

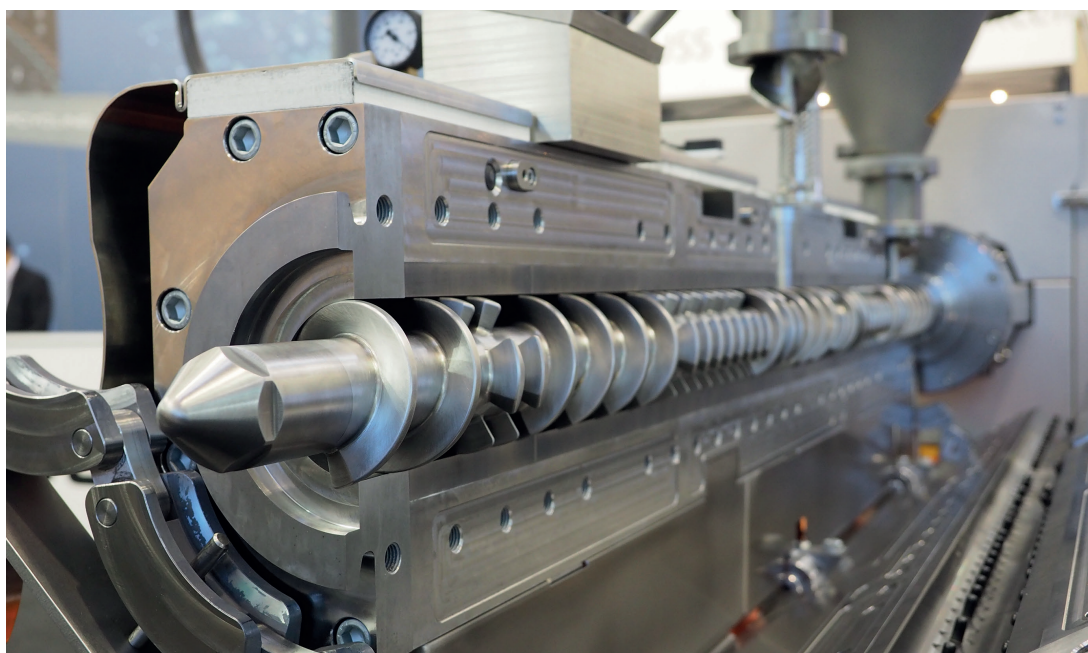
Hardware and Software Solutions for Extrusion

Perspectives for the Future

Manufacturers of extrusion lines are facing up to current challenges with a wide range of solutions, from processing of recyclates to new products in the field of digitalization. At K, they demonstrated what trends will become important in the future. In addition, many machine makers were able to go the extra mile in improving the energy efficiency of their machines. In this article, the *Kunststoffe* editorial team has summarized some highlights of K 2022.

Compounding system from Buss: the co-kneader Compeo 88-18F with a screw diameter of 88 mm has a throughput range of up to 850 kg/h.

© Hanser/Schröder



For almost all manufacturers in the field of extrusion, digitalization plays a major role: the machine monitoring is designed to avoid downtimes and identify the maintenance requirement at an early stage. For this purpose, many parameters are continuously recorded to provide information about the state of individual parts and entire assemblies of a machine or system.

Process Control Made Easy

At K 2022, KraussMaffei, with Pioneer ProcessControl, presented a system that ensures constant high productivity and quality, independently of the operator (Fig. 1). "Because of the technical staff shortage, companies are increasingly finding it difficult to obtain qualified technical personnel. That is why, with our new Pioneer ProcessControl, we are focus-

ing on simple and clear operation", says Xiaojun Cui, Executive Vice President for New Machines at KraussMaffei. The core features of the new interface are so-called "wizards," which give the operator step-by-step instructions for particular operations, such as the start-up or shutdown of the entire system. Every operator receives the necessary information precisely at the right time. In addition, he can store his experience in the system so that others can profit from it. This allows a less experienced employee to take control of a complex extrusion process. Operating errors are reduced, which results in fewer downtimes and therefore greater production efficiency.

