



The colour displays are mounted on the headrests of the front seats for the rear-seat entertainment system.

Stable, reliable and flexible

Rear-seat entertainment systems help make car trips a relaxing experience. To ensure the production of the display frames also runs smoothly, Plastivaloire in Langeais near Tours in France relies on tie-bar-less injection moulding machines from ENGEL. For the automotive supplier, they guarantee high precision and the flexibility to integrate multiple processing technologies at the same time.

High-quality finishes are one of the specialties of the Plastivaloire Group, which is at home in the field of automotive, multimedia, industrial, household appliances and recreation. Very diverse technologies are in use at the altogether 25 production sites in Europe and North Africa: from variotherm tempering to in-mould decoration and paint finishing to chrome-plating. At the headquarters in Langeais, the development team is continuously working on new techniques for which they are increasingly combining different technologies into one integrated process. "The requirements of our customers are becoming more complex," explains Fabien Kiffer, director of the facilities in Langeais. "A high-quality finish alone is not enough. At the same time, we must also reduce unit costs, and save raw material and weight."

Plastivaloire produces 100,000 frames for colour LCD displays per year. These are installed in the rear-seat entertainment system of the Mercedes S-class, which is an option that the automobile manufacturer also offers for several other models. Until recently, the frame consisted of two pieces. The mounting and decor were injection-moulded separately, fitted together and then painted. In order to increase production efficiency even more, Plastivaloire developed a new manufacturing

process. This not only saves one complete production step, it also improves the quality of the product. The key to this lies in the combination of physical foam injection moulding with variotherm process control on a tie-bar-less ENGEL e-victory injection moulding machine. "We were able to achieve a marked increase in production efficiency with the new process," says Dominique Manceau, director of research and development at Plastivaloire: "Now we can produce thin-walled parts out of PC-ABS with very high quality surfaces and excellent fine structure reproduction at the same time in a single injection moulding step. In addition, we make a contribution to lightweight design. The new frames weigh 30 percent less than the two-piece version." Optically, the visible parts fulfil the high requirements directly after the injection moulding step. The paint with which they are subsequently sprayed only serves to improve the scratch resistance.

Sophisticated thin-walled parts with a perfect surface

For mould temperature control, Plastivaloire implements an inductive method from Roctool. Before the injection of the plastic melt, the inner surfaces of the cavities are heated and then cooled after the form has

been filled. This method raises the contact temperature between the melt and the mould wall, thus retarding the development of a solidified layer at the edge and reliably preventing the formation of flow marks on the surface of the part.

While the variotherm process brings a shine to the piano-black surface, the MuCell foam injection process developed by Trexel opens up new freedom for component design, reducing the amount material needed and reducing component weight. "Foam injection moulding makes it possible for us to realise component geometries that could not be produced using conventional compact plastic melt," says Manceau.

Tie-bar-less injection moulding machines provide advantages for foam injection moulding, since the foaming process improves the flow properties of the melt and thus reduces the required clamping force. The tie-bar-less technology makes it possible to choose the machine size according to the amount of clamping force actually needed instead of according to the size of the mould. As a result, the tie-bar-less design supports the trend towards more compact production cells and reduces both the investment and operating costs.

Perfectly equipped for the future with hybrid machines

In Langeais, the preferred model is currently the ENGEL e-victory hybrid machine with a tie-bar-less hydraulic clamping unit and all-electric injection unit. "Many of our moulds have hydraulic core-pulls and sliders," explains Patrice Quellier, director of maintenance at the site. "Thanks to the integrated hydraulics of the hybrid machine, we don't need an extra hydraulic system for the core-pulls, and at the same time we can achieve very high precision with the electrical injection unit." Plastivaloire is certain that it is also optimally equipped for future challenges with tie-bar-less injection moulding machines. "The integration of multiple

technologies will continue to gain importance," says Fabien Kiffer. "Thanks to the barrier-free clamping unit, the tie-bar-less machines offer great flexibility in this respect." The more technologies that are combined, the more complex the process as a whole becomes, and the process window becomes smaller. "We need extremely stable and reliable machines for this," says Vincent Garon, director of production at the headquarters in Langeais. "We know that we can rely on the high process stability and reproducibility of the ENGEL victory and ENGEL e-victory machines."



"With the double integration of technologies, we achieve thin-walled parts with a very high-quality finish and at the same time an excellent rendition of fine structures, all in one single production step."

Dominique Manceau, director of research and development at Plastivaloire



Long-year cooperation: Vincent Garon, Patrice Quellier and Fabien Kiffer of Plastivaloire with Philippe Sterna, managing director at ENGEL FRANCE, and Franz Pressl, product manager for the tie-bar-less ENGEL victory and ENGEL e-victory machines at ENGEL AUSTRIA (from right to left).



The machine park in Langeais contains 55 mostly tie-bar-less injection moulding machines.