

What's new in hot runner technology?

In the ultra-competitive world of injection moulding, there is plenty that is new to help moulders improve cycle times, cut scrap and reduce tooling costs. With current tough market conditions, advanced hot runner systems are increasingly providing moulders with a crucial competitive edge.

Developments in hot runner systems are being driven by several trends. Cost competition is leading to higher cavitation moulds and more process integration, such as two-colour moulding. Material savings and faster cycle

times are becoming increasingly important. These trends are leading to more valve gate systems for better process control and new side gating nozzles that allow direct side gating of parts without the need for sub-runners. Hot runner developments will also continue to focus on prevention of resin leakage, which results in expensive downtime.

Thin-wall parts for applications such as handheld electronic devices require hot runners that can perform well at extremely high pressures. In order to

achieve balanced material flow, it is crucial that manifold construction be both thermally and rheologically balanced. Not least, hot runner and manifold suppliers have the manufacturing know-how to reduce product development time and piece part cost. They should be relied on for guidance on gate location and configuration.

Over the following six pages John DeGaspari looks at the latest hot runner developments and applications from a range of leading suppliers, including nozzles, controllers and manifolds.



SISE presents new modular control system

The new M-Series hot runner controller from SISE Plastic Control Systems features a modular, multi-zone structure. The controller is equipped with a central processing unit card that controls up to 24 zones. In addition, the thermocouple and power cards are independent and interchangeable.

The controller series is compatible with J/K thermocouples and two soft-start modes are available. In addition, permanent auto-tuning software allows for optimised hot runner temperature control. The series provides alarming for open and inverted thermocouples
www.sise-plastics.com

Moulder puts MDi internally heated nozzles to the test

Melt Design Inc (MDi) says that its internally-heated moulding machine nozzles combine accurate temperature control and long, dependable heater life, helping reduce to material costs and maintenance downtime.

Spectrum Plastic Group, an injection moulding company in Minneapolis, Minnesota, USA, decided to put the claims to the test. The moulder was faced with a difficult moulding project that was creating excessive maintenance and material waste costs.

Tom Ries, who is senior project engineer at Spectrum's Minneapolis plant, described the challenging project: "We had an application with a high-end industrial product that had both high visual and dimensional demands. When we first approached MDi, we were running around 30% fallout,

moulding a wide spec resin that our customer required us to use". He adds: "We had already tried utilising a cold-runner mould, and then when that didn't work we went to a hot sprue with no success and we really did not see any gains by doing that."

Reis says that he had heard of MDi's internally heated nozzle bodies, but had never used them. He decided to give the nozzles a try. "We installed one of them on the moulding machine and our scrap rate dropped to less than 5%," he says. "That's a huge difference and it gave us absolute control over the heat in the material, which had been problematic until the MDi nozzles were used. It worked smoothly, and our technicians, who previously had

to deal with uneven heating of the material, could let the mould run without daily adjustments, saving valuable downtime."

Ries acknowledges that MDi's internally heated machine nozzles are expensive compared to standard nozzles with band heaters, but he maintains the benefits have outweighed the cost. "They are worth it when you look at the savings in material and processing time," he says.

www.meltdesign.com



Spectrum Plastics tried Melt Design's internally heated nozzles for a demanding project

www.injectionworld.com

Athena Controls makes wiring more simple

Athena Controls offers pre-wired combination mould junction boxes that simplify hot runner wiring. Available in three different models, the prewired junction boxes offer a fast and simple method for mounting power and thermocouple connectors to the mould.

Each box is constructed of plated heavy gauge steel and has drilled holes for quick mounting of the box to the mould. Delivered with all necessary mounting hardware, they feature pre-numbered terminal strips to correspond with the power connectors.

