Sustainability with Vision

RKW and Nordson are taking steps to prepare for the future by enabling producers to process blown film with high recycled content

Sustainability is becoming increasingly important for plastic products, and this message has been reinforced by both the EU and state governments through new laws, regulations, and charges. Virgin material used in packaging products will be subject to country-specific fees ranging from 0.23 to 0.45 Euros per kilogram of packaging material. These changes in EU packaging laws are aimed at promoting the circular economy in the plastics industry.

The new regulations pose a significant hurdle for film producers. They must rapidly modify their film production to accommodate a large volume of recyclable materials.
However, this challenge can be advantageous for those who are well-prepared. At RKW in Echte, Germany, the use of recyclable materials has been a topic of discussion for quite some time. "We have been using recyclables in our films for many years," explains Thomas Steffen, an Application Engineer at RKW. "These films are subsequently used in products where quality standards can be met through recycled material."

Efficient filtration is crucial when using recyclates to maintain the quality of the end product. Melt filters have been utilized in blown film lines for many years, but in the past, these filters were mostly discontinuous, requiring the line to shut down for a screen change. "In processes with clean virgin material, this is not a problem," says Stefan Wöstmann, process engineer at Nordson BKG, "the filters here take on a purely protective function and ensure that no loose screws from the material feed or other transport contaminants get into the process. But the degree of contamination is so low that screen changes are rarely necessary."

Compensating Material Quality Differences

By using more recycled material, the process needs to handle an additional component with much impact on the final product. „The quality of the recyclate containing dirt particles fluctuates significantly. Thus, we cannot guarantee that the quality of the final product is always the same. We needed to enable ourselves to react flexibly to varying levels of contamination, „says Sven Pastrik, Manager of Extrusion at RKW in Echte.

Fig. 1: Thomas Steffen (RKW), Sven Pastrik (RKW,) and Stefan Wöstmann (Nordson) with a continuous BKG® NorCon™ K-SWE

As a first step, continuous screen changers were implemented. These filters allow operators to change screens without interrupting production and adjust screen fineness for different production batches based on quality requirements. "As a result, we have significantly fewer machine downtimes, and the

productivity of our plants has increased significantly," reports Sven Pastrik. "We can compensate quality differences in the material very well and process high proportions of recyclate, for example, in our FFS bag production."

The use of recyclate in **RKW ProVent plastic bags**, commonly used in the construction and chemical industry for packaging powdery goods, is becoming more prevalent and continues to increase. "Here, it is essential that the protective and barrier properties are guaranteed and that no dust, dirt, or moisture can penetrate," explains Thomas Steffen. "We inspect our films with optical systems before further processing. But for us, finding defects is not a strategy; the goal is to prevent them altogether. We knew that the proportion of recycled material would keep increasing and that we would have to redefine the filtration process when designing a new 5-layer line."

Fig. 2: RKW ProVent plastic bags

The goal was a system in which high-quality films could be produced in a continuous, automated process. "We needed a plant concept with fast setup and changeover times. We don't want to deal with screen changes and thus line downtimes often and for a long time, but rather ensure an extrusion process that is as uninterrupted as possible."

RKW had a positive experience with Nordson® BKG® screen changers, leading them to approach the filter manufacturer again. Their new five-layer plant is now equipped with continuous BKG screen changers and has been running successfully since 2021. "We are very satisfied with the performance of the system. Thanks to continuous filtration, we produce high-quality films with high recycled content in an uninterrupted process and can cover a wide application window," explains Sven Pastrik.

At RKW and Nordson, they were certain that the development must go further. "The use of recyclates will continue to increase in the future," explains Stefan Wöstmann. "The EU's Green Deal and national packaging laws are massively increasing the pressure and forcing system - and component manufacturers - to act."

The Solution: An Innovative Backflush Screen Changer

To expand the application window and process higher proportions of recyclate and prospectively even highly contaminated materials, e.g., from the yellow bag, without compromising quality, a screen changer with backflush function has now come into play. "We are already seeing that the backflush technology enables the use of recyclate from the PCR area," explains Sven Pastrik."

"Melt filters without a backflush function reach their limits when processing recycled material. The degree of contamination is high, and the screens become clogged quickly," explains Stefan Wöstmann. "Screens are expensive, and changing them is time-consuming. Backflushing repeatedly clears the screens of contaminants and deposits, so manufacturers need fewer filter elements, and operators have to change screens less often."

