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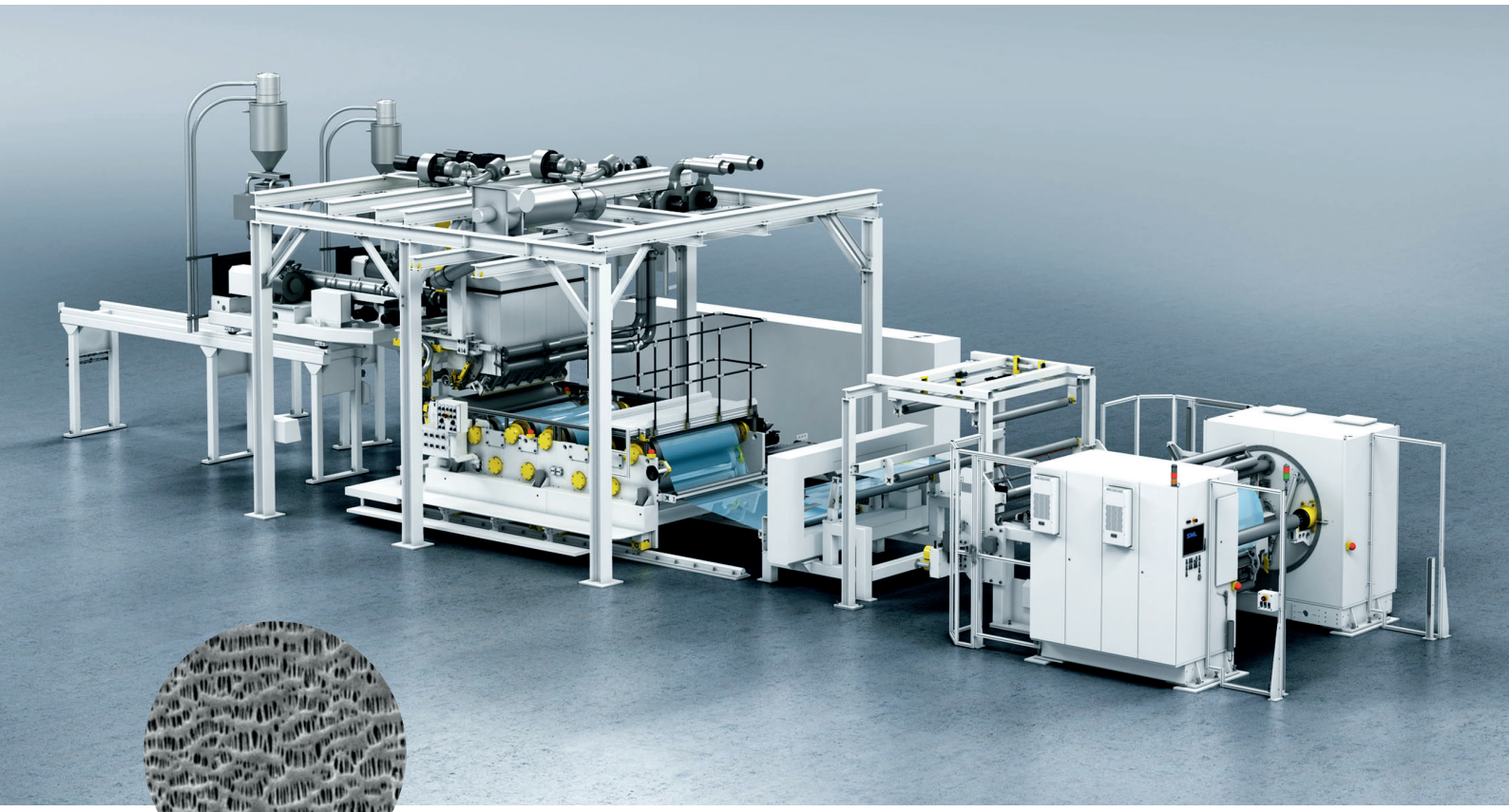
EXTRUSION LINES – ENGINEERED TO PERFORM



