

Complex cell batch produces autonomous radar-capable vehicle transceivers

Sumitomo (SHI) Demag in collaboration with LEONHARD KURZ Stiftung & Co showcases production of innovative driver-assistance In Mould Decoration (IMD) vehicle sensors in a single mould, presenting contactless cleaning technology and new robot concept.

Schwaig, October 2021 – At Fakuma 2021, Sumitomo (SHI) Demag Plastics Machinery GmbH, Schwaig, Germany, will demonstrate the production of backlit IMD badges for use in autonomous driving systems. Comprising an all-electric injection moulding IntElect 220/660-1100 machine, specially equipped with a plasticising unit to process crystal-clear polycarbonate (PC), the pioneering production cell introduces the company's first SAM-C linear robot developed in-house.

Designed to measure, detect and locate obstacles and enhance autonomous driver safety by interacting with the environment, the moulding specialist will showcase the fully automated production of automotive sensors designed for exterior vehicle applications. To achieve optimal resolution, the seamless IMD process involves back-injecting the radar sensors' second surface using single-image decors before cleaning the emblem using contactless technology.

Henrik Langwald, Director of Automotive & Electronics Business Development, describes the process: "After the part has been sprayed, the robot enters the mould extracting the finished part using a removal gripper which it places in a receptacle located on the servo motor sliding table. From there it is held in place within the laser station. The sprue is separated, free falling into a box. The cycle then continues towards the CO2 cleaning station, with the robot resuming its standard position. Every cleaned part is removed from the receptacle by the robot using a transfer gripper and placed visible side facing up on the conveyor belt, with the robot continuing the cycle returning to its component extraction position above the mould tool."

Specialists in thin film technology and functional decorative coatings, LEONHARD KURZ Stiftung & Co. KG adapted the innovative IMD process which involves repositioning the IMD films to the movable platen during each cycle using a classic roll-to-roll process with a film feed device. The SAM 10-C linear robot adapted to the fixed clamping plate is used for removal of the component. It then takes over the complete part handling, using suction cups to remove the part from the injection moulding tool, before storing it on the servomotor sliding table and then smoothly transferring the component onto the conveyor belt.

As extremely high-quality and sensitive surfaces, to protect the components from contamination the injection moulding cell is equipped with a movable laminar flow unit. Supplied by airflow experts PETEK Reinraumtechnik, the ISO class 7 cleanroom cell uses the German company's innovative Flowbox

technology to deliver targeted filtered air into the corresponding film feed unit and handle&place automation area, explains Langwald. He adds: "UV curing is not a requirement for this specific application. However, for future flexibility, the exclusion strip can be switched out and the UV module inserted."

IMD advantages

For high-tech automotive radar surfaces, IMD is an economically viable and more sustainable option, offering the capability, design freedom, repeatability and energy efficient production.

"Indium-based metallisation is radar-compatible," the expert assures. "Using this technique means that the functions of corresponding sensors located around a vehicle are not disturbed. Such systems offer an important design advantage over conventional sensors because they can be concealed using optically non-transparent materials. This is due to the different wavelengths of the radar beams compared to visible light beams."

Evaluated against lacquer or PVD processes, the IMD manufacturing process is significantly more economical, with the automotive expert reaffirming the benefits of having a continuous, uninterrupted work flow for production and emblem decoration. "Additionally, this will be our first live demonstration of the contactless cleaning technology," announces Langwald.

Other advantages of the process are design freedom, energy efficiency and sustainability. Through the integration and synergy of the IMD process with the moulding component production, no extra processing is required. This significantly reduces CO2 emissions. "Additionally, during the IMD process decorative layers are transferred as a dry coating system. This eliminates the likelihood of wet coating contamination. Furthermore, no post-drying energy is consumed," states Langwald.

Always supporting the sustainability agenda

Component recycling, fewer pollutants and lower energy consumption are among the other advantages of the process being showcased at Fakuma 2021. "The IMD decoration process diligently supports component recyclability," says Langwald. Both IMD components and sprues, including decorative layers, can easily be recycled. Additionally, as the thin-film metallisation takes place within the decor, there are no hazardous chrome-6 issues.

In adopting this process, Sumitomo (SHI) Demag is living and standing by its new "Act! Sustainably" slogan being unveiled at the trade fair, whereby only equipment and machinery that drive sustainable and positive environmental actions will be presented by the company.

