



EK-PACK FOLIEN
INNOVATIV-PRODUKTSCHUTZ

ProTec Polymer
Processing

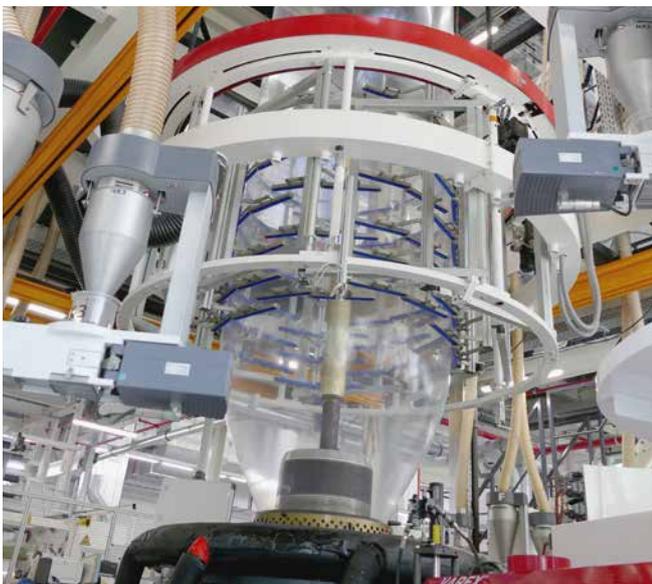
User report – EK-Pack Folien GmbH

Central materials conveying for blown film coextrusion – combining performance, fault tolerance, flexibility and energy savings

EK-Pack Folien GmbH was looking for an economical and flexible conveying solution for reliably supplying up to three tonnes of material per hour to three new blown film coextrusion lines. The solution selected was a centrally controlled vacuum system from one-stop shop supplier ProTec. This system is capable of reliably and promptly delivering more than thirty different materials to the extruders using around ninety supply lines. Further benefits include low energy consumption and ease of expansion.

EK-Pack, headquartered in Ermengerst-Wiggensbach/Allgäu, Germany, develops, manufactures and converts innovative composite films of up to nine layers for the foodstuffs, cosmetics and pharmaceutical industries. This family business, founded over forty years ago, boasts of being one of Europe's leading manufacturers of barrier films and, back in 2012, it decided to expand blown film coextrusion as part of an investment program. The plans included a new production shop with three manufacturing lines which were set to be installed in a number of stages. Peter Stober, EK-Pack's Technical Managing Director, was looking for a reliable, high-performance materials conveying solution for the new production shop.

This was a major challenge because it meant providing a flexible, reliable and constant connection between the many external silos and bins and the various extruders to meet varying requirements. As Stober explains: „A nine-layer film consists of up to thirty materials, all of which have to be transported from their source to each of the three coextrusion lines. This means we need a total of eighty to ninety pipelines and a conveying system with the flexibility to cope“



Left:
A nine-layer film consists of up to thirty materials ...



Right:
... which have to be transported from their sources to the coextrusion line.

Photos: ProTec Polymer Processing GmbH

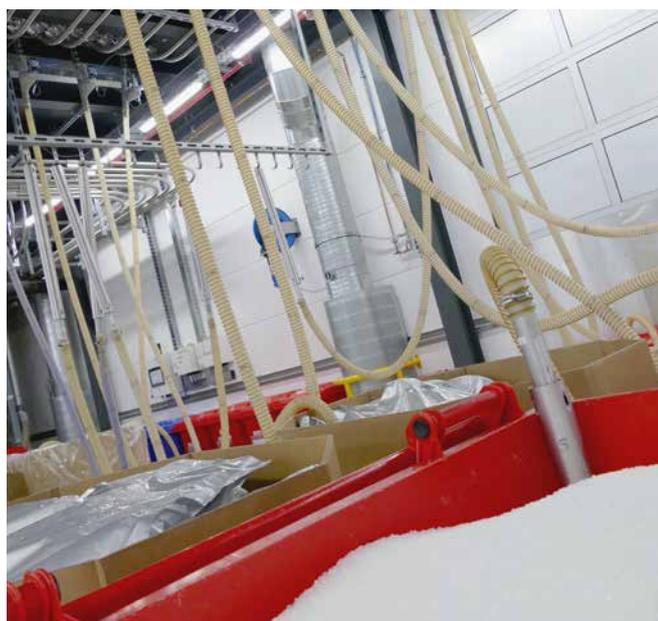
„We thought then and still do that ProTec’s design is the most economic and technically innovative solution. Moreover, we felt we were well supported and advised throughout the entire planning phase. Our wishes were addressed and appropriate solutions rapidly devised.“