Flexible Compounder Series

At the center of all the systems supplied by Buss is a co-kneader of the Compeo

series, which is designed to mix considerable amounts of additives gently and thoroughly into base materials (Title figure). The modular machine concept is so flexible that a specially configured compounding line is available for each application – for all temperature ranges up to 400 °C and for all plastics, from temperature-sensitive thermosets through to challenging engineering thermoplastics.

The five production sizes with throughputs from 100 to over 12,000 kg/h are now complemented by a new compact and user-friendly Compeo LAB laboratory compounder with throughputs from 50 to 100 kg/h for development, process optimization and small production campaigns. It offers all the advantages of the large co-kneaders, including the combination of two-, three- and four-flight screw

elements, and permits precise and reliable scale-up of process parameters to production.

Injection Systems for Throughputs up to 100 t/h

Because of the recent takeover of AMN in France by the Maag Group, a complete AMN central injection system (CIS) was presented at the K show, consisting of a 1500 mm diameter die plate, a central water injection and sword-shaped knives (**Fig. 2**). The CIS was developed to improve pellet cooling and ejection. It is an effective solution for polymers with high melt flow index or peroxides.

The aim is to protect the cutting face against rapid wear and to permanently improve pellet quality. The die plates stand for high quality and achieve throughputs up to 100 t/h. By using high-strength materials instead of surface treatment, the die plate achieves a lifetime up to 30 % longer, according to the manufacturer.

Blow-Through Rotary Valve for Powder

The eye catcher at the Coperion booth was the ZXQ 800 high-pressure blow-through rotary valve, which offers a high conveying rate thanks to the large inlet with no reduction in cross-section (**Fig. 3**). The rotary valve, which ensures gentle, reliable and economical handling of powders and pellets, features particularly low gas leakage rates and was specially



Fig. 1. The Pioneer ProcessControl from KraussMaffei makes process control easy even for less experienced employees.

© KraussMaffei

developed for feeding into pneumatic conveying up to 3.5 bar. Thanks to its high performance, it is very suitable for the high-throughput production of polyolefins, which are planned for the future. In addition, the ZXQ 800 ensures optimum chamber emptying with low pressure loss, according to the manufacturer.

Roll Stack Operates at Speeds up to 120 m/min.

At the battenfeld-cincinnati booth, the highlight was a multitouch roll stack (**Fig. 4**). The principle of multiple roll gap and long roll-film contact has become established in many applications for manufacturing stress-free films and sheet. The horizontal roll stack is suitable, in particular, for laminated films, such as mono- or multilayer films for the dairy industry. The line for manufacturing thin

polypropylene films polished on both sides features a power of up to 1200 kg/h and speeds up to 120 m/min. and offers several special features. The roll stack is designed for a thickness range from 200 to 2000 µm. To allow, in particular, thin films to run reliably it is necessary to precisely check the position at which the melt comes into contact with the rolls. Furthermore, the size of the kneading in this thickness range is of crucial importance. This was solved by the fact that the nozzle is disposed vertically above the roll stack, allowing the roll stack position to be precisely adjusted. The setting is therefore very variable and can be precisely adapted to the specific requirements.

The Multitouch is not only suitable for manufacturing 3-layer films, but can also be used for laminating functional films.

Energy Savings with Induction Principle

A focus at the Bausano booth was the Smart Energy System with induction coils, which was registered for a patent in 2022 (**Fig. 5**). In contrast to con-



Fig. 2. The AMN cutting head system with central water injection from Maag ensures permanently high pellet quality. © Hanser/Schröder

Info

Digital Version

A PDF file of the article can be found at www.kunststoffe-international.com/archive

German Version

Read the German version of the article in our magazine *Kunststoffe* or at www.kunststoffe.de



Fig. 3. The ZXQ 800 high-pressure blow-through rotary valve from Coperion was developed for high-throughput systems.

