system with 2 components. Option: 3 or 4 components |                         |                             |                             |
| 5 extruders  | 6 extruders             | 5 extruders                 | 6 extruders                 |
| 2 x 90/33 each 600 kg/h  | 2 x 90/33 each 750 kg/h | 2 x HSE 90/33 each 950 kg/h | 2 x HSE 90/33 each 950 kg/h |
| 1 x 75/33 480 kg/h   | 4 x 60/28 each 240 kg/h | 1 x 90/33 600 kg/h          | 4 x 75/33 each 300 kg/h     |
| 2 x 60/28 240 kg/h   |                         | 2 x 75/33 each 300 kg/h     |                             |
| SML advanced heaters for the extruder barrels                                |                         |                             |                             |
| Edge encapsulation extruder 45/28D (optional)                                |                         |                             | Edge encapsulation          |
| 5-layer feedblock  | 7-layer feedblock       | 5-layer feedblock           | 7-layer feedblock           |
| Automatic flat die: 3,750mm  |                         |                             |                             |

### CHILL ROLL UNIT:

- Primary chill roll Ø 1,200mm, width 3,800mm
- Secondary chill roll Ø 400mm, width 3,800mm
- Automatic positioning
- IR thickness measurement
- Alternative: X-ray or beta sensor
- Oscillating frame
- Cut-resistant guiding rolls

### EDGE TRIM RE-FEEDING SYSTEM:

Recycling unit with reel feeder for the pelletising of edge trims and start-up rolls.  
Alternative: Vertical scraptruder (fluff re-feeding system).

### WINDER:

Depending on the customer's requirements the winder W4000-2S, the winder W4000-4S and also the winder W3000-4S can be integrated in the *SmartCast*® line.



# PowerCast

## STRETCH FILM EXTRUSION LINE

PowerCast represents the latest 4 meter wide (8-up) stretch film line which combines an ultimate low space requirement with highest production flexibility for 3-inch hand, machine and jumbo rolls at top performance level. This standardised system with three pre-configured extrusion units at throughputs ranging from 2,400 kg/h to 3,800 kg/h and the choice between 7 or 55 layers guarantee easy customizing to meet individual requirements.

Using the optional edge encapsulation system, production speeds of up to 850 m/min are feasible, which provides an output on the winder of over 2,000 kg/h of 12µm film.

Apart from a new generation of standard and high-speed extruders, SML has also upgraded the chill roll unit by using a 1,600mm C1 roll, avoiding vibrations and making operation easier.

The new version of the winder W4000-4S allows a quick changeover when different roll width is needed. It is easy to produce 400/450/500mm without using a deckling or a winder edge trim.

### TECHNICAL DATA:

|                      |  |             |
|----------------------|--|-------------|
| Products             | super power stretch, machine stretch, hand stretch, cling film |             |
| Film thickness range | 8 - 50µm   |             |
| Film final width     | 8 x 500mm, 9 x 450mm, 10 x 400mm                               |             |
| Film structure       | 7 - 55 layers  |             |
| Production speed     | up to 850 m/min  |             |
| Net output value     | 12µm   | >2,000 kg/h |
| <b>PowerCast:</b>    | 23µm   | 3,200 kg/h  |



| <b>PowerCast 7L:</b> |
|----------------------|
| Slip layer           |
| Side layer           |
| Sandwich layer       |
| Core layer           |
| Sandwich layer       |
| Side layer           |
| Cling layer          |

| <b>PowerCast NANO 55L:</b> |
|----------------------------|
| Slip layer                 |
| Side layer                 |
| Nano layer                 |
| Core layer                 |
| Nano layer                 |
| Side layer                 |
| Cling layer                |



