



# Cancer research in the cleanroom

Immuno-oncology therapies treat tumours with individual support of patients' immune systems. In the field of immunological diagnostics, the Immun-Onkologisches Zentrum Köln is researching and developing new methods of cancer treatment. A 100-square-metre GMP cleanroom laboratory was installed in Cologne for sterile production of the vaccines.



Already since 1985 the Immun-Onkologisches Zentrum Köln (IOZK) has been employing physicians and natural scientists to research the role of the immune system in cancer. The oncological immunotherapies developed out of this aim to support the body's immune system in destroying cancer cells.

Tobias Geef, Head of Purchasing and Technology at IOZK, attempted to explain the complex processes of the therapy in simple terms: 'We use the biological foundations of immunology in our research and develop vaccines that activate the immune cells of the body for fighting cancer. Through our vaccine the immune system is targeted specifically at the tumour antigens of the tumour to attack it. The therapy should put the immune system in a position to become active itself and fight the disease on its own. In the ideal case the tumour is thus completely and sustainably removed by the body's own defences without side effects.'

## Development of vaccines for fighting cancer

In combination with oncolytic viruses that can specifically attack cancer cells, this creates a groundbreaking approach to fighting cancer that drastically reduces the side effects of the treatment. The IOZK has received the authorisation to develop combination agents mixed with certain viruses. The vaccines invade and alter the tumour cells. This form of therapy is still not a treatment standard, but is already being made available as an individual

treatment method for private patients. In the laboratory spaces human cells are made to grow in special nutrient fluids and at body temperature. Foreign particles as interfering factors and any bioburden must be excluded in the process.

The production of the patient's individual vaccines hence takes place in a sterile CleanSteriCell® brand cleanroom laboratory that meets the requirements for GMP cleanroom class B.

Tobias Geef explained the necessity of the new investment: 'The IOZK has several laboratories for research, diagnostics and production. For the production of the patient's individual vaccines, we have to meet the requirements for pharmaceutical production and the requirements of the Medicinal Products Act. We have now invested in a brand new production laboratory with cleanroom technology. The cleanroom system corresponds to GMP cleanroom class B, is energy-efficient and is state-of-the-art; that was important to us.'

## State-of-the-art, energy-efficient cleanroom system

The cleanroom laboratory was planned and built by SCHILLING ENGINEERING. A special challenge resulted from the limited space conditions and the low ceiling height in the existing building. The 100 square metres of the cleanroom were tailored exactly to these space conditions and the corresponding ducting was planned for

## Cancer research in the cleanroom

the airconditioning technology. With over 120 air changes per hour, the supply of the clean areas and workstations with ultra-pure air according to the principle of low-turbulence displacement ventilation was secured. Filtering takes place via laminar flow units equipped with ULPA 15 high-performance filters integrated in the ceiling. The system from SCHILLING ENGINEERING is operated with an especially energy-efficient air recirculation process to reduce the high energy costs associated with the operation of a cleanroom. A large portion of the air discharged from the cleanroom is thereby circulated within the cleanroom walls and introduced back into the circuit via the filter units. Because this air is already cooled and has a reduced particle count, the high costs of air conditioning are omitted. In addition the filter units take longer to become clogged and thus have a considerably longer service life.

### GMP Monitoring

Workstations for up to ten employees were set up in the new GMP laboratory. Three personnel and three material airlocks which are operated with different air pressure stages and air changes guarantee the purity of the laboratory system to GMP class B. A special feature of the cleanroom laboratory is the integrated GMP-compliant monitoring. Particle count, temperature, relative humidity and air pressure are continuously monitored and recorded for the required monitoring. Serving as a control system for the cleanroom and the air-conditioning technology is the user-friendly CR Control®, with which all setpoints including the air-conditioning technology are regulated and monitored and which is operated via a central touch screen or a mobile device.

The CleanSteriCell® cleanroom system has a modular design and can be flexibly extended and converted thanks to a patented silicone-free GMP sealing clip system. GMP-compliant LED light strips provide for pleasant and energy-saving lighting and additionally have a very long life.

The cleanroom laboratory was qualified according to GMP regulations and handed over in turnkey condition by SCHILLING ENGINEERING. Tobias Geef was very pleased with the support of the cleanroom experts: 'The qualification of the GMP cleanroom went smoothly. There are very many regulations that have to be adhered to here, but our cleanroom supplier prepared or took over everything well for us. We just went into production and are very satisfied with the way things are running. A big plus is that Schilling Engineering could offer us a complete package for the cleanroom laboratory. In addition to the actual cleanroom and air-conditioning technologies, for example, a GMP-compliant monitoring system, the easy-to-understand control system and the entire furnishings were supplied to us. Now we have a central partner, even for future servicing.'



Schilling Engineering GmbH

Industriestrasse 26

D 79793 Wutöschingen

Telefon: +49 7746 9278971

E-Mail: [i.doerffeldt@schillingengineering.de](mailto:i.doerffeldt@schillingengineering.de)

Internet: <http://www.schillingengineering.de>



**Oktober 2019**

Dear subscribers,

ILMAC 2019 in Basel is over. The Lounges on Tour will be in Vienna soon. The ÖRRG General Assembly will also take place as part of this event. And then is still the Cleanzone in November. So there are a lot of possibilities for personal contacts. In the meantime, you will receive compact information from us.

in the current issue of the cleanroom online newsletter you will find among others on the following topics:

**Cancer research in the cleanroom**

**3D-printed medical robots**

**Case study : How to dispose of equipment containing hazardous products?**

**A GUF for all purposes**

...

Yours sincerely

Reinhold Schuster

# Case study : How to dispose of equipment containing hazardous products?

When our customers wish to dispose of contaminated obsolete or defective equipment, sending this cumbersome waste as is to a hazardous waste treatment facility is often the first solution that comes to their mind. The following case study shows that on-site decontamination can render the waste appropriate for disposal in a non-hazardous treatment facility – a less lengthy and more cost-effective solution.

In March 2019, CURIUM received a request from a medical centre in Switzerland for the disposal of a refrigerator contaminated with osmium tetroxide on its internal walls. Treating the waste in Switzerland appeared too complicated: the refrigerator needed to be cut in pieces in order to be accepted by the hazardous waste treatment facility. The customer had considered sending the waste to France without prior decontamination or dismantling. This solution presented regulatory constraints which would have entailed significant costs: the completion of a notification document for the transboundary movement of hazardous waste, and the proper packaging and transportation of the waste according to the ADR regulations. We proposed several alternative solutions, and the customer finally opted for on-site decontamination of the refrigerator so that most of it could be disposed of as non-hazardous waste.

After a contamination study, we found an optimal decontamination method to neutralize the oxidative nature of osmium. The decontamination operation was carried out on the customer's site, while applying all chemical safety measures such as zoning and wearing

appropriate PPE. The fridge chamber was completely decontaminated and eliminated in Switzerland as a non-hazardous waste. Heavily contaminated porous plastic elements were dismantled, cut and packaged in accordance with the Swiss hazardous waste treatment facility's specifications. As a matter of fact, their complete decontamination would have taken too much time and resulted in a higher cost than their disposal as hazardous waste. By opting for preliminary decontamination, the customer was able to dispose of the entirety of the waste in Switzerland, and to make a 30% saving compared to the solution consisting in exporting the waste.

## **In summary, preliminary decontamination is preferred when**

- the waste can be partially recovered
- it cannot be accepted as is by a waste treatment facility
- decontamination and disposal in a non-hazardous waste treatment facility is more cost-effective than its treatment as hazardous waste.

Decontamination appears to be the most optimal solution for the disposal of equipment such as extractor hoods, refrigerators, freezers, gloveboxes, biological safety cabinets, etc. Intermediate tailor-made solutions depending on the type of equipment and the hazardous product it contains are also possible, in order to optimize costs and maximize the safety of personnel handling the waste.

CURIUM FR 69700 Montagny



# 3D-printed medical robots



**Five international research teams are developing a robot for cancer treatments of the future. Although it comprises dozens of components, joints and parts with varied material characteristics, this robot can be printed using a 3D-printer in a single-step process.**

All that is required is a single click of a button – the 3D-printer takes care of the rest. As is the case with an ink jet printer, fluid is sprayed onto the surface. However, instead of different colors, this PolyJet printer uses plastic: the jets can apply two different polymer solutions, either individually or mixed, with pinpoint accuracy. UV light hardens the plastic before the next layer is applied to produce a medical robot, layer by layer. When fully developed, the robot will assist doctors in taking biopsies and in tumor thermotherapy.

“The positioning of a needle or probe in a minimal invasive procedure is absolutely crucial, because at best the doctor can be guided by computer tomography or MRT imaging and that means working with the patient lying in a narrow tube. This more or less limits the doctor’s freedom of movement”, explains Marius Siegfarth of the Fraunhofer IPA project group for Automation in Medicine and Biotechnology (PAMB) at the Medical Faculty Mannheim at Heidelberg University.

The robot is being developed by Siegfarth’s team under the SPIRITS project in conjunction with other research groups from Germany, France and Switzerland. The robot is small and light enough to be inserted in the scanner tube with the patient. It is controlled hydraulically from outside – so that doctors can be a few meters away and may even be in another room, where they are protected from CT imaging radiation hazard. The acronym SPIRITS stands for Smart Printed Interactive Robots for Interventional Therapy and Surgery.

“The challenge presented by this project was to develop a design that could be generated in a single stage by PolyJet printer, but that at the same time comprised fully functional components, for example, rotary joints with hydraulic actuators and a drive mechanism to move the needle. All these components have different material characteristics”, Siegfarth adds.

The PolyJet is already printing out the first prototypes at the Institut national des sciences appliquées de Strasbourg, INSA, where the SPIRITS project is being coordinated. These prototypes have lever arms linked by rotary joints that can rotate the needle in any direction around the point of entry. The movement is provided by a hydraulic

drive system developed by PAMB researchers using tiny tubes with diameters of just 4 millimeters, seals and pistons. What is particularly special here is that the design of the piston produced by 3D print technology exerts hydraulic pressure on the seal and thereby enhances its effectiveness.

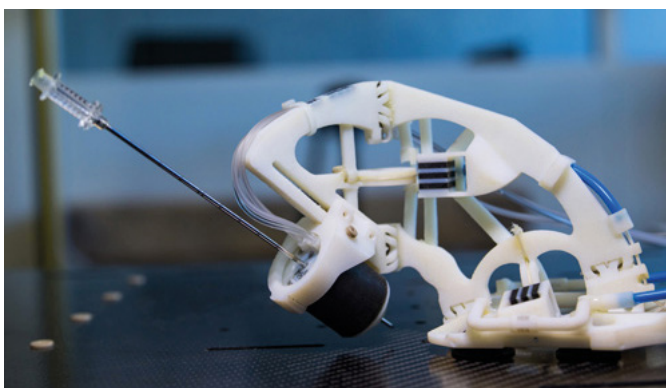
Initial trials show that the hydraulic drive generated by 3D printer works. In the coming months, further elements will be integrated in the prototype: for example, a smart needle equipped with a force sensor, a development by the École polytechnique fédérale de Lausanne, EPFL, while the mechanism driving the needle was developed by INSA researchers. Another feature is the “haptic feedback”, which converts the results measured by the force sensor into resistance that the doctor will be able to feel when directing the needle through softer or harder tissue. The feedback function was developed by researchers at the Furtwangen Technical College, while the University of Applied Sciences of Northwest Switzerland (FHNW) is currently producing printable, non-magnetizable metal components for the next generation of prototypes.

The first fully printed medical robot will be tested on dummies as early as before the end of 2019.

With a total budget comprising EUR 1.67 million, SPIRITS is being co-financed by INTERREG V Oberrhein, while the European Regional Development Fund (ERDF) has contributed an additional EUR 436,201. The project is receiving further support from regional and cantonal partners as part of the “Offensive Sciences” initiative, which finances state-of-the-art research projects on a cross-border basis. Consequently, the project has also received financial backing from Großregion Ost (macro region East), the German states of Baden-Württemberg and Rhineland-Palatinate, the Swiss Confederation, the Cantons of Aargau, Basel-City and Basel-Country.



