September 2013, Kottingbrunn/Austria

PRESS RELEASE

WITTMANN BATTENFELD at the K 2013

“Power for the Future” for feather-weight foam cores in flawless shells

Foam injection molding becomes fit for the world of visible components

In cooperation with SCHAUMFORM GmbH, WITTMANN BATTENFELD is demonstrating at the K 2013 in hall 16, booth D22, how foamed injection-molded parts can be produced with a surface quality which actually looks exactly like the surface of an injection-molded part made of solid material.

The part produced is a component formed with structured foam technology with a visible surface. It is actually a tray for depositing a coffee cup or placing a business card on. In this application, the CELLMOULD® structured foam process from WITTMANN BATTENFELD is used in combination with variothermic tempering and the HiP-Opening (High Precision Opening) program. Through this high-precision opening process, a reduction in weight of up to 30% can be achieved; the integral foam distribution ensures a light-weight, yet sturdy molded part.

The components are manufactured on an energy-efficient, all-electric ***EcoPower 240/1330*** equipped with the CELLMOULD® and Variomould packages and the HiP-Opening program. Parts removal and depositing is handled by a WITTMANN W822 robot. At the K 2013, an all-electric toggle machine is used for the first time to implement this combination of processes.

Where three innovative technologies, namely physical melt foaming, variothermic mold tempering and high-precision mold opening, are combined with each other, optically flawless visible parts can be produced by foam injection molding. The parts not only show a surface completely free of striations, but thanks to high-precision opening of the foam injection mold, the foam expansion can be controlled with extreme accuracy. The parts produced can therefore be 30% lighter than their compact predecessor models. Typical applications are automobile interior cladding parts, as well as components for sports equipment or housings of electrical appliances.

In conventional foam injection molding with a high-precision opening function an optimal compromise is invariably sought when setting the mold temperature, melt temperature and foaming parameters, which includes the gas load and the opening stroke. The mold temperature is set just high enough to provide conditions for foaming the material which are still favorable but also make it possible to produce the parts in a short cycle time.

Consequently, the thermal conditions in conventional mold tempering, which are set primarily to promote the development of foam, must also be accepted for the formation of the surface. For optimal foaming, however, and above all for a striation-free surface, much higher cavity wall temperatures would be necessary. The comparatively low mold temperature which has been in general use so far therefore contributes to the formation of the typical striations found in injection-molded parts.

With variothermic mold tempering, thermal separation of surface formation, foam expansion and cooling of the molded part from each other has been achieved. The process can be divided into three phases.

In the injection phase, the thermoplastic melt loaded with gas strikes a cavity wall with a high temperature. The injection pressure presses the plastic material against the hot cavity wall, so that the surface striations, which are otherwise typical for foam injection molding, are completely eliminated, provided the process is properly managed.

In the second phase, optimal conditions for the formation of foam are created, i.e. before the actual foam expansion begins, the cavity wall temperature is lowered, and high-precision opening is either started almost immediately at the end of the injection process or with a deliberate, slight delay.

The main concern of the third phase is stabilization of the foam structure and, above all, cooling of the molded part to demolding temperature. To this end, the mold temperature is reduced as quickly as possible to a lower level within the normal range for constant mold tempering.

The combination of physical gas injection into the melt with cyclical heating of the foam injection mold and foam expansion with high-precision opening of the mold not only opens the door to using foam injection-molded parts for visible applications. Since the foaming process takes place at a higher mold temperature than the subsequent cooling phase, a stronger foam expansion can also be achieved, and since the injection phase is also carried out at a significantly higher mold temperature, even extremely small wall thicknesses can still be filled. Both these

factors have a positive effect on the design of light-weight components. As a result, visible parts can be produced with this new foaming technology with up to 30% less weight than their compact counterparts. The key to success lies in the correct coordination of the technologies applied.

In addition to vehicle construction, which constitutes undoubtedly one of the most important fields of application for visually attractive, high-gloss injection-molded parts with top-quality surfaces, numerous applications in many other areas are conceivable. These include housing components of medical appliances, as well as storage container systems or sports equipment such as injection-molded snow shoes.

Last but not least, the elimination of striations also leads to a visible surface on foamed components which is ideally suited for subsequent painting or even metallization. So foam injection molding with high-precision opening in combination with cyclical mold heating is suitable for almost as many fields of application as have previously been conceivable for standard injection-molded visible parts.

Fig. 1: The parts are produced on an *EcoPower* 240/1330 equipped with the HiP-Opening program and the Wittmann Battenfeld CELLMOULD® package

Fig. 2: Interior component produced by structured foam technology with a visible surface

SCHAUMFORM

Schaumform is a technical service enterprise that is specialized in the development of lightweight parts. There are always thermoplastic materials in use. Schaumform starts with the product design and delivers tested prototypes ready for production.

The WITTMANN Group

The WITTMANN Group based in Vienna/Austria is one of the world's leading manufacturers of robots and peripheral equipment for the plastics industry. The WITTMANN product portfolio includes robots and automation equipment, automatic material loaders and material dryers as well as equipment for plastics recycling, mold tempering and cooling, and volumetric and gravimetric metering appliances.

WITTMANN BATTENFELD, a company of the WITTMANN Group with its headquarters and production facility in Kottingbrunn (Lower Austria), is a leading manufacturer of injection molding machinery and equipment for the plastics industry. The company is present in about 60 countries with its own sales and service companies as well as representative offices, thus offering optimal support to its customers in all matters concerning injection molding technology.

WITTMANN BATTENFELD at K 2013: hall 16, booth D22
WITTMANN ROBOT SYSTEME at K 2013: hall 10, booth A04

Contact:

WITTMANN BATTENFELD GmbH
Wiener Neustädter Strasse 81
A-2542 Kottingbrunn
Tel.: +43 2252 404-1400
Fax: +43 2252 404-991400
gabriele.hopf@wittmann-group.com
www.wittmann-group.com

WITTMANN BATTENFELD GmbH & Co.KG
Werner-Battenfeld-Strasse 1
D-58540 Meinerzhagen
Tel.: +49 2354 72-0
Fax: +49 2354 75-485
info@wittmann-group.com
www.wittmann-group.com