

# Hygiene at the highest level

## How a digital washroom can ensure corporate success and world health

Washing hands makes successful. When employees are absent due to illness during waves of colds after business trips, trade fairs and major events, the workload is high for every company: shifts and tasks have to be rescheduled, orders remain unprocessed, productivity drops and some companies even have to close for days on end. The loss of turnover is immense. Increasing mobility around the globe also poses a health risk. The solution: Companies and businesses are focusing more on health prevention of their employees and training them. Disciplined hand hygiene is becoming increasingly easier for users of washrooms. Digitized products and processes in a „washroom of the future“ serve as aids for more hygiene and health - in the company and around the world.



Every third employee who had been absent in February 2018 stayed at home because of a flu-like infection. Diseases cost German companies around 130 billion euros per year. This translates into around 3,600 euros per capita.<sup>1</sup> Regular hand washing and drying efficiently prevents the risk of infection. A study from the USA shows that hand hygiene in combination with appropriate training can reduce the sick rate by up to 50.6 percent.<sup>2</sup>

Thomas Schmidt, CEO of CWS-boco International GmbH, orients his entire company towards providing more health and safety: „As a modern system provider, we focus on more than just products. A newly established business unit is responsible for integrated washroom solutions. Research and development at CWS-boco follow the vision to make the world healthier and safer through innovative and digital solutions“.

### Airport risk: health prevention in times of increasing mobility

Around four billion people were travelling at international airports in 2017. In 2038, the International Air Transport Association estimates that this figure will rise to around 7.8 billion. The traffic hubs do not only distribute people all over the world. Pathogens are unwanted travel companions here. Washing hands at airports has a direct effect on the spread of germs. This is shown by a recent simulation by international scientists<sup>3</sup>: an increase in the level of hand hygiene at the turnstiles significantly reduces the worldwide spread of infectious diseases.

### Online recommendations: Hygiene as a quality feature and competitive advantage

Today's society deals very systematically with decisions. She doesn't want to be unpleasantly surprised while travelling or in the washroom. So, she relies on



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online recommendations. Apps and criticisms from the community are also becoming increasingly important for the operators of washrooms. A public washroom is a sensitive, intimate area that has to meet a variety of requirements. Families want equipment suitable for children, people with walking disabilities or older citizens may be looking for toilets that are higher up. This information and the hygiene level provide information on whether a location is visited or not. The catering trade can also enhance its image with top-equipped washrooms.

### The digitization of equipment as a driver for more hygiene

On average, people spend three years of their lives in washrooms. Therefore, a washroom should offer a hygienic experience. CWS-boco would like to realize a holistic concept in the washroom, for which washroom trends and the wishes of the users are investigated. The company's site in Duisburg has its own washroom of the future, the CWS Washroom Experience Lab. This test laboratory shows how pleasant public washrooms can already be today: Before entering the washroom, CWS-boco guides the visitor by indicating



CWS hygiene experience lab: user navigation

which cabin is free and freshly cleaned. In this way, the user already has the first positive experience when entering the washroom.

### Mirror, mirror on the wall shows the correct hand hygiene

Doors without handles that can be opened without contact; walls with an antibacterial surface and a module in the mirror that indicates how long the hands should be soaped, rinsed and dried. A digital faucet dispenses water and soap ready mixed. These technologies promote better hand hygiene by integrating a training component and the automatic use of soap into the hand washing process. According to a study by the London School of Hygiene & Tropical Medicine, only 32 percent of men wash their hands with soap. The figure for women is 64 percent.

Washing hands remains an essential means of disease prevention and for the benefit of all: in the workplace, in the company and in public spaces. CWS-boco has the mission to contribute to more health and safety with its holistic concepts.