Fraunhofer-Institut für Produktionstechnik und Automatisierung IPA  
Nobelstraße 12 D 70569 Stuttgart  
Telefon: +49 711 970 1667  
E-Mail: joerg-dieter.walz@ipa.fraunhofer.de  
Internet: <http://www.ipa.fraunhofer.de>



Prototype of the medical robot generated by 3D printer.  
(© Photothèque ICube / A. Morlot)



3D-printed pistons for the hydraulic drive mechanism.  
(© Fraunhofer IPA / Marius Siegfarth)

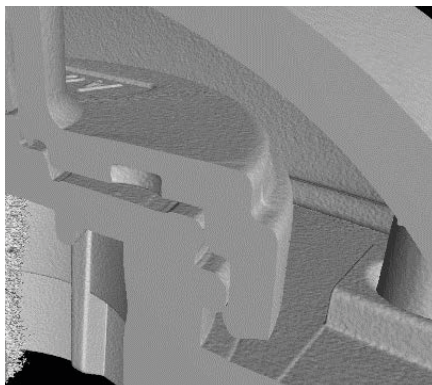
# Top spot for the KT International Rational Process Achievement Awards 2019

## Gerresheimer wins gold for successful application of problem analysis according to the Kepner-Tregoe methodology

**Gerresheimer Medical Systems took the top spot in the "Single and Team Use Application of KT Process" category at this year's Kepner-Tregoe International Process Achievement Awards. Companies that have achieved exceptional economic and technical performances through the use of the Kepner-Tregoe system are distinguished with the prize. In the selection process, Gerresheimer was able to beat high quality competitors like Microsoft – Customer Service and Support, the Walt Disney Company, or Honda Motors.**

In the case of Gerresheimer's KT project, which has been distinguished with gold, it was about solving a production problem involving a drug delivery device. In the environment revolving around a material change, around 5 percent of a batch failed a 4-bar pressure test here. More defective devices were determined during the final inspection of the products, as well as in the context of a project for revision of the design. The consequence was that the batches couldn't be delivered, and the schedule of the project became shaky. This was even more serious, as Gerresheimer is a single source supplier for this project, and the supply of medication for patients could be endangered by delivery failure.

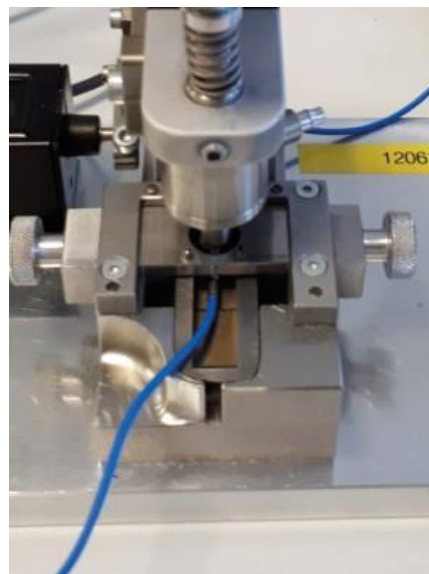
The chronological coinciding of the error with a material change suggested the assumption that the error was material-related. However, this would have been an inadmissible, intuitive, hasty reaction from the perspective of Kepner-Tregoe. There was also no possibility to simply change back to the old polymer, as it would soon no longer



A CT of the drug delivery device shows the section responsible for the pressure loss.

be available. It was thus necessary to closely examine all plausible error catalysts. Gerresheimer initiated a KT project to reliably identify the root of the problem in this complex constellation. The company cooperated with the customer over the entire course of the project, who also thought an error analysis according to Kepner-Tregoe to be the most sensible procedure, and who was highly satisfied with the systematic procedure.

In the project, a well-founded problem definition was first formulated and a summary of all known numbers, dates, and facts compiled in the form of a problem specification. A list of possible error causes was then created, which extended from the material through the injection molding tools and the test process used to the sterilization and sto-



The self-developed pressure sensor prevents the error from creeping in again in series operation.

rage of the finished product. All these potential causes were tested for plausibility in the next step. Based on the many facts known from the problem specification, several possible causes could already be excluded here. A test plan for the remaining and thus probable causes was subsequently developed, with which these could be systematically examined. The tests, which were in part self-developed, initially provided surprising results – the new material was eliminated as a cause of error, as the error could also be reproduced with the old polymer. The possible influence of the injection molding and sterilization processes was also quantified in the context of the tests and eliminated as the exclusive cause of error.

A step in the in-process inspection in production was ultimately identified as the true cause of the error. Here, a minimal deviation during assembly of the test tool caused excessive force to be exercised on the work piece and subsequently led to a pre-existing defect. In the next test step, the pressure test was then failed due to this defect. No further errors were determined after the test tool was readjusted. A sensor was also developed, with which the force can be better monitored, in order to identify a renewed occurrence of the error and to immediately correct it where necessary.

### A solution that only has winners

The problem solution with the Kepner-Tregoe system only means more time spent at first glance. An allegedly plausible cause was very quickly revealed to be a dead end by the systematic analysis. The new material was not the catalyst, and neither was the old one, which was no longer available. In this way, no further material change was necessary, but even more importantly, we and our customer were spared an extensive recall action. The KT methodology ultimately determined that the batches were produced without errors and that the problem was merely caused by an easily correctable false adjustment of the test system. This then also ensured that patients were supplied with correctly operating devices – and that is even more important than the top spot for the KT Award.

# A GUF for all purposes

## An overview of the diversity of mk's belt conveyor variants

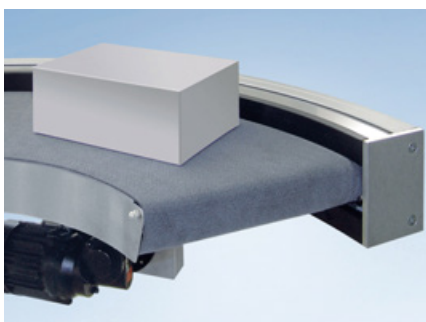
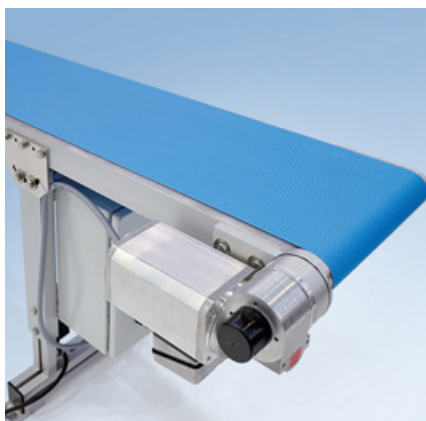
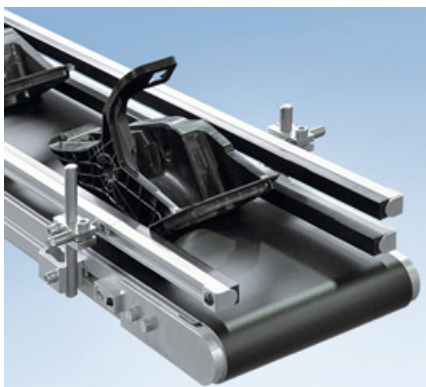
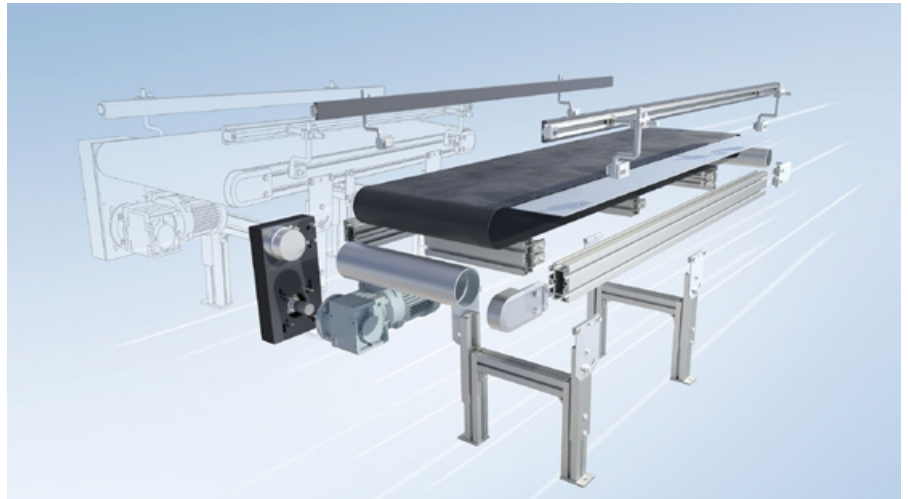
With the rise of industrial automation, belt conveyors have taken on most of the transport tasks involved in production processes. Nowadays, wherever you look, you'll find belt conveyors in all different designs and versions.

Belt conveyors are suitable for almost any industrial application in which piece goods are to be transported without any particular requirements in terms of their orientation or positioning. All different shapes and dimensions, packaged or unpackaged, light or heavy, can be transported using a belt conveyor.

For these applications, mk offers an enormous range of standardised, modular belt conveyor systems, also called GUF. The design options are virtually unlimited: any width from 50 mm to 2 m, any length from 300 mm to 20 m, loads of up to 350 kg, and speeds of up to 80 m/min.

Thanks to a compact design using aluminium profiles, the conveyors are easy to integrate into existing production lines, even complex ones, and to adapt as necessary. The profile system makes the design highly flexible, and lateral profile grooves provide ample options for mounting attachments and accessories.

In addition to straight segments, belt conveyors are available in double-line, inclined and curved versions. Special designs are available for clamping, scanning, vacuum and magnetic applications as well as in stainless steel for the food and pharmaceutical industries.



### The right system for any application

mk developed a standard straight belt conveyor in the mid-1970s. Today, innumerable further developments later, it forms the heart of the portfolio of mk conveyor technology. Over the years, versatile belt conveyor series of all different sizes and weight classes have been created. The perfect conveyor can be configured for virtually any type of goods, transport or environmental conditions.

Small Conveyor GUF-P Mini – The smallest series, GUF-P Mini, is particularly well-suited to transporting and separating small components with low volumes and weights. It is available in widths of 75 to 150 mm and in lengths of 360 to 5,000 mm. Thanks to its minimal installation height, this conveyor is ideal for use in complex systems where space is at a premium. Since the belt recirculation is integrated in the conveyor frame, the con-



## A GUF for all purposes

veyor can be placed directly on the machine bed.

Compact Belt Conveyor GUF-P 2045 – The extremely compact GUF-P 2045 series is perfect for integrating into systems with limited space available for installation. The  $\varnothing$  50 mm drive roller combined with the weight-optimised, 45 mm tall conveyor frame profile produces a conveyor that is extremely flat and without any obstructing edges. A total permissible load of 15 kg accommodates most of the products typical in the packaging and injection moulding industries.

Versatile Belt Conveyor GUF-P 2000 – The GUF-P 2000 series is the all-rounder for light-to medium-weight goods based on the mk 2000 profile. It is extremely versatile thanks to the large assortment of available drives, tails, stands and belt types. This series is characterised by a low height of 50 mm and a compact  $\varnothing$  53 mm driving roll as well as a wide variety of different belt types. Furthermore, the system is available with an optional stationary or rolling knife edge. Due to the maturity and standardisation of this series product, its delivery times are particularly short.

Sturdy Belt Conveyor GUF-P 2041 – Based on the mk 2251 profile, the sturdy GUF-P 2041 series was developed for high belt loads of up to 150 kg and for conveying goods up to 1200 mm wide. It uses an 85-mm driving roll that affords highly efficient transmission of the motor's power. The series is available with a virtually unlimited selection of different belt types, including designs with cleats and side walls, and numerous combinations of drives, tails and stands, with knife edges and drum motors as options.

Heavy Belt Conveyor GUF-P 2004 – The GUF-P 2004 is the largest series, based on the mk 2004 profile, and features a 105-mm roller. Capable of handling a total load weighing

up to 200 kg and measuring up to 2,000 mm wide and 20,000 mm long, this torsion-resistant conveyor frame provides easy transport of particularly heavy loads and bulky goods. It can be complemented with reinforced accessory components such as side rails and stands.

Double Belt Conveyor DGF-P 2001 – The dual-line DGF-P 2001 series is particularly well-suited for transporting pallets. Its very small idler rollers allow it to transport even short pallets, for example those used in assembly systems in the electronics industry. The belt runs entirely atop wear strips, which allows for a maximum weight of 15 kg per section.

Cleanroom Belt Conveyor GUF-R 2000 – The GUF-R 2000 belt conveyor is certified for demanding use under cleanroom conditions. Based on the GUF-P 2000 conveyor system, it has been optimised to ensure the lowest possible levels of particle emissions. Furthermore, the conveyor uses a surface-cooled smooth-surface motor that produces very little air turbulence during operation. Thanks to its smooth and large surfaces, the conveyor is particularly easy to clean. The system version with the AF drive has been certified by the Fraunhofer Institute IPA with an air cleanliness class of 4 in accordance with DIN ISO 14644-01 standards.

### Left, right, up and down

Other designs such as curves and inclines make it possible to construct three-dimensional conveying paths. These modules are entirely compatible with each other to allow uninterrupted conveying. Predetermined space requirements can be used or adapted for, bridged or detoured around, using any combination of straight, curved

and inclined conveyors.