### LINE CONFIGURATIONS:

| <b>PowerCast S</b>   | <b>PowerCast XL</b>     | <b>PowerCast NANO</b>   |
|--|-------------------------|-------------------------|
| Gravimetric batch dosing system with 2 components. Option: 3 or 4 components |                         |                         |
| 7 extruders  | 7 extruders             | 7 extruders             |
| 2 x 90/33 each 600 kg/h  | 2 x 90/33 each 950 kg/h | 2 x 90/33 each 950 kg/h |
| 5 x 60/28 each 240 kg/h  | 5 x 75/33 each 380 kg/h | 5 x 75/33 each 380 kg/h |
| SML advanced heaters for the extruder barrels                                |                         |                         |
| Edge encapsulation extruder 45/28D   |                         |                         |
| 7-layer feedblock (optional 9, 11, 13 layer)                                 |                         | 55-layer feedblock      |
| Automatic flat die: 4,800mm  |                         |                         |

### CHILL ROLL UNIT:

- Primary chill roll Ø 1,600mm, width 5,000mm
- Secondary chill roll Ø 400mm, width 5,000mm
- Automatic positioning
- IR thickness measurement
- Alternative: X-ray or beta sensor
- Oscillating frame
- Cut-resistant guiding rolls

### EDGE TRIM RE-FEEDING SYSTEM:

Vertical scraptruder (fluff re-feeding system)  
Alternative: Recycling unit with reel feeder for the pelletising of edge trims and start-up rolls.

### WINDER:

Depending on the customer's requirements the winder W4000-2S or winder W4000-4S can be integrated in the PowerCast line.



# MasterCast®

## STRETCH FILM EXTRUSION LINE

The manufacture of machine rolls in large quantities with maximum efficiency requires production lines with exceptional output ranges. The *MasterCast®* line from SML is a globally unique system in a width of 6 meter (12-up) and with an installed extrusion capacity of up to 5,000 kg/h.

A production line on this scale offers an unbeatable ratio with regard to investment cost per kg of output, minimized labour costs and optimum energy use. Equipped with proven SML components, this line is offered in a 5- and a 7-layer version

and in combination with the fully automatic winder W4000 in a triple turret version, the *MasterCast®* sets new standards for the mass production of stretch wrap films.

### TECHNICAL DATA:

|                      |  |            |
|----------------------|--|------------|
| Products             | super power stretch, machine stretch, standard stretch |            |
| Film thickness range | (8) 10 - 50µm  |            |
| Film final width     | 12 x 500mm   |            |
| Film structure       | 5 or 7 layers  |            |
| Production speed     | up to 650 m/min  |            |
| Net output value     | 12µm   | 2,400 kg/h |
|                      | 17µm   | 3,300 kg/h |
|                      | 23µm   | 4,000 kg/h |



| <b>MasterCast® 5L:</b> |
|------------------------|
| Slip layer             |
| Sandwich layer         |
| Core layer             |
| Sandwich layer         |
| Cling layer            |

| <b>MasterCast® 7L:</b> |
|------------------------|
| Slip layer             |
| Side layer             |
| Sandwich layer         |
| Core layer             |
| Sandwich layer         |
| Side layer             |
| Cling layer            |



### LINE CONFIGURATIONS:

| <b>MasterCast® 5L</b>                             | <b>MasterCast® 7L</b>      |
|---|----------------------------|
| Gravimetric batch dosing system with 2 components | Option: 3 or 4 components  |
| 5 extruders                                       | 6 extruders                |
| 2 x 150/33 each 1,250 kg/h                        | 2 x 150/33 each 1,250 kg/h |
| 1 x 135/33 1,050 kg/h                             | 4 x 90/33 each 600 kg/h    |
| 2 x 90/33 each 600 kg/h                           |                            |
| SML advanced heaters for the extruder barrels     |                            |
| 5-layer feedblock                                 | 7-layer feedblock          |
| Automatic flat die: 6,950mm                       |                            |

### CHILL ROLL UNIT:

- Primary chill roll Ø 1,200mm, width 7,000mm
- Secondary chill roll Ø 600mm, width 7,000mm
- IR thickness measurement
- Optional X-ray or beta sensor
- Oscillating frame
- Cut-resistant guide rolls

### EDGE TRIM RE-FEEDING SYSTEM:

Recycling unit with reel feeder for the pelletising of edge trim and start-up rolls.  
Alternative: Vertical scraptruder (fluff re-feeding system).

