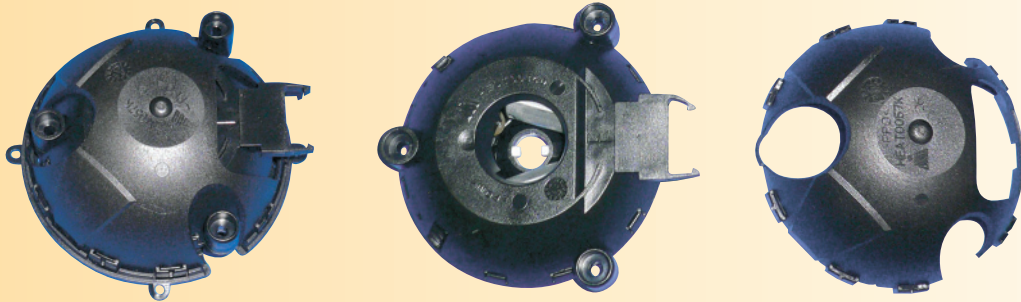




Melt flow control for exterior car mirror drives

# High quality for a high number of pieces



*Faceplates and subshells for exterior car mirror drives: Depending on the type, the systems are consisting of approx. 15 different molded parts.*

The automotive supplier Magna Auteca mass-produces drives for exterior car mirrors. There were consistently problems during production with not completely filled cavities. The consequences were scrap and an extensive finishing. Thanks to an active melt flow control system these problems belong to the past.



*Christopherus Bader, CEO Priamus (right), Karl Buchgraber, Production Manager at Magna Auteca (left): "With the active melt flow control we see irregularities during injection molding process before we have scrap."*

Magna Auteca AG, Weiz/Austria, produces each year 12 mio drives for electronically adjustable exterior car mirrors. Depending on the type, the systems consist of approx. 15 different molded parts and are produced in various versions for different exterior mirrors, for example with or without memory function. The injection molding of all components on altogether 25 machines and the fully automatic assembly of the electronically adjustable devices are done completely at the site of this automotive supplier in Weiz/Austria.

"The systems are compactly set up so that they fit in without any difficulties in different mirror shells. They run very stable and have a high quality through a 100 % control of all components," Karl Buchgraber, production manager at Magna Auteca, describes the advantages of the devices. Before using PRIAMUS Fill, a system to control, monitor and balance the melt flow in hotrunner molds, they had again and again scrap caused from not entirely filled parts. "For example during injection molding of the shells for the drive of type MR4 on an 8-fold mold,

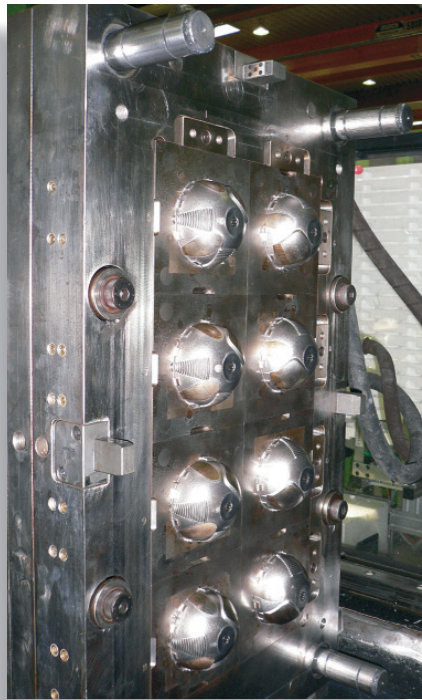
many times the cavities were not filled completely," remembers Buchgraber. It also occurred that these parts came to assembly. "In some cases we noticed faulty parts not until after the mounting of the devices. That cost a lot of time and effort to dismantle these devices," says Buchgraber. The production manager remembers cases where his employees had to inspect several thousand parts to sort out eventually two faulty parts. "Before using the hotrunner control system we had about four or five major sorting actions per year in order to detect faulty parts," tells Buchgraber. "This doesn't happen anymore. Today we see possible problems already during the injection molding process, also before we have scrap." During the process the system controls small variations independently. It analyzes permanently with the help of cavity temperature sensors the filling of each cavity. If there are deviations, it adjusts the temperatures of the hotrunner nozzles automatically so that a balanced condition is always guaranteed. The system controls the cavities so that they are filled at the

