TECHNOLOGY report

SML
EXTRUSION LINES – ENGINEERED TO PERFORM

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EDITORIAL

Karl STÖGER
Managing Director

Dear Reader,

Extrusion lines – engineered to perform. This new mission statement under the SML company logo was chosen because it describes our endeavor to build machines with a cutting-edge technology, guaranteeing utmost efficiency, reliability and durability. For our customers, a quick return on investment matters and to achieve this goal, it is of vital importance that the purchased machine performs well from day one. SML keeps its promises. With an impeccable track record, the superior performance of SML extrusion lines is acknowledged in the market and has helped our company to achieve a sustained growth rate. And to our clients, having a machine supplier who offers innovative solutions and at the same time is able to take the risk out of their investment is an absolute advantage to them.

EcoCompact is a new and innovative product of SML - engineered to perform. A 4-up stretch film line assembled with high-grade components from the world's most renowned sub-suppliers. The EcoCompact is capable of producing thinner film, at higher speed, achieving better film properties, winding the film on thinner cores, in a perfect winding quality, requiring less space to be accommodated and consuming lesser energy than any comparable machine.

The EcoCompact launched and demonstrated live at the K-show in Düsseldorf is targeted to be the match winner in today's competitive world of stretch film. You don't believe it? Come and see it for yourself. SML keeps its promises, doesn't it?

Yours sincerely

EcoCompact – the new benchmark in stretch film extrusion

The current success of SML stretch film lines has prompted us to design a new, standardized machine with a price-performance ratio that is second to none. Our prime objectives were to build a line that would offer a large number of features and thus be of interest to as many customers as possible, while reducing the price by means of standardization.

The new line produces 4 x 500mm stretch films with a net production capacity of around 1,200 kg/h and runs at speeds in excess of 600 m/min. Besides, as space is at a premium in the industry, its components are arranged on two levels, which minimizes the line footprint. With the extruders, air-conditioned e-cabinets and water pumps on the upper level, we have been able to compress the floor space requirement to a mere 140 sq m, which is only half the room needed by a conventional stretch film line. Besides, it must also be stressed that no compromises have been made with regard to the amount and dimensions of the equipment installed, or the proven quality of SML components.

***EcoCompact* extruder group**

***EcoCompact* winder 4000**

The line is fully equipped with three or four extruders and provides a choice between a 3-layer or 5-layer feedblock, infrared gauge and a complete recycling unit with reel feeder. It is also fitted with our robust W4000 turret winder and with an optional automatic core and roll handling system. In combination with cut-resistant guide rollers, this proven winder provides perfect winding quality for both machine rolls and jumbo rolls up to 60kg. Furthermore, we have also included our ThinCore technology in the winder package that allows to use 3-inch cores of only 350g.

This new package, which is called "*EcoCompact*", will make its market debut at the K 2010.

In today's energy competitive environment, the efficient use of power is a key to success. Accordingly, with a combination of a High Speed Extruder and efficient conventional extruders, which are all boosted with top quality infrared heaters, our new line will win any comparison in this connection.

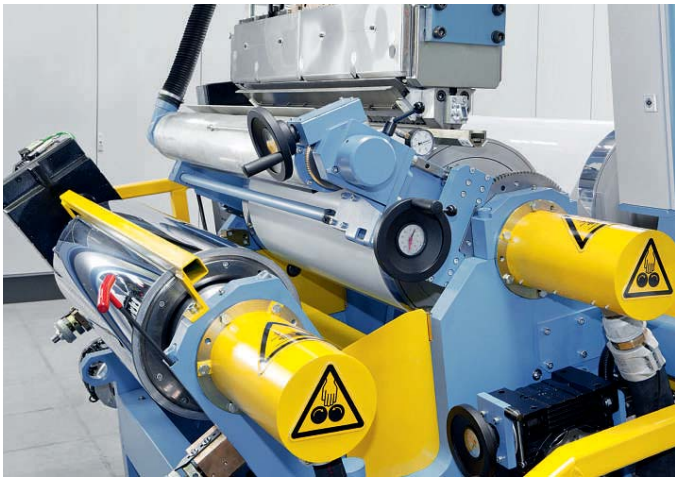
Thomas RAUSCHER,
Product Manager, Cast Film Extrusion