1 Booz & Company strategy consulting firm

2 Study: The effect of a comprehensive handwashing program on absenteeism in elementary schools

Reference: AJIC: American Journal of Infection Control. 30(4):217-220, June 2002. Guinan, Maryellen a,b; McGuckin, Maryanne Dr ScEd, MT (ASCP) c; Ali, Yusef PhD

3 <https://www.biorxiv.org/content/10.1101/530618v1>



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Dear subscribers,

only a few days ago we sent you a special newsletter on the subject of events, and today's newsletter is also packed with interesting facts and many news from the fascinating world of clean rooms. Quite a lot of material for you!

Our suggestion: Take advantage of the approaching Easter holidays to get a little deeper into the reading in peace. It is definitely worth it.

With this in mind, I wish you a stimulating and informative Easter holiday.

Sincerely,  
Reinhold Schuster

# Industry Experts Combine to Create Safer Intravenous Delivery



**The Italian Biochemical Institute, Comecer, and Particle Measuring Systems share expertise to develop and manufacture a safer intravenous solution.**



The Italian Biochemical Institute (IBI) „Lorenzini“, Comecer, and Particle Measuring Systems (PMS) recently partnered to leverage and combine the expertise of each entity to design a new drug delivery system and a filling line to safely and effectively manufacture it. A Quality Risk Management (QRM) approach was used as the basis to meet the distinctive needs of the aseptic filling line and ensure that regulatory needs were met.

This partnership started when IBI designed a new approach to drug infusions deliveries, patented as “Espresso®”. “Espresso was created to ensure the safe delivery of sterile intravenous medication to patients”, said J. Khevenhüller, CEO at The Italian Biochemical Institute (IBI). “Following the initial project, we needed a way to safely mass produce Espresso. However, because of its unique design, existing filling lines could not meet our needs, so we contacted Comecer to create something new.”

“When Lorenzini approached us with their Espresso approach, we were immediately intrigued by the design challenges it presented. We took on the project to create something with a completely fresh approach to ensure the product sterility”, said S. Penazzi, Sales Area Manager Pharma Division at Comecer. “We had worked with PMS in the past and invited them to join our development team to leverage their industry knowledge.”

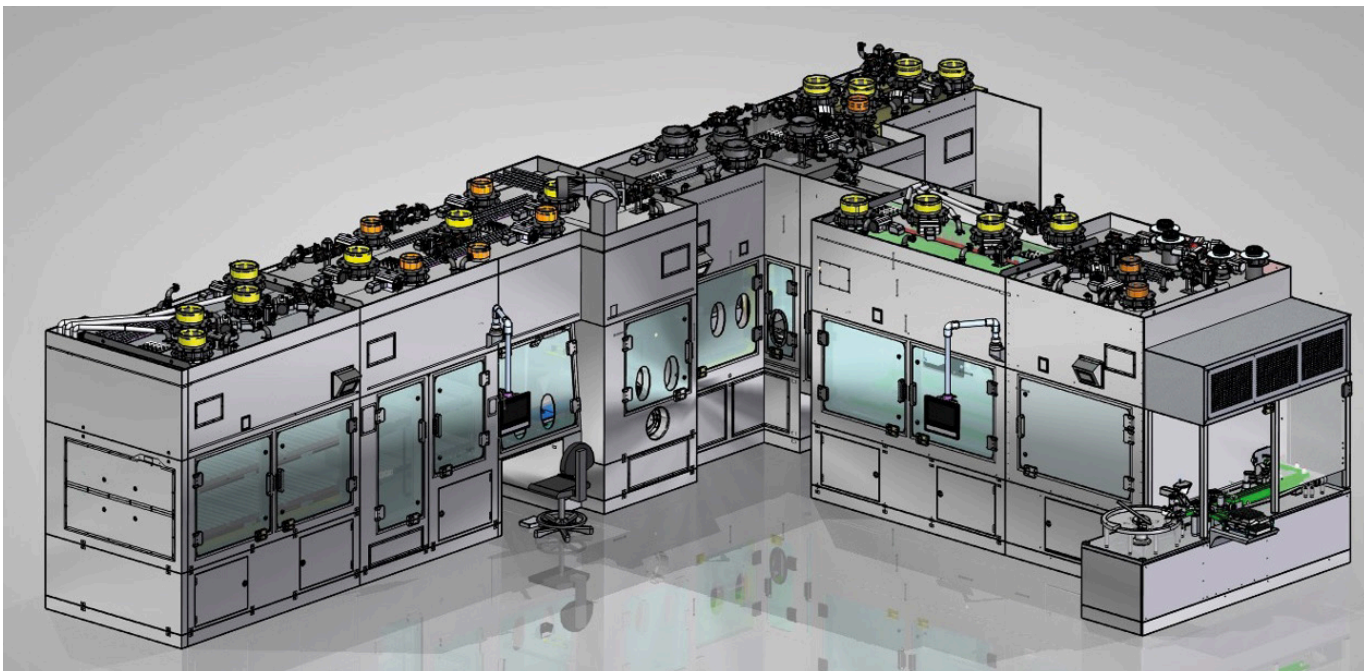
“Our Advisory Team has experience working with manufacturers to ensure they meet regulatory needs and to provide safe drugs to their customers, and we were confident our background could