the same and in the time. With a free definable temperature window the limits can be set within the hotrunner temperature has to range until an error message arises. "By monitoring the mold cavity temperature not only problems with hotrunners can be seen but also such with temperature controllers or blocked cooling channels," knows Buchgraber. "Users can save quality control costs because if there are no faulty injection molded parts there is no need to control them."

### Detect error causes

During production of the subshell for an electronically adjustable drive the control system identified for example irregularities caused by the hotrunner. "We knew from filling studies that the single cavities had different fillings," remembers Buchgraber. "After installing the control system we saw clearly that the temperature differences during the filling of each cavity were caused by an insufficient feeding of the heating. So it was the hotrunner's manufacturer responsibility to make adequate corrections. In addition, the system recognized deviations in viscosity of the raw material. We then asked the supplier to deliver a more constant quality."

"In general the technology of active melt flow control ensures a high transparency of the whole injection



*There were problems with not entirely filled cavities during injection moulding*

molding process," explains Christopherus Bader, CEO of Priamus System Technologies AG, Schaffhausen / Switzerland. "Apart from balancing multi cavity molds the system has yet other functionalities." He mentions as an example the applications with family molds which are automatically controlled in order to meet a reference condition. Multi component applications are being optimised by the control units which balance each single component during production. Sequential molding applications are controlled in a way that the melt flow in two molded parts is always at the same time at the same position. "The system can also be used for the mold setup of new molds, for example to learn how the hotrunner system is balanced," adds Buchgraber. "Further applications are for example delayed opening and closing of nozzles, process dependent pushing and pulling of venting cores or the control of weld lines."

At present the system can control up to 64 hotrunner channels. New is the integration of the additional module "Cool". This does

not control the melt temperature but influences the surface temperature of the cavities and is responsible for a uniform temperature distribution over the cavity surface which affects positively shrinkage and warpage of the molded part. The additional module Priamus Heat is designated for thermoset and elastomer applications.

The two companies made the implementation of the system together. The respective bores had to be attached to the mold and a temperature sensor had to be installed in each cavity. "It is of course easier to plan such a system already during the design of the mold," knows Buchgraber. The system can be adapted any time for other applications. By the same number of cavities no additional components are necessary. If a molder moves for example from a 4- to a 64-cavity mold, he needs additional amplifier channels. "This retrofit however is easily possible," says Bader. "If an injection molder decides to implement a melt flow control he has to plan investment costs, depending on the system, of 16 000 to 20 000 Euro," adds the system supplier. The investment paid well off for the automotive supplier. Four systems are in operation at the site in Weiz. The production is running since two years. Within one year the systems were amortized.

Christian Bothur

### Magna Auteca

Magna Autece AG, Weiz/Austria, produces with 280 employees electronically adjustable plastic drives for exterior car mirrors. Clients are automotive manufacturer such as Daimler-Chrysler, VW, Audi, General Motors and BMW. The 1987 established company is a daughter of the worldwide operating automotive supplier Magna. Magna develops, constructs and produces systems, assemblies, mounting parts and components for cars and light trucks. The company employs worldwide over 82 000 persons.

### Priamus

Priamus System Technologies AG, Schaffhausen/Switzerland, was established at the beginning of 2001 and employs today 25 persons. Products range from cavity pressure sensors, cavity temperature sensors and corresponding electronics to whole measuring systems for process monitoring and process control. Apart from the headquarter in Schaffhausen Priamus has group companies in Germany, USA and Japan.