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# There is no smaller footprint

Automotive component supplier KDK fabricates air vent frames and cover flaps for VW on IMD systems from KraussMaffei – mechanical engineering company acts as general contractor for the manufacturing cell



**Space-saving and ergonomic:** The CX 160 offers excellent accessibility for changing film rolls. The entirety of film peripherals (spool core, control unit) can be integrated below the cantilevered clamping unit.

Photo: Krauss Maffei



**Flexible Automation:** Thanks to dockable automation, use of the injection molding machine – with or without automation – is just as possible as relocating the cell to another site of production. Thus, maximum flexibility when changing products or molds is provided. Photo: Krauss Maffei

**Automotive** The footprint won the prize: Surface specialists KDK Automotive from Lennestadt, Germany decide in favor of two identical IMD systems from KraussMaffei on the basis of the CX 160. The floor space it demands is smaller than any other machine model in this clamping force

range. Furthermore, the automation cells are dockable. In the new manufacturing cells, delicate air vent frames as well as multiple versions of the Climatronic cover flaps for the VW Tiguan are formed, which are surface finished in the in-mold decoration process

(IMD). For this purpose, a film with corresponding coating runs vertically through the two-cavity mold. The mold closes and the coating is transmitted to the surface of the plastic part by means of injection pressure and temperature. A 6-axis robot demolds the frame and feeds it into

a UV station, where the coating is cured as a glaze, and deposits the finished component onto an integrated conveyor belt. Approx. 3,000 components are molded in this way – per day and per machine. Within the KDK group, KDK Automotive Lennestadt (in Germany) is

## IMD and IML at the same time

**Functional integration** Last year at Fakuma, KraussMaffei exhibited how to use IMD and IML both simultaneously and in a highly automated fashion. On a PX 320, a complete, 10" large HMI display (Human Machine Interface) featuring integrated electronics, black decorative frame and scratch-resistant coating was built in just a single production step. In doing so, a 6-axis robot inserts the IML film with printed strip conductors on the nozzle side. In addition, on the ejector side, an IMD film with single-image design ran through the mold, transferring its lacquer package with design layer and UV-curing top coat to the component. In addition to the IMD film for the HMI display, another film ran through the mold, providing a second cavity with a different pattern. This was possible thanks to the IMD SI Duo film feed by Leonhard Kurz, which was the first worldwide to be able to position two single-image decors independently of each other with hundredth-of-a-millimeter accuracy, for which a patent is pending.



**Function and decor rolled into one:** At Fakuma 2018, a complete 10" HMI display with integrated electronics, back decorative frame and scratch-resistant coating is formed by a PX 320 in a single production step. Photo: Krauss Maffei

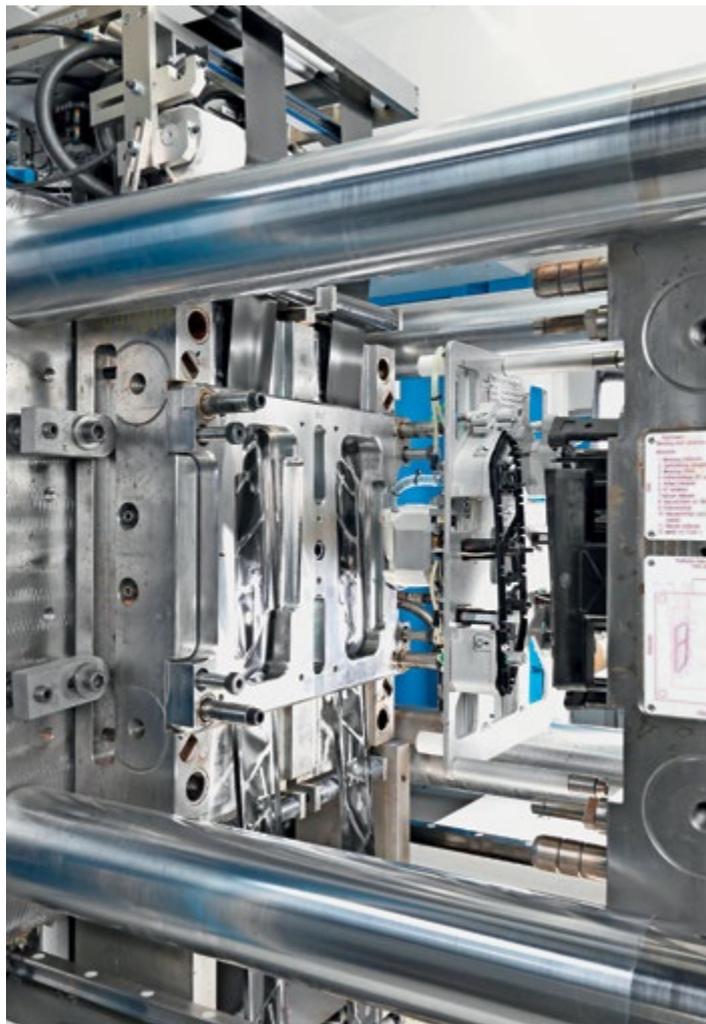
the specialist for the decoration of surfaces using film, and already has all technical options for IMD and IML (in-mold labeling) available. The approximately 300 employees are tasked with implementing every surface desired by the customer, whereby the focus is on scratch-resistant and chemical-resistant decoration. In addition to the film specialists, the departments for development and project management are also located in the Sauerland region so that many projects are able to be started centrally via this production site and then transferred elsewhere.