### WINDER:

Winder W4000



## WINDING SYSTEMS

Before entering the winder, the film is oscillated in an overhead position by a frame, in order to ensure a perfect film roll surface. Both the oscillation distance and speed are adjustable.

The winder is the heart of a stretch film line and decisive in terms of overall line performance. Accordingly, SML is proud of its peak performance winders, which are the result of many years of intensive, in-house technological development work. Every new product, idea or requirement, which is spotted in the market, or is the object of a customer inquiry, is passed on to the R&D department. Following a detailed evaluation, SML then upgrades its winders with corresponding, new features.

SML has created three different winding systems for the production of stretch wrap film. All of these have a solid, vibration-free steel frame construction, which is able to resist the dynamic forces generated at high production speeds.



## THE “SHAFTLESS” WINDER W3000-4S

This highly sophisticated winder does not produce bleed trims and thus utilizes the extruded film in a most effective manner. The incoming film is simply cut by single blades to the final film width, e.g. 6 x 500mm and then passes an equal number of separation frames. Directly after the satellite roll, the film is wound onto the winding core via a driven contact roll.

This core is only clamped by special chucks and not supported by a winding shaft. Therefore, the winder is unique, as it is shaftless and thus offers the major advantage of no critical revolution speeds due to dynamic deflections.

Nevertheless, the winder still has a turret with four winding stations for extremely short cycle times, perfect winding quality up to the end of the roll with an ultimate short tail.

These features are supported by an additional contact roll, which follows the roll along the cutting index. The winder W3000-4S is able to handle 2-inch and 3-inch cores with both standard and thin wall thicknesses (thin core technology).



## THE “WORKHORSE” WINDER W4000-2S

This is the primary selling stretch film winder and can be delivered in single-, double- and triple-turret versions with net film widths of 1,500 – 6,000mm. Simplicity, great width flexibility and top speeds for machine and jumbo rolls represent the key to high performance.

The film passes a satellite roll and is then wound onto a 3-inch winding core via a driven contact roll. Each turret is equipped with only two winding shafts and offers sufficient cycle time for typical machine rolls.

One extremely valuable benefit is the ability to produce jumbo rolls with a maximum diameter of 435mm and a weight of 60kg. This winder is capable of handling actual production speeds up to 750 m/min and comes with the thin core technology.



## THE “MULTITALENTED” WINDER W4000-4S

As technology leader, SML carefully analysed the possibility of producing a single winder design, which would meet all current market requirements and anticipated future developments.

The result is the unique and most versatile winder W4000-4S, which is based on the company's vast experience in stretch film and the feedback received from our top-level customers.

### THE WINDER W4000-4S COMBINES FEATURES SUCH AS:

- 4 winding shafts in each turret
- Single or double-turret design, depending on the width
- A separate contact roll for ultimate short tail
- Suitability for 2-inch hand rolls, 3-inch machine rolls, and jumbo rolls
- Thin core technology
- Coreless operation available
- Modified edges available

All these features make the W4000-4S winder a stretch film winding benchmark.

| Winding                            | winder W3000-4S | winder W4000-2S          | winder W4000-4S |
|------------------------------------|-----------------|--------------------------|-----------------|
| Thickness range                    | 8 - 35µm        | 8 - 50µm                 | 8 - 50µm        |
| Max. mechanical speed              | 650 m/min       | 850 m/min                | 850 m/min       |
| Winding width                      | 4 - 6 x 500mm   | 3 - 12 x 500mm           | 3 - 8 x 500mm   |
| Part roll width                    | 400, 450, 500mm | variable                 | variable        |
| Winding on 2-inch                  | yes             | no                       | yes             |
| Winding on 3-inch                  | yes             | yes                      | yes             |
| Coreless winding                   | no              | yes *                    | yes             |
| Max. mechanical diameter 2-inch    | 180mm           | no                       | 180mm           |
| Max. mechanical diameter 3-inch    | 400mm           | 435mm                    | 435mm           |
| No. of winding stations per turret | 4               | 2                        | 4               |
| No. of winding turrets             | single          | single / double / triple | single / double |
| No. of winding shafts              | shaftless       | 2 / 4 / 6                | 4 / 8           |

