

**PIPE AND PROFILE EXTRUSION.** "Turn the crisis into an opportunity" is an often-heard statement in times of economical upheaval. In fact, such times are almost ideal for repositioning the company in the market or increasing a company's market share. A prerequisite, of course, is to have products that meet the demands of the market.

## Output Assured

"The K2010 must bring a change" – that was the opinion of many industry experts in the not-so-distant past, even while manufacturers of pipe and profile systems reported sales declines of well over 30 % in recent months. But the economic upturn did not take as long as expected. In the meantime, the order books are well-filled again and the VDMA even envisions the possibility of double-digit growth rates for 2010 and 2011 – high expectations that can only be met through innovation and efficient solutions. This is indicative of interesting trends that point the way to the future.

### battenfeld-cincinnati „The Green Pipe“

battenfeld-cincinnati, Bad Oeynhausen, Vienna, Austria, will be exhibiting a new parallel twin-screw extruder series. This is the first joint development after the merger of Battenfeld Extrusion Technology and Cincinnati Extrusion. An extruder generation will be introduced that has been optimized primarily for processing of PVC and is supposed to offer increased output together with improved energy efficiency. With a processing length of 34 D and four models with screw diameters from 78 to 135 mm, the new parallel counterrotating twin-screw extruders offer throughputs of 100 to 1,000 kg/h for PVC profile production. Compared to previous versions from both companies, this represents an increase of

around 25 %. Furthermore, low-maintenance, self-optimizing screw core temperature control and insulated barrel segment that ensure energy-efficient production are standard on the extruders. The general-purpose basic screw geometry has a longer pre-heating zone, which provides very gentle treatment of the material.

lowers the melt temperature to already be reduced in the pipe head.

Up to 45 % of the cooling stage length can be saved by using the KryoS pipe head (**Fig. 1**). This is designed for optimum melt distribution based on spiral distributors. The melt is divided into layers and cooled "internally" using a closed temperature control circuit between the layers. In

of cooling water, but instead by supplying cooling water to the last tank and then routing the water from tank to tank against the extrusion direction. While with a conventional approach for an extrusion line with four cooling tanks a total of about 20,000 l of cooling water would be circulated per hour, the new system gets by with 2,500 l/h. By routing the cooling water from tank to tank, the water is warmed significantly by the time it reaches the first tank, which in this solution is absolutely desirable. On the one hand, much of the cooling can be achieved through free cooling; on the other, the waste heat can be used for a low-heating system in the processing plant, for example.

► Hall 16, booth B19



**Fig. 1. Melt cooling already in the die** (photo: battenfeld-cincinnati)

In addition, the Green Pipe concept will be presented for the first time. This encompasses three ways by which the line length and energy costs of a pipe extrusion line can be reduced. Use of a pipe tool with Efficient Air Cooling (EAC) can achieve a reduction of the pipe cooling stage by 25–30 %. The system, which can be retrofitted, cools the pipe additionally and effectively from the inside by means of an air stream flowing opposite the extrusion direction. The extrusion die is also cooled through use of directed air streams. This al-

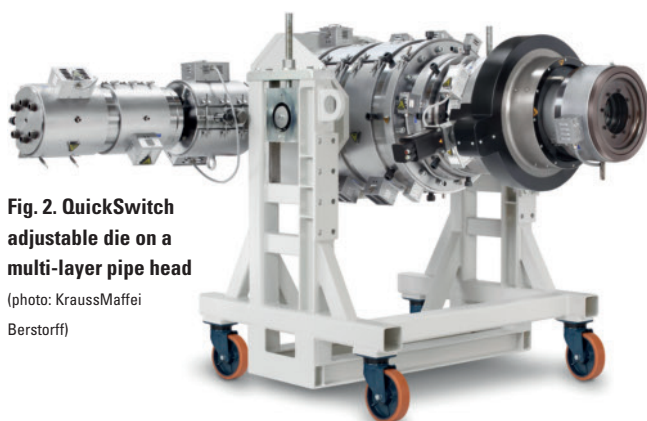
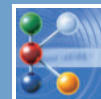
this way, the "bottleneck" of low thermal conductivity can be reduced, especially when it comes to thick-walled pipe. The melt temperature at the outlet of the pipe head is again reduced significantly with respect to EAC.

