

TOOLING. Maximum economy requires that each individual component in a mold be carefully adapted to the particular application. Suppliers have responded to this challenge and created market-specific products to satisfy the most demanding requirements for efficiency, reliability during processing and technological finesse.

A Fitting Solution

Production in a sterile environment, cost-effective and resource-conserving manufacturing of large quantities of items at minimal cycle times and controlling challenging process all require systems with carefully matched components. Standard approaches are less and less useful. For this reason, a wide variety of temperature control and hot-runner systems, standard mold components and measurement instruments that are tailored to the particular needs of the medical device, PET processing and packaging industries has been developed.

Mold-Masters

Ultra-fast Beverage Closures

With its new Sprint Series for ultra-fast molding of beverage closures, Mold-Masters Europa GmbH, Baden-Baden, Germany, has introduced a hot-runner system for the lower limit of achievable cycle times (**Fig. 1**). The system uses a modified nozzle tip in conjunction with the time-tested manifold technology that has been designed for fast color changes and optimal filling. The product line includes efficient complete systems consisting of hot-runner system, hot half and temperature control unit. These are designed for the respective field of application, with the focus on the medical device and packaging industries as well as multi-component and PET systems.

Translated from *Kunststoffe* 9/2009, pp. 121–126

Article as PDF-File at

[www.kunststoffe-international.com](http://www.kunststoffe-international.com;);
Document Number: PE110197

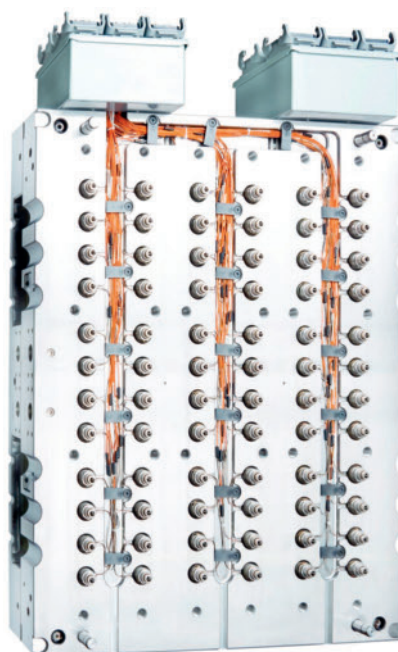


Fig. 1. Hot halves from the Sprint Series designed specifically for ultra-fast cycle times
(photo: Mold-Masters)

The Melt-Disk technology introduced in 2004 for direct side gating of small to medium-sized cylindrical parts is available with new gate options. The company has recently introduced a shutoff function for individual cavities that is accessible from the front of the mold. By turning the respective shutoff mechanism 90°, the cavity can be shut off or opened.

In addition, the company has introduced an auxiliary injection unit and rotary platen that can be mounted directly on the mold as a portable multi-component approach for use on a single-component machine. The new injection units are available in a choice of electric or hydraulic version with screw diameters from 10 to 36 mm. All controls for the hot runner and injection unit are integrated

into a single compact enclosure that interconnects the machine, robot systems and injection unit through a single interface.

► **Hall A5, booth 5205**

Hummel

Avoiding Downtime

Greater reliability is being offered by Hummel AG, Waldkirch, Germany, with its new Wire Test diagnostic function for the Temp-Star Multi hot-runner controller (**Fig. 2**). The built-in cable test reliably detects wiring faults in the hot runner. To

check the hot-runner wiring, each zone is briefly activated in succession, and the sensor assignment checked. If the corresponding heater warms up and the associated thermocouple indicates an increase in

temperature correctly, the control unit switches to the next heater zone automatically. Load circuits interruptions, assignment errors and reversed sensor polarity are detected and displayed to the operator. This auxiliary function permits a wiring test prior to the start of production on the machine and protects the hot runner. Expensive downtime during production can thus be avoided. The diagnostic function is available for checking all 230 V hot-runner systems and available with Multi models for 12–24 or 36 zones.

► **Hall B1, booth 1011**

Listemann

Cleverly Joined

Listemann AG, Eschen, Liechtenstein, is offering an alternative approach to conformal mold temperature control. The cooling channels are first machined into the as-yet unassembled components of the mold. Next, the individual components are joined via vacuum brazing to form strong, gastight assemblies, a process which hardens the mold at the same time. This yields conformal cooling channels, while the concept and design of the mold remains the know-how of the customer.

Combining conformal cooling channels with copper pins for enhanced heat conduction presents no difficulties. The heat treating services of the company are available to both injection molders and moldmakers alike.