Peter Stober, Technical Managing Director at EK-Pack Folien GmbH

High availability a key requirement

Reliability of the conveying system was of particular concern: „If there is any interruption in supply, restarting an extruder takes two to three hours, so there can be no pauses in material supply.“ After completion of the final stage of expansion, the aim was to be able to reliably handle a throughput of up to three tonnes per hour, while allowing quick and easy implementation of the intended expansions. The system was also intended to be easy to operate and maintain and to consume as little energy as possible.

In 2013, EK-Pack got into contact with ProTec Polymer Processing GmbH from Bensheim, near Darmstadt, Germany which has developed a central vacuum conveying system as an alternative to conventional multiple feed conveying. As a one-stop shop for the plastics industry, with a focus on injection molding, extrusion and blow molding, ProTec Polymer Processing has already delivered over a dozen such projects to Germany, Austria and Switzerland as well as France. Showcase projects include reliable, flexible and energy-saving full-scale industrial systems for up to 80 conveyors capable of handling throughputs of seven tonnes per hour and these were enough to convince the decision makers at EK-Pack.



In its latest stage of expansion, the system can reliably transport up to three tonnes of material per hour.

Foto: ProTec Polymer Processing GmbH

Working hand-in-hand with EK-Pack, ProTec’s experts designed a complete system with a central vacuum and an easily expandable modular structure. It consists of a central vacuum generator, stainless steel pipework, valve systems, a monitored coupling station, platforms with the suction conveyors and a controller. ProTec was also responsible for the complete installation, programming and maintenance of the materials conveying system, so Stober always had someone to turn to with any questions.

Central vacuum network beats multiple feed conveying systems

A central vacuum network lies at the heart of the system and has a number of advantages over conventional multiple feed systems, combining high levels of both performance and material availability with low energy consumption and low noise levels. All the suction conveyors are connected to a central pipework system which is permanently under a preset vacuum. When a material is required, the corresponding conveyor opens the appropriate line and the required quantity is directly conveyed without any need to wait for a fan to run up to speed.

Frequency-controlled vacuum pumps maintain the preset pressure, irrespective of the number of active conveyors. A number of materials can thus be conveyed without any waiting time. Fault tolerance is ensured by a redundant vacuum generation system which can also be switched in to handle peak loads.

2013 saw the commissioning in the new production shop of a 9-layer blown film coextrusion line supplied by Windmüller & Hölscher (W&H) from Lengerich, Germany with 31 hopper loaders and a capacity of one and a half tonnes per hour. EK-Pack uses this line to produce high barrier films up to 2.60 m in width which its customers process into products such as thermoformed trays for sausage, cheese or meat. The first stage of expansion came along in 2016 with the installation of a 3-layer blown film coextrusion line from W&H for producing PE films for conversion in house. It processes half a tonne of material per hour and is connected to a further 15 hopper loaders.

The expansion did not require any changes to the control system and materials delivery capacity. All that was required was to lengthen the vacuum line and to add a new platform with suction and conveying bins together with the appropriate lines for connection to the existing system.



Low energy consumption thanks to load-dependent vacuum generation

Since central vacuum generation is load- and demand-controlled, the conveying system has low energy consumption. Manfred Horsch, ProTec Sales Manager for the Germany, Austria & Switzerland region and the manager of this particular project, estimates that its power consumption is around 50 per cent lower than that of a comparable multiple feed conveying system.