With the next-gen concept, developed jointly with the Austrian company Poloplast GmbH & Co. KG, Leonding, and the Technical University of Vienna, Austria, the energy needs of the cooling section can be cut nearly by half. This is achieved by not every tank having a direct supply

### KraussMaffei Berstorff New Pipe Dimensions

In pipe extrusion, material costs play a crucial role. Accordingly, KraussMaffei Berstorff, Munich, Germany, offers a number of processes that can reduce material consumption. With the QuickSwitch extrusion system, the diameter and wall thickness of the pipe can be changed in minutes, without interrupting production (**Fig. 2**). A newly developed adjustable die makes the process even more flexible. Until now, the QuickSwitch pipe heads for polyolefin processing were equipped with a moving mandrel and a fixed die. This principle has now been modified so that the die can be adjusted, while the mandrel remains in a fixed position. As a result, the new adjustable die can easily be combined with conventional standard pipe heads, so

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**Fig. 2. QuickSwitch adjustable die on a multi-layer pipe head**

(photo: KraussMaffei Berstorff)

that even existing extrusion lines can be upgraded much more easily.

The use of fillers represents a further possibility to reduce the cost of materials in pipe extrusion. In order to incorporate fillers into polyolefin pipe, the company offers the direct extrusion concept. Here, the raw materials are compounded and formed into the finished pipe in one step. In contrast, for pipe used in non-presurized applications, material savings can be achieved by foaming. For this approach, the company offers pipe heads from the KM-3 LRK 4X series that are designed specifically for PVC foam core pipe. By foaming the middle layer, the material costs can be reduced by up to 25 %.

An extrusion system for the production of smooth-walled PE-HD pipe with a diameter of up to 2,400 mm will be introduced. It is based on the time-tested 36 L/D barrier screw technology in combination with a spiral mandrel and matching calibration and cooling equipment. Extrusion of such large pipe, three extruder models with 105, 125 and 150 mm diameters come into consideration. Thanks to the low melt temperature, the sagging effect is minimized. In the pipe

head, the melt is pre-distributed gently through several holes and transferred to the spiral distributors specifically designed large-diameter pipe extrusion. The die set can be pre-adjusted manually. Several oil-based temperature control circuits in conjunction with segmented heater bands assist the subsequent fine tuning of the wall thickness.

► **Hall 15, booth C24**

## Weber Increased Throughput

The new NE High Performance NE 6.40D, NE 7.40D (**Fig. 3**) and NE 9.40D extruders with grooved feed zones will be the highlight at the booth of Hans Weber Maschinenfabrik GmbH, Kronach, Germany. The concept incorporates new screw technology as well as a newly designed grooved feed zone, among others. This achieves a 35 to 40 % higher output compared with previous NE extruders. This increase in output is associated with a lower melt temperature and reduced specific energy consumption. All extruders in the new

NE series are powered by a synchronous or asynchronous three phase motors. These are coupled directly to the gearbox without a belt drive. The new versions of the ES 80 and ES 100 single-screw extruders have also been equipped with new drives that achieve considerably higher screw speeds. When used with a matching screw geometry, up to 50 % higher output than that of the predecessor models as possible when processing engineering plastics.

The Weber CE 8 and CE 8Z (coextruder) conical twin-screw extruders are being exhibited with an eye on window profile extrusion. Here there is a growing demand for larger add-on extruders in a piggyback arrangement above the primary extruder. This is the reason for the redesigning of the previous CE 8, which is now available as both a primary extruder as well as a space-saving add-on extruder. The output in window profile extrusion is as high as 270 kg/h.

