

## Think big

Autotest relies on a System 1500 machine for injection moulding of rear spoiler modules



The front bumpers of the Porsche Panamera Sport Design package are produced at Autotest Eisenach.

The holding frames for the bumpers of the Porsche Panamera with Sport Design package weigh about 700 grams. Only a fraction of the weight of the bumper. However, the holding frames impose exacting requirements on injection moulding production; they make a significant contribution to the rigidity of the complete component and, what is more, must be visually perfect. The components supplier Autotest Eisenach achieves this using a high-performance injection moulding machine from Sumitomo (SHI) Demag.

Autotest is not a company that thinks in small dimensions: The company with its headquarters in the Italian town of Lana is a tier 1 supplier to the major brands in the automotive industry: any of the big names from Audi, BMW, Daimler, Lamborghini, VW through to Porsche. Nowadays, they all decorate their vehicles with interior and exterior parts from the Autotest's Eisenach plant: fuel tank flaps, front spoilers, rear spoilers, instrument panels, door trims ... anything that can be made from plastic. Autotest has established itself on the market above all as a system supplier of complete modules. The Development and Project Management departments for these are located in South Tyrol, from where they operate centrally for all sites. As well as Eisenach and Lana, these are located in Bratislava (Slovak Republic) and Fortezza (Italy). "We undoubtedly focus on innovative applica-

tions. We regard ourselves as the partner to OEMs, and we work with them to develop ground-breaking solutions," explains Karl Menrad, the CEO of Autotest Eisenach GmbH. By way of example, he refers to a new rear spoiler module for the Porsche 991 SDP / Aerokit. In the past, this had traditionally been a composite part. Autotest then suggested a combination of injection moulding and polyurethane (PUR) to the Stuttgart-based luxury car maker. Menrad: "Although this means the rear spoiler is slightly heavier, it does cost about a third less." In July 2012, Autotest Eisenach was awarded the Porsche Supplier Award 2011 as a reward for this and other innovative ideas.

### Eisenach as a site for large injection moulding machines

The example shows that injection moulding production at Autotest goes hand-in-hand with PUR processing. Due to its history – as a site of AKTec Automobil- und Kunststofftechnik belonging to the Edag Group – the company in Eisenach initially concentrated entirely on PUR processing. However, Menrad above all thought there was potential to use large injection-moulded components in the exterior area, such as rear and front spoilers. Consequently, the top floor quickly decided to establish injection moulding production in Eisenach with machines from 10,000 kN clamping force and up. The principle was as follows: small and medium-sized components come from injection moulding production in Fortezza – Think big in Eisenach. With equal alacrity, the plan was put into practice because new orders were already being received: a new hall for injection moulding was set up and employees hired within a matter of weeks. These personnel were furnished with the necessary company knowhow by the injection moulding experts from Fortezza. All that was missing was an injection moulding machine with high clamping forces that could be delivered quickly. Menrad found the



Large machine for large components: The holding frames of the bumpers of the Porsche Panamera are produced on the System 1500 injection moulding machine from Sumitomo (SHI) Demag with 15,000 kN clamping force.



Karl Menrad, CEO of Autotest Eisenach GmbH, won a series of new orders from German automobile manufacturers in early 2011.



Karl Menrad inspecting a rear spoiler. Autotest Eisenach combines injection moulding technology and polyurethane processing for such components.



After the bumper parts have been painted at an external partner, they are quality-checked at Autotest and then glued together.

answer at Sumitomo (SHI) Demag, and chose a System Large 1500 with 15,000 kN clamping force. "In the past, I always had good experiences with machines from Sumitomo (SHI) Demag. Also, our partner companies confirmed to us that the machines operate very reliably," says Menrad. For him, reliability and excellent, reproducible results are the decisive factors in injection moulding. "We produce within tight timeframes, according to our orders from automobile manufacturers. We don't have a large back-up warehouse. This means nothing is allowed to go wrong with our production. As a result, we need reliable injection moulding machines with reliable processes and high availability," says Menrad. He makes this clear by taking the example of a holding frame for the front bumpers of the Porsche Panamera Sport Design package. With the Sport Design package, Porsche offers Panamera customers an opportunity to give their vehicle a more individual look. It comprises a special front-end part painted in body colour, with enlarged black air inlet grilles, characteristic sill trims as well as the rear-end underside painted as standard in body colour, including a diffuser with fins. Autotest produces this bumper in Lana. The sill as well as the trims are made from PUR-RIM, whereas the holding frame and the air guides are injection-moulded from thermoplastics. A holding frame of this kind weighs between 700 and 800 grams; it makes a significant contribution to the rigidity and stability of the entire

module. Therefore, ASA/PC material was selected instead of PP. As well as this safety aspect, it is above all the look of the injection-moulded part that is important.

**Optical component with exacting surface requirements**

Menrad: "This is a component with what we refer to as a 'zero-kilometre look' which does not receive any subsequent surface treatment. As a result, it is extremely important that no surface defects or dents to be visible after the injection moulding. Post-shrinkages have to be ruled out, therefore." For this reason, Autotest has selected a cycle time of 70 seconds. One issue with this large component concerns the long flow distances. As a result, it was important for Autotest to find out during the development and in the startup: Where will we put the moulding gates? Where is the optimum reversing point? How powerful should the squeezing be? How can the flow lines be transferred into the non-visible area? All of these parameters should then be presented for the follow-on time as a reliable process, stored and able to be recalled at any time.