More features for SML **thermoformed sheet lines**

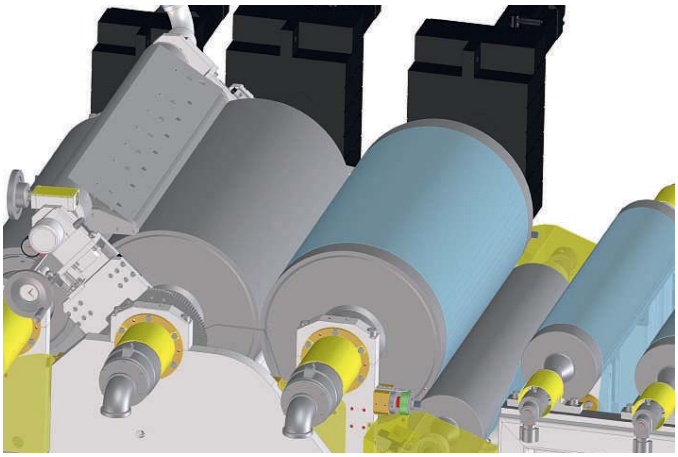
The production methods used for the manufacturing of PS and PP thermoformed sheet have been well established in the industry since decades. In spite of the fact that the scope of applications and raw material selection do not show major progress, the volume of material consumption remains at a very high level. Therefore, successful processors deliver superior product quality and focus on efficient production.

New extrusion lines have to be more efficient and must satisfy future quality expectations. Standardization would be desirable, but in practical terms, lines have to incorporate individual features. They need to be tailored to individual requirements on sheet width, thickness range, layer configuration, output, space availability and winding technology if not operated inline with a thermoformer. SML meets these requirements by using modular design and superior components, which provides more features and greater efficiency.

Our new air knife, which is fully integrated into our successful horizontal roll stack, allows rapid changes from calendering to the cast mode. The polishing roll (C0) is locked in an open position and this enables the 3-axis adjustment mechanism to move the air knife into an optimum setting for casting. Moreover, electrical height adjustment of the roll stand creates an advantageous casting position with more than 230°(!) of sheet wrap on the centre roll (C1). Using our far-reaching experience in cast film, we have thus been able to raise typical production speeds by 25% without any impact on the calendering mode, as the air knife is parked behind the die. Thick sheet can pass as many post-cooling rolls as required for top performance. At high line speeds, we push the first post-cooling roll against the cast calendering roll (C2), thus achieving excellent roll contact and hence better surface quality in tandem with high output.



Roll stack in air knife operation



The thin shell roll design of SML calendering rolls was originally targeted on an increase in the cooling performance of a given roll diameter. However, we have also discovered that it enhances the sheet's thermoforming properties, edge behaviour, transparency and winding quality.

All in all, the new SML High Speed Extruders, a choice of highly efficient roll stacks and an extensive selection of company-built winders mean that we can supply innovative and integrated solutions for virtually every requirements.

Berthold DRÖGE, Technical Director

SML - your research centre for photovoltaic film and sheet

In recent years, SML has gained vast experience in the design of extrusion lines for different types of films used in the photovoltaic industry. All these products, which include EVA encapsulant films, backsheet films and functional films, require a great knowledge of application technology, in order to ensure excellent product quality for the film producer. Accordingly, SML has developed customized solutions based on proven processes and machine components such as the sleeve-touch technology.

The competition in the photovoltaic market is increasing. And in the face of this challenge, our customers are being forced to develop new formulas and processes for films, which allow higher module efficiency, longer service life and shorter processing times (i.e. ultra fast curing EVA films). In this situation, with our highly flexible laboratory line, which is equipped with a various production methods sleeve-touch module, an air knife calendering roller, and a coating/laminating station, SML constitutes the perfect partner for both, product development and for extrusion lines to realise these innovative applications.