In the FBL 5 feedblock for the production of multi-layer PVC pipes in the 200 to 500 mm diameter range, the material for the inner skin enters the feedblock through a spider strainer die. The usually foamed core layer and outer skin then join the inner skin in the feedblock without encountering a torpedo.

The RKX 63 pipe head for production of PEXa pipe with diameters of 32 to 63 mm extends the series, which ended at 32 mm until now, to larger sizes. These heads are used in conjunction with the Pexlink technology from Inoex or iBA, which is based on cross-linking in an infrared oven.

► **Hall 16, booth F06**

## Surface Engineering and Alloy Company Wear-resistant Coating

Surface Engineering and Alloy Company Inc., St. Petersburg, USA, known for tungsten carbide-coated plasticizing screws as well as for parallel and conical twin screws and continuously mixing rotors, will be exhibiting examples of tungsten and chromium carbide coatings that demonstrate how carbide can extend the service life of components (**Fig. 4**). Under the brand name Extreme Coatings, the



**Fig. 4. Tungsten carbide-coated 105 mm screw for 40 % glass fiber-filled material** (photo: Surface Engineering and Alloy)

company will be presenting its competence and technology for complex surfaces such as screw flights. The technology is based on the use of thermal spraying methods (flame spraying). The FliteGuard process, which is used solely to coat the flight flanks, achieves a three to five times increase in screw life. Using this process, it has recently become possible to also coat twin-screw geometries. Here, screw life has been extended to twice that of nitrided screws.

► **Hall 13, booth B91-5**

## Busch Degassing Systems for Extruders

Dr.-Ing. K. Busch GmbH, Maulburg, Germany, has developed its Plastex vacuum systems specifically for the degassing zone of screw extruders (**Fig. 5**). These vacuum systems compress dry, meaning without fluids such as water or oil. The claw vacuum pumps used for this purpose feature a noncontact design and are therefore wear-free and require little maintenance. A flushing device is integrated for cleaning the compression region of the vacuum pump. Six standard sizes of the vacuum system are available for degassing during the extrusion of PMMA, PA, PE, ABS, PE-HD, PVC, PP and many other plastics. These systems are delivered ready for connection and consist of a Mink claw vacuum pump, an upstream filter system, a discharge pulsation silencer, a flushing device, and a switch and control cabinet. The entire vacuum system is compactly mounted on a frame. →



**Fig. 3. The high-performance NE 7.40D extruder with grooved feed zone**

(photo: Weber)

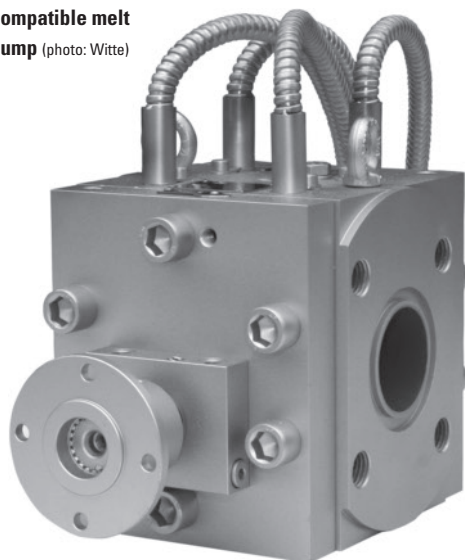


**Fig. 5. The Plastex vacuum system for extruder degassing** (photo: Busch)

As an alternative, the company offers systems with Dolphin liquid ring vacuum pumps, Cobra dry screw vacuum pumps, and R-5 oil-lubricated rotary vane vacuum pumps. For large suction volumes additional Roots vacuum pumps are used.