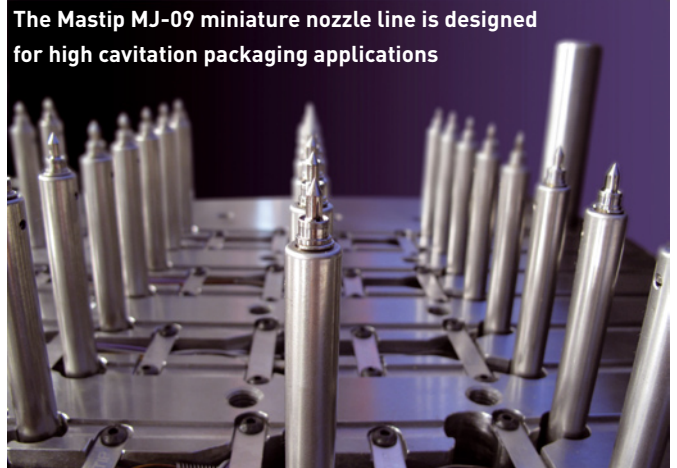
! www.athenacontrols.com

Mastip introduces miniature nozzles for high cavitation

Mastip is offering a new line of miniature nozzles developed for moulding applications involving small parts and high cavitation. The company says its MJ-09 nozzle's special design fits within a small gate/bore detail for use with small parts where gating locations are tightly confined.

The nozzle design provides optimum flow characteristics, improved cooling performance and gate strength, and excellent thermal stability for a wide moulding window. The MJ-09 nozzle is ideally suited for high cavitation medical and packaging applications.

The Mastip MJ-09 miniature nozzle line is designed for high cavitation packaging applications



In addition, Mastip has introduced a single valve gate for single-cavity large part applications with sensitive materials or where high quality

gate cosmetics are required.

[Click here](#) to download Mastip's useful 44-page system selection guide.

! www.mastip.com

Synventive stops leaks and eases installation

Synventive Molding Solutions has introduced two additions to its hot runner product line that resist leakage and simplify installation.

The model 06e threaded (screwed-in) nozzle style is an alternative to support ring/face fit type of nozzle, which can be more prone to leakage according to a company spokesperson. Plastic material that leaks at the manifold/nozzle interface can be a major problem that results in expensive downtime for cleaning and refitting the nozzles.

Available with both thermal gate and valve gate options, the 06E features a 6-mm flow bore with a 20-mm mould cut-out, and is designed for small shot weights up to 100 grams



The Synventive 06E provides "plug'n'play" simplicity when used as a valve gate and combined with the PNC30 bolt-on actuator

per nozzle. These nozzles are externally heated and are available in lengths from 60 mm to 200 mm. The nozzle heaters are easily replaceable and have integrated, replaceable thermocouples.

The second product is the

PNC30 pneumatic bolt-on actuator for valve gate hot runner systems. When the new 06E nozzles are used as a valve gate system and combined with a Synventive bolt-on actuator, the complete hot runner system is supplied pre-

wired and pre-hosed for simple "plug'n'play" mould installation.

The PNC30 features a top clamp plate that can be removed without removing valve pins from the hot runner. No pneumatic or cooling hoses are required, because these lines are gun-drilled directly into the top clamp plate.

In addition, Synventive is developing a new product called the "e-gate," an electric valve gate system that provides clean operation and increased gate control. It will allow open/shut programming of the valve pin in each individual nozzle in the hot runner system for optimal shut-off and gate fill. The product will be released later this year.

! www.synventive.com



Husky offers sophisticated controller

Husky Injection Molding Systems has launched its Altanium Neo2 temperature controller which features two to 24 zones of control. The system is equipped with 15 amps per zone, making it flexible enough for a wide variety of applications.

"With controllers for less than 24 zones, moulders are often limited to a lower quality interface. Altanium Neo2 offers a more sophisticated design and features that are normally only associated with high-end controllers," says David Whiffen, Husky's director of marketing, Hot Runners.

The Neo2 is designed with a large full-colour touch-screen and support for external storage through a USB key. Accurate control is achieved through Active Reasoning Technology, which creates a custom control algorithm for each zone.

[Click here](#) to download a brochure with more details.

www.husky.ca

DME and PETS launch first product of partnership

DME and Plastic Engineering & Technical Services (PETS) have formed a strategic partnership that will initially focus on the medical and high-volume consumer markets.

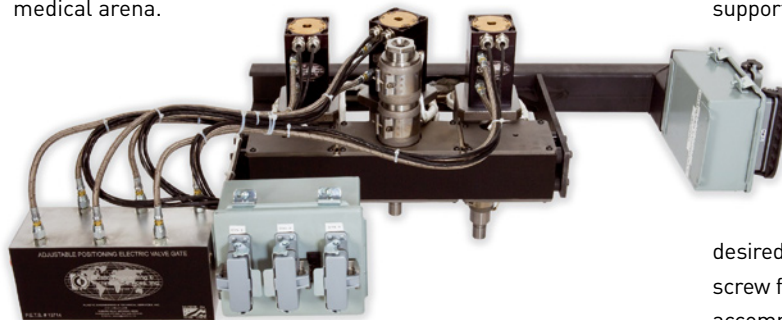
The first product introduced as part of the partnership is an Electric Valve-Gate (EVG) system ideally suited for high-precision, clean-room moulding applications, commonly found in the medical arena.