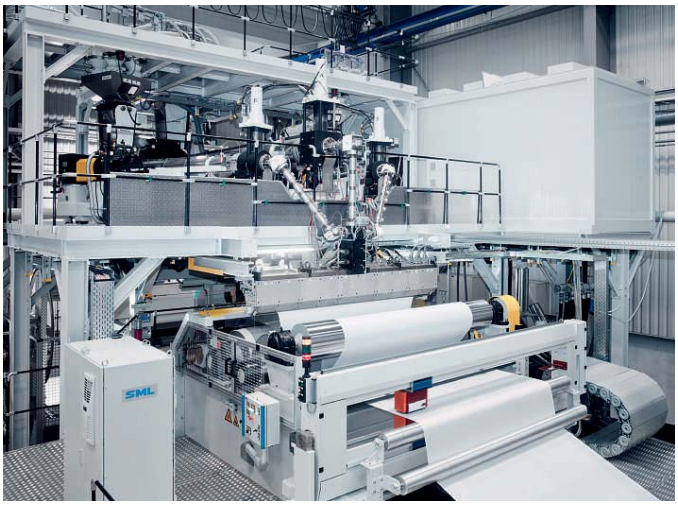
Martin KALTENECKER,
Head of Sales Department

Hygiene is a healthy market

The global market for hygiene products such as baby diapers, incontinence diapers and sanitary napkins is expanding rapidly and this has prompted a corresponding rise in demand for breathable film, breathable laminate, melt-embossed film and cloth-like laminate for use as backsheets. SML is the machinery market leader in this field and has developed its own line concepts specifically for these products. Company competence in the hygiene field is also mirrored in the delivery of over twenty trendsetting backsheet film and laminate lines in recent years.

The products

Breathable film generally has three layers based on a PE compound containing approximately 50% $CaCO_3$. The lowest film thickness is 15 g/m² and production speeds of 300 m/min are available.



Production line for hygiene backsheet

Breathable laminates are produced on the same line as breathable film and merely require the addition of an unwind for the nonwoven and the "porous coating" station. Accordingly, SML has developed a new unwind for continuous production at full speed capable to handle maximum roll diameters of 1,500mm.

Melt-embossed films consist of three or five layers, the latter being ideal for minimized film weights and high speeds. Related SML technology includes the latest dry embossing process during which the film is processed in a nip between a cooled rubber roller and an embossed steel roller. The films thus produced have thicknesses of 17-24 g/m² and production speeds can exceed 400 m/min.

Melt-embossed laminate production also simply requires the installation of an unwinder for the nonwoven, which is laminated with the film during melt embossing.

The outlook

Films and laminates will be printed in-line in up to 4 colours and SML has already developed a line concept with an integrated flexo printer for this purpose, which will save costs and also pave the way for higher value products. Breathable film and laminate are used for premium products, while melt embossed film and cloth-like laminates are widely employed for standard products.

MDO unit for breathable film

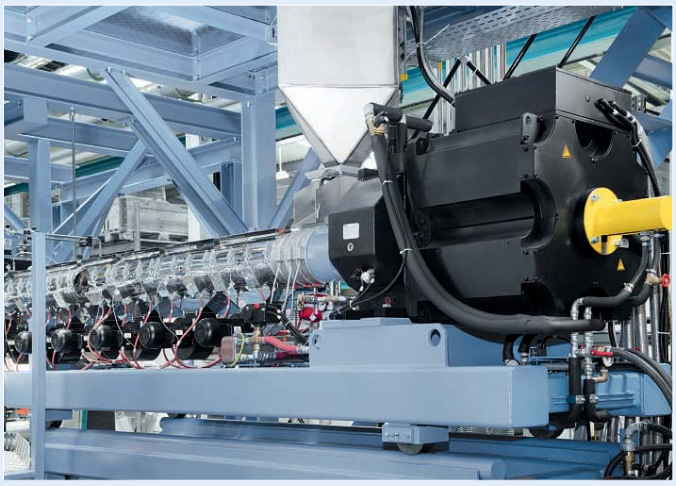
Alexander BRUCKMÜLLER,
Product Manager, Cast Film Extrusion & MDO

The new HSE 90/37 LD High Speed Extruder

Recent developments have demonstrated the fundamental advantages of High Speed Extruders (HSE) for a number of suitable applications. These machines have now passed their infancy stage and acceptance has been achieved in several industrial branches.