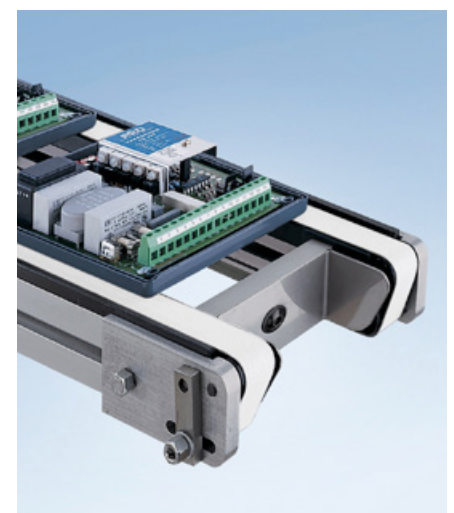
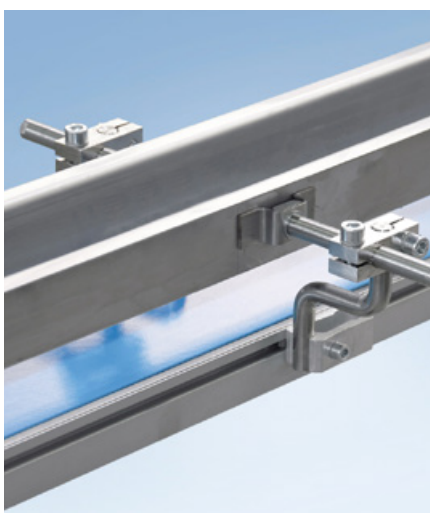
Curved Belt Conveyor KGF-P 2040 – The KGF-P 2040 series of curved belt conveyors conveys goods around a curve of either 90 or 180 degrees. This series is available in usable widths of 300 to 600 mm and is equipped with a rolling knife edge with a diameter of 20 mm to ensure transferral of small conveyed goods. Belt tensioning is handled by an automatic tensioning device, which is integrated in the tail, keeping the conveyor's outer dimensions constant.

Incline Conveyor KFG-P 2000 – The KFG-P 2000 series of inclined belts is based on the well-proven mk 2000 profile and allows vertical transport and connecting different levels of belts. The incline angle is variable, and various belts, cleats, stands, funnels, slides and side rails can be selected. Equipped with rollers for mobility, this series is particularly well-suited for mobile use in filling containers or lattice boxes. The KFG-P 2000 ECO is a design of the KFG-P 2000 series restricted to 18 different versions. ECO stands for economical, meaning an optimised cost/benefit ratio, which is reflected in the conveyor's affordable price and quick delivery times.

### Tailored to customer requirements

A comprehensive portfolio of accessories allows further options for completing a conveyor system. In addition to a large selection of stands, side rails and drives, mk offers belts in a variety of materials to suit the task and the goods to be conveyed.

Drives – The standard mk range for configuring a new conveyor system offers a variety of in-stock motors from well-known manufacturers. Depending on the choice of motor, the load to be applied to the belt and the type of operation, conveyors can achieve



## A GUF for all purposes

speeds of up to 80 m/min. Power transmission can occur directly via the drive shaft or indirectly using a chain, no matter whether the belt is operated continuously, in reverse or in cycles. This additional option to adjust the transmission ratio allows you to achieve very fine speed increments. Positioning can be accomplished with a head drive at the in-feed or discharge end, with a lower belt drive for reversing operation, or with an internal drive (drum motor) without obstructing edges and low particle emissions.

**Conveyor belts** – In order to best handle any type of goods under diverse conditions, mk provides a wide selection of standard belt types. Materials and textures are available for nearly any conveying application, including accumulating belts with low friction for continuous accumulated operation and laterally stiff belts to allow pushing products off the side of the belt. In addition, belts can be antistatic, FDA-compliant, oil-compatible and cut-resistant.

**Cleats and corrugations** – For transporting bulk dry goods, or to overcome inclines, the belts can be customised with weld-on profiles. These profiles can be lateral or longitudinal cleats or side walls that are additionally welded onto the belt conveyor. Lateral cleats function as cams on inclined conveyors,



while side walls serve to keep the conveyed goods in place. They can be used instead of side rails and are often employed in incline conveyors. Longitudinal cleats serve primarily as belt guides.

**Transitions** – At transitions between one system and another, e.g. from a curve to a straight segment, the transfer of small products can be accomplished using a “knife edge”. This may be an idler pulley with a particularly small diameter (a rolling knife edge) or a fixed edge over which the conveyor belt slides (stationary knife edge).

**Stands** – The conveyors can be equipped with stands in various types, designs and weight classes to suit the environmental and application conditions. These include compact single stands with foot plates, sturdy height-adjustable H-profile stands with leveling feet, and fixed or swivel casters for mobile use. The stability of the conveyor system depends on the ratio of its height to its width, the load’s centre of gravity and environmental factors. Using the mk aluminium profile system affords almost limitless possibilities for building the structure.

**Side rails** – There are various types of side rails available for positioning the conveyed goods on the conveyor and for infeeding and discharging the products. These include simple sheets, stainless steel bars and aluminium profiles with wear strips, which may be rigidly connected to the conveyor or adjustably screwed into the slot in the side of the conveyor frame profile. Adjustable side rails are customisable in the usable width and the height of the rails.

**Additional equipment components** – The mk portfolio contains many additional attachments and services to serve a wide variety of requirements and functions, including initiators for controlling, positioning and monitoring processes, end stops for process-dependent accumulation of conveyed goods, drip

pans for catching pollutants, and full-featured control systems for process integration.

### Easy online configuration of belt conveyors

mk offers the QuickDesigner configuration tool to help you configure a custom belt conveyor easily and conveniently. This tool helps with configuring any customised belt conveyor of the GUF-P Mini, GUF-P 2000 or GUF-P 2041 series, with no installation of software required.

Your on-screen entries are checked for plausibility immediately, to ensure that you are always offered the ideal conveyor. Each input field has an info button that provides detailed notes in order to make the tool as easy as possible for you to use.

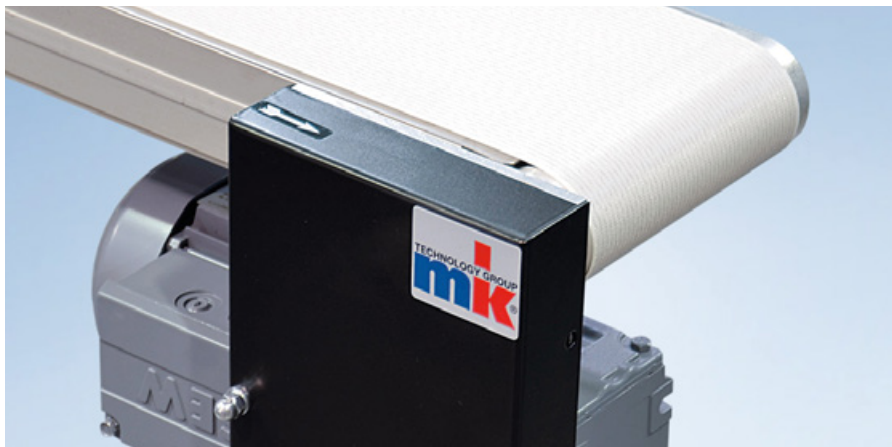
Once your conveyor is fully configured, the tool automatically generates a CAD model immediately. If desired, it can also generate a quotation. The created configurations, with the associated models and quotations, can be accessed and even edited further at any time via the “My Account” menu.

### Just the tip of the iceberg

The variety of the conveyor systems from mk is practically endless. Aside from the proven belt conveyors, the portfolio also includes chain, timing belt, modular belt, and flat top chain conveyors as well as roller conveyors. The extremely sturdy modular belt conveyors are more wear-resistant than belts and can be employed anywhere that goods with sharp edges are to be conveyed. The multi-strand chain conveyors are typically used for transporting pallets. And roller conveyors dominate logistics with boxes and pallets. Whether the goods to be conveyed are loose piece goods, boxes, crates, pallets or workpiece carriers, any transport task is manageable.

This product range is complemented with rotary tables for simple, economical buffering, storing and separating workpieces and with linear modules for precision linear handling.

The team from mk is ready to provide any assistance needed by mechanical engineers and designers who aren’t sure which conveyor system is best-suited to their intended application. Our conveyor technology experts have years of experience in finding solutions for applications of all different kinds.





# Gerresheimer expands the Gx RTF ClearJect product line

## Production for the new 2.25 ml COP (cyclic olefin polymer) SIN (staked in needle) will start this month

Gerresheimer is expanding its range of pre-fillable polymer syringes to include a new product: the Gx RTF® ClearJect® polymer needle syringe, 2.25 ml. Like the 1.0 ml syringe, this syringe will be produced in Pfreimd, Germany.

The material used for the syringe is a high performance polymer called COP (cyclic olefin polymer). It is suitable for use as primary packaging for sophisticated medications, especially for sensitive, biologicals, biosimilars, and biobetters. The product was developed in close cooperation between two Gerresheimer locations in order to create synergy between the syringe experts in Bünde and the plastic experts in Wackersdorf, Germany.

The Gx RTF ClearJect COP SIN of Gerresheimer Bünde GmbH is now available in the sizes 1.0 ml long and 2.25 ml. The design is inspired by ISO 11040-6 and registered. The syringe is equipped with a 27-gauge, 1/2-inch (12.7 mm), thin-walled stainless-steel needle with three bevels.

### Low interaction potential of the syringe with the medication

COP does not release tungsten metal ions into the medication solution as glass syringes can, which is a major concern for some. Since the entire syringe, including the insert-molded needle, is produced in a single step, the product, hence becomes free of tungsten and adhesives. The material has a high pH tolerance and the pH value does not change while in storage. The oxygen permeation rate is low in comparison to other plastics, and the values for extractables and leachables are low.

### Safety and reliable functionality for the end user

Another important argument in favor of the Gx RTF ClearJect needle syringe is its end-user safety. COP is particularly break-resistant, making it suitable for packaging aggressive or toxic materials. The syringes are siliconized with a precisely controlled quantity of the highly viscous Dow Corning 360 MD (12,500 cST) silicone oil, in order to ensure

reliable syringe functionality with low break-away and sliding forces with the lowest possible particle load.

### Precision and flexible design

Production in the injection molding process ensures precise dimensions. The dead volume in the syringe is also minimized, reducing overall waste of the costly drugs. The material enables a broad range of design options, which make it ideal for customer specific requirements. The syringes are also engineered for use in autoinjectors thanks to their robustness and precision.

### Economic efficiency through standard components

This syringe system, like the 1.0 ml syringe, is economical thanks to the fact that the innovative COP syringe body is designed to use commercially available standard components throughout. This starts with the use of standard cannulas and continues with the piston rods, piston plungers, backstops and closure systems used.

Gerresheimer AG D 40468 Düsseldorf



The new Gx RTF ClearJect 2.25 ml polymer needle syringe.



The Gx RTF Clear polymer needle syringe is available in the syringe size 1.0 ml and 2.25 ml.



The new Gx RTF ClearJect polymer syringe is packed in nests for easy handling and filling. These nests are suitable for all of the usual filling systems.



# Partnership for smart production

## Endress+Hauser and Deutsche Telekom drive industry digitization with 5G campus networks

With its campus networks, Deutsche Telekom offers an infrastructure for the smart factory of tomorrow. Together with partners from industry, Europe's largest telecommunications company wants to further expand its 5G ecosystem for industry. In process automation, Deutsche Telekom is now cooperating with Endress+Hauser.

The aim of the cooperation is to develop joint offers in the field of measurement and automation technology for the process industry. This involves the integration of measuring instruments and accessories into the next generation of mobile communication networks as well as digital services based on them. Both companies have signed a corresponding memorandum of understanding and are now working on a coordinated timetable.



"5G campus networks open up a second signal path that is independent of the plant's control system and thus make it possible to tap the potential of digitalization," says Matthias Altendorf, CEO of the Endress+Hauser Group.



Deutsche Telekom is cooperating with Endress+Hauser to expand its 5G ecosystem. The aim is to develop joint offers in the field of measurement and automation technology for the process industry.

### Measuring instruments with mobile communication module

Endress+Hauser is one of the first manufacturers to equip its field devices with mobile communication modules and to connect existing installations to 5G networks via newly developed HART gateways. This enables a large number of instruments to transmit a wealth of process and device data in parallel and in real time. These can, for example, be used in cloud applications for predictive maintenance of process plants.

### Campus networks open second signal path

"In addition to the actual measured values, our instruments record a wealth of information from the process and about the sensor," says Matthias Altendorf, CEO of Endress+Hauser. "5G campus networks open up a second signal path that is independent of the plant's control system and thus make it possible to tap this potential. This will enable us to link value chains more closely across company boundaries and make industrial processes more efficient."

### Strong partners for smart production

"Building a complete 5G ecosystem for industry will accelerate the pace of digitalization in industry," explains Claudia Nemat, member of the Deutsche Telekom Board of Management, Technology and Innovation. "We look forward to working with renowned and experienced partners." In addition to the partnership with network supplier Ericsson, the telecommunications company now also cooperates with E&K Automation, a manufacturer of driverless transport systems, and Konica Minolta, which offers augmented reality glasses, among other products.

