

Greater Extrusion Flexibility

An Eye for Details to Improve Efficiency

The selection of extrusion products at the K 2016 trade fair ranged from new equipment concepts over flexible tool systems to software for equipment networking and process monitoring.

The innovations presented at this year's trade fair are the result of consistent further development and detailed optimization. Current requirements such as resource efficiency, the networking of system components between each other and improving the usability of systems played an important role here.

Inline Production of Test Specimens

The system concept from **Brabender GmbH & Co. KG**, Duisburg, Germany, is entirely novel in the market. The SpecIMold (Fig. 1) combines the running compound-

ing process with an integrated unit for test specimen production using injection molding. This makes it possible to produce test specimens during the compounding process without melting and thereby thermally stressing the test material again. The test specimen therefore reflects the properties of the raw material from production. As a result, the system is suitable for material testing and quality control, with time savings thanks to the significantly shorter test specimen production process and reduced material costs.

The system is used in a classic compounder line between twin screw ex-

truder and extruder head. The extruder plasticizes and homogenizes the plastic type being processed and conveys the melt through the SpecIMold block before it is cooled in a water bath through the extruder head and broken up in the granulator. A piston and nozzle as well as a tool for producing the test specimen are integrated in the heated SpecIMold block. The two mold halves are closed using a toggle lever mechanism. A chamber next to the flow channel is slowly filled during the ongoing extrusion process with subsequent injection into the heated tool for test specimen production.



Fig. 1. Setup of the SpecIMold (© Brabender)

Faster Product Changeover

The company **KraussMaffei Berstorff GmbH**, Hanover, Germany, presented a broad product portfolio at this year's trade fair. Extruders for various applications were on display in addition to tools such as the QuickSwitch technology (Fig. 2) for fully automatic dimension changes in tube extrusion. A combination of two series KMD 108-36 E2/R twin screw extruders is used for the production of PVC tubes. This system sets itself apart with a small footprint and a throughput rate of 2000 kg/h. A processing system for recycled materials that keeps gaining in importance was presented as well: the KMD 73 K/P corresponds to a twin screw extruder with conical screw arrangement, space-saving design and flexible application.

The QuickSwitch technology helps to improve economic efficiency in tube extrusion. Especially for small orders, the amount of waste using a conventional system can quickly be close to the order volume itself due to a tube diameter change. QuickSwitch handles the change-



over process in around 10 min, merely producing a cone section with a length of 4 to 6 m. The system therefore promises short changeover times, low scrap rates and high flexibility. Compared to a conventional tube line, it is intended to reduce changeover costs by up to 90% and storage costs by about half.

The maximum version now enables automatic dimension changes from 280 to 500 mm in diameter and therefore expands the range of the predecessor model, which incrementally covered 25 to 450 mm. Core components of the new technology include the tube head and calibration basket. The tube head consists of a conical nozzle set and an adjustable pin. The dimensions of the molten tube are specified with the pin and nozzle, and adapted by a vacuum in a downstream suction bell. With the suction bell, the molten tube coming out of the tube head is widened to the desired calibration diameter provided the diameter of the molten tube is greater than the nozzle diameter at the tube head. The most important system component for automatically changing the tube diameter is the calibration basket, which automatically adjusts to the desired diameter. Networking the components with each other meets Industry 4.0 requirements as well: all downstream units integrated into the control unit are automatically changed over at the same time, and no readjustment is required. All production parameters can be monitored and documented as well.

KraussMaffei Berstorff also produces tools for the extrusion of polyolefin and PVC multilayer tubes on the basis of filled formulations and multifunctional layers. In addition to the KM-5L RKW 01-40 five-layer tube head that supports the production of PO tubes with a diameter between 8 and 40 mm, a revised version of the KM-3L RK 42 three-layer tube head for the production of PVC tubes with optimized installation and handling was presented at this year's trade fair. The tool covers diameters from 75 to 200 mm and is at the top of the performance range with a throughput of 800 kg/h. A distributor block integrated into the tube head ensures an exact layer thickness distribution on the one hand and short dwell times of the melt on the other hand. Gentle material processing is therefore possible.