We have discovered that the HSE can also improve polymer properties. Within extruders, polymers suffer from residence time at high temperatures and from accumulative shear in general. Although the HSE shears the material at a higher rate, due to a much smaller volume of polymer in the machine, the time involved is much shorter. This cut in the residence time at high temperatures reduces thermal degradation and it has been established that the combination of these two effects is most advantageous with regard to the higher quality of the end product. The HSE demands the screw design being adapted for the material, as the smaller processing unit does not allow the compensation of poor screw design by the addition or removal of heat through the barrel. For the optimal processing of polymers with different melting behaviour it is often required to use a separate screw design for each individual polymer.

Accordingly, in order to attract a wide range of customers, who are searching for more flexibility without screw changes, SML decided to find a suitable solution for an HSE that reacts in a more "forgiving" manner to different polymers.



HSE 90/37 LD

This assignment has been fulfilled through the development of a "gentler" extruder based on a 90mm screw diameter. Using a screw speed in the 500rpm range together with an extended barrel length, we have been able to increase the specific output of the screw substantially, thus the processing window with the same screw opened up for a wider range of MFI'S.

For typical thermoforming grades, SML can guarantee an output of more than 1,000 kg/h PP - virgin material and also 100% regrind. The use of a relatively small extruder together with a brand-new and highly efficient gearbox-motor combination results in very low energy consumption for an extended range of materials. Indeed, with its HSE 90mm extruder, SML has created a new, unique, and more flexible addition to the young HSE family.

Dr. Wolfgang BINDER,
Product Manager, Extruder

News in spinning technology:

BCF:

The producible yarn weight range on a single texturing jet has been enlarged to 300 - 5000den. Moreover, the influence of production parameters on yarn crimp and rest shrinkage has been investigated and tabulated.

FDY:

On standard Austrofil lines the producible titer range for high and medium tenacity yarns increases from 150 up to 4000den.

Production of Microfilaments with common spinning equipment:

In cooperation with a customer a product method was developed to produce MT yarns with a titer of 310 denier with 600 filaments, (dpf = 0,5). This type of yarn is used in soft touch Chenille garments for children.

"EcoFlex" SML´s latest unwinding system

A new series of unwinds called "EcoFlex" has been introduced to the market. In its basic version the EcoFlex can handle roll diameters up to 1,500mm. It is capable of handling all common substrates such as cardboard, paper, foil, film, nonwoven, fabric, fleece, etc. A range of optional features is available, which includes an integrated edge guiding system, a constant gap unwinding device for the handling of thin aluminium foil, automatic roll handling and an additional cutting station for bi-directional unwinding. As a result of the EcoFlex's modular design, these features, if not installed at the beginning, can be easily retrofitted at a later stage when needed. Last but not least as the EcoFlex is equipped with a self-sufficient PLC system, it can also be integrated easily into existing lines.

EcoFlex in operation

8-up stretch film line with **nano-layer technology**

SML has recently delivered an 8-up line (4,000mm net width) for stretch wrap film, which uses nano-layer technology for 31 individual layers. This high output line is able to produce up to 3,000 kg/h of machine stretch wrap film with top mechanical properties in a thickness range of 12 – 23µm.

Apart from the numerous 4-up and 6-up stretch film lines on SML's order books, two more 8-up lines will go into production in recent months. For SML, the nano-layer technology represents a means of preparing lines for future material development trends and the achievement of an optimized cost/performance ratio for the film producer.

Casting section of 8-up line

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EVENTS 2010/11

EVENT	LOCATION	BOOTH NUMBER	DATE
K2010	Düsseldorf, Germany	H16, B47	Oct., 27 - Nov. 3, 2010
ARABPLAST	Dubai, United Arab Emirates	Austrian Pavillon Hall 6	Jan., 8 - 11, 2011
INTERPLASTICA	Moscow, Russia	Austrian Pavillon Hall 8.1	Jan., 25 - 28, 2011
PLAST EXPO 2011	Casablanca, Marocco		April, 6 - 9, 2011
INDEX11	Geneva, Swiss		April, 12 - 14, 2011

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