Within the group, Lennestadt is very much in competition with the low-cost operations in the Czech Republic and Spain, which is why the topic of automation plays a special role. All injection molding machines have had simple removal systems for over 20 years now – there are no free-falling parts.

Andre Winkelmann, current Plant Manager, says that over at least the last five years, applications have become increasingly complex. To remain flexible enough to take on all challenges, for its current project, KDK has specified the requirement that an automation cell be dockable and mounted on freely-movable heavy-duty casters. Thus, the use of the injection molding machine without automation is just as possible as the relocation of the cell to another production site – offering maximum flexibility when changing products or molds.

### Machine + IMD + Automation

As a general contractor, KraussMaffei supplied the total package with the CX 160-injection molding machine and laminar flow box for dust reduction with a film rolling unit from



**Glance into the mold:** The dual cavities ensure increased output. The article-specific gripper precisely extracts components and deposits them. Photo: Krauss Maffei



**Integrated and space-saving:** The hanging 6-axis robot with article specific gripper ensures safe and secure handling as well as film curing in the UV tunnel. Photo: Krauss Maffei

Kurz, a 6-axis robot from Kuka using article-specific grippers, a product-specific sprue trimming solution, a UV station with integrated conveyor belt and a manual work station. With its cantilevered clamping unit and the space provided below it, the CX 160 enables optimum integration of film peripherals. The two-platen design allows fast access to the film rolls. In combination with the machine housing, optimized for the IMD process, changing film is in turn simplified.

Winkelmann explains, "For the first time, we have a 160-ton machine equipped with complete technology, IMD plus automation, in which all safety requirements are fulfilled and maximum functionality is achieved – and all this on the smallest floor space."

### Reject values in manufacturing are very low

Key factors in selecting a supplier included the concept of being compact and practically oriented as well as the adherence to a tight delivery date. In the end, machines that are ready to operate and validated production processes must be available at the start of project are the crucial factor. Winkelmann is likewise impressed with the performance. "Unfortunately, a one-to-one performance comparison cannot be made, since the Tiguan vent frame is a new component. However, we were able to achieve very good results in both the cycle time area as well as the area of component quality. Scrap and process capability are a big topic for us, due to the one-time use of IMD film. KraussMaffei systems currently achieve the lowest scrap values in our production."



In a 1+1 cavity mold forms delicate air vent frames (L.). The Climatronic cover flap is moved into a 1-cavity mold (R.).

Photo: Krauss Maffei

These values are incorporated in the KDK database, in which there are currently 12 million film components

because, for instance, IMD needs to ensure that a 2D film is able to cling to a 3D component.

started production of these components.

### “KraussMaffei systems currently achieve the lowest scrap values in our production.”

Andre Winkelmann, Plant Manager, KDK in Lennestadt

### IMD is usually less expensive than IML

Provided that the parts geometry allows for it, IMD is usually the less expensive alternative when compared to IML. This is because the latter requires an inlay, i.e. a film that has been thermoformed and trimmed. Then, in a second production step, the inlay has to be inserted into an injection mold and back-injected. sk

stored along with the associated process information. The KDK team can draw on this treasure trove of data during the assessment of scrap numbers as well as while developing new components. For film technologies in particular, it is advisable to integrate later producers as early as possible into the design and engineering process

The new Opel Insignia, which first arrived at auto dealerships in 2017, showed how early KdK is often on board. By that time, the team had already been collaborating in the development of interior components for three years, having implemented the requirements of the customer and having successfully

[www.kdkautomotive.com](http://www.kdkautomotive.com)  
[www.kraussmaffei.com](http://www.kraussmaffei.com)

### THREE QUESTIONS FOR ANDRE WINKELMANN, PLANT MANAGER AT KDK IN LENNESTADT

#### About KDK

**Tier 1 supplier** The KDK group is part of the South Korean corporate group Dongkook and supplies all major OEMs and Tier 1 suppliers with products for automobile interiors, for instance, decorative parts, center consoles or trunk systems – all from its locations in Lennestadt in Germany, Wächtersbach in Germany, Tachov, Czech Republic and Borja, Spain.

**KK: What is important to you when making a decision on new suppliers? What qualifications do they need to have?**

**Winkelmann:** We didn't have any KraussMaffei machines at our location here, so it was a really big step for us to introduce a new supplier into our production. However, they impressed us with the flexible system concept of dockable automation cells. The build of the machine also played a role. The CX

is ideally suited for fabrication using film, since the free-standing clamping unit offers lots of space for the integration of peripherals.

**KK: In IMD production, changing film rolls is always a criterion. For you specifically as well?**

**Winkelmann:** Ergonomics and safety are very important to us. Production employees are enthused about the new concept and embrace it. It integrated well, due to the KM

machine design. Of course, that was a critical point in the selection of supplier.

**KK: Everything from a single supplier – is that always an important point?**

**Winkelmann:** Yes, that is also a basic requirement for us. We want to have total CE marking for the system. However, a supplier's support of all of their components was also very important here.