help solve the needs of the Espresso approach”, said Maurizio Della Pietra, Global Data Management Specialist and Process Advisor at Particle Measuring Systems. He continued, “Our insights to regulatory requirements, plus Comecer’s expertise in building filling lines, combined to create a forward-thinking, effective result.”

“As aseptic manufacturers develop unique new solutions, the requirement for increasingly complex manufacturing requirements to meet quality standards and to ensure the safety of drugs arises”, said Gianni Scialo, VP Pharmaceutical, Particle Measuring Systems. He continued, “Creative partnerships such as that between IBI, Comecer, and PMS will become increasingly important to meet these needs.”



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# Smart light

## Glass diode laser optics for high-volume applications

For the first time ever, high-grade glass laser optics are now available for price-sensitive high-volume applications such as LIDAR and ID sensors thanks to a new production method. LIMO GmbH, a maker of high-precision micro-optics for laser systems, has become the world's first manufacturer to successfully process large 300 mm x 300 mm glass wafers and use the wafers to fabricate cost-effective micro-optics.

When mass-producing complex glass optics, manufacturers face the challenge of processing large wafer areas with a consistently high level of precision. But in 2018, LIMO achieved a technology breakthrough: The German micro-optics manufacturer managed to produce 140-mm glass wafers for the fabrication of high-precision cylindrical lenses—without sacrificing any quality at all.

After further enhancements to this technique, the company now has the capability of producing 300-mm glass wafers (12 inches x 12 inches). The result: 25,000 FAC lenses with typical dimensions can be made from just one of these wafers, as well as other acylindrical lens arrays featuring consistently high optical quality. The advances in production technology have lowered the unit costs for high-grade diode laser optics made from glass to levels previously only seen for low-cost plastic lenses. For the first time ever, high-quality glass optics can also be used in price-sensitive consumer and high-volume applications. Examples of typical application areas include:

- LIDAR for autonomous driving and autonomous transport (logistics, drones, etc.)
- Communications and data exchange, e.g., for smart computing and smartphones with optical ID sensors
- Defined homogeneous laser illumination for optical measurement
- Security (home automation, data sharing, financial transactions)
- Industry 4.0 applications (machine vision)