According to PETS, the EVG can be paired easily with the company's Valve-Gate Sequencer, which offers real-time, section-views of each valve-gate, with the capability of digitally, precision positioning each valve-pin independently in 0.001-inch (0.025-mm) increments.

PETS claims that the EVG has a higher response time compared to its pneumatic

and hydraulic counterparts. Because of the fast, precise and powerful closing force, there is no gate vestige into which scrap material can find its way. Gates will close on the material flow as programmed, even if the viscosity of the material has changed in the mould, according to the company.

The EVG includes a unique pin-positioning feature that supports additional design elements for a part. For example, it is possible to control how far the pin is sticking out, so it can protrude into the part if desired to create a hole for a screw for example. The EVG can accommodate family moulds.



The Electric Valve Gate system developed by PETS and DME is targeted at medical applications

www.dme.net

www.petsinc.net

MHT supports high cavitation

MHT Mold & Hotrunner Technology says that it has developed hot runner systems that permit very high number of cavities for preform and closure moulds.

"Up to now moulds for caps and preforms with up to 144 cavities have been the standard. Closure moulds with up to 192 cavities are possible with MHT hot runners," says Andreas Krampe, director of projects in North America at MHT USA.

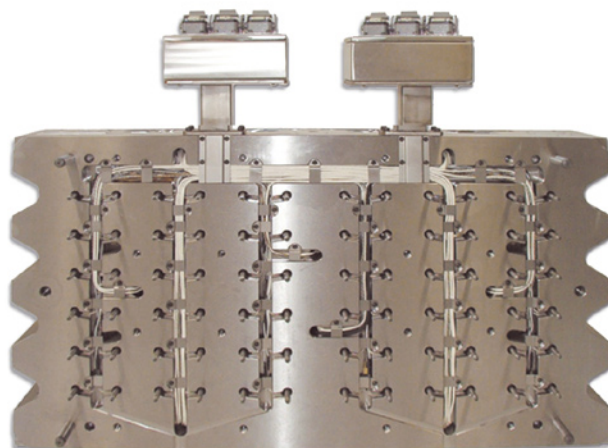
MHT explains that it uses a patented design that enables significantly thinner plates.

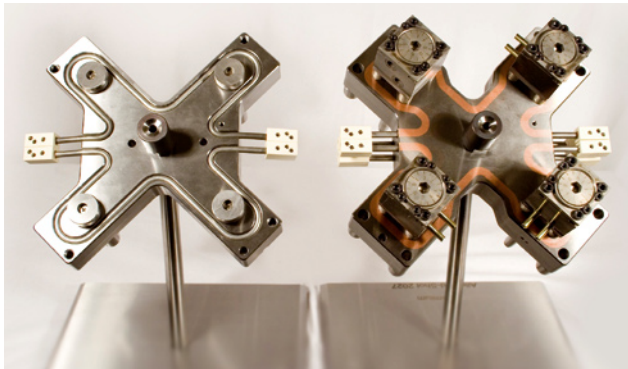
These require less energy, so MHT hot runners use less water and energy, saving up to 30% in costs.

In addition to supplying hot

runners, MHT itself produces preform moulds with up to 192 cavities using this technology.

www.mht-ag.de/en





PSG's Thermoject Econ manifold covers a broad range of moulding applications at an economical price

The Econ-Trol hot runner controls from PSG are designed for one to 12 zones



PSG focuses on speed and versatility

Recent product developments from PSG (Plastic Service GmbH) are designed to enable moulders to increase productivity at a low cost.

It recently introduced its Thermoject-Econ line of hot runner manifolds. The system is available in five standard manifold heights (33, 40, 50, 60 and 70 mm) that are matched to the diameter of the respective melt channels. The Thermoject-Econ manifolds are available as components that are assembled

by the user, or ready-built as a complete drop-in system, including all plumbing and wiring. They can also be supplied as complete hot halves, with two- and three-plate versions available for bolting onto the mould. The manifold systems provide manifold melt channels from 8 to 24 mm and shot weights from 0.5 to 6,000 g. The systems are priced 25% less than PSG's current premium line.