|                    |                 |          |             |
|--------------------|-----------------|----------|-------------|
| Minimum cycle time | 20s             | 60s      | 15s         |
| Film tail          | very short      | standard | ultra short |
| Bleed trim         | bleed trim-free | yes      | yes         |

|                       |              |              |              |
|-----------------------|--------------|--------------|--------------|
| Winding tension       | 0 - 100 N/m  | 0 - 100 N/m  | 0 - 100 N/m  |
| Contact roll pressure | 50 - 500 N/m | 50 - 500 N/m | 50 - 500 N/m |

|                                  |     |          |     |
|----------------------------------|-----|----------|-----|
| Core and roll handling manual    | no  | optional | no  |
| Core and roll handling automatic | yes | yes      | yes |

\* With centre support



## PRODUCTS

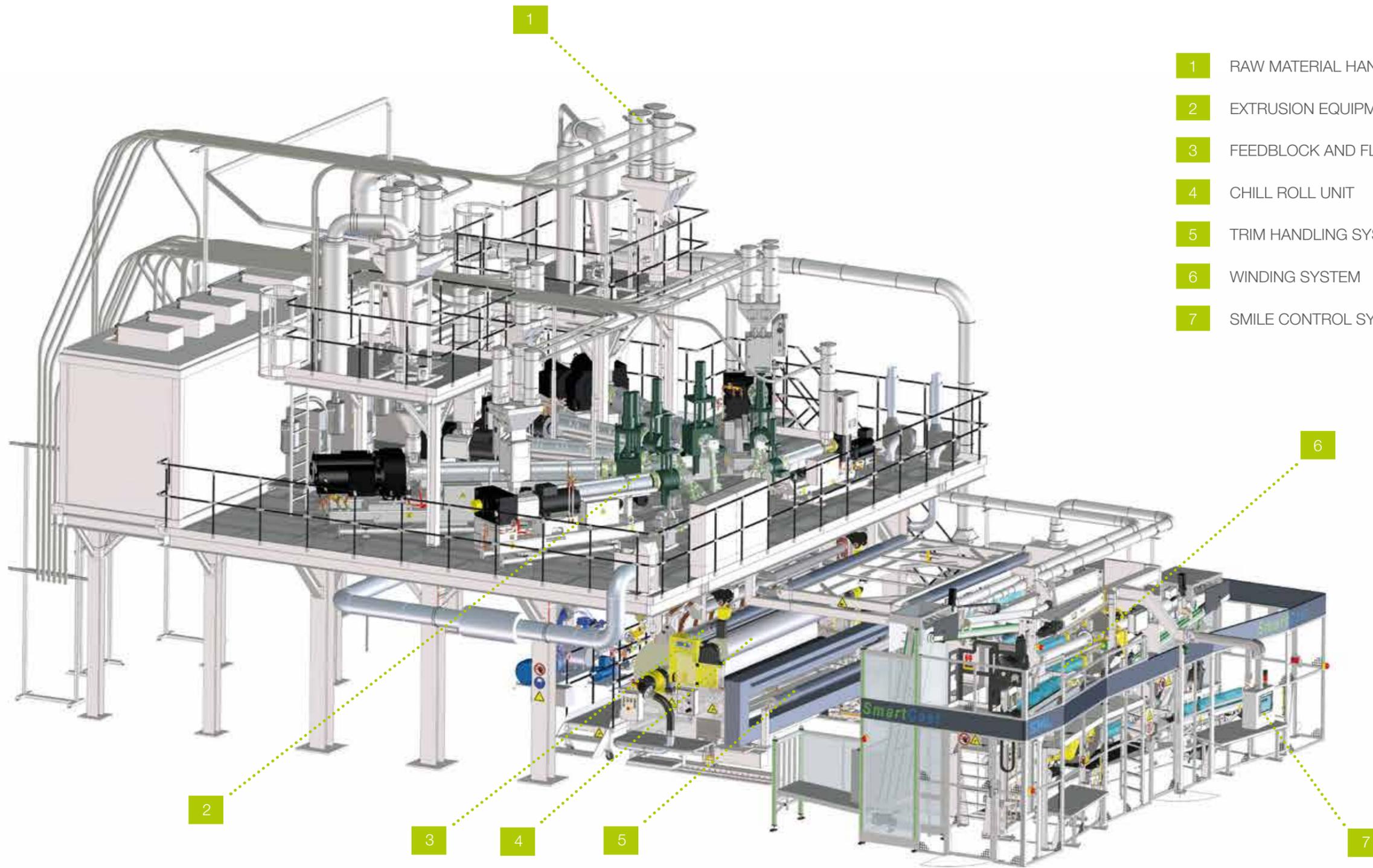
Pallet stretch wrap film represents the biggest stake of the cast film market. And while some regions have already evened out their supply shortfall other regions still depend heavily on imports to cater their demand. Moreover, what makes stretch film especially interesting for the industry is the fact that it has the lowest unit wrap weight of all the film palletizing solutions and therefore is also the most cost-efficient.