► **Hall A2, booth 2204**

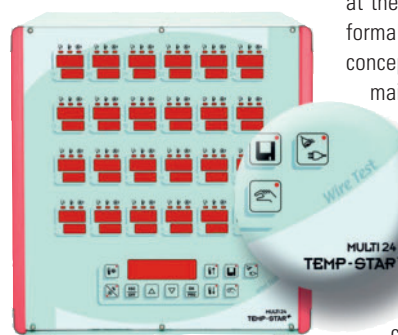


Fig. 2. The Wire Test diagnostic function checks hot-runner wiring reliably (photo: Hummel)

Ewikon Hot-Runner Systems

Gating at a Variety of Angles

When gating thin-walled, cylindrical parts from the side, the mold core is subjected to a load from one side. By using an angled tip, it is possible to position the gate closer to the core support, reducing the resultant core displacement. Accordingly, Ewikon Heißkanalsysteme GmbH & Co. KG, Frankenberg, Germany, has expanded its HPS III-MH nozzle series to include direct side gating at a variety of angles (Fig. 3). The classic tip position (at a 90° angle with respect to the ejection direction) is now accompanied by angle positions of 60°, 45° and 30°.

In addition, the manufacturer of hot-runner systems is addressing the challenge of gating in very tight quarter with a new technical development. For this nozzle concept, a gate geometry was developed that permits gating in the ejection direction (0°) in spite of introduction of melt from the side. This gives moldmakers the opportunity to employ direct gating onto horizontal surfaces and flanges at a distance of only 3 mm from a rising contour. This nozzle variant is available with both right-angled heat-conducting tips and needle shut-offs (valve gates).

The shutoff needles are actuated simultaneously by a plate mechanism. The combined nozzle seal and guide arrangement guarantee absence of leaks in the system, a short exposed nozzle length and minimal loads. Uniform distribution of heat in the gate region is assured by fork-shaped heat-conducting elements that surround the needle over a large area without actually touching it.

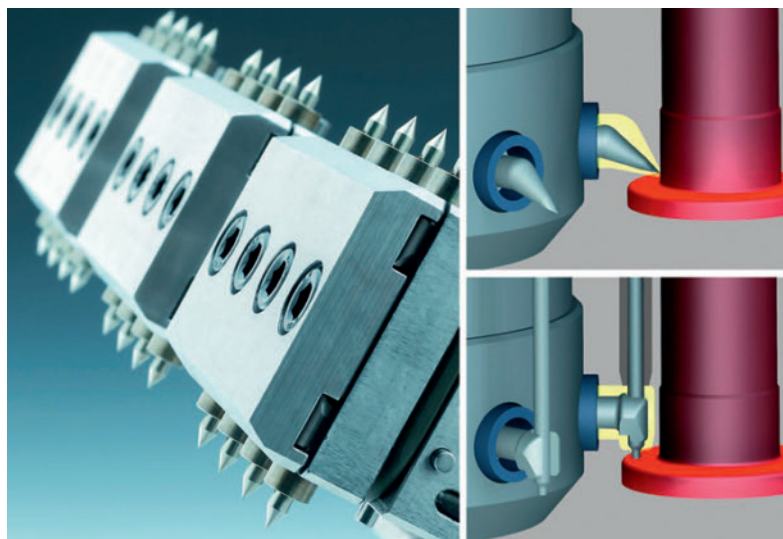


Fig. 3. Optional gating angles of 0°, 30°, 45°, 60° and 90° for the HPS III-MH nozzle series (photo: Ewikon Heißkanalsysteme)

► Hall A2, booth 2203

Priamus

Automatically Balanced

Cavity wall temperature sensors have been used to balance hot-runner systems automatically for years. Priamus System Technologies AG, Schaffhausen, Switzerland, has now filed a patent for a new balancing method. To detect the melt front quickly, cavity pressure sensors are now used as well. While balancing multi-cavity molds through use of temperature sensors

is a relatively straightforward and reliable process, the new method with cavity pressure sensors offers the further opportunity to monitor compression of the melt in addition (Fig. 4). This additional information permits adjustment of individual nozzle temperatures within a hot-runner system and optimizes timing for actuation of existing shutoff

