männer introduces mold for its 4-point SIDEGATE valve gate nozzle

16-cavity side injection with valve gating

At K 2007, männer – the high-precision mold and valve gate specialist – introduced a mold for producing syringe barrels using männer's new SIDEGATE system. Two goals were achieved with the introduction of the new mold: not only did it give the public the chance to see männer's new 4-point SIDEGATE nozzle in action, but also proved that this remarkable mold concept could meet the strict demands that männer places on all of its high-performance molds.

Side gating – this used to mean forgoing the benefits of valve gate nozzles. The melt was injected into the cavity via cold runners or open gates, making it necessary to resolve the specific issues associated with these gating methods, including critical temperature management in the gate area and the formation of cold plugs. Uncontrolled opening of connecting orifices makes it especially difficult to achieve consistent filling of the parts when high-cavitation molds are used, which can lead to a noticeable reduction in process reliability and part quality. Other factors that can have a substantial effect on production costs are the complicated vestige removal and refinishing of molded parts in the case of cold runners, or stringing and subsequent surface treatment when open gates are used.
Valve gate positioned at 90-degree angle

männer has developed a side injection system in which the pins move at a right angle with respect to the opening and closing of the mold. The nozzle body and pneumatic unit are arranged in the usual way parallel to the mold direction. The pneumatically actuated control pin simultaneously operates all four valve pins. The valve pins themselves are arranged perpendicular to the control pin.

The new system lets you enjoy the benefits of männer's cylindrical valve gate such as defined pin opening and closing, impeccable surface quality, material savings, and – above all – high process reliability in applications employing 4-point side injection.

A carefully calculated mold solution

männer's side valve gating system was introduced at K 2007 in a mold featuring 16 cavities. With each cycle, 16 syringe barrels are ejected from the machine, which is filled by four SIDEGATE nozzles, each with four injection points. Despite the unusual position of the hot runner valve gate system, männer has succeeded in preserving its proven mold concept with respect to cooling and stability. With this mold, männer continues to stick to its Easy Change principle to ensure that molds are as maintenance friendly as possible. This principle has two aims: first, to ensure that mold inserts and mechanical parts that may be exposed to wear can be accessed from the parting line without having to unclamp the mold, and, second, to manufacture mold inserts in such a way that they can be exchanged without requiring any additional adjustment.

The Easy Change principle greatly reduces downtime due to maintenance or replacement of individual components.
Easy Change for side valve gating
With side injection, exchanging mold inserts without unclamping the mold requires an innovative solution. Mold inserts on the fixed half are not installed at the front but, instead, are inserted from the side and guided by means of a feather key slot. For the 4-point SIDEGATE nozzle, two mold inserts on opposite sides are first installed to secure the float-mounted valve gate nozzle in center position. After this is done, the remaining two mold inserts can be put in place. Another feature specially developed by männer is the manifold, which is float mounted on the valve gate nozzle. This type of mount prevents the pin from bending due to lateral thermal expansion of the manifold.

Reliability throughout the demolding phase
The syringe barrels are injected on their long side. As a result, parts are demolded at a 90° angle in relation to the valve pin. During the closing process, the pin plunges several hundredths of a millimeter into the molded part. To prevent the valve pin from damaging the surface of the syringe barrel during demolding, the pin completes a defined return stroke before the mold is opened. The valve pin remains in the connecting orifice throughout the return stroke to prevent uncontrolled discharge of the melt.

An ejection plate removes the syringe barrels from the core. The ejection plate is equipped with four laser scanning units that monitor the demolding process and ensure that all syringe barrels are removed fully from the core.
Conclusion: ideal for plastic medical parts

The side valve gate seems almost predestined for the production of syringes, pipettes, or other tube-shaped plastic parts. Long, narrow cores and an opening on both sides of the plastic part make side injection necessary. The same is true for other applications, in particular medical parts, which often have an eccentric injection point located in a visible or functional area. In these instances, side valve gating is the ideal solution, owing to its ability to produce impeccable surfaces. With the introduction of its 16-cavity mold for the production of syringe barrels at K 2007, männer has succeeded in creating a mold for side injection that provides the benefits of a valve gate system. The mold proves that unusual positioning of the injection points does not mean you have to forgo the advantages that are characteristic of männer's high-precision molds. While sticking to a compact design, männer has succeeded in developing a sophisticated mold concept for side injection that excels with respect to precision, stability, and cooling. At the same time, the mold introduced by männer at K 2007 holds its own against other molds in terms of cycle time and ease of maintenance while setting new standards with regard to process reliability.
Fig. 1:
männer 4-point SIDEGATE:
valve gate nozzle for side injection

Fig. 2:
syringe barrel
Fig. 3: männer's 16-cavity high-precision mold for side injection featuring valve gating and compact design (LxWxH) 446x496x450 mm

Fig. 4: fixed half with exchangeable mold inserts
Abstract
Side injection is a hot topic in the industry. A 16-cavity mold with a valve gate system for side injection was introduced for the first time at K 2007. This latest advance was developed and manufactured by männer – the high-precision mold and hot runner specialist for high-quality injection-molded parts. With around 370 employees worldwide, männer is among the industry's leading suppliers and has its own production, sales, and service locations in Europe, the USA, and Asia.

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