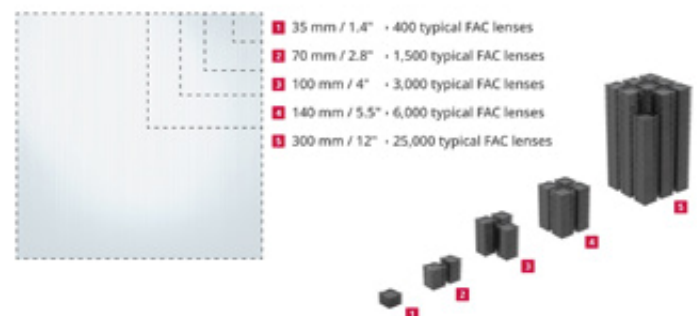
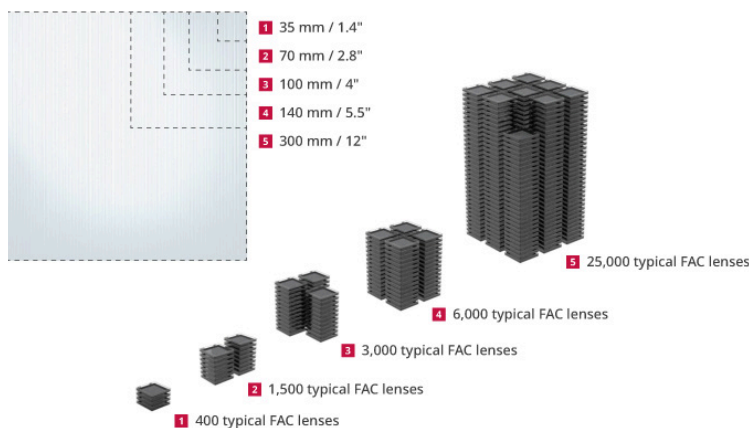


LIMO is the world's only company with the capability to fabricate 300-mm glass wafers for the production of high-precision cylindrical lenses. (Image: LIMO)

### The advantages of high-precision glass optics

The biggest advantages of glass optics are their high optical quality, long-term stability, and excellent performance characteristics:

- Glass optics provide flawless and reliable functionality over a temperature range from -40 to at least +105 °C. Glass optics deliver long-term stability while performing consistently over this entire temperature range.
- Glass optics offer consistent optical performance even when used with higher power outputs. Thanks to their zero hot-spot beam shaping, glass optics are also suitable for laser illumination in safety-related applications.
- LIMO's manufacturing technique makes it possible to freely form surfaces along one axis, which allows the creation of any desired illumination area with an extremely wide angle (field



The edge length of the glass wafer, which can be simultaneously structured across its entire surface with the new technique, was successfully increased from 35 mm (1.4 inches) to up to 300 mm (12 inches) in five steps. Since the wafer area scales quadratically with the edge length, with only a negligible increase in processing time, LIMO has been able to lower the production costs per mm<sup>2</sup> with each wafer generation. (Image: LIMO)

## Smart light

of view of up to 120 degrees). This means that each sensor has a larger field of view—a benefit both in terms of the number of sensors required, e.g. in LIDAR systems, and for all types of consumer electronics in general.

### Glass optics for safety-related components

High-quality, economical glass laser optics have the potential to make innovative applications, such as those used in additive manufacturing (3D printing) and for LIDAR systems (laser-based light detection and ranging), suitable for high-volume demand. The LIDAR systems and 3D sensors used for autonomous driving are particularly important components from a safety standpoint, and are also used in harsh ambient atmospheres. Aside from high quality, they also need to deliver reliable operation with long-term stability. The only way to meet these requirements is with laser systems that

utilize high-end glass micro-optics.

### Improved production method for laser optics made from glass

In 2018, the Dortmund-based LIMO GmbH developed a revolutionary new processing method that is much more productive than the processes that have typically been used in the past for optics and micro-optics. Processing the material at room temperature makes it possible to increase the wafer size for micro-optics without any loss in quality, while also reducing the cycle time per wafer and cutting production costs over the long term. LIMO is the world's only company to have mastered this type of production process for large quantities.

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# Air outlet particle filter for the MAS-100 NT microbial air sampler



The MAS-100 NT microbial air sampler from MBV AG is specified for use in ISO Class 5 and GMP Grade A clean rooms. Construction, surfaces and components are of the highest quality and do not produce significant amounts of particles that contaminate the environment.

However, there are situations where a user wants to use his air sampler in different cleanliness classes. This creates a low risk of contamination within a device being carried-over from one environment to another and then blown out.