► Hall 9, booth E23

**Fig. 6. Compact and compatible melt pump** (photo: Witte)



## Witte Easy and Compatible

Witte Pumps & Technology GmbH, Uetersen, has expanded its line of ex-

trusion pumps and will be exhibiting the newly developed Extru III for the first time (Fig. 6). The basic idea arose from the need to replace existing pumps, without having to modify the entire unit. The result: a pipe design that can be accommodated easily by the system in a simple exchange thanks to its compatibility. It can be

operated with viscosities of up to 40,000 Pas, temperatures of up to 400 °C, suction pressures of up to 120 bar and pressure differentials of up to 250 bar. The pump comes with aluminum-bronze threaded shaft seals as standard. This shaft seal is specially designed for high viscosities and suction pressures, and is available in a cooled version upon request. Thanks to the more efficient pressure

buildup, very gentle delivery of product is possible, since relatively little energy or heat is introduced into the polymer. To ensure long and reliable operation, the friction bearings have been designed with special lubricating pockets and grooves.

► Hall 10, booth B55

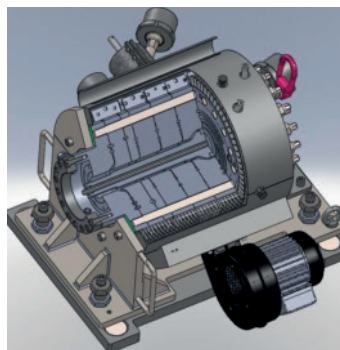
## Eta

### Dies for Multi-layer Tubing and Pipe

Whether for automotive or medical applications, combining different plastics in multi-layer tubing and pipe achieves a specific combination of different material properties in response to ever-increasing quality requirements and economic pressures. To produce such multi-layer tubing and pipe, ETA Kunststofftechnologie GmbH, Troisdorf, Germany, has, in recent years, advanced the

circular distribution technology based on the principle of the spiral distributor, where the melt is distributed in layer-like elements without weld lines (Fig. 7).

This technology offers a great deal of flexibility in terms of range of throughputs, materials and layer structures. The modular design permits independent temperature control of individual distributors as well as fabrication from different, e.g. highly corrosion resistant, materials. Moreover, modules for additional layers are easy to add, even



**Fig. 7. A 5-layer die using circular distribution technology** (photo: Eta)

subsequently. The uniformity of the layer and wall thickness distribution as well as the material and color change behavior are optimized with the aid of 3-D flow simulations. Eta will be introducing new die types for higher throughputs and larger product diameters that extend to larger sizes the 1- to 7-layer dies that have been well-received by the automotive and medical device markets. Additional new development focus on fine centering of mouthpieces and/or sleeves, especially in dies for corrugated tubing and special applications.

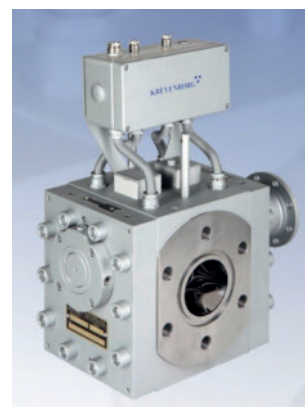
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## Kreyenberg

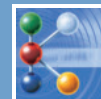
### Melt Pumps for Shear-sensitive Products

With the new GPE 03 melt pump line (Fig. 8), Kreyenberg GmbH of Münster, Germany, is extending its product range to include a model for residence time-sensitive plastic melts. Visitors can view the company's five different models, with ten sizes available for extrusion of as little as few kilograms up to 12 t/h. The new pumps are characterized by simple and robust construction with high pumping accuracy, and their ability to build up pressure with minimum thermal stress on the material. The main advantages of the new pumps are optimized inlet and outlet channels, which provide a reduced volume of melt in the pump. These changes result in the same flow rate at a shorter melt residence time. In addition, the company offers a variety of coatings and related surface treatments which can increase pump life significantly (depending on the application, pump life can be more than tripled).