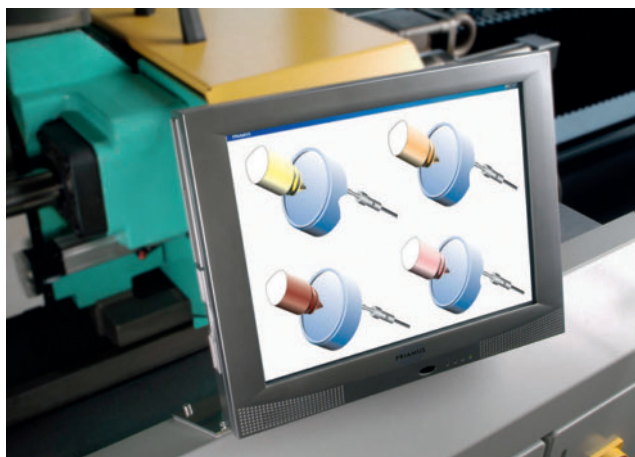


Fig. 4. Cavity pressure sensors provide additional information for – balancing hot-runner systems (photo: Priamus)

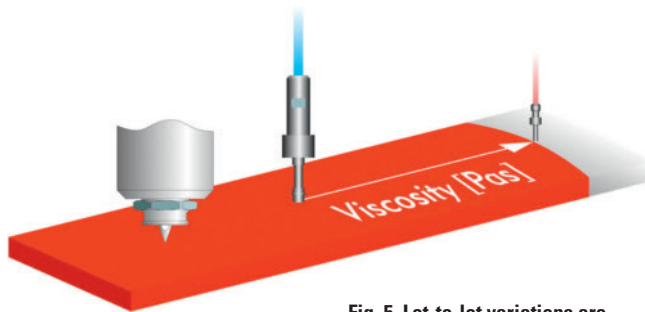


Fig. 5. Lot-to-lot variations are detected by monitoring the viscosity directly in the mold (illustration: Priamus)

apostles for identical filling and solidification conditions for all molded parts.

Furthermore, the combined use of pressure and temperature sensors represents the basis for an approach to detecting and correcting for lot-to-lot material variations. Process fluctuations that occur because of different material lots must be corrected by adjusting the machine settings. The viscosity of the plastic melt, which should remain as constant as possible during processing, is the most informative material property with regard to characterizing lot-to-lot consistency. While the classic method of determining the melt viscosity under isothermal conditions

with the aid of a rheometer provides ideal prerequisites, it is relatively expensive and time-consuming. Determining the viscosity directly in the mold cavity now presents an inexpensive alternative with which the flow characteristics of the melt can be monitored directly in the mold during every cycle and documented. To this end, the rise in a pressure signal and a temperature signal are measured during the injection process and used to calculate the viscosity (Fig. 5).

► Hall A3, booth 3205

Günther Hot-Runner Technology

All-Electric and Suitable for Cleanrooms

Günther Heisskanaltechnik GmbH, Frankenberg, Germany, is taking a step into the food processing and medical device sectors with its electric drive for needle shutoff systems that is suitable for use on all-electric injection molding machines and can be used in clean-

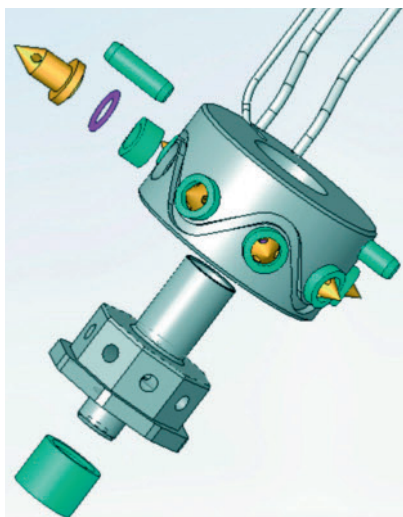


Fig. 6. The tips of the LOT secondary manifold can be replaced individually (illustration: Günther Heisskanaltechnik)

rooms without restriction. The compact system is based on the ME 10/UV 75 solenoid, which can

be incorporated into the clamping plate without the need for utility supply channels. The external eValveControl-4 control unit is responsible for actuation. Up to four needles can be moved with high precision individually, and up to eight simultaneously. The solenoids provide a mechanical stroke of approx 10 mm; the needles are held at the end positions by permanent magnets.

For direct side gating of articles in compact, high-cavity molds, the company offers hot-runner solutions with the LOT and LT secondary manifolds. Both are available with a pitch circle diameter starting at 37 mm and max. eight tips per secondary manifold (**Fig. 6**) or with a spacing of 12 mm for up to 24 tips per secondary manifold. The LT has been designed for challenging applications such as those in the medical device and food processing industries. It can be used in combination with a single nozzle or in conjunction with a distribution manifold. Furthermore, both are heated to ensure an optimal temperature distribution and are optionally available with a metal carbide nozzle tip that exhibits good heat conduction for processing of filled materials.

