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PLASTICS TECHNOLOGY GROUP

GAS ASSIST INJECTION MOLDING

ADAPTING YOUR PROCESS FOR GAS ASSIST

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THE TWO METHODS OF GAS ASSIST INJECTION MOLDING

Nozzle Injection

In 1996, a patent for using this technique lapsed into public domain. This patent held the greater gas assist industry at bay for a long time; not only is this method the oldest and easiest way to demonstrate the gas assist process, but it is also the simplest way to implement gas assist injection molding in a conventional molding process. There have been many designs of nozzles and hardware, some of which are very expensive and are difficult to create repeatable processes with. In addition, there has always been one issue with this type of gas injection: the need to use sprue break on the molding machine prior to opening the mold to vent the gas out of the part. Bauer has addressed this and we continue to research hardware and methods that will eliminate the need for sprue break using nozzle injection.

Gas injection through the nozzle is very easy to perform, even on tools that have not been designed for gas assist injection molding. The nozzle, which acts as both a shutoff and gas nozzle, simply threads on to an existing molding machine. Gas is connected to the check valve located in the body of the nozzle; once these items are installed, you are ready to employ the gas assist process.

The only real detriment in using this gas assist method is that the gas will leave a hole at the gate as it vents through the original sprue of the mold after resin injection is complete. It is not as controllable as gas injected through a pin, but is still a great starting point for gas assist conversion as it can be utilized without initial tool modification. Another minor setback with this gas assist method is that resin injection must be completed before gas is injected. The reasoning is similar to use of gas with a hot runner system; resin flow must be shut off to prevent any gas from traveling into the injection barrel. This can cause a stalling effect, leaving visible evidence of the stop and start of resin flow (known as a hesitation line).

Gas Pin Injection

Injection of gas through a small device located within the tool has become more prominent as gas assist technology has progressed. This is due to the need for more precise control of the gas within the mold cavity; because of this higher degree of control you can now shoot resin and gas simultaneously, which can be very advantageous in many applications. The use of gas pins in the mold does require varying

degrees of tool modification, though the costs of such modifications are typically minimal. The advantage of being able to apply pressure of the gas directly to the part or an area of the part itself has become a very user friendly way of injecting and pressurizing a plastic part.

Gas pins come in a variety of configurations, but very few types work for the long term. Through extensive research and development, Bauer markets one of the most reliable, compact pins designs on the market. Molders who have any type of gas assist equipment often gravitate towards using the Bauer pin because of its proven effectiveness and its compact design.

In gas pin injection, a gas line is connected to the side of the mold and is connected via channel to the pin. The pin, which is mold face mounted, then injects the gas into the part or runner depending on part design. Gas pins or injectors can be placed in multiple locations and usually require less pressure to penetrate into the part as compared to nozzle injection. Either way, you will still always have a hole in the part.

It is important to remember the following points when making a decision on which gas assist method is most appropriate for your application:

1) Seek expert advice when considering gas assist injection molding.
2) Control on the short shot is crucial. Ensure barrel and screw tolerances are within specification.
3) Make sure you are using a highly controllable gas system.
4) Gas assist will save you money in many ways:
    a) Reduce tonnage
    b) Reduce cycle time
    c) Reduce tooling costs
    d) Increase product design criteria
    e) Improve quality of the molded part
    f) Improve marketability
    g) Improve startup of molds
5) Gas assist is not always the correct process.
6) There will always be a hole in the part.
7) Mold flow simulations using gas assist are available and can be a very useful tool.

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