► Hall 9, booth A44



**Fig. 8. Melt pump for shear-sensitive products** (photo: Kreyenberg)



### Widos

## Mobile Large Pipe Processing

The Swabian company Widos GmbH, Heimerdingen, Germany, manufactures a variety of machinery and fixtures for welding and cutting large-diameter pipe that will be exhibited at its booth. The machinery complies with various international welding guidelines for welding pipe up to 2.40 m in diameter directly onsite. An assortment of pipe clamping inserts ensures that various types of pipe such as solid wall, wound and corrugated in different diameters and wall thicknesses can be processed (Fig. 9). Depending on how the machine is equipped, the hydraulic output can be adjusted to the particular welding specifications. Hydraulic lifting apparatus is employed to simplify welding machine operation when used for large diameters. While controlled from the outside, it remains attached directing to the welding unit together



**Fig. 9. A saddle welding machine for production of parts** (photo: Widos)



**Fig. 10. PMM 80 profile measuring system** (photo: Zumbach)

with the control elements. The optional CNC controls with logging function ensure consistent quality for reliable welding. In addition to equipment for joining, the company offers the appropriate solution for cutting large pipe directly onsite as well. The saws for onsite use can also handle pipe diameters up to 2.40 m while keeping the pipe ends free of lubricant contamination. Use of selected, special saw blades prevents the risk of potential jamming as the result of stress-induced pipe deformation. The company has also passed the 2 m mark when it comes to part production.

► **Hall 11, booth B41**

### Zumbach

## In-line Measurement and Control

Zumbach Electronic AG, Orpund, Switzerland, will be exhibiting new developments in the field of in-line measurement and quality control. The Umac product line encompasses a number of noncontact, ultrasonic-based systems for wall thickness measurement and control in pipe, tubing and cable production. The heart of each system is the Umac measurement electronics, which scans up to eight sensors at high speed. The Wallmaster system processes data from several Odac measurement head as well as that from an ultrasonic Umac wall thickness/eccentricity system on the extruder. Automatic control of wall thickness and/or diameter becomes a simple matter.

Complete profile cross-section measurement, including recessed dimensions, radii etc. can be measured by the Profilemaster system, thanks to light-based measuring technology (lasers and CCD cameras). The compact PMM 80 model is being exhibited as the representative of the entire product line (Fig. 10).

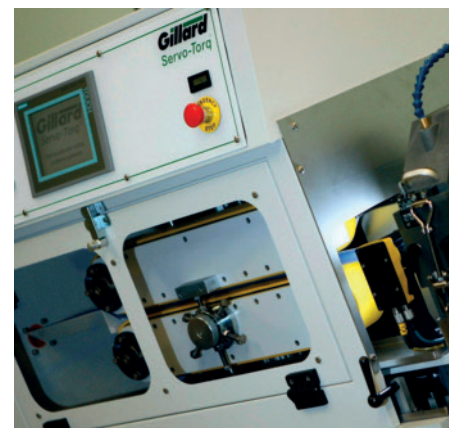
► **Hall 10, booth E41**

### Gillard

## High-Performance Cutting

Gillard & Co. Limited, Tewkesbury, United Kingdom, will be exhibiting the high-performance Servo-Torq

Ultra cutting system for smooth and corrugated pipe and tubing (Fig. 11). This new system employs a special camera system that can identify the crests along corrugated products, guaranteeing that cutting always occurs at the same place. A digital 3-axis servo control system ensures high cutting precision with deviations



**Fig. 11. Cutting machine** (photo: Gillard)

less than  $\pm 0.2$  mm. Special blades are available for cutting materials such as nylon, EVOH or silicone.

► **Hall 15, booth B23**

## Conclusions

As always, high extruder output, process reliability and energy efficiency are the objectives. At the same time, peripheral equipment, especially downstream equipment, will continue to gain in importance. The question of thermal optimization is a constant factor in all process steps and equipment component considerations. ■

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