© Hanser

ventional resistance-based systems, the barrel is heated contactlessly by means of an alternating electromagnetic field: a faster and more efficient method intended to ensure peak performance by reducing the wear of the components and energy consumption by up to 35 %. In Düsseldorf, Germany, the Smart Energy System could be seen both on a Nextmover series twin-screw extruder and on the new E-GO R single-screw extruder, which is intended for plastic recycling.

The Smart Energy System consists of forced-cooled induction coils with special openings for air circulation and the installation of the temperature sensor. The spool is encased in highly thermal insulating materials to minimize the barrel heat loss. In addition, the special internal structure transfers the cold air directly to the extrusion barrel, where it is cooled faster than in resistive systems.

Extruders for Recyclate Processing

At K, Leistritz Extrusionstechnik placed its employees at the center of its trade show presence. On the central stage at the booth, the experts reported on successfully completed customer projects from the field of extrusion technology and recyclate processing. This included the production of bio-based wine corks or PCR floor coverings.

Christopher Helms, Head of Engineering at Leistritz, explains: "The combination of materials for flooring is a complete new development by our customer. It is based on minerals and PP recyclate. Since the use of recyclates in high-quality applications is gaining increasing popularity, we have optimized our plant

and process technology to these requirements. We can see a clear advantage in the technology of our ZSE Maxx extruders for material recycling. The material is very efficiently mixed, but only sub-

jected to low stress. A benefit for recycling is also the high degassing performance of the twin-screw extruders. In addition, the surface renewal, which is many times better than single-screw extruders, permits efficient odor reduction and dehumidification of the melt."

The ZSE 60 iMaxx could be seen live at the booth. This adds another machine size to the iMaxx series. The series is characterized by its flexibility and modularity. The applications cover all plastic extrusion and recycling options. Because of the high specific torque of up to 15.0 Nm/cm^3 , in conjunction with a high free volume ($\text{Da/Di} = 1.66$), the ZSE Maxx machines are among the most powerful co-rotating twin-screw extruders, according to the manufacturer. ■

Susanne Schröder, editor

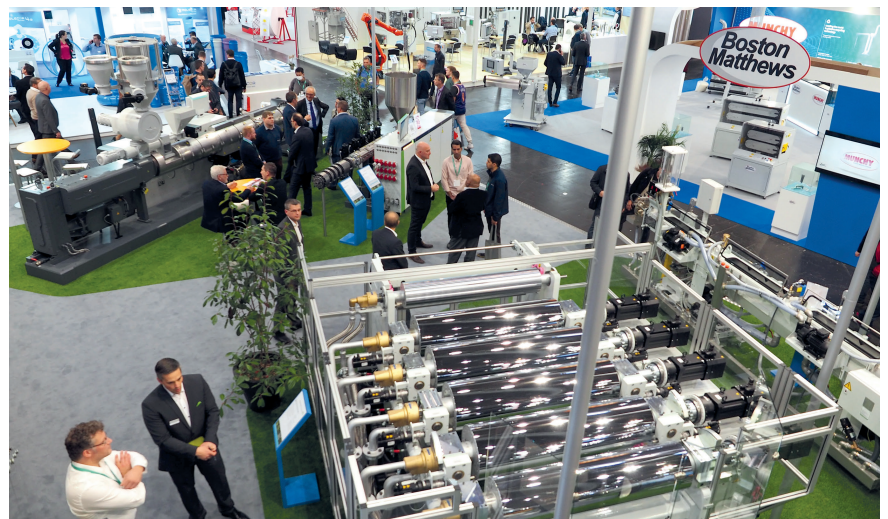


Fig. 4. View of the battenfeld-cincinnati booth: in the foreground, the horizontal multi-touch polishing stack for manufacturing polished thin film with an output of up to 1200 kg/h can be seen. © Hanser/Schröder



Fig. 5. Bausano applied for a patent in 2022 for its inductive Smart Energy System.

© Hanser/Schröder