It was necessary to adjust to the conditions to achieve optimal results in blown film lines. Since the film bubble is sensitive to changes in temperature, viscosity, and pressure, even minor deviations can negatively impact the final product. Adding recyclates to the process can make it even more challenging. Pressure fluctuations during screen changes, backflushing, and deaeration can significantly reduce film quality or cause downtime. To address this issue, Nordson collaborated with equipment manufacturer Windmöller & Hölscher to develop the Nordson® BKG® HiCon6 K-SWE-HD/RS backflush recycling filter. This new filter is specially designed for blown film lines and has a compact design suitable for tight spaces.

Fig. 3: Stefan Wöstmann (Nordson) and Sven Pastrik (RKW) with the continuous BKG® HiCon™ K-SWE-HD/RS backflush recycling filter

Eliminating Even the Slightest Pressure Fluctuations

Maintaining constant pressure is crucial for a successful operation of a blown film line. Any material withdrawal for screen changes or backflushing can result in a balancing act in this area of tension. Hence, it is imperative to avoid pressure fluctuations through intelligent solutions in the high-pressure range. Each screen change in the filtration process is a sensitive step since the empty cavity must be refilled with melt after the change. If this is done too quickly, it can lead to pressure fluctuations and quality issues. "This is a major problem with blown film lines, as the film is usually very thin and sensitive to such changes," explains Stefan Wöstmann. "The BKG HiCon K-SWE-HD/RS is equipped with the patented melt pressure-controlled venting start, which fully automates the filling of the screen cavity after the screen change and thus ensures maximum pressure consistency. In addition, filling is so sensitive that no air pockets endanger the process or the end product. Manufacturers can rely on a stable process and high blown film quality."

The new BKG HiCon K-SWE-HD/RS was provided to RKW as part of a user test and installed in a 3-layer plant. "The start-up was a complete success. We installed the screen changer and produced film successfully immediately; our machine operators were thrilled," reports Sven Pastrik. "The handling of the screen changer is simple, and due to the high degree of automation, we only have to intervene minimally in the process," explains Detlef Nolte, machine operator. "The fact that a newly developed machine was installed in one of our lines without any complications and then works so well directly is quite remarkable. In addition, it is immediately apparent that the experience gained from the initial joint project has been directly incorporated into the new screen changer."

Meeting Future Challenges

RKW and Nordson plan to continue working together long-term to meet future challenges. "The shift from virgin material only to recycled material is huge. With the BKG HiCon K-SWE-HD/RS, we offer blown film producers an efficient tool to achieve this goal," says Christian Schröder, Global Segment Manager Recycling at Nordson. "With this machine, we are helping to make plastic packaging more sustainable. We are proud of that."

RKW also made a strong commitment to sustainability. Recycling is considered a crucial component of this commitment. Each site has recycling facilities that process internal and external production waste into high-quality recyclates. The company is dedicated to investing in new technologies to further this effort. Sven Pastrik explains, "Our goal is to increase the proportion of recycled material used, depending on the specification, and also incorporate PCR material. We are fortunate to have filtration experts on our team to help achieve this goal."

Blown Film With High Recycled Content | Nordson BKG® HiCon6 K-SWE-HD/RS | Nordson Polymer Processing Systems

Nordson BKG® HiCon6 K-SWE-HD/RS Recycling Filter

About Nordson Corporation

Nordson Corporation is an innovative precision technology company that leverages a scalable growth framework through an entrepreneurial, division-led organization to deliver top-tier growth with leading margins and returns. The Company's direct sales model and applications expertise serves global customers through a wide variety of critical applications. Its diverse end market exposure includes consumer non-durable, medical, electronics, and industrial end markets. Founded in 1954 and headquartered in Westlake, Ohio, the Company has operations and support offices in over 35 countries. Visit Nordson on the web at www.nordson.com, www.twitter.com/Nordson_Corp, or www.facebook.com/nordson .

About Nordson BKG GmbH

Preparing and shaping polymer melt – that is what we do at Nordson BKG (part of Nordson Polymer Processing Systems). It almost does not matter which product is manufactured; it is always essential that the used polymer is clean and well mixed. We ensure that the polymer melt has the right pressure, reaches the components at the right place and time, and is cut into perfect pellets in a smooth and sustainable process.
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About RKW Group

The RKW Group is an independent family-owned company headquartered in Mannheim, Germany, and one of the world's leading manufacturers of sustainable film solutions. RKW is the market leader in the areas of hygiene and agricultural films, films for the beverage industry and packaging for powdery goods. Moreover, the company also supplies films for the chemical and processing industries as well as for the construction sector. The RKW Group's innovative plastic-based films enable its customers to improve the daily life of consumers all over the world. RKW employs approximately 2,800 people at 18 locations worldwide.
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