Resource-saving production with the sandwich technology from WITTMANN BATTENFELD

In sandwich injection molding, two different materials are injected in quick succession to give parts a 3-layer structure. The core material is completely enclosed by an outer shell. An attractive surface is created by using a high-grade material for the shell. The core material is selected to fit the purpose of the molded part and the requirements it must fulfil. To prevent sink marks or to reduce the part's weight, for example, the core material can be foamed, or a reinforced plastic material can be used to boost its mechanical strength.

A special role is assigned to the sandwich technology as part of WITTMANN BATTENFELD's quest for sustainable, resource-saving production processes, since sandwich injection molding also enables the use of recycled materials as "fillers" for the core component.

Sandwich technology has a long-standing tradition at WITTMANN BATTENFELD. This process is available across the company's entire range of machinery. It can be implemented just as effectively in the lower clamping force range on machines from the *SmartPower* series, as on machines from the *MacroPower* series in the upper clamping force segment.

The specially developed sandwich software for the UNILOG B8 control unit supports easy setup of the defined standard sequences. These are the simple two-step sequence of shell – core, or the three-step sequence of shell – core – shell to "seal" the gating, as well as the multiple sequence for interval injection with the result of a marbling effect on the molded part through several alternations between the two injection units.

Depending on the machine model and size and customer-specific boundary conditions, a choice of several different sandwich machine versions are available. Oftentimes, the machine must not only be suitable for sandwich technology applications, but also for standard applications as well. In this context, the *MacroPower* in the medium clamping force range with an H-Y configuration of its injection units has proved particularly advantageous. The main injection unit is placed central, in the standard position (H), the second injection unit is positioned diagonally behind the main aggregate in Y configuration. This configuration provides good access to the nozzle and to the barrel to enable easy and safe servicing from both sides. Moreover, it makes material feeding with standard material loaders possible. The Y configuration of the second aggregate also provides short flow paths. The reclining position of the injection units keeps the total height of the machine low, thus ensuring an easy installation of automation equipment as well.

Thanks to the central positioning of the main aggregate, the machine can also be used as a conventional one-component model without any significant adaptations.

An application example for sandwich injection molding implemented at WITTMANN BATTENFELD is a bowl made of PP with a foamed PP regrind as its core component.

In this case, the “gas pressure” of the foamed core material prevents sink marks, especially in wall thickness boundary areas, where conventional holding pressure can no longer take effect, such as at the end of the flow path at the upper rim of the bowl in this particular application example.

Another characteristic of this part worth mentioning is its remarkably high 60% core component proportion consisting of regrind.

How much core material can be used without it breaking through the skin layer and becoming visible on the surface depends on the design of the molded part and its particular geometry.

Edmund Kirsch, product specialist for multi-component technology at WITTMANN BATTENFELD, will be glad to offer expert advice to customers wishing to produce specific parts as to how far the sandwich process is suitable for their particular application, and what results can be expected from this process in each case.

Fig. 1a+b: Application example “large bowl” and 3-layer shell-core-shell structure