The IntElect 220/660-1100 being used for the demonstration at the booth fits this criteria exactly. Dynamic, precise and energy-saving, it features the latest servo drives that deliver improved repeatability and shorter cycle times. As a result of the in-house developed drive motors, frequency inverters and the entire servo motor control, the IntElect series remains one of the most efficient injection moulding machines on the market, consuming up to 20 percent less energy compared to conventional all-electric injection moulding machines. Further advantages are higher availability and greater precision, both of which have a positive effect on the machine's cost-effectiveness. "All relevant interfaces are integrated into the control system, as is the IMD package and standardised communication with our SAM-C robot," says Langwald.

Machine and robot from one source

Designed by Sumitomo (SHI) Demag to complement the injection moulding process perfectly, the biggest reveal at the trade fair is the company's highly anticipated own-branded, SAM-C (Sumitomo Demag. Automation. Machine – Cartesian) handle&place robot series developed in-house.

"For the IMD application, height optimisation is achieved using a compact telescope axis," explains Jürgen Schulze, Director Automation. Customers benefit from process and system technology from a single supplier source, complete with hardware and software control integration of robot technology into the injection moulding unit and production-optimised robotic mechanics fully customised to Sumitomo (SHI) Demag machines.

"With SAM-C, we have succeeded in engineering the smallest automated injection moulding cell, comprising robot and material handling technology," explains Schulze. "We offer high system availability with minimal repair and maintenance work, thanks to Sumitomo (SHI) Demag's in-house servo motor technology and low-maintenance drive and guide technology. With the corresponding vacuum technology, the systems also deliver significant energy-savings."

Initially comprising four payload sizes - three, five, ten and 20 kg –the SAM platform will expand in phases over the next two years adding further robot kinematics and functional elements.

Other efficient automation concepts included within the IMD cell include sprue separation and laser marking supplied by H + S Automatisierungstechnik GmbH, Groß-Umstadt; a cleaning station from Kurz subsidiary Baier GmbH + Co KG Maschinenfabrik, Rudersberg; the PETEK laminar Flowbox; and a CO2 laser system from Datalogic S.P.A., Lippo di Calderara di Reno (Italy) for sprue separation. Other partners involved in this innovative project include Universal Robots GmbH, Munich, supplying the compressed air and a universal component cleaning cobot, and developer of the durable PMMA filter compound PLEXIGLAS® Röhm GmbH from Darmstadt.

Images/captions



Image 1: Complex cell batch with IntElect 220t produces autonomous radar-capable vehicle transceivers

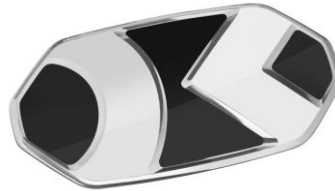


Image 2: The seamless IMD process involves back-injecting the radar sensors' second surface using single-image decors



Image 3: SAM-C: Sumitomo (SHI) Demag's first own-label robot series

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Wednesday, October 13, at 9.00am
Room Oesterreich, Conference Center West, 1. Floor

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Sumitomo (SHI) Demag Plastics Machinery GmbH

Sumitomo (SHI) Demag has shaped the development of the plastics industry from its very beginning. As a specialist for injection moulding machines for plastics processing, Sumitomo (SHI) Demag and its Japanese parent company are leading the industry.

The global development and production network of Sumitomo Heavy Industries and Sumitomo (SHI) Demag is comprised of four facilities in Japan, Germany and China with more than 3,000 employees. The product portfolio includes all-electric, hydraulic and hybrid injection moulding machines with clamping forces of between 180 and 15.000 kN. With more than 125,000 installed machines, Sumitomo (SHI) Demag is present in important global markets and ranks among the largest manufacturers of injection moulding machines in the world.

At Sumitomo's headquarters in Chiba, Japan, the company manufactures machines with clamping forces in the small to medium range. Nearly 95 % of all delivered machines are equipped with an all-electric drive concept. Sumitomo (SHI) Demag's German facilities in Schwaig and Wiehe produce the Systec Servo range with hybrid drive as well as the EI-Exis SP and Systec SP range of high-speed, high-performance machines. The all-electric IntElect range for international customers is also being produced in Germany.

As early as 1998, Sumitomo (SHI) Demag set up its first production site in Ningbo/China. In 2015, the Chinese subsidiary Demag Plastics Machinery (Ningbo) Co., Ltd. installed a new facility with a 13,000 m² floor space. It is earmarked for the production of the Systec C range with clamping forces of between 500 and 10,000 kN for the Asian market.

In addition to injection moulding machines, Sumitomo (SHI) Demag offers customised and standardised systems for the part handling automation, technical and process solutions for special applications, tailored services and service concepts as well as a range of financial options to support investment in injection moulding machines.

With its comprehensive sales and service network of subsidiaries and agencies, Sumitomo (SHI) Demag is present in all major markets.