In response to the varied requirements for different transportation methods and distances, a wide range of stretch film qualities has been developed and continues to expand. This extends from simple 3-layer hand film, to machine film grades with very high pre-stretch rates and dart-drop values.

In addition, new materials are being created and stretching machine speeds are rising, due mainly to the need to reduce the cost of packaging, while enhancing its safety.

In view of the fact that over 80 per cent of production costs relate to raw material, it is their effective use, in combination with cost-saving formulations and reliable machinery with high efficiency and low waste rates that represent the keys to success.

It is precisely this approach that SML employs together with its customers. An approach that potentially can offer outstanding success.



- 1 RAW MATERIAL HANDLING AND DOSING
- 2 EXTRUSION EQUIPMENT
- 3 FEEDBLOCK AND FLAT DIE WITH ENCAPSULATION
- 4 CHILL ROLL UNIT
- 5 TRIM HANDLING SYSTEM
- 6 WINDING SYSTEM
- 7 SMILE CONTROL SYSTEM



multilayer  
extrusion unit

## 1 RAW MATERIAL HANDLING AND DOSING

In view of the fact that raw material account for roughly 80 per cent of the overall stretch film production costs, it is essential to ensure their efficient use in every film layer. A wide range of gravimetric batch blenders and continuous gravimetric feeders with up to six components per extruder enable recipes to be run with great accuracy and repeatability.



gravimetric batch dosing  
system



continuous gravimetric dosing  
system

Moreover, the complete dosing system, as well as all the material supply vacuum pumps, filters and valves are fully integrated into the SMILE control system.



extrusion tool unit

## 2 EXTRUSION EQUIPMENT

All SML stretch film extruders are designed to handle a wide range of polymers used in this market. A choice of standard versions with 45-180mm screw diameters and a 90mm high-speed version is available. The extruders with an L/D ratio of 28 or 33 and bimetallic barrels are driven by energy-efficient, water-cooled AC motors as a standard feature.

Moreover, although stretch wrap film is regarded as a commodity, the screw design is highly sophisticated. For example, hardened flanks, barrier-, shearing- and mixing zones are all employed in line with the layer characteristics such as slip-, cling- or functional layers and the polymers utilized in the extruder. Today, apart from standard LLDPEs in C4, C6 or C8 quality, an increasing number of mLLDPEs, widely spread MFIs and even other polymers such as PP are being used in stretch film production.