PSG has also introduced a

new RC5 nozzle tip that dramatically reduces the time taken for colour changes. In trials, the nozzle has demonstrated improved colour change properties and reductions in colour changeover times ranging from 50% to 97%. The RC5 Nozzle tip is particularly suited to applications using metallic pigments. Visible flow lines are greatly reduced and in some cases eliminated, according to the company.

Also new from PSG is its

Econ-Trol line of hot runner controls. These are designed for one to 12 zones, and have a compact design. They offer PID auto tuning, control accuracy to 1°C, soft-start function, alarm contactors and a manual mode for operation without a thermocouple. Instead of replacing entire control cards, the Econ-Trol design uses replaceable, affordable and readily available solid state relays.

www.psg-online.us



Quick-Flo systems are designed for applications that demand maximum output, repeatable part quality and superior cosmetics

Incoe targets high-cavitation

Incoe has developed a series of hot runner systems designed for the processing of commodity grade resins used in high-cavitation moulding. Quick-Flo systems are used specifically for caps/closures, medical disposables, pharmaceutical and packaging applications.

Nozzles are available in three popular sizes with flow channel diameters of 3, 5 and 8 mm and with shot ranges of 3 to 375 g. For added processing value, QF systems that use Opti-Flo manifolds with the Beaumont Technologies patented MeltFlipper technol-

ogy, can provide improved cycle times.

In addition, Incoe has developed an Axial Protected (AXP) feature for longer Direct-Flo Gold hot runner designs with multiple heating zones. The AXP feature eliminates the time and expense of adding a separate groove over the entire length of the nozzle bore in order to accommodate heater cables. The AXP design uses the same bore diameter that mouldmakers create for the hot runner nozzle. The cables are routed in an axial direction alongside the nozzle heater.

Incoe has also recently developed a manifold technology featuring laminate construction. Manifold halves are machined to mirror each other and then are metallurgically fused to create a complete laminate manifold. This eliminates the need for welded plugs associated with gun drilled designs. Inherent in the manifold design is the ability to manufacture flow channels that are difficult or impossible to produce using conventional gun drill methods.

www.incoe.com

Thermoplay targets large parts

Thermoplay has developed two nozzles for lateral injection at critical points.

The DL-8B nozzle for double-side edge-gate injection is recommended for internal injection at critical points or when the shape of the moulded part requires the use of a small tip. It can also be used when it is necessary to keep the heated part of the nozzle from the surface of the moulded part to avoid spots and defects. It is suitable for moulding caps and other small parts.

The FL-1B extended nozzle is designed for tilted side injection. It has an extended tip and a maximum inclination of 45°. It is recom-



mended when the injection point is located at critical positions and when the application demands a very small tip. The tip inclination can be customised depending on the position of the injection point, and the nozzle can be used for both internal and external injection of moulded parts.

In addition, Thermoplay has developed a new hot runner system for moulding large dimension parts such as automotive bumpers and spoilers, household appliance parts and shipping pallets. Large parts such as these use sequentially controlled injection to improve the appearance and mechanical properties of

the part. The new injection system allows nozzles and shut-off groups to be mounted at various angles. The company says the system is designed to improve the flow of the melt from the hot runner to the mould cavity. The system is pre-wired to meet the specific needs of the customer. Nozzles are available from 76 to 800 mm in length.

A new TH-M6 temperature controller from Thermoplay is available for six and 12 zones. The controller provides synchronous heating of all of the zones. A plastic leakage alarm monitors power consumption to detect leakage from the nozzle. Temperature settings and all control and alarm parameters can be modified at once by pressing a button on the front panel.

Thermoplay has just opened a subsidiary in China this month and it will exhibit these products at Chinaplas this month.

www.thermoplay.com

Ewikon side gate enhances syringe

German mouldmaker and injection moulder Hans Rethwisch selected a direct side-gating nozzle from Ewikon Molding Technologies for the production of disposable syringes. The mouldmaker designed a compact 16-cavity mould for the production of the syringes which are made of Topas cyclic olefin copolymer.

The part features an adapting cone for a Luer lock thread. The undercut of the cone required a slide mechanism in the mould. This is much easier to integrate if the parts are arranged in a row, so a side-gating nozzle with tips in a linear arrangement was chosen.

Ewikon supplied the HPS III-MH nozzle in a linear version with tips angled at 60°.