Endress+Hauser AG  
CH 4153 Reinach BL 1



Endress+Hauser is one of the first manufacturers to equip its field devices with mobile communication modules and to connect existing systems to 5G networks via newly developed HART gateways.

# Automated contamination control is more reliable – and it can breathe



**It appears to be a new law of nature: anything that can be digitalised, will be. Including in cleanroom production facilities. On 19 and 20 November 2019 in Frankfurt am Main, the Cleanzone trade fair will demonstrate how this can be put into practice in individual companies.**

**19th - 20th November 2019: CLEANZONE 2019, Frankfurt am Main (D)**

Digital technologies offer tremendous potential for increasing production efficiency and quality. Whereas initial efforts focused on data collection, people are now taking the next step: enabling communication. This quickly leads to automation, the deployment of robots and self-optimising systems. Whereas contamination control has already been automated to a great degree in the semiconductor industry, with many of the processes being encapsulated (taking place in mini-environments), the trend is now moving on to other industries – including the automotive, pharmaceutical and biotech sectors.

According to Egon Buchta from Ingenieurbüro & Reinraumservice Egon Buchta GmbH in Wannweil: “The more demanding the requirements for a cleanroom are, the greater the advantages offered by automation and the use of robots. That is because people are the primary source of micro-organisms and particulate contamination, and therefore pose the greatest risk of disruptions and downtimes.” It goes without saying that automation also helps combat the sector’s lack of specialists and skilled personnel.

That is why robots are already active in cleanrooms. These are not humanoid versions with a head, arms and legs, but rather a wide range of single- and multi-armed grippers and autonomously mobile disinfection units, such as the UVD Robot that was presented at Cleanzone 2018 by LabTec Labor Technik. Following manual cleaning by human staff, these robots carry out a final cleaning in which concentrated UVC light is shone on ‘infection hotspots’ in pharmaceutical production facilities, laboratories and hospital rooms. These disinfection robots can be started with an app, after which they independently travel to their place of deployment. Once the robot has completed its task, it reports that “bacteria has been eliminated at the hotspot”, creates a log and leaves the room.



(Messe Frankfurt/Sandra Gätke)

## Automation and robotisation require dialogue

In fields that are subject to strict regulations, automation and robotisation pose particular challenges for production. These are but a few of the problems that might occur: A family-run firm in the pharmaceutical industry is looking to bring its overseas production back to Europe. Quality and cost factors make it advisable to switch to large-scale automation as part of this transfer, as that is the only way that the return home is financially viable. For one complex mixing process, there are a number of cleanroom-compatible automatic mixers that could be used, but these would be unable to withstand the centrifugal forces created by the existing process. Alternatively, there are robot systems that are sufficiently robust mechanically, yet these are not suitable for use in cleanrooms. What is to be done?

Another example: As part of the quality control process in a pharmaceutical production facility, ten employees are taking samples from the ongoing process manually. The goal is to automate this step, and initial tests using a pilot system in the laboratory delivered promising results. But this is where questions arise: What can be done to disinfect the robots’ mechanical systems? How should the chemical waste be dealt with?

In each of these examples, one thing is necessary: The operator, and if necessary their suppliers as well, have to sit down with cleanroom experts specialising in microbiology for the pharmaceutical industry and work together on developing practical solutions. The result might, for example, involve taking robots with suitable mechanical capabilities and rendering them cleanroom-compatible through the addition of coverings and encapsulations. Or, a cleanroom-compatible robot could be upgraded mechanically so that it is able to perform the desired tasks. An additional robot may be required for waste disposal.

## Cleanrooms that breathe

Josef Ortner, Ortner Reinraumtechnik GmbH, Villach, is certain: “Automated systems are more reliable than people. They drive innovation. Over the past few weeks, I have witnessed the launch of an interesting project in the pharmaceuticals industry with the motto ‘Automation in the pharmaceuticals industry, including upstream and downstream steps such as filling and mixing’. A great deal has happened in this area over the past few years.”

In the interplay between digital technology and automated controls, the use of access control data for fine-tuning air exchange volumes can open up additional opportunities, because if an intelligent system knows how many employees are in the cleanroom, it can ensure that the airexchange volumes are higher for twenty people than they are for four. The cleanroom can breathe.

Limitless opportunities? – To achieve even greater fine-tuning, ex-

## Automated contamination control is more reliable – and it can breathe

parts expect measurement technology to reach a whole new level. While many things have been optimised over the past fifteen years, it will not really be possible for a cleanroom or even an entire factory to 'breathe freely' until today's point-measurement procedures according to ISO 14644 have been replaced by the screening of larger areas or even threedimensional spaces. The data obtained in this way can then be compiled in a central monitoring station and evaluated digitally. In effect, this creates a dynamic contamination map for the entire cleanroom, whereby the changes in contamination over time can be used as additional information for fine-tuning the air-exchange volumes. This impacts both micro-organisms and particulate contamination.

### Pumps for soap and disinfectant dispensers produced in a clean environment

Even supposedly 'simple' components must be carefully controlled for particulate and biological contamination. A good example is offered by the pumps for soap and disinfectant dispensers. These are produced in an ISO class 7 cleanroom using a plastic injection moulding process in which employees' role is limited to supplying their robot 'colleagues' with individual parts. That is because picking various parts from different containers and passing these on in the proper quantities continues to be quite challenging for robots.

Even so, Markus Thamm, cleanroom.de GmbH, Heidelberg, belie-

ves that: "This process will also be automated over the long term. As soon as the quantities being dealt with increase, it is worthwhile to develop a product-specific automation solution." There is no better place to begin a dialogue about the opportunities presented by digital technologies, automation and robotisation than at a specialised trade fair – such as Cleanzone on 19 and 20 November 2019 in Frankfurt am Main.

Before Cleanzone opens its doors in Frankfurt in November, the second Cleanzone Middle East will be taking place in Abu Dhabi on 18 and 19 September. This conference and exhibition is focused on the Middle East, parts of Asia and Africa, bringing together the manufacturers of cleanroom technology and equipment with user industries.

## cleanzone

cleanzone  
Messe Frankfurt Exhibition GmbH  
Ludwig-Erhard-Anlage 1  
D 60327 Frankfurt am Main  
Telefon: +49 69 7575 6290  
Telefax: +49 69 7575 96290  
E-Mail: [anja.diete@messefrankfurt.com](mailto:anja.diete@messefrankfurt.com)  
Internet: <http://www.messefrankfurt.com>

# Combining new functionalities with the strictest design requirements



## ENGEL automotive at K 2019

**Experience. Passion. Innovation. This is the motto ENGEL will be adopting for its appearance at the K 2019 trade fair in Düsseldorf, Germany, between October 16th and 23rd. ENGEL will once again underline its technological pre-eminence by demonstrating a wide range of challenging industry applications, including functionalised surfaces and lighting technology for the automotive industry.**

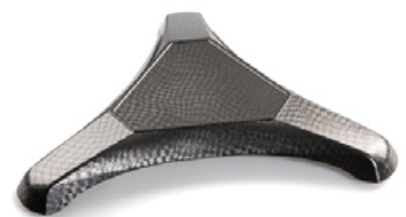
16th - 23rd October 2019: K 2019, Düsseldorf (D)

### Autonomous driving: foil applications increasingly in demand

Autonomous driving is presenting new challenges in a vast number of different areas for car manufacturers. "Firstly, vehicle interiors will change, needing to become more homelike with controls replaced by high-quality surfaces. Secondly, autonomous driving will require brand-new sensor technology that can be unobtrusively made a part of the design. In both instances, there is a growing preference for foil applications as the

production solution," comments Dr. Georg Steinbichler, senior vice president of research and development for technologies at ENGEL AUSTRIA. With foilmelt and clearmelt, ENGEL has two extensively tried-and-tested technologies used for the processing of both functional and design foils. And there will be two applications at K to illustrate the diverse array of possibilities.

ENGEL is demonstrating the amazing flexibility of this production-ready, roll-to-roll IMD injection-moulding process by producing complex, three-dimensional sam-



ENGEL is demonstrating the amazing flexibility of this production-ready, roll-to-roll IMD injection-moulding process by producing complex, three-dimensional sample parts with different decor. (Picture: ENGEL)

## Combining new functionalities with the ...

ple parts with different decor on a victory 1060/300 injection moulding machine with an integrated viper 20 linear robot. The joint development by system partners ENGEL, Leonhard Kurz, Schöfer and Isosport Verbundbauteile makes it possible to thermoform, back inject and die-cut a limitless selection of surface systems from roll to roll in the mould in this one-step process.

The wide range of possible material combinations is remarkable. It is possible to process both multi-layer foil systems with paint film surfaces, as well as structured, backlightable and functionalised foils with capacitive electronics. To change the decor, the structure and the functionality, only the roll has to be changed, not the mould. In addition to typical materials such as ABS, PC and PC/ABS, it is also possible to use PP and recycled material for back injection. At the K show, ENGEL will be mixing recycled material in the form of plant scrap shredded together with the foil.

ENGEL has further increased the foilmelt technology's degree of integration for K 2019, with the contouring process taking place directly in-mould. As a result, an external laser station is no longer needed, cutting out an entire step of the process.

ENGEL is demonstrating a second IMD application (IMD PUR) at its partner Leonhard Kurz's stand in Hall 5 (Stand A19), where sample parts based on front panels are produced via the clearmelt process on a duo 2460/900 injection moulding machine with an easix articulated robot. These parts meet the new requirements for sensors. The clearmelt

process involves refining the surface using a polyurethane top coat, which is especially effective in exterior use due to its highly glossy and scratch-resistant properties. The thermoplastic and PUR processing can either be carried out in sequence or in parallel using a horizontal rotary table, depending on the number of parts and the conditions in the injection moulding shop. The other partner companies involved in this exhibit are Hennecke, Votteler, Sabic and Velodyne LiDar.

### Lighting: the ultimate clean look for optical fibres

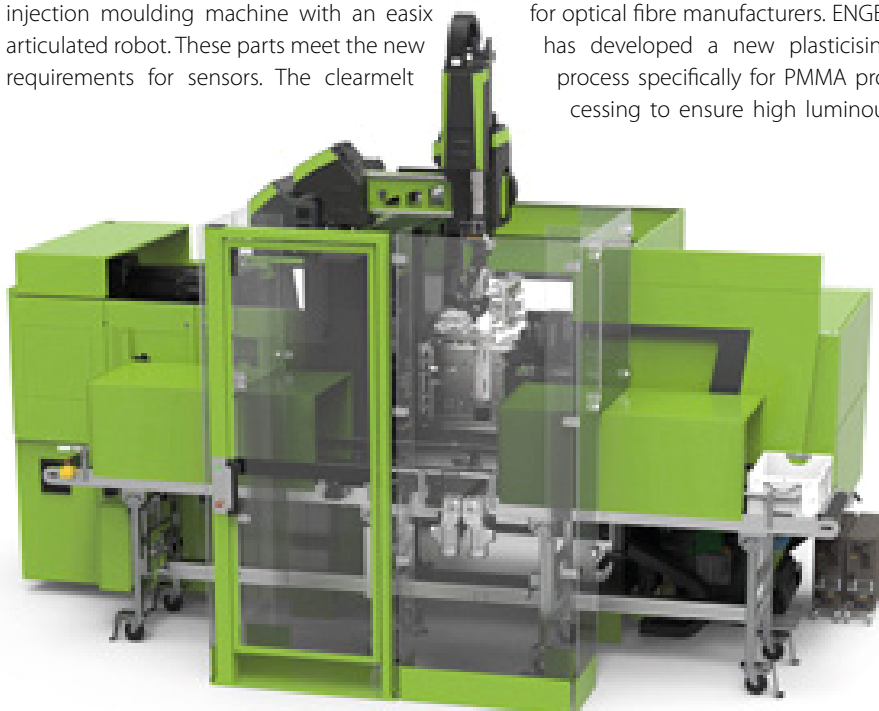
LEDs are becoming more and more versatile in their use in vehicles, increasingly being added as distinctive design elements. The level of variation in their shape is growing accordingly, creating new challenges for optical fibre manufacturers. ENGEL has developed a new plasticising process specifically for PMMA processing to ensure high luminous

efficiency, even in cases featuring complex shapes and long structures, such as outline lighting. This increases the homogeneity and purity of the melt, making new options available to lighting designers.

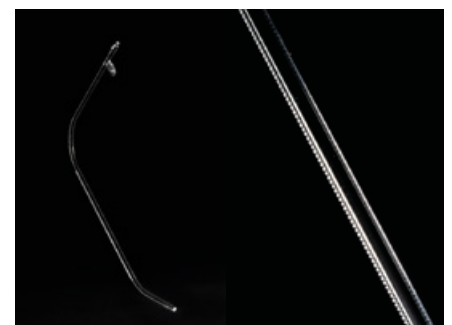
"Even the most subtle shades of yellow invisible to the human eye reduce the light intensity," Georg Steinbichler explains. "By reducing the thermal stress and ensuring airtightness, we can also minimise material damage to LED shapes with long flow paths. The result: ultra-clean optical fibres, which allow for LEDs with even longer and more complex structures."