**Wanted: an injection moulding machine with many options**

"For this reason, we need a machine that offers many options right from the start, in order to achieve the optimum injection moulding result," says Menrad. "It is better to sort out a certain quantity of faulty parts during startup, rather than having

to do so later on in series production. That's less painful – and later on, we simply no longer have the time to optimise the process." The batch sizes in injection moulding of the holding frame for the Porsche Panamera are between 1,000 and 2,000. This means the mould remains on the machine for between four and six shifts. The specification from the CEO is unequivocal: the machine has got to deliver reproducible results very quickly after startup – after a maximum of five to ten scrap parts. "We can achieve this without problems using the machine from Sumitomo (SHI) Demag. This is because the machine monitors all parameters throughout the entire production, and it activates an alarm if the actual values deviate from the nominal values. To this extent, we can fully rely on the machine."

To obtain optimum results from the injection moulding process, Autotest safeguards it using simulation software. This is used right from the development phase in order to carry out verifications. Later, the supplier undertakes the comparison with the actual injection moulding parameters on the machine. This is in order to find out where and which distortions are to be expected, for example. Only then is the mould built. During startup, the software helps to tap the optimisation potential to the full – parameters that the setter on the machine does not know. The insights gained are then put to use in the machine controller.



Delighted with the successful start to injection moulding production at Autotest Eisenach (from r.): CEO Karl Menrad, Autotest founder and owner Josef Unterholzner as well as Wolfgang Zill, sales employee at Sumitomo (SHI) Demag.



Josef Unterholzner (right) receiving the Porsche Supplier Award 2011 in the Production Material Category from Porsche CEO Matthias Müller. This means Autotest is one of the ten best suppliers of the previous year.

Menrad also knew precisely what he wanted when deciding which peripheral devices to use: for example, he insisted on an A and B axis to be integrated in the production unit for handling purposes. In this way, the sprues can be cut off whilst still in the gripper directly after removal from the mould, before the parts are placed on a belt. This saves about 30 seconds processing time per holding frame.

At Sumitomo (SHI) Demag's recommendation, the machine was also equipped with a material feed system featuring two containers from Werner Koch Maschinenfabrik GmbH, Ispringen. As a result, two standard granulates are always available. The system was integrated directly into the machine controller in order to achieve the greatest possible level of security in material selection. "The experts from Sumitomo (SHI) Demag are our partners who respond quickly and flexibly to our requirements," says Menrad with satisfaction. At the present time, Autotest Eisenach produces twelve different components on the injection moulding machine – and the next major order has already winged its way to the company: a multi-piece rear spoiler for the Audi A3. Autotest is the sole supplier. The upper and lower shells are produced in Eisenach, while the aerodynamic corners made from PMMA are supplied from Autotest's plant in Fortezza. In addition, all parts are connected together on a gluing machine in Eisenach, before being delivered directly to Audi. Following the

startup ramp, output should plateau at 550 rear spoilers a day.

#### **A sequential valve gate controller is on the shopping list**

In order to cope with these quantities reliably, Autotest has already ordered a second System 1500 machine from Sumitomo (SHI) Demag. To a large extent, this will have the same functions as the first machine – but with a few additional items by means of which Menrad intends to crank up the production efficiency even further: for example, it is his absolute requirement for there to be a sequential valve gate controller for staggered con-

trol of sealing nozzles. In this way, it will be possible to influence the flow paths more effectively. Furthermore, he is considering how the setup times can be minimised such as by bringing the moulds to the required temperatures in advance. The switch-on program of the NC5 controller should help to achieve this: it allows oil preheating, cylinder heating, mould temperature control or socket combinations to be started without operator intervention. All procedures can also be started up in a staggered procedure, thereby facilitating the automatic startup of the machine by programming the date, day and time. ■

#### **Autotest on course for growth**

Think big also applies to the company development of Autotest AG. Up to spring 2011, the South Tyrol component supplier had only been represented by one sales team in Germany. When, in 2010, the Edag Group company AKTec Automobil- und Kunststofftechnik in Eisenach – or more precisely Hörselberg-Hainich – was put up for sale, it quickly became clear to the Autotest founder and owner Josef Unterholzner that he wanted to take over the site in the middle of Germany lock, stock and barrel with its 160 employees, machines and orders, so as to be closer to German customers. In doing so, Autotest doubled its workforce at a stroke. The number of customers also increased: VW and Audi were already on the order books, and Autotest now also works for Daimler and Porsche. The company can also look to its sales figures with pride: for example, Autotest Eisenach GmbH planned to achieve sales of EUR 9 m in 2011. In fact, Autotest Eisenach GmbH finished the year with EUR 11.5 m. Further increases are indicated. As a result, the Autotest Group expects to report more than EUR 48 m sales in 2012, and to break the EUR 55 m barrier by the end of 2014. Above all, growth at the Eisenach site is to be promoted through a further expansion of capacity. Thus, a new logistics hall covering 4,000 m<sup>2</sup> will be completed in 2012/2013, as well as the covering over of a 3,000 m<sup>2</sup> yard area.