► **Hall A2, booth 2207**

Kistler

Identical Cycle to Cycle

Kistler Instrumente GmbH, Ostfildern, Germany, is now also using the cavity pressure sensor as an important process variable to determine part quality when balancing hot-runner systems. The new CoMo Injection Type 2869B process monitoring system with optional built-in MultiFlow function combines process monitoring and automatic hot-runner balancing. This software function analyzes the cavity pressure curves for the filling and holding pressure phases in all cavities during each cycle. With the objective of filling all cavities identically – that is, a simultaneous rise in the cavity pressure in all cavities – it calculates the setpoint temperature as the controlled variable automatically for each hot-runner nozzle and transmits this value to the hot-runner controller. This balances the mold automatically when the process starts up. Continuous optimization during processing ensures identical cavity pressure curves from cycle to cycle in all cavities. Time-consuming manual optimization of the hot runner by means of mold filling studies before and during production is thus eliminated. At the same time, the system monitors the quality of all parts produced continuously and generates signals to separate rejects automatically.

► **Hall A3, booth 3104**

Jumo

Ceramically Insulated

Melt temperature sensors from Jumo GmbH & Co. KG, Fulda, Germany, have been used in the plastics industry for years. The existing product line has now been expanded through addition of a new design with a ceramically insulated measuring tip (**Fig. 7**). By reducing the heat loss error and ensuring good thermal insulation regarding nozzle heating in the region of the shaft, possible errors in measurement can be minimized. To simplify installation, a version with plug-in connections for thermocouples (Fe-CuNi or NiCr-Ni) and resistance thermometers (Pt100) has also been added to the product line. Thanks to these two- or four-pin Lemosa connectors on the measuring insert, the connecting cable to the measuring instrument can be disconnected easily, making sensor installation and replacement easier.

In addition, the company has introduced an additional model, the 316 with dimensions of 48 x 48 mm, for the dTRON controller series. This now makes three different controller



Fig. 7. The melt temperature sensor is now available with a ceramically insulated tip and plug-in connection (photo: Jumo)

sizes available for use in the plastics industry. The basic version of the controllers already has the most important relevant functions, e.g. hot-runner startup mode, heater current measurement and monitoring, setpoint lowering, etc. All units are freely configurable as a two-point, three-point, three-point stepping or continuous controller. They can further be programmed with max. eight segments as a program controller. In conjunction with the IP65-rated enclosure, the front membrane keypad guarantees reliable operation even in harsh surroundings.

► **Hall A5, booth 5225**

Frigel

Designed for Modular Use

Together with its new representative, Delta-p GmbH, Waldburg, Frigel Firenze S.p.A., Scandicci, Italy, presents its line of chillers (**Fig. 8**). The Heavygel EFX is a modular central chiller with Danfoss Turbocor variable-speed centrifugal compressors, which according to the manufacturer, currently offers the highest efficiency on the market. Equipment is supplied with chiller water from the Ecodyr system and can be operated in a free-cooling mode.

The unit is very compact in design and can be incorporated fully into a process cooling system thanks to its intelligent microprocessor-based controls. The compressor operates on a centrifugal compression principle and features oil-free magnetic bearings. It offers high efficiency under partial-load conditions and soft start. Moreover, individual chillers in this product line can be linked together to



Fig. 8. The Heavygel EFX can be incorporated fully into a process cooling system as a modular central chiller with microprocessor-based controls (photo: Frigel/Delta-p)

form a single system when the need arises for increased chiller capacity.

► **Hall A5, booth 5126**

Hasco

Better Machinability

Hasco Hasenclever GmbH & Co. KG, Lüdenscheid, Germany, covers the entire spectrum of plastics-specific standard components for moldmaking, ejection and mold temperature control. With the corrosion-resistant chrome stainless steel grade 1.2099, this supplier of standard mold components and hot-runner specialist now offers a material with better machinability as an alternative to 1.2085. The prehardened tool steel grades Toolox 33 and 44, which exhibit a very good dimensional stabil-

ity and good polishing as well as etching characteristics while retaining good toughness, offer even more benefits in terms of machinability. The range of dimensions now includes, among others, the line of P8000 round stock.