### The newly available optional air outlet filter for the MAS-100 NT air sampler has the following properties:

- HEPA H13 filter with more than 99.95% separation rate for particles > 0.3µm.
- No unfiltered dead volume can be transferred as the filter is positioned directly at the air outlet.
- The filter adapter can be retrofitted by the user for all MAS-100 NT. Recalibration of the airflow sensor is recommended.
- Filters can be exchanged by the user. No recalibration is required.
- Filters are specified for at least one year of use.

### The filter module is available immediately in the following configurations:

- MAS-100 NT with filter adapter and filter
- Retrofit set incl. filter for all MAS-100 NT
- Replacement filter

For more information, including data on the separation rate, the long-term behaviour and the transfer of particles between cleanroom classes, please visit [www.mbv.ch](http://www.mbv.ch).

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# Total precision: Diaphragm pump enables the exact dilution of emulsifiers and reduces logistics costs thanks to space-saving storage

**Metering additives using hermetically tight systems engineering  
- Independent of delivery quantities and more production flexibility**



„According to customer specification, the emulsifier mixture may not deviate from the required 20 percent by 1 percent,” explains Volker Kirschbauer, Sales Engineer at LEWA GmbH. Thanks to the optimized control system and placement of the flow meters at strategically relevant points, we can easily comply with this requirement.“  
(Source: LEWA GmbH)

Because they can be soluble in a variety of substances, emulsifiers are frequently used when immiscible components have to be combined. In order to achieve a suitable mixture, such as in food production, the pure, highly concentrated emulsifier is diluted beforehand to the working intensity. Above all, mixing installations for producing a suitable emulsifier have to have high metering accuracy in order to ensure an exact degree of dilution and prevent incorrect mixtures or fluctuations in individual batches. Since this could not be guaranteed sufficiently by its former manual process, an international chemical company turned to the experts at LEWA GmbH. Its metering systems are equipped with flow meters that continually check the required degree of dilution of 20 percent; in the event of possible deviations, incorrect mixtures can be prevented thanks to the short settling time and the fast response of the control system. Use of the LEWA mixing modules also makes it possible to minimize logistics costs. By stocking the highly concentrated emulsifiers, which are only later diluted with water, the use of additional tankers delivering pre-diluted concentrate mixture, can be dispensed with.

„With regard to the right dosing, what is most important in emulsifier dilution is accuracy and fulfillment of the safety-related standards,” says Volker Kirschbauer, Sales Engineer at LEWA GmbH. As the additives are primarily used in the food industry, the dilution systems used must meet high operating requirements. „This includes requirements that the modules

must be robust and wear-proof to prevent leakages and – in the case of a hydraulically operated pump – any possible contamination of the emulsifier with lubricants,” the specialist explains. At the same time, however, the system has to function as precisely as possible so that the dilution levels requested by the customer can be adhered to without any deviations.



The flow meters of the system continually check the required degree of dilution. Incorrect mixtures can be adjusted quickly as needed thanks to the short settling time of the control system. (Source: LEWA GmbH)

Using the diaphragm metering pump of the ecodos series, the highly concentrated emulsifier can be diluted to a working intensity of 20 percent.  
(Source: LEWA GmbH)

## Total precision

Conventional packed plunger pumps, which the chemical company had used to dilute emulsifiers, are not ideally suited for this purpose. „In the first step here, the concentrated emulsifier fluid was directed into the tank manually. If the required volume was reached, the valve was closed and a second one was opened for the addition of the process water for dilution,“ says Kirschbauer. „Then, an agitator needed to be operated for half an hour to produce a homogeneous mixture.“ This time-consuming, labor-intensive process negatively impacted the customer’s production efficiency, while also at times the correct mixture couldn’t be achieved. „The human error rate is high due to factors like stress or distraction,“ Kirschbauer says. „If the pump is stopped too late, for example, the intensity of the emulsifier mixture can be changed substantially, leading to more water needing to be added in order to restore the concentration required originally. In turn, though, this means spending extra time.“

### High metering accuracy thanks to optimized control

The large corporation, headquartered in Great Britain, therefore contacted pump manufacturer LEWA GmbH and commissioned the German company to construct a system for diluting a 70-percent emulsifier. After visiting the company’s location and developing a customized offer that took the specific spatial and logistical circumstances into consideration, the customer ultimately decided to purchase a LEWA metering system with ecodos diaphragm metering pumps, which were to be used to dilute the emulsifier to 20 percent.