To highlight the great potential, an all-electric and tie-bar-less e-motion 310/120 TL injection moulding machine will be put through its paces at K. ENGEL has joined forces with its development partners INglass and HRSflow to test out a variety of injection systems with electrically operated needle valves, and will be exhibiting a solution that has been fine-tuned in every detail. The other partner companies that have been helping to make the exhibit possible are Volvo and Arkema.

ENGEL AUSTRIA GmbH  
A 4311 Schwertberg



To highlight the great potential, an all-electric and tie-bar-less e-motion 310/120 TL injection moulding machine will be producing LEDs at K. (Picture: ENGEL)



ENGEL has developed a new plasticising process specifically for PMMA processing to ensure high luminous efficiency, even in cases featuring complex shapes and long structures. (Picture: ENGEL)



# Cleanzone has the power to initiate and promote new technologies

On 19 and 20 November, Cleanzone – the international trade fair for contamination control and cleanroom technology – will be bringing manufacturers and users together in Frankfurt am Main. As the event draws closer, Josef Ortner from Ortner Reinraumtechnik, who is also a member of the Cleanzone strategy commission, explains the trade fair's importance and offers insight into the biggest challenges facing the industry.



Joseph Ortner (Messe Frankfurt/Sandra Gätke)

the full spectrum in a single trade fair. This is further exacerbated by internationalisation and the differences in standards and conditions found in individual countries and regions. As a trade fair in the truest sense, Cleanzone has the power and potential to develop into a major international marketplace for cleanroom technology, and in particular to initiate and promote new technologies. Especially in the expanded life sciences market, users and providers alike are in need of fresh inspiration and new approaches. Mechanical cleanroom production facilities, such as those for microelectronics, mechatronics and electronics, are facing a wave of change. Considering the development and expertise of engineering firms and planners, trade fairs like Cleanzone can deliver real added value."

### 3. In what areas do you expect the industry to be presenting innovations at Cleanzone?

**Josef Ortner:** "I believe that there will be a focus on products, systems and processes dealing with microbiological cleanliness; in other words, decontamination technologies. It would be both fascinating and welcome if there are numerous foreign exhibitors at the trade fair to present their products and services. Sometimes the cleanroom industry and providers have a tendency to make things more complicated than they need to be, or to apply the wrong standards. International comparisons make it clear that simple, cost-effective solutions are also available. Besides, there are also excellent products and solutions in use in other economic regions, and we would do well to take note of these. Competition creates pressure, and pressure supplies the energy for change – in every direction."

### 4. What are some of the biggest challenges facing cleanroom technology over the next few years?

**Josef Ortner:** "In future, all the industries in which cleanliness and cleanroom techno-

logy are important will feel a major impact from four interrelated elements:

- Security: It will be necessary to develop or combine systems, processes, facilities and technologies that increase security in every sense of the world, be it in manufacturing, automation, digitalisation or the quality of products and work. Cybersecurity will be of particular importance.
- Energy: We will have to undertake every conceivable measure that helps save energy and protect the environment. This could well result in major change processes and may even impact the designs of buildings and production facilities. Mini-environments and the isolation philosophy will play a key role here.
- Information: Huge advances in measurement technology will be necessary, and modern digitalisation systems will have to be introduced and integrated into every aspect of cleanroom technology, so that all relevant process steps can be defined and monitored in real time. This results in the generation of information that triggers actions, in keeping with the motto: "Once I know, I know what to do."
- Flexibility: In every area and field pertaining to cleanrooms – production, laboratories, support zones, common areas, working zones and more – it will be necessary to achieve the greatest possible flexibility. This applies to infrastructure installations, equipment installations, processing facilities and fabs. The result: 'a factory that can breathe'.

### 1. Ortner Reinraumtechnik has booked a much larger stand for Cleanzone 2019. What led you to do this, Mr. Ortner?

**Josef Ortner:** "Our company participates in numerous international cleanroom trade fairs and conventions, and it goes without saying that these events differ from one another. We have discovered that trade fair success depends to a very large degree on the manner in which systems and techniques are exhibited and presented. Giving demonstrations and offering visitors the chance to come into contact with the equipment allows them to go home with impressions that will last. Cleanzone offers us a platform for vivid and varied presentations of our cleanroom systems, especially our newest developments, for a professional audience. Among other things, we will be presenting an entirely new material airlock technology."

### 2. What is the importance of Cleanzone for the cleanroom community?

**Josef Ortner:** "The cleanroom industry is extremely diverse, and it is difficult to cover

cleanzone

cleanzone

Messe Frankfurt Exhibition GmbH

Ludwig-Erhard-Anlage 1

D 60327 Frankfurt am Main

Telefon: +49 69 7575 6290

Telefax: +49 69 7575 96290

E-Mail: [anja.diete@messefrankfurt.com](mailto:anja.diete@messefrankfurt.com)

Internet: <http://www.messefrankfurt.com>



# Trends, ideas and know-how for consistently clean parts



## parts2clean 2019 (22–24 October)

Coping effectively and efficiently with new and different challenges in parts cleaning is of ever more mission-critical importance for all manufacturers aiming to stay competitive. parts2clean puts them in touch with all the latest trends, solutions and expertise they need to stay ahead of the competition.

22nd - 24th October 2019: parts2clean, Stuttgart (D9)

Whether digital transformation, redesigned parts and the new challenges they pose, innovative manufacturing technologies and materials, or tougher demands in terms of the stability, reproducibility and cost efficiency of processes – the changes now taking place in many sectors of industry also have direct implications for parts and surface cleaning. “parts2clean is the world’s biggest showcase of technology for consistently reliable and efficient parts cleaning,” said Olaf Daebler, Global Director of parts2clean at Deutsche Messe, adding: “The exhibitors will be presenting effective ways of meeting today’s and tomorrow’s standards.” The leading international trade fair for industrial parts and surface cleaning runs from 22 to 24 October in Stuttgart.

### Innovations and advancements for every conceivable application

“parts2clean is the place where the market leaders present their new and improved products to the international industrial community,” explains Daebler. These include, amongst other things, solutions that combine the deburring and cleaning of parts in a single process and with short cycle times. This enables manufacturers to meet demanding standards for particulate cleanliness. New and improved process technologies for wet chemical cleaning are likewise making it possible to achieve improved cleaning results more quickly. Exhibiting firms will also be showing solutions specially developed to meet new or revised standards in fields such as electromobility or medical tech-

nology. Typical examples are dry cleaning processes that can be readily integrated into a linked sequence of production processes. When it comes to cleaning processes, the monitoring of cleaning parameters, cleanliness checks or servicing and maintenance, automation and digitalization are also at the top of the agenda, as will be reflected by exhibitors’ showcases.

### Special displays covering today’s – and tomorrow’s – hottest topics

“In addition to individual showcases by exhibiting firms, a top-notch supporting program offers visitors in-depth information, ideas and valuable know-how on every conceivable aspect of parts cleaning,” says Daebler. The special “QSREIN 4.0” display staged by the German Industrial Parts Cleaning Association (FiT) serves as a starting point for discourse on adaptive process solutions capable of self-adjusting depending on the condition of the parts involved and the degree of cleanliness required. This facilitates the optimization of processes as well as the mastering of new challenges as they arise.

Another special display at the upcoming show is “Parts Cleaning 4.0 in practice”, which reflects the trend towards automated cleaning and handling solutions and the resulting need for technical information. The display is being co-organized by robotics specialist Stäubli.

At the special display entitled “Process flow in parts cleaning, including cleanliness checks”, industrial cleanliness specialists will be on hand to guide visitors through the steps needed in order to pro-



## Trends, ideas and know-how for consistently clean parts

perly achieve, document and maintain any specified degree of parts cleanliness.

### Bilingual Industry Forum: a highly valued resource

The three-day Industry Forum that forms part of parts2clean, and whose program is coordinated by the Fraunhofer Cleaning Technology Alliance and FiT, is internationally renowned as a highly valued resource. The talks by senior experts from industry and the scientific and research community – available in simultaneous translation (German <> English) – will show how issues such as the digital transformation, artificial intelligence (AI), simulation and computer-aided process optimization are and have been impacting the world of industrial parts cleaning. Grouped into six sessions, each talk will focus on a different theme: "Cleaning processes", "Cleaning, drying, and maintaining bath hygiene", "QSREIN 4.0 – process solutions for parts cleaning in the future", "Digitalization and automation", "Analytics and industrial cleanliness", and "Cleaning in practice". The full agenda is published on the

parts2clean homepage. Admission to the Industry Forum is free of charge for parts2clean attendees.

### Guided Tours – the shortest route to best-fit solutions

The Guided Tours offered at parts2clean are a great source of orientation, especially for less experienced users and newcomers to industrial parts and surface cleaning. Taking in selected exhibitor stands that cover each and every link in the process chain, the tours enable visitors to discover relevant solutions and innovations and to identify the most promising suppliers for solving their particular challenges. Tours last about two hours, and are available for groups of up to 25 persons (max.) on all three days of the show. Each tour is led by a trained guide, with commentary in English.

Deutsche Messe AG  
D 30521 Hannover

# The Future of Injection Moulding



FANUC is responding to market demands with new ROBOSHOT technical solutions for future-oriented injection moulding. The company will demonstrate several premieres in their product portfolio on FANUC's K 2019 stand A 60 in hall 14. Apart from implementing industry-specific know-how FANUC's products are well known for their low power consumption, no hydraulic oil involved, low carbon footprint, low scrap rate and more. Furthermore, technical progress with ecological benefits leads to commercial advantages – short downtime i.e. long uptime, better product unit cost/price, high-end production quality and prevention of rejects and – last but not least – longevity of the ROBOSHOT injection moulding machine.

16th - 23rd October 2019: K 2019, Düsseldorf (D)

### Premiere: ROBOSHOT α-S150iA Medical Package

FANUC has now released an injection moulding machine specifically for the medical and pharmaceutical markets: the ROBOSHOT α-S150iA Medical Package. ROBOSHOT

meets stringent user requirements for low energy consumption and flawless injection moulding quality combined with stability, repeatability and process reliability. The ROBOSHOT α-S150iA Medical Package, which has now been presented for the first time, also has Class 7 cleanroom approval. This

has been achieved through design features such as tie-bars without bearing bushes, Cr-coated linear guides, NI-coated plates, specially approved lubricants and an unpainted, brushed stainless steel cover. In the 32-cavity mould, needle caps made of PP are produced. Like all FANUC injection moulding machines, the "Medical Package" also operates with these processing features: efficient energy recovery control function, reliable torque plasticise control – Precise Metering Control (PMC) 2&3 – as well as backflow monitor and highly efficient AI mould / ejector protection. The results are high-end process performance and product quality.



### Premiere: ROBOSHOT α-S450iA with a larger standard injection unit

A new larger injection unit specially developed for high injection pressures and volumes has been developed. FANUC thus extends the performance of its largest precision injection moulding machine to date



## The Future of Injection Moulding

– the all-electric ROBOSHOT α-S450iA – by a further step. More cavities on larger moulds require larger platens, which in turn require a larger/stronger machine with higher clamping forces and powerful injection units. Beyond the automotive industry, medical and pharmaceutical markets, as well as other precision parts industries, are demanding more precise, faster output and higher production rates than ever before. What's more, complex geometries require absolute precision – especially in terms of surface quality, contour accuracy, weight stability and reproducibility. FANUC was aware of this when the company decided to develop a larger machine with the same reliability as the previous six models with clamping forces between 150 and 3000 kN. Now we have 4500 kN clamping force, 920 mm x 920 mm tie bar spacing, a clamping stroke of 900 mm, 1300 mm x 1300 mm platens and a mould height of up to 1000 mm. The α-S450iA shows its impressive productivity potential: for lawn mowers, Polypropylene covers measuring 330 x 570 mm are produced in less than one minute cycle time: shot weight 725m<sup>3</sup>. A FANUC Robot

M-20iA, mounted on the IMM's fixed platen, takes care of demoulding and depositing the hoods.

### Premiere: ROBOSHOT α-S50iA LSR Edition

For products that need to be tightly protected against environmental influences, FANUC presents its proprietary liquid silicone processing cell. The ROBOSHOT α-S50iA - 500kN clamping force - works with a FANUC Robot LR Mate 200iD/7. It takes four rectangular (length approx. 8 mm) LSR electrical connector seals from the four-cavity mould and deposits them on a conveyor belt. The core of the system is the D18mm LSR screw/cylinder unit developed by FANUC. Here, a Robot system called QSSR (Quick and Simple Start-up of Robotization) has been implemented.