In the hot-runner area, various needle shutoff solutions (valve gates) as well as innovative solutions for difficult gating conditions were presented. In the field of standard components for ejection, the company exhibited a wide variety of latches, two-stage ejectors, gear-driven elements and collapsible cores for demolding internal threads and undercuts. The internal Z178 round latch was introduced as a new, compact control element for mold opening (Fig. 9), as was the pneumatic Z1680 ejector coupling to make mold changes simpler and safer. The company further exhibited a wide range of cooling products, starting with the complete line of hoses and connectors and continuing through cooling cores and diverters to individual laser-generated conformal cooling channels for optimum mold temperature control even in difficult-to-reach areas.

► Hall A2, booth 2202



Fig. 9. The internal Z178 round latch is a compact new product among the actuating elements for mold opening (photo: Hasco)

Meusburger

Always at Hand

The focus is on efficiency and operational reliability when it comes to product innovations at the moldmaking supplies specialist Meusburger Georg GmbH & Co. KG, Wolfurt, Austria, as well (Fig. 11). The Moldstick E 2760, for instance, eliminates the time-consuming search for the necessary production, installation and operating data. Using the portable data storage device for installation in molds and dies, tool-specific data can be stored directly "in the tool", where it is always at hand.

The line of carriers and stops has been expanded to include a slide retainer and slide stops with rollers that are ideally suited for use in cleanrooms. The E 1808 roller puller with adjustable trigger force and the E 3220 expandable core for releasing exter-

nal undercuts, preferably on round parts, are among the new products.

Additional components are also available in the area of erosion ancillaries, for instance, numerous copper and graphite electrode blanks for the most commonly employed clamping system on the market, head electrodes and square bars made from

Strack Norma

Recessed for Flush Mounting

As one of the largest suppliers on the market, Strack Norma GmbH & Co. KG, Lüdenscheid, Germany, exhibited an extensive range of standard

in place flush, eliminating potential errors when setting up the mold in the machine or potential hazards when transporting the mold.

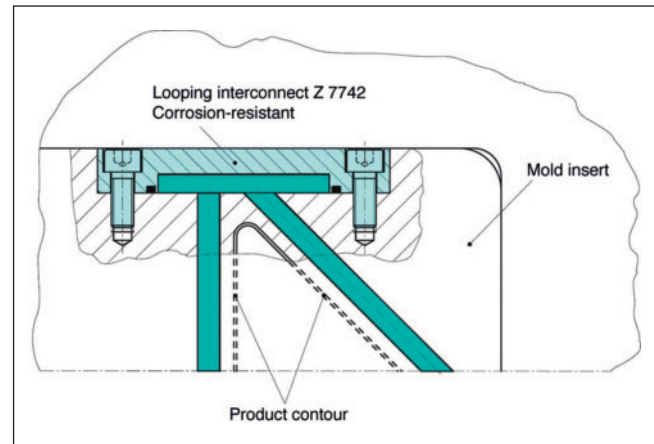


Fig. 10. The Z7740/42 cooling channel looping interconnects are recessed into the mold plate and bolted in position flush (illustration: Strack Norma)

components. Among the product innovations is the Z7740 cooling channel looping interconnect. It presents a convenient way to loop cooling channels in mold plates. The Z7740 offers a way to interconnect and redirect cooling channels within mold plates themselves. This is accomplished with the aid of a machined pocket into which the interconnect is recessed (Fig. 10). It is then bolted

The looping interconnect is available in two materials: aluminum (model Z7740) and stainless steel (model Z7742). Viton, a time-tested material, has been selected for the sealing rings. The product comes in two sizes and two different lengths, so that cooling channel diameters from 6–12 mm and cooling channel spacings of 16 mm to max. 98 mm can be accommodated.

► Hall A1, booth 1103



Fig. 11. Exhibited products: Insulation boards, carriers and stops, flexible ejector units, guide rails as well as erosion ancillaries (from left to right)

(photo: Meusburger)

high-grade spark erosion graphite in various grain grades. Also new in the product line is a large selection of predrilled insulation boards that make it possible to dismantle the mold without the need for removing the insulation boards. Subsequent machining of the insulation boards is no longer necessary in most cases.

Flat, predrilled maintenance-free steel guide rails ready for fitting round out the program.

► Hall A2, booth 2313

Conclusions

The exhibition focused on application-specific solutions for achieving unrestricted performance in tight quarters and at minimal cycle times. The exhibitors see themselves increasingly as providers of system solutions based on supplying reliable products with maximum user friendliness, service and know-how. How they substantiate this claim is demonstrated by the wide variety of attention-getting exhibits.

Silke Allert