

# New quality standard in valve gating

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Heitec hot runner technology presents an innovative valve gate system for the production of high-quality injection-moulded parts.

Heitec now offers a new hot runner system for applications where plastic parts with a high surface quality or high component strength must be produced.

Both the design of the injection mould and the hot runner system have a decisive influence on the quality of the plastic part. Valve gate systems are being used more frequently for today's applications because the gate diameter can be chosen to be larger, thereby reducing the shearing in the gate area. Additional benefits include the high-quality gates as well as an optimized flow of the melt. This is attributed to the fact that, in contrast to applications without shut-off needles, the melt stream doesn't have to flow through one, two or three small holes in the nozzle tip. If you observe a transparent plastic part under polarized light, there are, depending on the type of plastic, to a greater or lesser extent pronounced visible flow lines. These flow lines are caused by the splitting of the melt flow in the nozzle tip. The flow lines produce tension in the plastic part, reduce the consistency and, especially in colored plastics or plastics coated with glitter, mar the appearance of the article's surface.

The flow lines are reduced, but not completely removed with a conventional valve

gate system. However, the new "Free-Flow" Hot runner system makes the elimination of flow lines, which were created by the hot runner, possible or prevents them from forming in the first place.

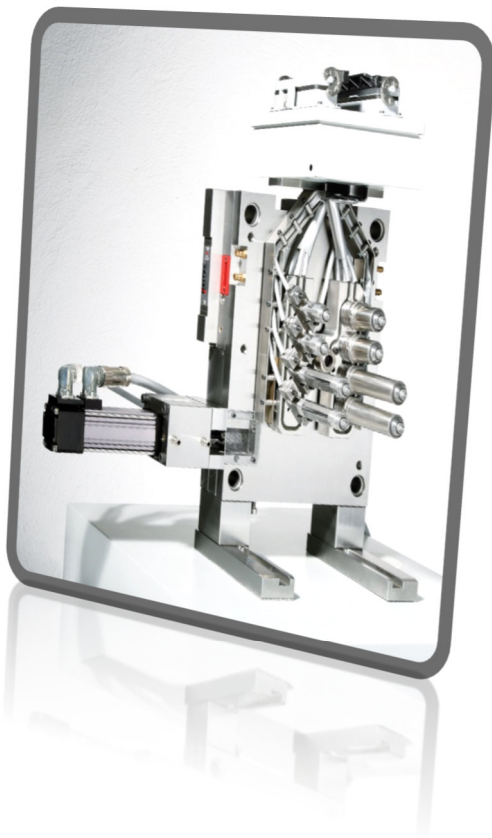
On conventional valve gate systems, the shut-off needle is positioned in the centre



of the hot runner nozzle and is surrounded by the melt flow. The shut-off needle interferes with the melt flow and contributes to an increase in a loss of pressure in the system. This occurs because the flow cross section in the nozzle is reduced by the presence of the shut-off needle. Since the needle is located in the midst of the

melt flow, the melt is split, similar to applications using nozzle tips. As a result of this, flow lines appear at the injection point and undesired tension points arise in the plastic part. With the "Free-Flow" system from Heitec, the molten plastic will at no point in time split and the flow lines, which are caused by the needle, will not even appear.

A test series with different materials that are difficult to process was done, among these materials was a SAN with 3% cos-



metic flitter.

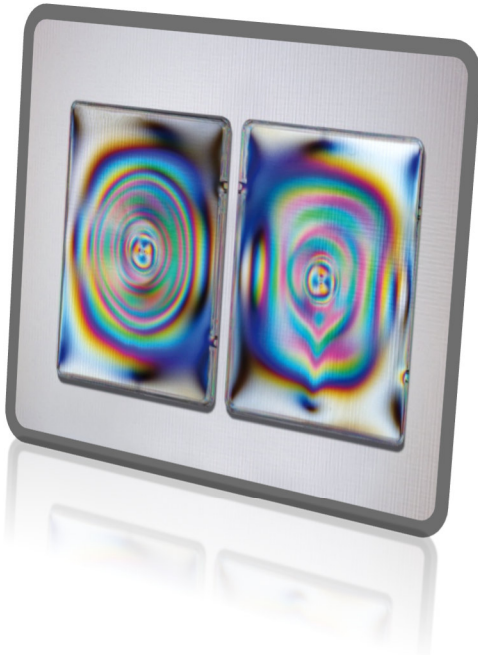
Two trial tools were constructed during the development process. Extensive material tests and injection attempts were carried out with a two-part box with measurements of 115 x 95 mm. In the special mold, it is possible to inject plastic parts in a conventional way with a special device in the tool or to create a "Free-Flow" effect

using the same mold. By doing this, it was possible to make a direct comparison from shot to shot and to assess the newly developed hot runner system. Obvious benefits of "Free-Flow" were recognized during the processing of plastics that were colored or coated with glitter. A SAN with 3% cosmetic flitter was used for test purpose. If this plastic material is injected without "Free-Flow", a distinct, almost black line is recognizable. This occurs because the glitter particles converge along the flow line. A flawless surface is the outcome when the plastic part is injected using the "Free-Flow" effect with identical injection parameters. During the course of the filling studies, it was observed that the typical heart-shaped flow pattern, which appears with the use of conventional valve gate systems, doesn't appear when "Free-Flow" is used. It is possible to inject a nearly perfect round pane. This underscores the homogenous filling behavior of the "Free-Flow" system.

"Free-Flow" is an optimal solution, particularly for the following fields of application: the production of plastic parts for the cosmetic industry, the production of containment vessels, components that are exposed to high mechanical stress as well as the manufacturing of optical lenses or headlamps for the automobile industry. Since the Free-Flow technology helps avoiding flow lines it does not have any

influence on the light refraction of optical plastic parts.

The Heitec „Free-Flow“ valve gate system



is now available as an individual application, as complete system or as hot half in various nozzle sizes and is suitable for every type of plastic, even technical plastics with difficult processing parameters. Shot weights between 5 g and 12 kg can be achieved due to the various sizes.

HEITEC Heisskanaltechnik GmbH

Frankenberger Straße 25

35099 Burgwald

Tel.: +49 (06451) 7283-0

Fax.: +49 (06451) 7283-83

[www.heitec.com](http://www.heitec.com)