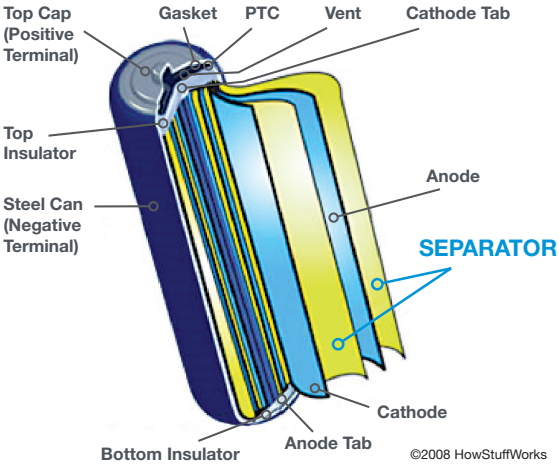


# LiBSF

## LITHIUM ION BATTERY SEPARATOR FILM LINE

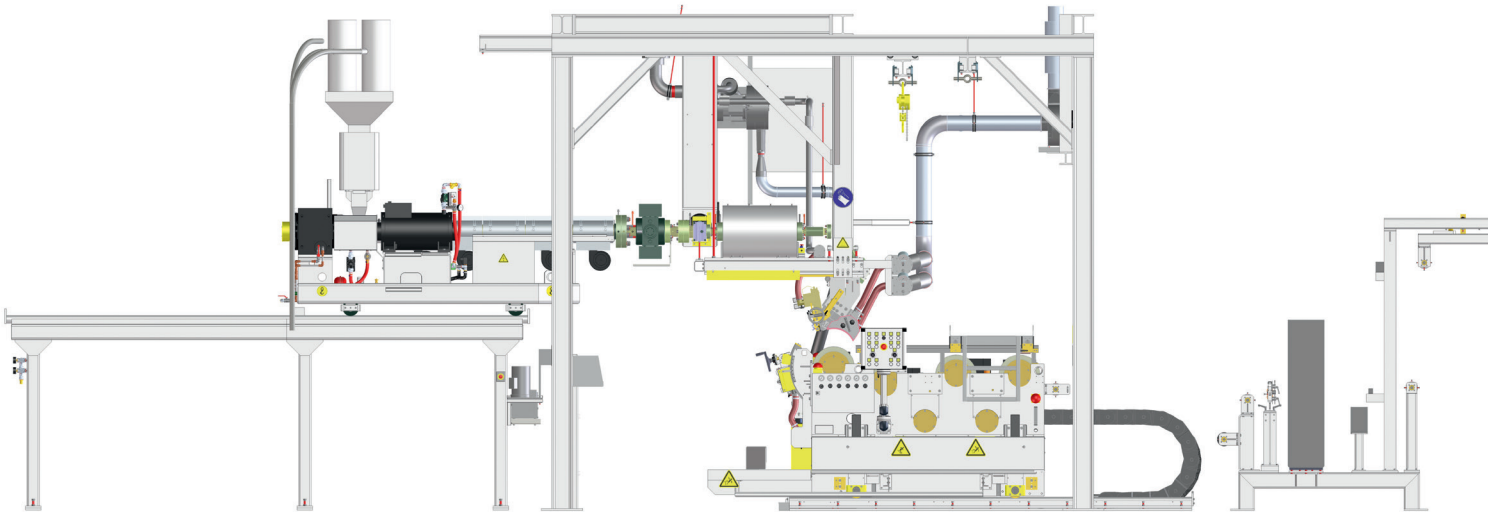
The market for lithium ion battery separator film is growing steadily, as the film is used in rechargeable batteries for mobile phones, laptops, e-vehicles and hybrid cars.