### ROBOSHOT α-S150iA + SI-20A Multi Component

FANUC now offers a further develop-

ment in multi-component injection moulding: a rotary table with one of the most reliable servo drives on the market. A production cell of ROBOSHOT α-S150iA + vertical type 2nd injection unit SI-20A is automated with a FANUC Robot LR Mate - also via QSSR. Useful during the cold season: the FANUC Robot deposits two-colour ice scrapers moulded in a special hard PC/ABS blend combined with a soft TPE handle on the conveyor belt. Visitors are invited to take the product home.

### ROBONANO Demonstration

At a demonstration station, mould makers can discuss real precision with FANUC experts. ROBONANO is the company's solution in the sector of finishing quality optical surfaces. ROBONANO's typical applications are the finishing of tool inserts for injection moulding machines when form accuracy and surface finish requirements are strict, for instance in the production of high quality optical components. ROBONANO features a high positioning accuracy with the programming command resolution of 0.1 nanometre (0.1nm is equal to 10<sup>-10</sup> meters or 1 Angstrom, the unit of length used to measure the size of molecules and atoms) which is required to achieve optical quality surface finish. You can meet a perfect showcase of FANUC state of the art technology. In Japan ROBONANO has been contributing for about two decades to the success of FANUC's customers serving information and communication technology, automotive, medical and other industries. A video shows this new machine tool in its ability to produce highly precise, repeatable and stable optical quality surface finishing on high-precision mould inserts.

### Industry 4.0: FANUC ROBOSHOT LINKi & Euromap 77

In an area on Stand A60 in Hall 14 - the so-called IOT Corner - visitors can see how FANUC masters the new Euromap 77 OPC UA Interface in cooperation with the TIG „Authentig“ MES System (Manufacturing Execution System). The viewer sees real-time quality, machine and order status monitoring of all machines and robot cells - in accordance with industry 4.0 specifications/requirements. ROBOSHOT LINKi will be demonstrated live to visitors.



# Lab Innovations 2019 to showcase advances shaping the laboratories of the future



Game-changing instrumentation and presentations spanning new regulations to artificial intelligence feature in the UK's most forward-thinking laboratory event.

30th - 31st October 2019: Lab Innovations 2019, Birmingham (UK)

Lab Innovations, the UK's only trade show dedicated to the laboratory industry, will be a one-stop showcase of new products and various aspects involved in future-proofing the laboratory. Visitors to Lab Innovations 2019 at the NEC, Birmingham on 30 and 31 October, will be able to discover ways to improve workflow efficiency, benefit from advances enabled by the digital age, and make sustainable procurement decisions that both support the environment and also save money.

The latest products will be on display, and Lab Innovations is partnering with Innovation DB to celebrate product innovation through the 'Innovation Gallery', 'Innovation Trail' tours and the 'Lab Innovations Award'. The Innovation Gallery features products that will enable scientists to perform their work more effectively through developments in technology, connectivity and space utilisation. Examples include: the Zetasizer Ultra, Malvern Panalytical's most advanced system for the measurement of particle and molecular size, particle charge and particle concentration; Merck KgaA' Milli-Q® Connect remote service capability for its Milli-Q® CLX 7000 water purification systems, which enables users to maximise lab productivity, and facilitate data traceability and lab accreditation; and IKA's NANOSTAR 7.5 Digital overhead stirrer, which, at only the size of a small apple, is an example of how manufacturers are supporting scientists working in labs where space is at a premium.



A shortlist of products from the Innovation Gallery will be selected for the Lab Innovations Award by Dr Gerald Law, CEO, Innovation DB. Visitors will be able to gain real insight into these products of the future by signing up for one of the twice daily 'Innovation Trail' tours, and the winner of the Lab Innovations Award will be announced during the show.

With technological developments and digitisation expanding the boundaries of laboratory research, Lab Innovations will also support lab professionals in their day-to-day challenges through a comprehensive programme of presentations. These free-to-attend, CPD-accredited sessions will cover issues such as sustainability, modern work practices, and the use of virtual and augmented reality and artificial intelligence.

In the Insights and Innovations Theatre sponsored by PerkinElmer, presentations include 'Innovations in lab equipment sustainability', by Andy Evans, of Green Light Laboratories, 'Use of VR in the lab', by Pawel Gawkowski, COO of Solution4labs and 'Using AI in science', by Prof Dr Ji Zhou, Phenomics Group Leader, Earlham Institute. Recruitment specialists Kolabtree will present on 'Freelancing in the lab', and show how laboratory managers are able to tap into the increasingly prevalent gig economy and access highly skilled scientists on a freelance basis. Budding entrepreneurs will benefit from the presentation 'Hiding in plain sight – spotting valuable intellectual property', by Richard Wells, Patent Attorney, Potter Clarkson.

Lab Innovations visitors will also be able to find out about the new regulations, guidelines and aspects of design that will affect tomorrow's laboratories. In the Cleanroom Hub, managed by industry journal Cleanroom Technology, presentations include 'Impact of the EU Biocidal Product Regulations', by Siobhan Murphy of Contec and 'Facility design: Cleanrooms 4.0', by Helen Tebay of Connect 2 Cleanrooms.

The combination of products, networking and educational sessions makes Lab Innovations 2019 an unmissable event for UK laboratory professionals. Commenting on last year's event, Natalie Cole, Chemist, Biolab Medical Unit said: "It's fantastic seeing all the different equipment that's now available, as well as learning things about lab products that I wouldn't have known otherwise. Another real bonus when visiting Lab Innovations is being able to attend presentations that are relevant to my professional development and earn CPD points."

To register for Lab Innovations 2019 at the Birmingham NEC on 30 & 31 October, click 'Register for free' on the Lab Innovations homepage.

# Amorphous metals combined with polymers for the first time



## ENGEL AMM at K 2019

ENGEL and Heraeus have managed to reduce cycle times by up to 70 % compared with previous production solutions for the processing of amorphous metals in injection moulding. In doing so, the two system partners have opened the door to these alloys with truly special qualities entering large-scale production for a wide assortment of end uses. ENGEL is presenting the next big step in this development at the K 2019 trade fair in Düsseldorf, Germany, between October 16th and 23rd. Two-component parts made of amorphous metal and silicone are produced for the first time – a process that is taking place in a fully automated manufacturing cell.

16th - 23rd October 2019: K 2019, Duesseldorf (D)

Due to their randomly arranged, non-crystalline structure, amorphous metals are both extremely hard and highly elastic. They have very good elastic recovery, are extremely corrosion resistant and biocompatible according to ISO 10993-5. With this combination of properties, these alloys are superior to steel, titanium and many other materials.

On the basis of its proven hydraulic and tie-bar-less victory range, ENGEL has developed a new injection moulding machine for processing amorphous metals from Heraeus' Amloy product range. The ENGEL victory AMM (amorphous metal moulding) delivers

fit-for-purpose parts with a premium quality surface finish within very short cycle times.

### Fully automated process

For the production of two-component housing demo parts at the K show, ENGEL is combining a victory 120 AMM with an insert 60V/45 vertical injection moulding machine, which is equipped with a two-station rotary table. The manufacturing cell is fitted with both an ENGEL viper linear robot and an ENGEL easix articulated robot for the fully automated production process.

The first step involves injection-moul-

ding the basic structure for the housing on the victory AMM from a zirconium-based Amloy alloy. To do this, the viper robot takes an Amloy pre-material from the separator and transfers it to the injection unit. After less than 70 seconds, the metal component takes full shape. The viper removes the part and deposits it onto a tray. The easix articulated robot takes over from there, placing the Amloy component on the lower mould half on the insert machine's rotary table, where a liquid silicone rubber (LSR) seal is moulded on the part. The elastomer component also consistently fills out the seal structure on the bottom of the part through narrow openings on the surface of the housing.

Both of the moulds are made by long-term ENGEL partners. The mould for the AMM process was provided by Flex, while Starlim Sterner supplied the LSR injection mould for the K show.

### Geared for high-volume production

The demo parts combine the needs of portable electronic devices with the in-



On the basis of its proven hydraulic and tie-bar-less victory range, ENGEL has developed a new injection moulding machine for processing amorphous metals from Heraeus' Amloy product range. (Picture: ENGEL)

For the production of two-component housing demo parts at the K show, ENGEL is combining a victory 120 AMM with an insert 60V/45 vertical injection moulding machine. (Picture: ENGEL)

## Amorphous metals combined with polymers for the first time

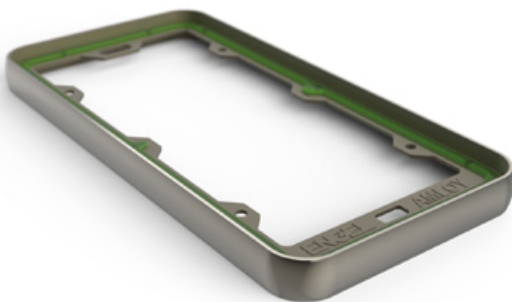
novative properties of the Amloy materials. In addition, two-component injection moulding opens up new opportunities for designing housing frames that are almost indestructible while enjoying better protection from dust, water and radio waves. "Fully automated hybrid production is unlocking huge potential, especially for the consumer electronics industry," Gerhard Dimmler, Senior Vice President of product research and

development at ENGEL AUSTRIA, states. "Our development work has confirmed that, in multi-component injection moulding, it is possible to create stable combinations not only of silicone, but also of other elastomers and thermoplastics with Amloy materials."

Zirconium-based and copper-based alloys for large-scale applications are currently available in the Amloy product line, with alloys based on titanium, iron and platinum

also in the works. With this variety of materials, Heraeus and ENGEL cover a huge range of new applications. The list includes portable electronic devices, durable instruments for minimally invasive surgery, stable suspension and wear-resistant drivetrain components for the aerospace industry, premium decor elements for cars, and abrasion-resistant watch components.

ENGEL AUSTRIA GmbH  
A 4311 Schwertberg



Premiere for the two-component AMM process. A silicone seal is directly moulded onto the parts, which are made of amorphous metal.  
(Picture: ENGEL)

## Dr. Timo Berger is Weidmüller's new Chief Sales Officer

**On September 1, 2019, Dr. Timo Berger succeeded José Carlos Álvarez Tobar as Chief Sales Officer of the Weidmüller Group as planned.**



New Weidmüller CSO Dr. Timo Berger. (©Weidmüller)

Dr. Timo Berger was appointed as Chief Sales Officer (CSO) of the Weidmüller Group in Detmold on September 1, 2019. Together with Jörg Timmermann (Chief Financial Officer [CFO] and Speaker of the Board) and Volker Bibelhausen (Chief Technology Officer [CTO]), he forms the Executive Board of the international market leader in Industrial Connectivity and Automation. Dr. Berger has been with Weidmüller since 2005 and most recently spent three years as Managing Director and Regional Manager responsible for sales in Germany and the Central European region. He had already been working closely with his predecessor José Carlos Álvarez Tobar since March 2019 to prepare for his new management role. Álvarez Tobar retires after 40 years with Weidmüller and almost four years as Chief Sales Officer.

„The appointment of Dr. Timo Berger as member of the Executive Board of the Weidmüller Group is another important element in our long-term corporate and management strategy. With his experience, Dr. Berger combines the highest sales and technological competence. Thanks to the transition phase with José Carlos Álvarez, the greatest possible continuity is guaranteed in times of accelerated change at our customers and in our markets," commented Christian Gläsel, Chairman of the Supervisory Board of the Weidmüller Group, on the occasion of the Hanover Fair 2019.

### About the person:

Dr. Timo Berger (46) has been with Weidmüller for over 13 years in various management positions in Germany and China. During this time, he was, Division Head and, since November 2016, Managing Director and Executive Vice President of Weidmüller Sales in Central Europe and Germany. Dr. Timo Berger is married and lives with his wife and his two children near Detmold.

Weidmüller GmbH & Co. KG  
D 32758 Detmold



# Utilizing Virtual DoE over the Entire Development Process

## Accompanying the development process with SIGMASOFT®, from part design, over mold design to production

At this year's K Show SIGMA Engineering aligns its booth concept with the motto "SIGMAinteract – Autonomous Optimization connects departments" and presents its new SIGMAinteract. In a cooperation project SIGMA shows how to use virtual DoE during the entire development process of the project. With SIGMAinteract results are displayed interactively and in 3D. Thus, its usage makes knowledge tangible and easy to share between departments.

16th - 23rd October 2019: K 2019, Duesseldorf (D)

For SIGMA Engineering GmbH the K 2019 (16th – 23rd October 2019, Düsseldorf, Germany) is all about "SIGMAinteract – Autonomous Optimization connects departments". At the SIGMA booth in hall 13 at booth B31 this immediately becomes visible with a completely new design concept.