The mould measured 296 x 446 x 443 mm with four nozzles, each with four tips, positioned in a row. The 16 parts form two cavity rows with 67-mm row spacing and 48-mm cavity spacing.

Ewikon says the HPS III-MH concept uses standard mould inserts that are easy to maintain because the nozzles

are accessible from the mould's parting line. A blocked gate can be cleaned in minutes with the mould still in the machine. The simple installation procedure allows even the angled tips to be fitted without dismantling the mould.

One of the main requirements from the customer was high dimensional accuracy

with minimal core deflection to guarantee a smooth movement of the syringe plunger. The 60° tip insert allows the gating point to be 3 mm closer to the core support, which gives a uniform flow front during injection. This eliminated nearly all core deflection with a value of just 0.02 mm.

Because the application requires the parts to be produced in two versions, one highly transparent and one in light-impermeable black, a quick colour change was essential for efficient production. The HPS III-MH nozzle design helped in this regard because it features fully balanced flow channels with no dead spots where melt residues might be left behind.

www.ewikon.com



Hasco targets high-cavity moulds

New developments from Hasco are focused on compact designs that enable increased productivity for the moulder and better process integration.

The company's new Multimodule Z3280S combines two to six modified Z3210 Compact Shot nozzles in a minimum of space. Through a modular design it is possible to work with cavity-to-cavity distances that the company says are unattainable with a conventional hot runner system. In addition, it offers a degree of flexibility in the arrangement of the gating points that traditional multiple nozzles do not provide. When used in combination with a hot runner, the Multimodule makes it easier to build manifold moulds thanks to the



Hasco's Z3280 Multimodule combines two to six compact shot nozzles in a minimum of space

possibility of grouping cavities together in clusters.

A new Compact Shot Z3240 valve gate nozzle is designed for small installation spaces. Internal gate positions in long and narrow articles can be

achieved with the process reliability of a valve gate solution, according to Hasco. The needle valve guarantees optimum post-pressure transmission and avoids stringing and poor gate quality.

The fit diameter of the front nozzle is just 7 mm with a 14-mm diameter hole over the body length. Lengths are available up to 180 mm, making the nozzle suitable for restricted areas of the article. The nozzle is well suited for processing polyolefins and styrenes with shot weights from 2 to 20 g.

A new Z106 hot runner manifold is designed with a highly heat-resistant, easy-to-maintain flexible tubular heating element. The heating element is sealed against the penetration of moisture, thereby excluding the possibility of short circuits. Should a heating element fail, it can be replaced directly on-site, says the company.

www.hasco.com

Mold-Masters cuts down leads times

Mold-Masters has introduced its Fusion Series G2 fully pre-assembled hot runner system for applications such as white goods, automotive, industrial containers and pails. It says lead times for even the most complex systems have been reduced to a maximum of three business days.

The system features screw-in style nozzles to provide a consistent and flat heat profile that has been engineered for optimal performance. The design includes the ability to control the heat at each gate independently, enabling for a wider processing window. An extensive range of nozzle lengths and flow channel

options provide for an individual system design based on particular customer requirements. Shot sizes start at around 15 g and range up to 3,500 g per nozzle. Nozzle lengths range from 90 to over 1,000 mm. The Fusion Series G2 is capable of running any commodity or engineering resins and is available as non-valve gate and valve gate systems with hydraulic and pneumatic actuation options.

Mold-Masters has also developed the Sprint hot runner system for cycles between 3 and 6 seconds. The Sprint system's nozzle tip design, coupled with Mold-Masters' manifold technolo-

gies, provides significant performance benefits for beverage closure moulders. Sprint systems have 10% lower pressure drops, greater than 90% fill balance and 25% faster colour changes than comparable systems in the field, according to the company.

For moulders who want to convert single material presses into multi-material systems, Mold-Masters offers "pellet-to-gate" solutions. With the addition of mould-mounted injection units and rotary platens, Mold-Masters says it can provide a complete portable multi-material solution for use on existing mono-material presses,

presenting significant cost savings compared to purchasing a new multi-shot machine. The units are available in hydraulic and electric options from 10- to 36-mm screw sizes.

Last year, Mold-Masters acquired PMS Systems, a manufacturer of hot runner controllers. Following the acquisition, Mold-Masters launched the K-Series modular controllers that are compact and economical, especially for high zone counts. Key benefits include a proven electronic design and a colour touch screen with software that controls up to 240 zones.

www.moldmasters.com