Fig. 2. Representation of the calibration basket for the QuickSwitch technology (© KraussMaffei)

Faster and More Efficient Material Changeover Processes

Windmüller & Hölscher KG from Lengenich, Germany, presented the Turboclean automation module using the production of a 5-layer film with the Varex II blown film line as an example. It sets itself apart with machine intelligence that supports the required material changeovers and thereby increases the productivity of the system. The module is intended to perform the changeover process in less than one third of the usual time, opening up great potential for increased productivity. This is made possible by automated and parallel process steps. All relevant processes required for this are integrated into the machine. The intuitively designed Procontrol user interface guides the user in starting the

changeover process. Turboclean then merely prompts the operator to switch the suction lance from one raw material container to the other. After this step, the automation module performs the entire changeover independently. An intelligent control algorithm together with the automatic cleaning of the gravimetrics and vacuum conveyors handles the rest. This is intended to reduce the time for order changeovers to around 30%, simultaneously increasing the time available for production by up to 6%. A changeover on a multilayer line can therefore be reduced from 40 min to 12 min.

One System for all Applications

Since the digitalization of production processes is considered a key factor »

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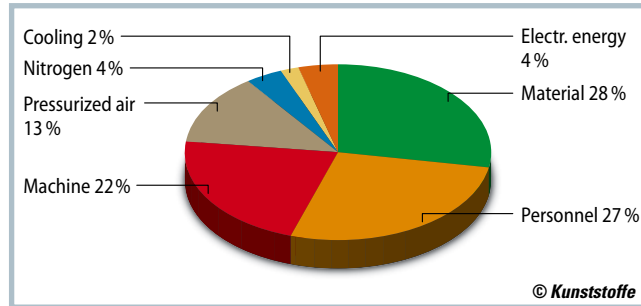


Fig. 3. Production costs per component produced: data measured and visualized online provide information about current production costs (source: SHS plus)

for maintaining competitiveness, it is increasingly taking center stage for manufacturers. Here the production parameters that are recorded not only have to be stored but also used for analysis and optimization. This issue is addressed by the **SHS plus GmbH**, Oberhausen, Germany, that presented its new PlusMeter measuring unit. It supports the recording, storage and evaluation of process data for all machines in a production facility and for all facilities centrally. Measurements such as the melt pressure and temperature as well as electrical energy flows, compressed air flow, coolant water and cooling performance along

with other substance and energy flows in production can be recorded. Automated analyses can be set up intuitively using the corresponding software (**Fig. 3**).

Conclusion

Manufacturers are clearly meeting the requirements of their customers for more efficient and flexible systems. These requirements can be met by improving details of existing products and also with entirely novel concepts, which is reflected by a positive prevailing mood in the industry. ■

TPT Golf Shaft

New Composite Tube Manufacturing Process

North Thin Ply Technology (NTPT), Rens, Switzerland, has launched a unique new composite tube manufacturing process. The patent pending process effects a unique fiber placement capability that has enabled the first real major technological development in golf shaft manufacturing since the mass adoption of graphite golf shafts in the 1980s.

TPT Golf shafts are manufactured using NTPT's Thin Ply Technology lightweight prepreg plies in combination with the new manufacturing process. The result is a perfectly centered and near homogenous shaft giving golfers greater stability during their swing and a better feeling impact that imparts lower spin to the ball – resulting in higher yardage and a lower shot dispersion. The micro-structure of a thin ply laminate results in higher mechanical properties. Within a golf shaft, or any other tubular product, the

use of thinner plies offers nearly unlimited options for fiber angles and fiber type combinations. NTPT's novel process ensures that each of the carbon plies are laid concentrically, resulting in a symmetrical shaft (or tube) with no spine, unlike the traditional table rolling production methods that have dominated the golf market until now.

The process also enables a precise control over the ratio of longitudinal plies to off axis plies along the length of the shaft. The resulting uniformity of wall thickness and control of fiber alignment provides a smoothly changing flex profile exactly matching the specific design.

NTPT's novel composite tube manufacturing process sees its first commercial application on the golf course but the overall potential of this innovative manufacturing technology is considerable. Automotive drive shafts, aircraft struts, wind-



The NTPT technology and TPT Golf shafts have already been adopted and endorsed by leading names within the sport (© NTPT)

surf masts, as well as other sports equipment shafts and frames are just a few example applications with the process being ideal for any tubular structures where weight, performance and cost are critical factors.

To the manufacturer's product presentation:
www.kunststoffe-international.com/2328378