Making informed decisions throughout a project requires involvement from partners in various departments. This means project data must be provided to each participant and they will need free and easy access to it. Therefore, SIGMA presents its new SIGMAinteract: Now, users can share SIGMASOFT® results interactively and in 3D with colleagues, project partners and customers. SIGMASOFT® hereby encourages the interdisciplinary exchange and provides a direct link between the simulation in development and production.

Visitors can experience and use SIGMAinteract live at the booth. There, SIGMA will demonstrate how virtual DoE is used most efficiently and how the SIGMAinteract tool significantly contributes to a good interdisciplinary exchange. As a demonstration SIGMA uses the project "Pot Cloth", which was realized as a collaborative project with Momentive Performance Materials GmbH, Germany, EMDE MouldTec GmbH, Germany, Wittmann Battenfeld GmbH, Austria, and Nexus Elastomer Systems GmbH, Austria.

In this project part design and tool construction were done in parallel. Therefore, it was necessary for all partners to work closely together. Simultaneously, SIGMA conducted a virtual DoE for the validation of the part design and the evaluation of the heating concept.

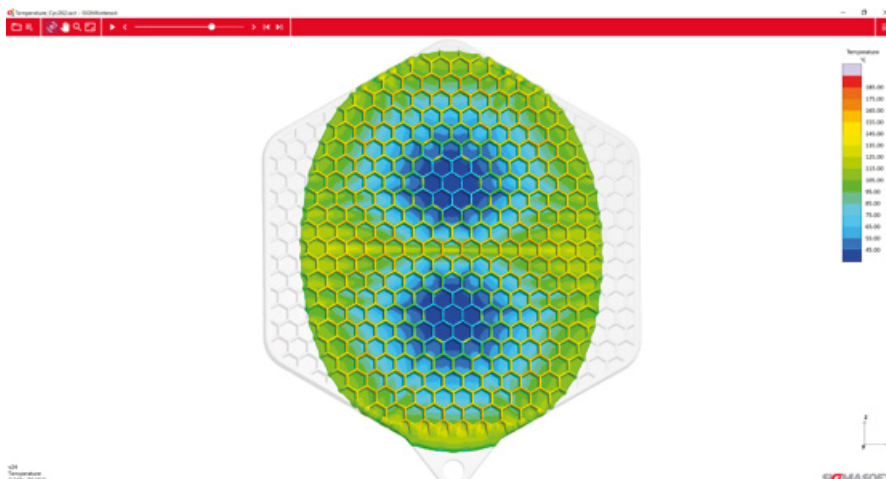
The SIGMASOFT® results showed that the honeycomb structure of the part placed high requirements on the material and the tool. There was also a high possibility for air entrapments at the weldlines of the comb walls and premature curing during filling which would

need to be prevented. The hanger was what determined the cycle time. With help from SIGMASOFT® the ideal length and power of the heating cartridges was determined to achieve an even temperature distribution in the cavity area.

Combining the results of these two DoEs, a common ground for all project partners was created and the project board could make fast and well-founded decisions: A venting system was implemented into the tool. Premature curing was prevented via a well-chosen material and the part could also be scaled up. The hanger was redesigned allowing the heating time to be reduced by five seconds.

At the SIGMA booth visitors can observe the production of the "Pot Cloth" virtual and live. It will be produced on a SmartPower 90/350, control UNILOG B8, from Wittmann Battenfeld [booth 15Co6]. The LSR injection molding tool including the cold runner system was constructed by EMDE MouldTec [booth 12A21]. The system is completed by a ServoMix X200 dosing system from Nexus Elastomer Systems [booth 12E49-01]. Silopren LSR 2640 from Momentive Performance Materials [booth 6B15] is used as material for the production.

As an example, for the knowledge transfer during the product and tool design phase central results are directly presented interactively and in 3D on the machine with SIGMAinteract. Thereby, simulation and production are directly linked together. The visitors see in a descriptive manner, how to share simulation results with colleagues and customers quickly and easily.



SIGMAinteract: Temperature distribution in the part during filling, shown on an interactive 3D model, here at 74% filled.

# Innovative and secure packaging for pharmaceuticals

## Gerresheimer at CPhI Middle East & Africa

Based at booth D11 in Hall 1, Gerresheimer's presence at CPhI Middle East & Africa – held from September 16 to 18 in Abu Dhabi (ADNEC) – will focus on micro pumps. Sensile Medical, a company of the Gerresheimer Group, developed for EVER Pharma under the brand name D-mine®, this wearable micro-infusion pump. It recently received European CE certification and it has already been launched in several European countries.

The compact, patient-friendly infusion pump is used for the continuous subcutaneous administration of drugs to treat Parkinson's disease. The first micro pump from Gerresheimer subsidiary Sensile Medical to be available on the market, it gives Parkinson's patients greater independence in their day-to-day lives.

### SenseCore – reliable function with a distinctive design

"Gerresheimer specializes in the safe storage and administration of all kinds of medication," says Ingo Waschulewski, Business Development Manager of Sensile Medical, expert in SenseCore micro pump technology. With SenseCore micro pump technology, Sensile Medical ensures the safe, simple, and precise administration of liquid drugs by the patient themselves at home or on the move, and always with absolute reliability. Our injection aids are impressively simple and discreet to use and the patient does not see the needle, making it suitable for all manner of different applications. The modular and flexible platform family shows a distinctive and now Good Design as recently awarded - developed by the British agency Team Consulting for Sensile Medical.



Gerresheimer has teamed up with select certified partners to add surface finishing of plastic dropper bottles to their irradiation services for ophthalmic and nasal.

### Irradiation of plastic dropper bottles for ophthalmic and nasal

With the irradiation service Gerresheimer wants to make life easier for its customers when it comes to procuring their dropper bottle. By treating the products with gamma radiation Gerresheimer adds in an important work step before filling. Therefore the company selected, recognized, and certified partners. The chosen partner companies have the requisite certification in accordance with ISO standards 11137, 11737, and 13004. The benefits of this service speak for themselves: Gerresheimer is assuming responsibility for handling this work step from start to finish, including transport to the irradiation company, monitoring and inspecting its work, and delivering to the location specified by the customer. The inspection processes also involve physically and chemically testing the product characteristics after irradiation. Gerresheimer regulates the validation and revalidation of the entire process, helping to reduce costs for the customer.

### Gerresheimer – the pharmaceutical glass specialist

Gerresheimer produces glass containers for medications in America, Europe, India, and China in accordance with uniform global standards. The products available range from simple tablet jars to sterile injection vials made of moulded or tubular glass. With the Gx Elite vials, Gerresheimer is setting new standards for type I vials made from borosilicate glass. They are the result of comprehensive optimization of the conversion process, removing all risks that can lead to product defects during manufacturing. Above all else, it prevents any glass-to-glass or glass-to-metal contact from when the tubular glass is made right through to the final packaging of the vials.

Gx® is a registered trademarks of the Gerresheimer Group.





# IPB 2019 showcases new exhibits and trends

IPB 2019 will take place from 16 to 18 October at the Shanghai World Expo Exhibition and Convention Center, where 230 exhibitors, 40 percent of them from outside China, will present their latest developments. It's where some 10,000 trade visitors from sectors like chemicals, pharmaceuticals and food gather to enjoy professional dialogue. As a knowledge-sharing and communication platform for international and Chinese exhibitors, purchasing managers, associations and universities from the bulk solids industry in China, the IPB has in recent years established itself as the leading "one-stop" fair for powder and bulk solids in China. It is co-organised by the Chinese Society of Particuology and NürnbergMesse China Co. Ltd.

16th - 18th October 2019: IPB 2019, Shanghai (China)

## Explosion protection the key topic at IPB 2019

This year the event will also host the 8th IND EX® Safety Symposium on Explosion Protection Regulations in partnership with the Intercontinental Association of Experts for Industrial Explosion Protection (INDEX). The symposium will put the spotlight on the explosion protection regulations introduced in China this year.

## Award-winning innovation and environmental protection policy

The Intelligent Green & Safety Award (IGSA) was introduced at the IPB by the co-organisers in 2018 and proved very popular. To consistently promote the Chinese government's innovation and environmental policy in the industry, a new round of assessments and selection processes for outstanding powder and bulk solids equipment eligible for the IGSA is under way for IPB 2019. This award is designed to monitor and promote the development of the Chinese powder in-

dustry. For a list of the award-winning exhibits please go to: [www.ipbexpo.com](http://www.ipbexpo.com)

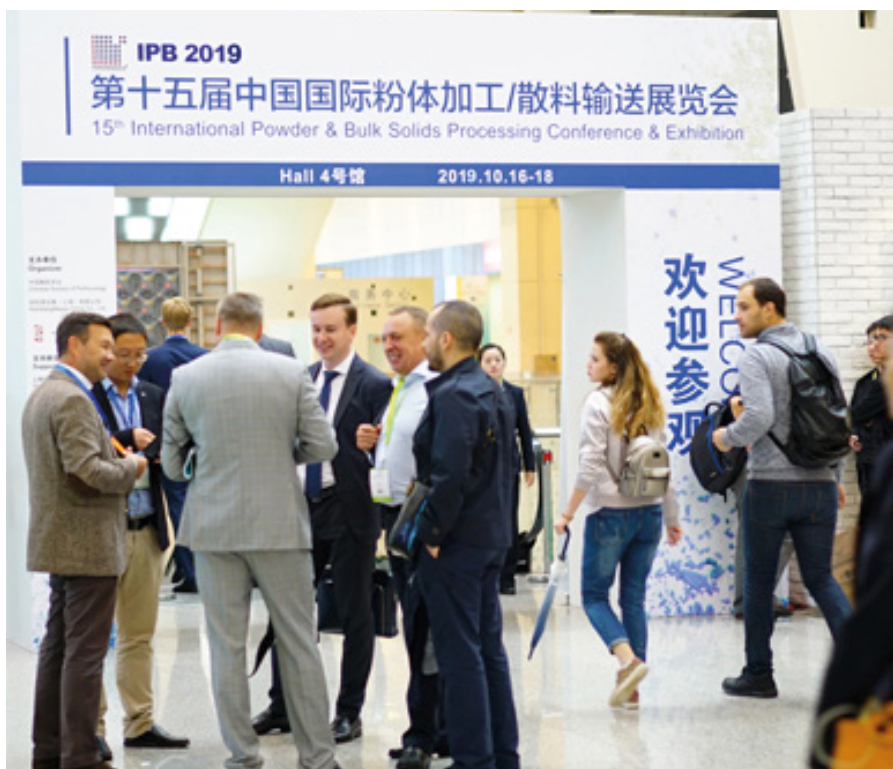
To coincide with the 70th anniversary of the founding of the People's Republic of China, the "Powder & Bulk Solids 3New Summit" is will be held from 16 to 17 October to bring together international and Chinese concepts and technologies. The "3New" in the title stands for new materials, new technologies and new products. More than 200 powder processing companies from all over the world are set to enjoy professional knowledge-sharing with 300 end-users.

## Pre-register for free tickets

Thanks to the IPB pre-registration system visitors can now access free tickets (the ticket fee is for visitors registering at the venue) and also have the opportunity to win an IPB mascot. If you become an IPB VIP visitor you have access to the VIP lounge at the venue and are invited to the VIP gala dinner.

## Expanding into overseas markets and exploiting global business opportunities

POWTECH World is a network of international trade fairs and conferences for the global mechanical processing industry on various continents and markets. This special alliance of events offers the industry global networking and marketing opportunities and is the perfect platform for gaining a foothold in new markets.



# SIGMA Makes First Steps in Extrusion Simulation



## Optimizing Extrusion Dies with Virtual DoE

The temperature distribution inside the extrusion die as well as the geometry of the flow channel are driving factors for the performance of an extrusion die and the dimensional stability of the extrudate. Assured by its broad experience in the thermal and geometrical optimization of hot and cold runner systems, SIGMA Engineering is making first steps into extrusion simulation. At K 2019 visitors of the SIGMA booth (hall 13, B31) will receive a first insight into current developments.

16th - 23rd October 2019: K 2019, Duesseldorf (D)

During K 2019, October 16th – 23rd, 2019, SIGMA Engineering GmbH from Aachen, Germany, will give an outlook on first developments for extrusion simulation with SIGMASOFT® Virtual Molding. In hall 13 at booth B31 SIGMA gives an insight to first developmental applications for the optimization of extrusion dies.

The behavior of the melt inside an extrusion die is comparable to the flow behavior inside the hot runner of thermoplastic or inside the cold runner of elastomer applications. For the extrusion die the temperature distribution inside the die alloy as well as the geometry of the flow channel also have significant influence on the flow behavior. With countless projects for thermoplastic and elastomer applications during the last years, SIGMA can rely on broad experience in the thermal and geometrical balancing of hot and cold runner systems. Thus, it is the logical

next step for SIGMA to become active in the extrusion market.