„The system consists of two pump groups: One pumps the emulsifier, the other the dilution water,“ Kirschbauer says, explaining the structure. „A flow meter is located in both which monitors the current flow rate before the two fluids flow into a static mixer, where they are mixed.“ A third measuring instrument in the tank lastly shows the sum of both flow rates for control purposes, thus giving the customer redundant security – the sum of the partial flows must ultimately equal the measured value of the sensor. „If the measured partial flows do not match the desired mixing ratio, the control integrated into the system automatically readjusts it.

The operator only has to first specify the desired mixing ratio,“ continues Kirschbauer. Due to the fact that the control technology of LEWA smart control only requires a short settling time, meaning it can counteract incorrect mixtures faster and in a more targeted manner than commercially available controllers – the transition times with imprecise mixture intensities are thus noticeably shorter. „According to customer specification, the emulsifier mixture may not deviate from the required 20 percent by 1 percent,“ Kirschbauer explains. „Thanks to the optimized control system, we can easily comply with this requirement.“

### Space-saving stockkeeping by using a metering system

Another specification from the British company was the use of the same sizes in the planning for the new metering as in a previous project system. „If needed, it should be possible to exchange individual components between the mixing units quickly and easily in order to prevent production bottlenecks,“ explains Kirschbauer. Since diaphragms and valves for both systems are of the same type, this also simplifies procurement processes and the stocking of wear parts.

Furthermore, the LEWA dilution module ensures more efficient stockkeeping thanks to its space-saving concept. For example, if the customer wants to further process the emulsifier in three different concentrations, in a conventional method, this would require the use of three tankers to deliver the necessary quantities in the desired intensities of dilution. Thanks to the possibility of blending the emulsifier continuously over a wide concentration range in-house, only a single tanker filled with a high concentration is needed.

The dilution system, through which a 20,000 kg mixing volume flows on a daily basis, has been in operation since summer 2018. „The customer has ordered from us once again, and not without reason. In particular, the production efficiency was able to be increased significantly thanks to the faster, automated sequence,“ Kirschbauer reports. Based on this positive assessment, nothing is standing in the way of another co-operative effort.

LEWA GmbH D 71229 Leonberg

# The production of Duma and Triveni containers will be extended by a plant in China

## Gerresheimer at CPhI South East Asia

At CPhI South East Asia in Bangkok Gerresheimer was presenting plastic containers by the famous Duma and Triveni brands, which in future will be also manufactured at a new plant in Changzhou, China. The Gerresheimer Group will therefore now own a total of six plants in Asia.

“Due to the high demand in Asia, we have decided to build another plant in China in addition to the locations in Europe, India and America. From this base we can supply many of our customers in the Asia region and strongly support even better those customers, who want to access the regulated US pharmaceutical market with their drugs packed into our products,“ said Jari Tevajarvi, Vice President Asia Plastic Packaging.

### The plant in Changzhou

The product portfolio will comprise pharmaceutical containers with closures and dropper bottles with accessories. The containers will be available with filling volumes from 30 ml to 3,800 ml and will include the leading Duma Twist-off container models as well as Triveni containers with an induction seal. All containers are provided with various types of closure options (for example, to protect

## The production of Duma and Triveni containers will be extended by a plant in China

the original contents, child-resistant and/or user-friendly for the elderly), and are available with different forms of desiccants (integrated/mounted) and adsorbents. The plant is certified according to ISO-standards ISO 9001 (quality), ISO 14001 (environmental management), ISO 15378 (quality management for manufacturers of



primary packaging materials for medicinal products) and ISO 18001 (occupational health and safety management system). Production is carried out in a modern Class 7 classified cleanroom (10.000) and will begin in the second half of 2019.