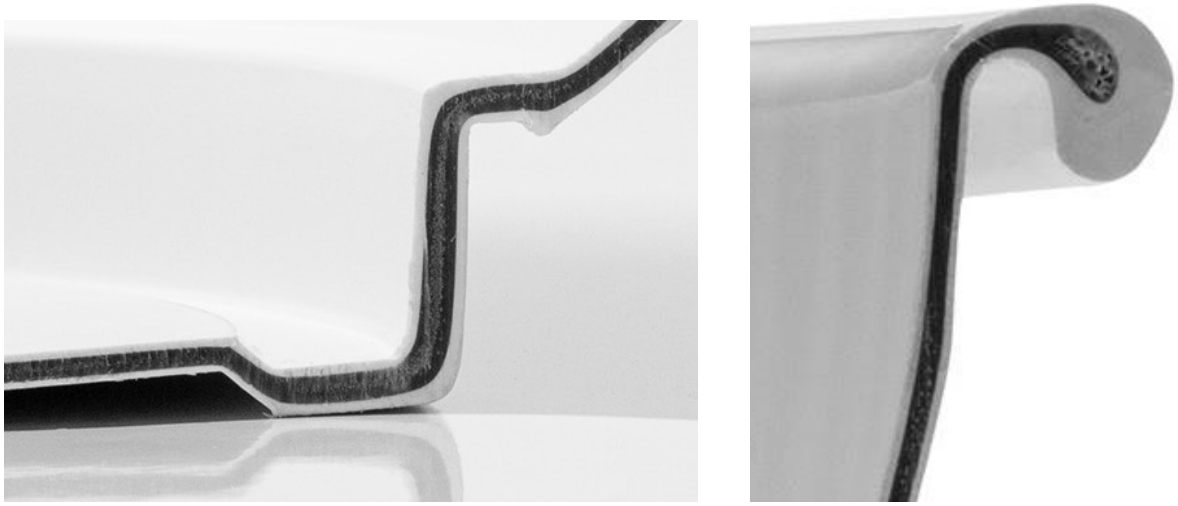

Fig. 2: 3-layer core material foamed to prevent sink marks

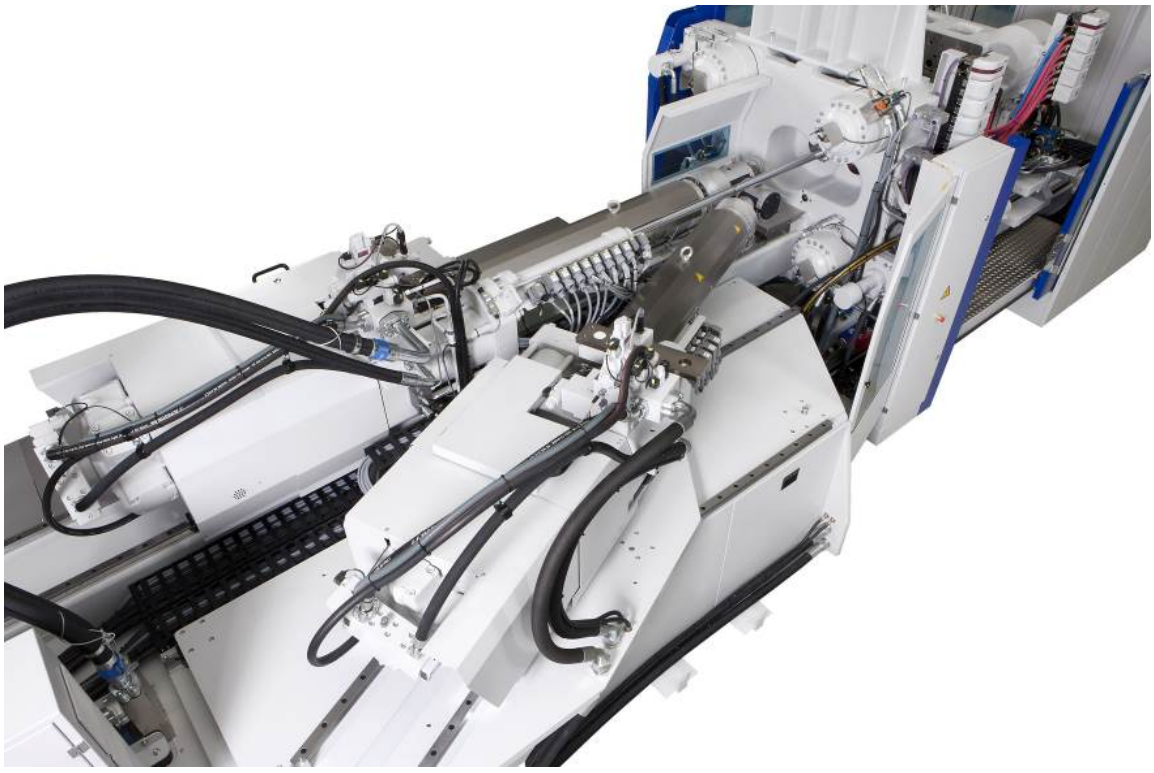

Fig. 3: View of the injection units of the *MacroPower* sandwich machine from above

Fig. 4: Y configuration of injection units

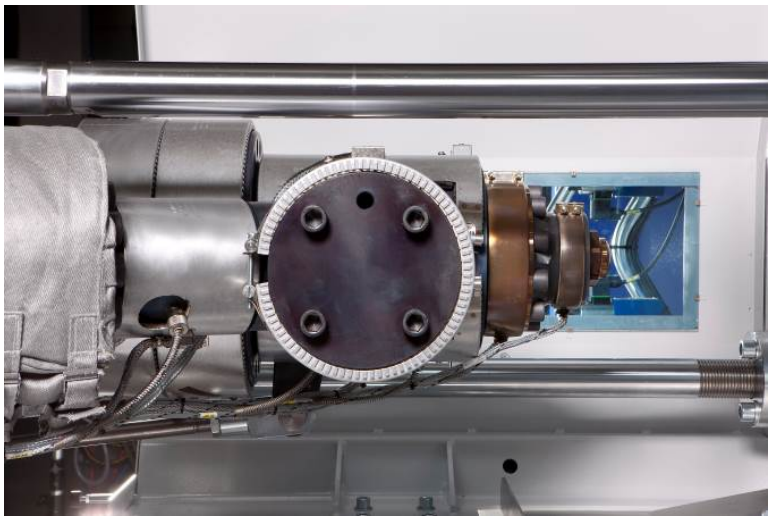

Fig. 5: WITTMANN BATTENFELD sandwich nozzle

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