

The project team in front of the new MXW 1000 ColorForm injection molding machine (from left): Peter Giessmann (KraussMaffei), Eric Jan Frijters (Techniplas), Philipp Strasser (KraussMaffei), Michael Fuchs (KraussMaffei), Rene Rudolf (Techniplas) and Sarah Seidel (Techniplas). © KraussMaffei

Combination of Injection Molding and Polyurethane Processing

No Grain of Dust in the Coating

Techniplas and KraussMaffei are focusing on sustainability in the production of high-quality automotive components with an MXW ColorForm system. Flow-coating with PU directly in the injection mold saves working steps and CO₂. With this system, KraussMaffei is demonstrating its expertise both in injection molding as well as in reaction process machinery.

In Treuen, Saxony, Germany, a KraussMaffei MXW 1000 ColorForm system for the series production of components with a transparent surface has been put into operation. "ColorForm technology holds great potential for a lower CO₂ footprint in the production of components with a finished multifunctional surface," explains Michael Fuchs, Global Application Owner Surface & Lightweight

at KraussMaffei. Now the technology once more demonstrates its strengths at Techniplas, the well-known provider of sophisticated plastic components for the automotive and plumbing industries.

ColorForm: Coating Right in the Mold

Process expertise and quality awareness are the keys to sustainable pro-

duction in the automotive industry. The wealth of experience of Techniplas as the user and KraussMaffei as the provider of injection molding technology and PU/PUA processing systems makes solutions possible that become increasingly more significant these days. ColorForm, that is, the ingenious fusion of injection molding technology and surface finishing with polyurethane in a

single process step, is one such solution.

The ColorForm process is based on a combination of injection molding and polyurethane processing. The tried-and-tested multi-component injection molding procedure is the foundation of this process. What is special about it: after injection molding of the thermoplastic mold base body, this body is flow-coated with polyurethane (PU) or polyurea (PUA) as the surface material in a second cycle (**Fig. 1**). The RimStar Flex ColorForm reaction process machine, which was designed specifically for this process, and the mixing head feed the surface material (PU/PUA) directly into the cavity. "RimStar systems take up very little space and meter even small amounts precisely and at a high clock frequency," explains Philipp Strasser, Global Application Owner RPM & Automotive at KraussMaffei.

Transparency with Depth Effect

"On this system, parts are produced in the injection-compression molding process. To obtain a special depth effect, a premium-quality, transparent PU surface is applied to these parts," explains Toni Luckner, Process Developer in Treuen. A swivel plate tool is used for this (**Fig. 2**). "One more system for the project will be put into operation in the first quarter of 2022."

"Our customers, large OEMs from the automotive industry, have stringent requirements regarding quality. There must not be any deviations greater than 0.2 mm on any part of the transparent component. Using the MXW 1000 in combination with the RimStar Flex for PU metering, we fully meet these requirements," says Luckner.

Techniplas has had positive experiences with the ColorForm technol-

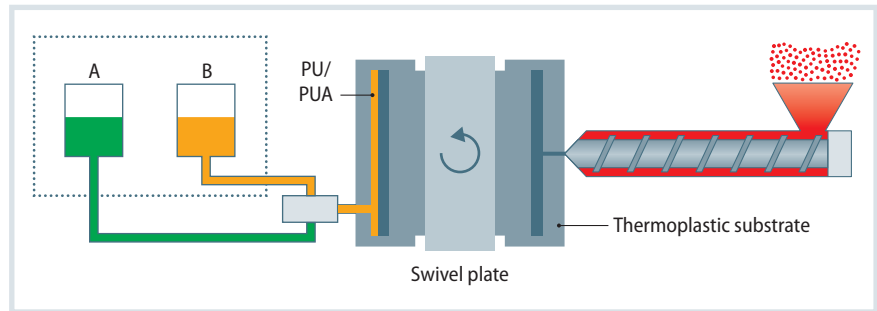


Fig. 1. Schematic representation of the PU/PUA flow-coating in the mold. Source: KraussMaffei; graphic:

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Fig. 2. The injection mold with swivel plate for the thermoplastic substrate makes the MXW 1000 from KraussMaffei particularly productive. © KraussMaffei



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Fig. 3. KraussMaffei supplied both the MXW 1000 injection molding machine and the RimStar Flex mixing and metering machine. Two MK5-2K CCM mixing heads ensure high productivity of the ColorForm system. © KraussMaffei

ogy from KraussMaffei for many years now. At Techniplas, the technology is called “ColorFuse”. The company currently has four ColorForm systems in Treuen and one in Rüti, Switzerland. This system has been manufacturing ColorForm parts in series production since 2016. In addition, their in-house TechCenter in Treuen operates two more systems.

Production in the Cleanroom

“We run this production process under cleanroom conditions. Thus, not a grain of dust can sneak in between the coating and the substrate surface while the

mold is open.” Accordingly, the entire system is equipped with a cleanroom enclosure. “In this way, we achieve very low scrap rates”, emphasizes Luckner.

Initially, ColorForm was developed for greater production efficiency and specific effects for vehicle interior components. At Techniplas, the MXW 1000 ColorForm system puts those qualities on full display. Today, however, aspects such as workplace safety and the CO₂ footprint of the technology compared to other production methods are becoming more and more important. Again, the ColorForm process scores points here in multiple areas. Moreover, ColorForm components are increasingly used even in the exterior area because here as well, a classy appearance is a selling point for end customers.

Painting Plant Is Saved

Not only is the ColorForm technology eliminating the need to transport and paint components, and to invest in a painting plant – the ColorForm components are also ready for installation as they are discharged from the highly automated production cell. The RimStar Flex mixing and metering machine for the coating (Fig. 3) saves both production time and money for buffer storage and drying of the components.

For the system that has been put into operation now, Techniplas used an existing MXW 1000 injection molding machine from KraussMaffei as the basis. Techniplas had the MXW retrofitted at its manufacturer’s main factory in Munich’s Allach neighborhood in Germany. “There, all necessary equipment is available on-site, and commissioning at the TechCenter was also completed on schedule – both for the injection molding machine and for the PU technology, that is, for the RimStar Flex with two MK 5-2K CCM mixing heads for simultaneous production of two components. This cannot be taken for granted under the current basic conditions determined by the pandemic,” says Luckner.

New Control System and Orca Cooling

The MXW 1000 was not just retrofitted for ColorForm technology. Its control system was also completely upgraded to the MC6 control system, and a new Orca cooling system was installed. “The system performs a contact-free temperature measurement, which minimizes maintenance. The technology allows us to control the twenty cooling circuits of the MXW precisely and thus makes a critical contribution to the high, uniform quality of the components,” explains Luckner. ■

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