### White products – CFDA-registered

All products comply fully with the requirements of the European Pharmacopoeia and the US Food and Drug Administration (FDA), with a Drug Master File (DMF) as standard. Since the start of the year, the white products manufactured at the Triveni plant in Kundli have been registered with the China Food and Drug Administration (CFDA). The Drug Master File (DMF) numbers have been published on the CDE (Center of Drug Evaluation) website. The next step is a technical review by the CDE as soon as a customer has submitted the drug file together with the letter of authorization (LoA) for the DMF. Several Chinese customers have now started their registration process. As soon as their files have passed the technical review, the DMF will be activated and the information marked with an “A” on the platform.

Gerresheimer AG D 40468 Düsseldorf

## Cherwell Publishes Guide on Sterility Testing



**The user's guide to regulatory expectations, the testing process, what to do in the event of test failure, and more.**

Cherwell Laboratories, specialist suppliers of products for environmental monitoring and process validation, has published an eBook titled, “Failure is not an option: Why sterility testing is so important”, which is available to download from Cherwell's website.

The guide offers a full overview of sterility testing including why the sterility test is such an important requirement for the manufacture of sterile products. It provides some practical steps that will help ensure the standards as set out by the European Pharmacopoeia and GMP are met. The eBook also addresses the role of environmental monitoring programs and how these are critical to successful sterility testing, product quality and business reputation.

Andy Whittard, Cherwell Laboratories' Managing Director comments: “While we recognise that sterility testing is a critical step in ensuring that pharmaceutical products are safe for human use, we also all know that the test is not perfect. Therefore, we have put together this eBook to offer some guidance and practical steps to overcome the challenges involved with sterility testing. Our guide will help the reader mitigate the risk of sterility test failure for their facility by using better processes and continuous environmental monitoring methods.”

Topics covered within the eBook include: the sterility test principle; what the expectations are within the pharmacopoeia and GMP; key considerations in the sterility testing process; how to tackle a sterility test failure and practical steps to minimise risk of contamination.

The new sterility testing guide can be downloaded at: <https://www.cherwell-labs.co.uk/why-sterility-testing-is-so-important-lp>

With over thirty five years' experience in manufacturing Redipor prepared media and within environmental monitoring applications, Cherwell has expertise in delivering high quality products and services to their clients. The company is flexible and reactive to the individual needs of its customers and is adept at working with customers to offer bespoke solutions to accommodate customers' unique needs.



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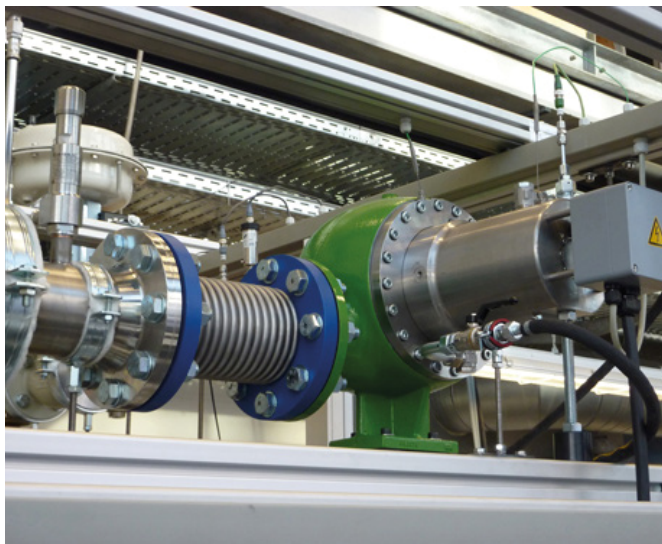
# Developing decentralised solutions – Generate power from industrial waste heat