Maintenance costs are also distinctly lower:

„In a distributed system, our thirty material sources would have required at least 15 pumps, all of which would have needed maintaining. And if one of them failed, the entire system would have come to a standstill“, says Stober.

While somewhat costlier to purchase, the central vacuum system with its multistage vacuum pumps is quick and efficient when all the extruders are drawing material at the same time. EK-Pack's Technical Managing Director is entirely satisfied: „We thought then and still do that ProTec's design is the most economic and technically innovative solution. Moreover, we felt we were well supported and advised throughout the entire planning phase. Our wishes were addressed and appropriate solutions rapidly devised.“



Central materials conveying ensures a quiet and dust-free working environment

The vacuum pumps were located on the first floor of the production shop away from the production area. This saves valuable production area and the exposure of the workstations to dusty, oily air and noise is distinctly reduced. Automatic central filters with a large effective area are built into the vacuum line to stop the pumps from drawing in particulates.

Raw materials are transported to the extruder in optimally sized stainless steel pipes. The layout of the pipework ensures gentle conveying, so avoiding the formation of angel hair on the material. As a result, even sensitive polyolefins can be transported without any problem over a distance of up to 100 meters between the external silos and the processing machinery.



Top:
The platforms with the suction conveyors are a vital component of the central vacuum conveying system.

Middle:
Two redundant frequency-controlled vacuum pumps maintain the preset pressure, irrespective of the number of active conveyors. A number of materials can thus be conveyed without any waiting time.

Bottom:
2013 saw the commissioning in the new production shop of a 9-layer blown film coextrusion line from Windmüller & Hölscher (W&H) with 31 hopper loaders, while in 2016 a further 3-layer blown film coextrusion line was added.

Process reliability ensured by monitoring of couplings

The conveying lines are connected to the material sources in a monitored coupling station. To avoid confusion during manual changeovers, the connections between hose and line are monitored by sensors. In addition, all the film formulations are stored in the controller, which is thus able to establish if the correct connections have been made and, if so, give the go ahead. If the connections are not correct, an appropriate error message is displayed and materials feed is stopped.

Communication between production and conveying systems by digital I/O signals

„One challenge was to ensure perfect communication between the W&H controllers and our conveying system“, explains Horsch. While the W&H controllers are based on a CAN bus system from B&R, ProTec uses the Siemens PROFIBUS system, which made connecting them together more complicated.

Smooth communication between the systems is, however, necessary so that any alarm messages generated by faults in the materials conveying system can be displayed directly on the display on the coextrusion system. „This makes life a lot easier in particular for staff working on night or weekend shifts“, says Horsch, „because staffing levels are often lower at these times.“

Close collaboration between ProTec and W&H quickly identified a simple solution: each of the systems had an additional I/O card installed, via which they can communicate with each other. Alarm messages are now displayed on both systems.

More projects in the pipeline

A further production shop, which is again set to make use of a central vacuum system from ProTec, is currently at the planning stage. EK-Pack's Technical Managing Director Stober is very pleased with the teamwork: „In a nutshell, the systems ProTec has installed run smoothly and faultlessly“. „The company has innovative ideas and communication is always uncomplicated and solution-focused. So we are looking forward to rising to our next challenge together.“



Peter Stober, Technical Managing Director at EK-Pack, can check on the display whether the right connections have been made between the hose and the line.

Photo: ProTec Polymer Processing GmbH

About ProTec

ProTec Polymer Processing GmbH is an international one-stop shop supplier to the plastics industry with a focus on injection molding, extrusion and blow molding. Its range of services covers components, solutions and turn-key systems for efficient materials handling, treatment and recycling of plastics and for manufacturing long fiber reinforced thermoplastics using LFT pultrusion lines. Managed by Peter Theobald and Dirk Egemann, the company has some 120 staff and is based in Bensheim, near Darmstadt, Germany.

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