HSE 90/33

### THE SML HSE 90/33-II PROVIDES VERY UNIQUE ADVANTAGES:

- An output of up to 950 kg/h at a screw speed of 350rpm.
- A significantly smaller footprint than that of a comparable standard extruder.
- Shortest material residence time in the extruder, which is ideal for fast material change and minimised polymer degradation due to thermal stress.
- Reduced heating energy for the barrel and low heat emission.



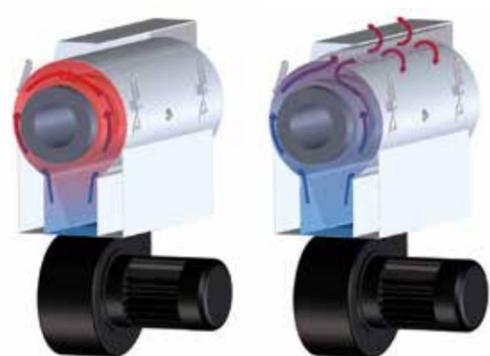
hydraulic single piston filter



feedblock and flat die

The extruder barrel of all extruder types is heated with the SML advanced heating system. A gravity-closing flap prevents the escape of hot air from the system, thus retaining the heat in the barrel.

Effective melt filtration for removal of impurities, unmelted or cross-linked particles, is most important. SML installs manual or hydraulic piston filters in its stretch film lines.



**EXTRUDER CHARACTERISTICS:**

|                          | 45/28 | 60/28 | 75/33 | 90/33 | HSE90 | 120/33 | 135/33 | 150/33 | 180/33 |
|--------------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| <b>Screw rpm</b>         | 289   | 272   | 294   | 226   | 350   | 146    | 139    | 139    | 114    |
| <b>No. of zones</b>      | 3     | 4     | 5     | 5     | 5     | 6      | 7      | 8      | 9      |
| <b>Output in [kg/h]*</b> | 95    | 240   | 480   | 600   | 950   | 950    | 1,050  | 1,250  | 1,600  |

\* For reference only. Depending on installed drive power actual output may differ.

**3 FEEDBLOCK AND FLAT DIE**

As the leading supplier of stretch film lines, SML relies exclusively on respected partners for its feedblocks and flat dies.

automatic die



The stretch film production trend is towards more sophisticated film structures with a greater number of layers than in the past. In general, three layers are sufficient to meet the basic requirements of a stretch wrap film. However, for higher quality films, the total number of layers is steadily increasing, in order to provide greater flexibility and efficient use of expensive raw materials.

Today, five or seven layers have become standard, but on request SML builds lines with more layers, MicroLayer or NanoLayer™ technology. Co-extrusion flat dies with T-channels are capable of incorporating fixed or variable internal decking systems. This feature provides an efficient means of varying net film width. Depending on the manufacturer, dies are either chrome- or nickel-plated, but in both cases automatic die-control via thermal heated bolts is standard.

**THE EDGE ENCAPSULATION SYSTEM**

is especially important for thin film production at high line speed. An additional extruder feeds a divided melt stream of LLDPE to the edges of the die. Edge encapsulation stabilises the melt curtain and thus reduces the danger of trim loss during production. A return on the additional investment required for edge encapsulation is obtained very quickly, as the downtimes caused by edge breaks during conventional production are avoided and higher running speeds are possible.



SML die splitting system

#### THE DIE SPLITTING SYSTEM

enables quick and safe die opening for cleaning purposes. The die remains in its original position in the machine and continues to be heated.

#### EDGE PINNING

A combined electrostatic and pneumatic pinning system fixes the film to the chill roll surface. Adjustable static power and air pressure, as well as easy positioning, allow precise pinning and therefore excellent film edge contact on the chill roll.



edge pinning system

#### A BI-VACUUM BOX

is mounted directly on the die body, and consists of two chambers. The pre-chamber extracts the air stream caused by the rotating chill roll, while the main chamber maintains a low air pressure between the extruded film and the chill roll. In addition, the length of the melt curtain can be adjusted before it touches the chill roll. Both chambers are equipped with separate speed-controlled suction fans.



bi-vacuum box



chill roll unit

### 4 CHILL ROLL UNIT

Apart from the extrusion section, in combination with the bi-vacuum box, the chill roll unit has a significant influence on final product quality. Parameters such as the position relative to the flat die, chill roll temperatures and surface have a direct effect on the film. In this connection, the vast experience obtained by SML with the delivery of a large number of lines facilitates the rapid determination of the optimum parameters for specific customer requirements.