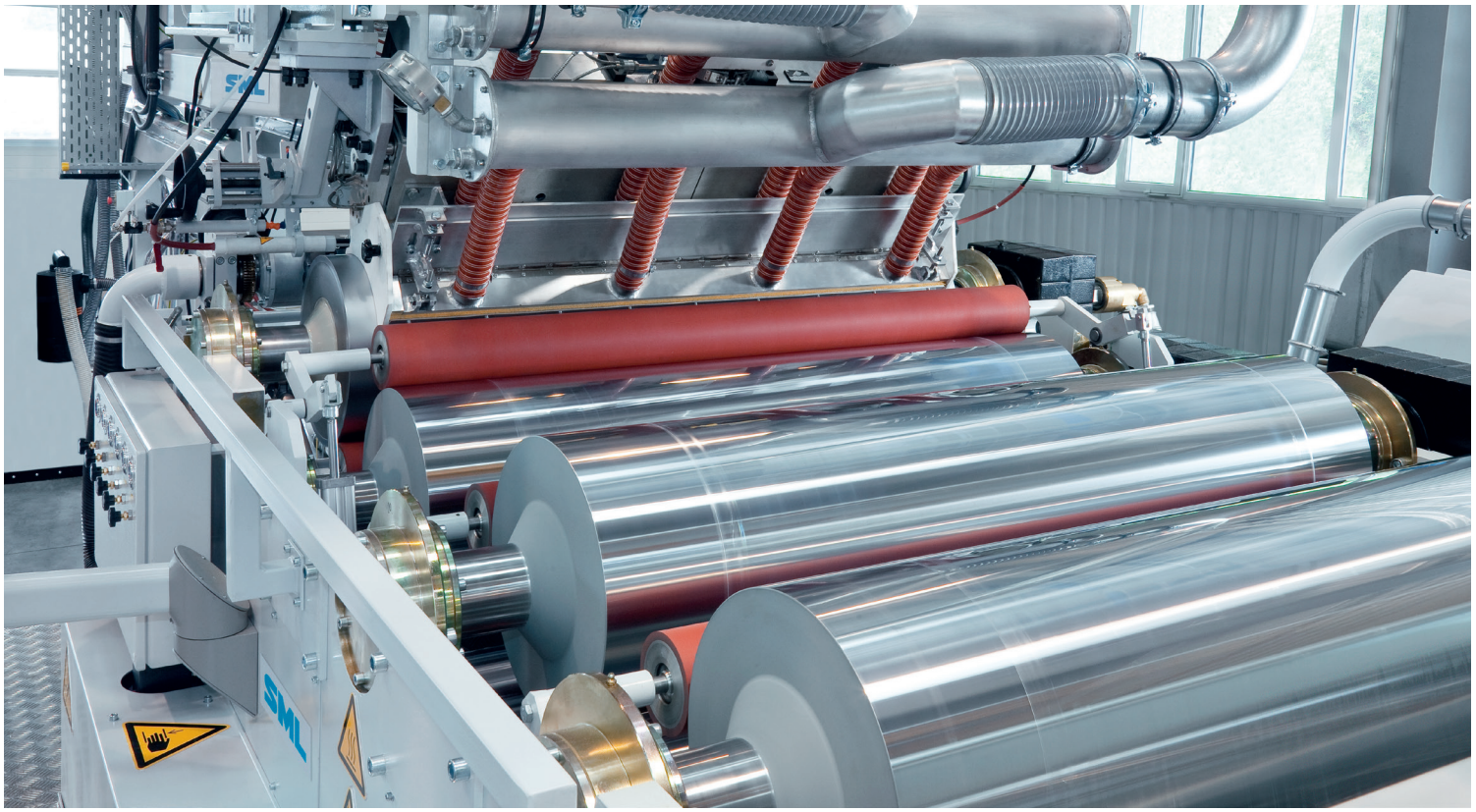
**The battery separator membrane is a microporous film that is inserted between the positive and the negative electrode in a liquid, electrolyte gel, or molten salt battery. Its function is to prevent physical contact between the positive and negative electrodes, while serving as an electrolyte reservoir to enable free ionic transport.**




Microporous membranes are characterised by their thickness (between 10 and 40µm), small pore size (<1µm) and low porosity (~40%). Either a dry or wet production process is used, both of which include an extrusion step to create a thin film and employ one or more orientation steps to generate the pores.

SML provides dry process extrusion lines for the production of mono-layer or co-extruded battery separator films.





## Extrusion

- Fully integrated extruder mounted gravimetric dosing system
- Single screw extruders or twin screw extruders
- Hydraulic piston filter, melt pump and disk or candle filter
- Inline die splitter for easy die cleaning
- Automatic coat-hanger-die or 3-layer-multi-manifold-die
- Double chamber vacuum box with two exhaust van

## Take-off and annealing station

- Electrostatic and pneumatic edge pinning system
- Airknife or softbox for film fixing
- 6 to 10 annealing and cooling rolls, individual driven and tempered
- Rubberised nip roll at each annealing and cooling roll

## Thickness measuring unit

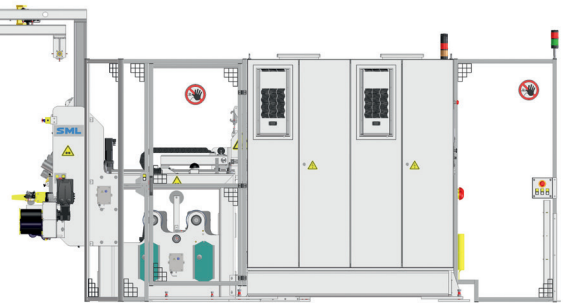
- Frame with beta sensor (Kr-85) or IR-sensor or x-ray-sensor
- Automatic profile control system
- Film inspection system

There are three main products on the market:

1. **PP-based mono-layer film**
2. **PE-based mono-layer film**
3. **PP-PE-PP three-layer film**

## Winder

- Fully automatic turret winder W1050
- Integrated edge trim cutting
- S-wrap for tension separation
- Ultra-light carbon-fibre dancer roll
- Contact and gap winding mode
- Low winding tension and low contact pressure adjustable
- Shaftless core clamping
- Cross cutting with twisting knife



## Future trends are moving in two directions.

The first involves a reduction in film thickness, which is necessary for small, high-capacity rechargeable batteries like those used in mobile phones. The second relates to extrathick separators, which are required for applications such as e-vehicles.

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