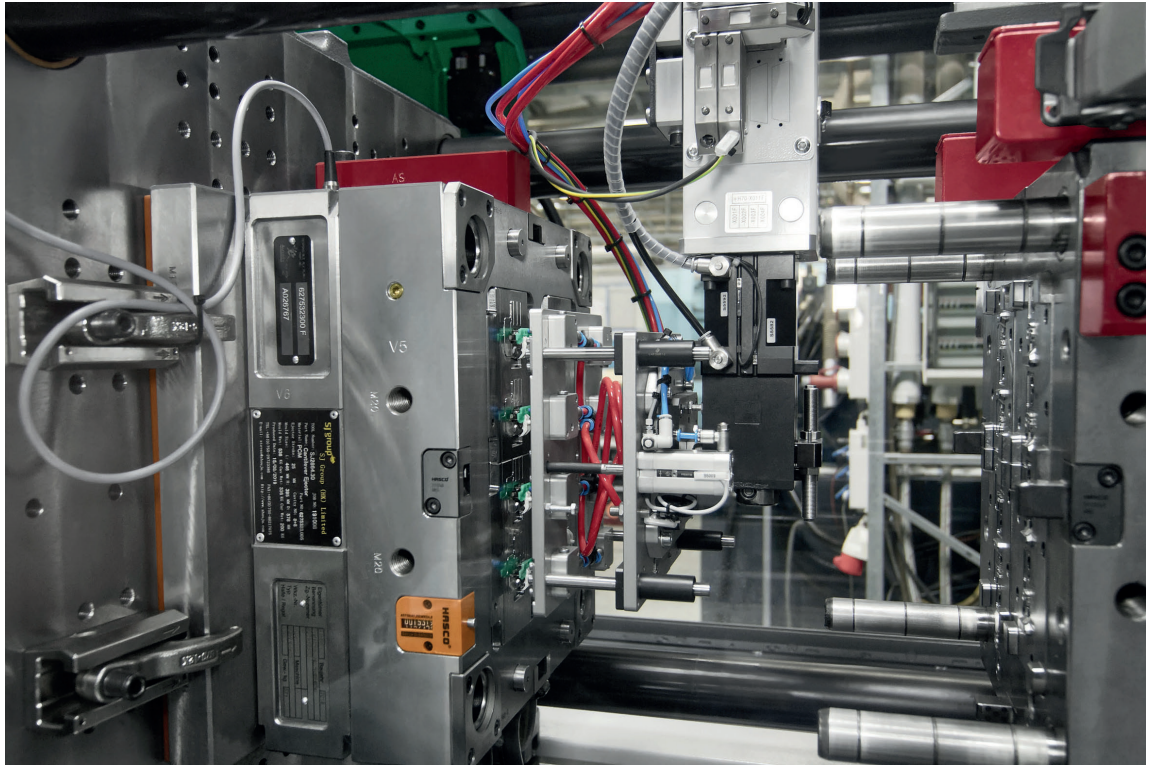


A robotic system removes the parts from TKW's 8+8-cavity mold. © Arburg



## Fully Automated In-Mold Assembly Process at TKW Molding Safely Belted in

The plastics processor TKW Molding, which specializes in safety-related automotive components, is responding to the increasing requirements of its tier 1 and OEM customers by extensively automating its injection molding production. This also encompasses downstream process steps, such as integrated component testing, traceable part deposition and packaging. The company has been working closely with Arburg in this field since 2020.

**T**KW Molding GmbH, part of the Henn Group of Austria, headquartered in Blankenhain (Thüringen), Germany, manufactures, besides containers for the pharmaceutical and cosmetics industry and plastic parts for the electronics sector, especially technical plastic parts, for example, for vehicle seat belt systems or seating groups. In addition to high-precision, automated production, subsequent steps such as optical parts inspection, separate set-down according to cavity, and intelligent and highly autonomous packaging of the articles in special cardboard boxes are of crucial importance for TKW and its automotive customers.

In the injection molding division, a two-manufacturer strategy is pursued,

but the complex automation tasks are placed exclusively with Arburg and its turnkey team. As Benito Hinkeldein (**Fig.1.**), Managing Director of TKW Molding, points out: "Arburg is the right point of contact for us at project level due to its comprehensive expertise. The turnkey specialists have always responded very quickly to our requests and implemented requirements in full. When it comes to full automation combined with highly specialized technical solutions, we feel we are in very good hands."

Arburg's turnkey systems are used to produce items such as covers for belt adjusters (snap-on covers), moving parts for integration in belt buckles (cantilevers) and airbag housings. The process



**Fig. 1.** For TKW Managing Director Benito Hinkeldein, the production of the cantilever is a "lighthouse turnkey project" in terms of flexibility and complexity. © Arburg

spectrum ranges from multi-component and assembly injection molding to fiber direct compounding (FDC) for light-weight, fiber-filled molded parts. The automation includes all downstream work steps related to quality assurance and packaging.

### *Lots of Technology in Not Much Space*

The automated production of cantilevers (Fig. 2.) using the two-component assembly injection molding process is a “lighthouse project” in terms of flexibility and complexity. According to Benito Hinkeldein, the component, weighing only 0.4 g with a flexible hinge is responsible for the correct operational sequence in the belt buckle when the red belt button is locked or unlocked. The requirements for the turnkey system are correspondingly challenging. The task was to fully automate the injection molding and removal process and to integrate:

- the inspection of the cantilever for completeness and function using two forked photoelectric sensors,
- the downstream set-down, and
- the separate collection of NOK and startup parts in the protected area – and all this with the smallest possible space requirement.

The solution offered by Arburg’s turnkey specialists consisted essentially of a hydraulic two-component injection molding machine (type: Allrounder 520 S) with a clamping force of 1600 kN and two small injection units that were adapted to the part size (Fig. 3), with a 20 mm and an 18 mm screw. This was supplemented by a Multilift V robotic system with a load of 15 kg in the longitudinal installation. A container changer with pipe manifold for small load carriers is used for cavity-separated set-down, and a QA drawer above the roller conveyor of the container changer for the separate collection of test parts. This arrangement saved a lot of space, especially widthwise.

The cantilevers are manufactured from two POM grades in different colors, with the two components being injected simultaneously. The 8+8-cavity mold (Title figure) for the small, delicate articles was created in TKW’s own mold-making, and includes two hot runner systems – one with a needle valve and



**Fig. 2.** Transmitting the locking and unlocking in the belt lock: the small cantilevers with movable hinge.

© Arburg



**Fig. 3.** Small, filigree cantilevers are produced on a two-component Allrounder 520 S injection molding machine using the assembly injection molding process. © Arburg

one open – for direct sprueless gating. “During the injection molding process, the two components are separated from one another by virtue of the mold design. The individual parts are only connected together via the hinge with the mold opening movement and thanks to a clever ejector solution,” says Hinkeldein, explaining the assembly process.

### *Nine Million Parts per Year*

The start-up phase of the system installed in 2020 ended with the production release by the Tier 1 customer in May 2021. “The system is currently running at full capacity with two different articles,” says Benito Hinkeldein. TKW collaborates with Arburg on complex automation tasks. This enables the joint development and implementation of unique systems that are both fully automated and highly flexible, and realized in close coordination with the company and its customers. “The plant combines functionality, flexibility, precision, and output. These are precisely the qualities

that count for our automotive customers too,” Benito Hinkeldein adds. “This enhances both our delivery and QA performance, and thus our reputation.” ■

## Info

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