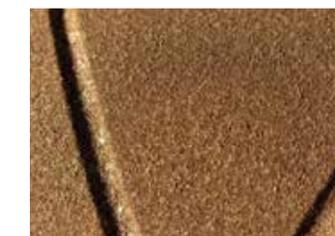
The unit consists of two cooling rolls (*PowerCast* one cooling roll) for which careful surface selection is vital. The electro-chemically matted surface of the first chill roll provides an extremely homogeneous surface and very high cooling capacity. Furthermore, this surface allows easy film release upon departure from the chill roll. The second chill roll has a polished surface for highly effective stretch film post-cooling. Both rolls are chromium-plated and equipped with separate water tempering systems and drives.

SML places the thickness-gauging unit directly on the chill roll frame behind the second chill roll. The shortest achievable distance from the die lip to the measuring point ensures minimum reaction times for extremely economic film thickness regulation. In answer to the differing regulations in customer countries and specific product needs, SML supplies automatic gauging systems either with infrared, X-ray or beta-ray sensors.



chill roll unit with thickness measuring unit

After leaving the chill roll, the film is transported to the winder via cut-resistant guiding rolls. These have a specially-hardened, cut-resistant surface for high film grip and long service life!



surface of guiding roll



recycling unit

### 5 TRIM HANDLING SYSTEM

The edges are cut off directly at the winder entrance and depending on the winding system, bleed trims are also removed. Stretch film production is only economic with complete trim re-feeding. Therefore, although this part of the line may not receive much attention initially, it has a major influence on successful 24/7 operation.

Fluff and pellet re-feeding are the two possibilities for recycling edge and bleed trims back to the process. In both cases, a blower system transports the trims, either to the grinder in the fluff re-feeding system, or directly to the recycling unit.

In the **fluff re-feeding system**, the trims are sucked through a grinder and then transported to a vertical scraptruder. This feeds the fluff together with virgin material directly to an extruder to form a core layer. Fluff re-feeding is the more energy-efficient and material-compatible method, as no additional melting is involved.

The **recycling unit** melts and repelletises the trim, which can then be sucked to the dosing system of an extruder. The recycling unit offers greater flexibility with regard to the use of recycled pellets on different extrusion lines. Moreover, it is a convenient solution in case frequent colour changes are required and for the recovery of waste and off-spec rolls.



fluff re-feeding unit



e-container

### 7 SMILE CONTROL SYSTEM

An innovative, intuitive and operator-friendly human-machine interface (HMI) with two 17-inch touch screens provides all the functions needed by operators and maintenance personnel to handle the complete line. Everything, from the input of the ratio of each raw material to the parameters of the winder can be dealt with from the main terminal, which is located in the casting section. A second touch screen at the winder that is linked to the main terminal allows winding parameter adjustment directly in the field of vision for the process.

Different access levels and features such as alarm management, recipe administration and remote service via ethernet/internet are standard. For extended trend analysis and quality documentation, data can be transferred to a data logging system via a separate PC, or existing data collection systems. The electrical equipment is either installed in an e-container or, depending upon the space requirement, in e-cabinets. Both customised solutions are supplied complete with electrical engineering, wiring and air-conditioning equipment. Only first choice and proven components are used for each device.

#### ADVANTAGES

- Centrally operated touch-screen monitor, displaying all relevant data
- Central control of all production parameters
- Industrial Ethernet Powerlink connection to decentralised I/O points
- Process data analyses
- Integrated OEE (Overall Equipment Effectiveness)



control panel

NOTES:

# SML

EXTRUSION LINES – ENGINEERED TO PERFORM ▶

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