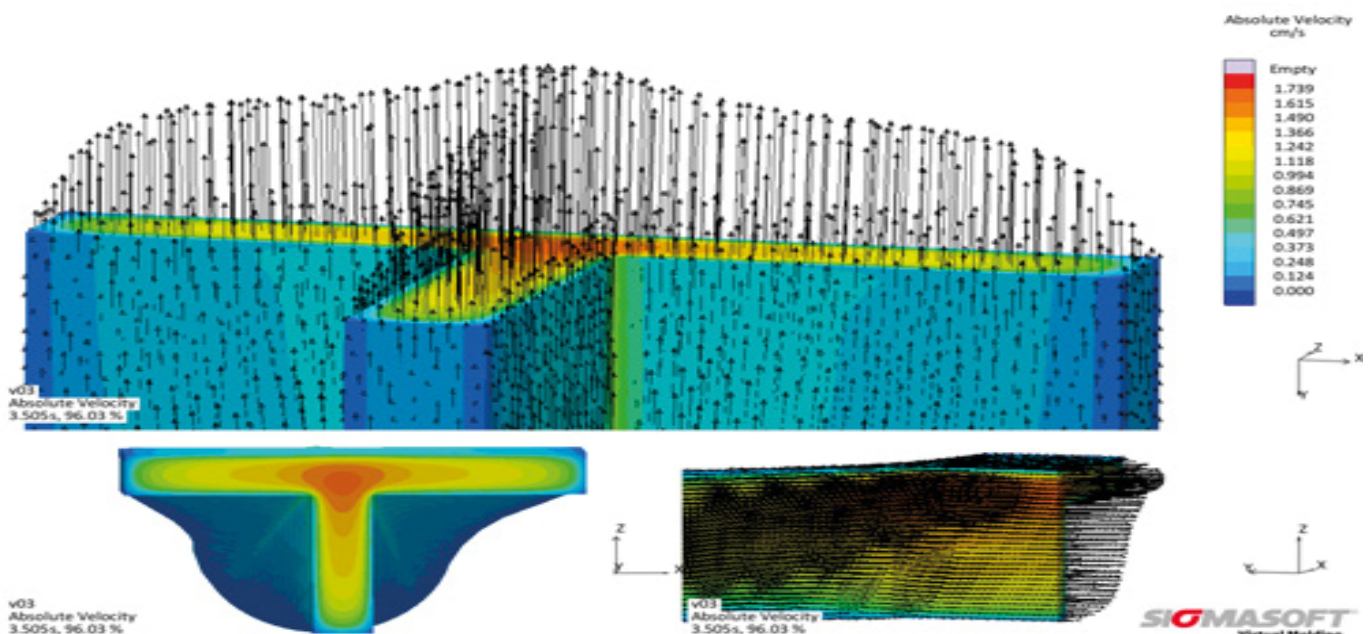
Simulation helps to identify dead spots, excessively long dwelling times in the die or high pressure losses even before the die is built. In this way, tool changing costs and excessive trial-and-error runs to find the optimum configuration are reduced. The development of a new extrusion line gets faster, cheaper and more predictable.

First test series show that especially with SIGMASOFT® Autonomous Optimization flow channels of the extrusion die are automatically optimized within hours. Thus, the quality of the extrudate is distinctly improved. To achieve this goal, geometrical degrees of freedom for the extrusion die's flow channel are defined inside the software. SIGMASOFT® then autonomously determines the ideal geometry for a dimensionally stable extrudate.

“The software currently available on the market helps to calculate the temperature distribution inside the extrusion dies. However, with the help of our software and the included Virtual DoE users will be able to automatically optimize their extrusion die finding a geometry which allows for an extrusion with homogenous velocities”, explains Timo Gebauer, CTO at SIGMA. With the optimized velocity profile inside the extrusion die the deformation of the extruded profile will be minimized.

Visitors interested in optimizing their extrusion processes are welcome to visit SIGMA in hall 13 at booth 13B31 to learn more about the current developments and how to utilize SIGMASOFT® to find the optimum configuration of the extrusion die.

SIGMA Engineering GmbH  
D 52072 Aachen



Inhomogenous velocity distribution on the melt which leads to a deformation of the extrudate.



# Adjusting Painting Processes to New Requirements

## 8th World's Leading Trade Fair for Industrial Coating Technologies in Karlsruhe (Germany) from 21 to 24 April 2020

Surface finishing is the decisive criterion for the success of products, and thus for a company's competitive edge. Consequently, industrial coating technologies make an essential contribution to value creation. Companies with in-house painting operations and coating job-shops are faced with changing and new requirements as a result, which necessitate corresponding process adjustments. PaintExpo will present the world's most comprehensive and future-oriented solutions to this end at the Karlsruhe Exhibition Centre from the 21st through the 24th of April, 2020. The exhibition portfolio covers everything from pre-treatment, right on up to quality control and packaging.

21st - 24th April 2020: PaintExpo 2020, Karlsruhe (D)

Companies in all industry sectors are currently being confronted with a wide variety of trends and changes. Amongst others these include new manufacturing technologies, the use of new and modified materials and material combinations, the realignment of entire industry sectors, shortened product lifecycles and smaller lot quantities, personalisation of products, regulatory changes, the digital transformation and more rigorous goals with regard to energy efficiency and climate protection. Industrial coating technology is being impacted by this as well.

### High Levels of Complexity Necessitate Comprehensive Information

Although some of the issues are by no means new, the competitiveness of coating operations will increasingly depend on how well and quickly they can respond to these changes. As a prerequisite, the coating process has to be adapted or optimised. The great complexity of painting and coating processes with numerous interlinking work steps makes comprehensive information concerning trends, technologies, new developments and the suppliers throughout the entire process sequence indispensable. PaintExpo will present a corresponding cross-technology, cross-industry overview with more compre-

hensive and up-to-date offerings than anywhere else in the world at the Karlsruhe Exhibition Centre from the 21st through the 24th of April, 2020.

On the one hand, a glance at the list of exhibitors demonstrates that PaintExpo lives up to this claim. By the end of August 2019, more than 450 companies from 22 countries – including all of the market and technology leaders – had already made firm bookings for their booth locations at the world's leading trade fair for industrial coating technologies. They've already reserved 98% of the exhibition floor space occupied at the event in 2018. On the other hand, it illustrates the extent of the exhibition offerings: the portfolio covers all process sequences for powder coating, liquid and UV painting and coil coating technologies. The spectrum of materials to be coated ranges from metals, plastics, wood, wooden materials, glass and ceramics, right on up to material combinations. "This targeted concentration of suppliers and technologies makes it possible for job-shop coaters and visitors from companies with in-house painting operations to inform themselves efficiently and in a targeted fashion about solutions to their own individual tasks, and to arrive at appropriate investment decisions," reports Jürgen Haußmann, Managing Director of FairFair GmbH and promoter of PaintExpo.



(Image source: PaintExpo)



(Image source: PaintExpo)

## Adjusting Painting Processes to New Requirements

### From Pre-Treatment to Quality Control

Exhibitors will present future-oriented solutions for meeting the increasing demands now being placed on quality, flexibility and productivity, as well as material, energy and cost-efficiency. For example, these include new and further developments for classic wet chemical pre-treatment, as well as alternative processes. New and optimised solutions, including the simulation of painting and coating processes, provide for improved energy and material-efficiency in the fields of equipment and application technology. Attention is also being focused on increasing flexibility and productivity in this regard. Improved energy-efficiency is also the primary focus of solutions for conventional circulating-air drying, as well as alternative methods such as IR, condensation and UV drying. Robot painting is playing an increasingly important role for mid-sized and small painting operations in order to ensure reproducibly high quality. New automation concepts make it

possible for these companies to get started with flexible, cost-effective solutions. However, exhibitors at the upcoming PaintExpo will not only present innovative developments for process optimisation in the fields of systems, applications and conveyor technology, drying and cross-linking, paints, automation and digitalisation, as well as quality control. For example, innovations which permit increased efficiency and process reliability will also be presented in the fields of compressed air supply, hangers and masking solutions, as well as packaging. "The comprehensive spectrum of new and improved products, technologies and processes provides visitors with a wide variety of impulses and approaches for designing or adapting their processes to meet future requirements," concludes Jürgen Haußmann.

FairFair GmbH  
D 72644 Oberboihingen

# Innovative First-Opening Indication for Prefilled Syringes from Schreiner MediPharm

## Integrity of Primary Containers

**A new tamper-evident security concept for luer-lock syringes has been developed by labeling specialist Schreiner MediPharm: Cap-Lock features a combination of a cap adapter and label that firmly seals prefilled syringes and reliably indicates any first opening. This ensures the integrity of the primary container and prevents any undetected opening of the cap.**

Cap-Lock is a specially constructed plastic cap adapter that is precisely placed on top of the primary closure of the syringe to equalize the diameter differences of the syringe body and closure. Subse-



Cap-Lock from Schreiner MediPharm easily, intuitively and safely protects syringes against undetected tampering attempts.

quently, a label with an integrated perforation for tamper evidence is applied that wraps around the syringe body and the bottom part of the cap adapter. When a user opens the syringe cap the label is partially destroyed, thus clearly and irreversibly indicating that the cap has been opened. This enables the user to quickly and intuitively tell if the medicine has been tampered with. Thus, patients are protected against administration of potentially counterfeit substances.

The utilization of Cap-Lock in daily healthcare settings is particularly easy, intuitive and safe: The syringe can be opened as usual and, due to the larger diameter, the adapter is easier to twist off even with gloves.

Cap-Lock from Schreiner MediPharm can be applied to the syringe in the conventional production process. Compared to shrink-wrap solutions, no heat is applied so that this solution is also suitable for sensitive substances. The label can be provided with additional functionalities such as counterfeit-proof features, detachable documentation labels or light protection. Both the label and adapter can be customized in terms of color and design. Due to the combination of the adapter with the primary closure of the syringe, no additional waste is generated because both parts are firmly connected to each other. The solution is adaptable to many commonly used syringe sizes.

At "PDA Universe of Pre-filled Syringes and Injection Devices 2019" in Gothenburg/Sweden in October, Schreiner MediPharm will present the newly developed Cap-Lock to an expert audience for the first time.

Schreiner MediPharm D 85764 Oberschleissheim

# Intrinsically Safe Humidity and Temperature Sensor for Gas Explosion Hazard Areas

**The new EE100Ex sensor is ATEX and IECEx approved for gas applications in explosion hazard areas up to zone 1.**

**The new intrinsically safe EE100Ex from E+E Elektronik is certified according to the European ATEX directive 2014/34/EU and the international IECEx standards for use in gas explosion hazard areas up to zone 1. The humidity and temperature sensor offers high measuring accuracy and is dedicated for demanding climate and process control.**

The EE100Ex complies with temperature class T4 for intrinsically safe equipment and can be mounted directly in hazardous area. Due to the robust IP65 aluminum enclosure and the wide choice of filter caps, the sensor is suitable for various applications such as utility tunnels, hazardous storage rooms or in the pharmaceutical industry.

## Excellent Measuring Performance

The sensor enables highly accurate measurement of relative humidity [RH] and temperature [T] in the range 0...100 % RH and -40...60 °C (-40...140 °F). The combination of robust sensing head, proprietary E+E sensor coating and encapsulated measurement electronics inside the probe ensures excellent measuring performance and long-term stability in harsh and corrosive environment.

## Configurable Analogue Outputs

The EE100Ex features two galvanically isolated, configurable 4...20 mA, 2-wire outputs. Besides RH and T, the sensor also calculates the dew point [Td] and frost point temperature [Tf].

## User Friendly Operation

The device can be powered by any appropriate intrinsically safe power source or via Zener barriers. An error indication at the analogue outputs according to the NAMUR standard facilitates troubleshooting in case of a malfunction.



EE100Ex humidity and temperature sensor for gas hazardous areas.  
(Photo: E+E Elektronik GmbH)



E+E Elektronik GmbH  
Langwiesen 7  
A 4209 Engerwitzdorf  
Telefon: +43 7235 605 0  
Telefax: +43 7235 6058  
E-Mail: [info@epluse.at](mailto:info@epluse.at)  
Internet: <http://www.epluse.com>

## Impressum:

cleanroom online / W.A. Schuster GmbH · Mozartstrasse 45 · D 70180 Stuttgart · Tel. +49 711 9 64 03 50 · Fax +49 711 9 64 03 66  
[info@reinraum.de](mailto:info@reinraum.de) · [www.cleanroom-online.de](http://www.cleanroom-online.de) · GF Dipl.-Designer Reinhold Schuster · Stgt, HRB 14111 · VAT DE 147811997

## Original texts and images

The contributions mentioned by name are the responsibility of the particular author. Reprinting, also of extracts, are permitted only with the approval of the editor and with reference to the source. The publisher does not accept any responsibility for unsolicited manuscripts and illustrations. The publisher is granted the exclusive, spatial, temporal and contentual limited right to freely use the article in unchanged or edited form for all purposes as often as desired or to transfer it to third parties for use. This right of use relates to print and electric media (Internet, databases, data carriers of all kinds).