With advancing changes in the energy sector, interest in decentralised, variable power generators is growing. The use of waste heat from industrial processes can significantly contribute to increased energy efficiency and the generation of low carbon power. The Organic Rankine Cycle (ORC) takes a technological approach to the conversion of waste heat into power. For over 7 years, a Northern Bavarian consortium, consisting of the University of Bayreuth, OTH Amberg-Weiden Technical College and the company DEPRAG, have been successfully developing ORC systems, specifically, micro expansion turbines in low power ranges of under 50 kW (electric).

The recovery of unused energy, such as the heat in exhaust gases from combustion engines or gas turbines or even the waste heat from industrial processes, is a promising strategy to address the challenge to increase energy efficiency. The existing technical solutions, such as downstream steam power processes or turbines as expanders of natural gas, are limited to energy flows with a temperature of over 500 °C and an electrical system output of over 100 kW. In order to achieve stronger market penetration and a tangible positive impact on today's energy system, it is vital to tap into the substantial potentials at lower temperature levels.

## The concept: An efficient, small-scale ORC turbine

The ORC is particularly suited to the conversion of energy from heat sources with temperatures of 100 °C to 500 °C. In principle, this is the traditional steam power process named after the Scottish physicist and engineer William John Macquorn Rankine (1820 – 1872). In contrast to conventional generators, in ORC systems however, the working medium is organic fluid instead of water. These materials have the advantage of turning to steam at comparatively low temperatures. This technology has not yet been sufficiently established in an electrical power range lower than 100 kW. This is due, amongst other things, to the lack of cost-effective micro expanders with generators. The group of partners have taken exactly this approach with their intensive research and development work. Firstly, a new type of highly-integrated turbine generator unit has



GET turbine generator (Photo: Universität Bayreuth)

been developed which is comprised of an axial impulse turbine with hermetically sealed synchronous generator (turbine image). Furthermore, an innovative heat exchanger design (plate and shell heat exchanger) has been tested to directly connect the ORC working medium with the exhaust gases. These measures avoid cost intensive intermediate circuits.

## Close cooperation: Bayreuth and Amberg

In the project “Development of an ORC mini generator for the utilisation of waste heat”, funded by the Bavarian Research Funding Charity from 2011 to 2013, the specific expertise of the three project partners were first brought together in several developmental stages: Stationary simulation and selection of fluid, design and production of a direct evaporator and a micro expansion turbine with generator, conception of the demonstration system as well as the building and operation of the system. The micro expansion turbine was calculated and designed by Prof. Dr.-Ing. Andreas Weiß from the OTH Amberg-Weiden Technical College. DEPRAG SCHULZ GMBH u. CO. based in Amberg solved the technical challenges involved in the production of the ORC micro expansion turbine. Finally, a research system was set up at the Zentrum für Energietechnik (ZET) at the University of Bayreuth under the leadership of Prof. Dr.-Ing. Dieter Brüggemann (research system image). “The intensive and focussed cooperation of the turbine developers from Amberg and the thermodynamics experts from Bayreuth led to the achievement of electric power of 12 kilowatts with turbine efficiency of almost 65 % using exhaust gas temperatures of up to 300 degrees Celsius”, recalls Dr.-Ing. Theresa Weith, who worked on the project and now heads the subject area of heat transfer at the ZET.

## Systematic further development: Wider application and flexible use

The research project is the first step in the systematic further development of the ORC technology by the project partners. After successful construction and testing of the experimental generator with direct evaporation of cyclopentane and a micro turbine as expander, a modular system for micro expansion turbines was developed.



Research system (Photo: Universität Bayreuth)

## Developing decentralised solutions – Generate power from industrial waste heat

ped. This came within the framework of the subproject of the Centre of excellence for combined heat and power generation, “Micro expansion turbines with high speed generators for the conversion of waste heat in CHP or other industrial processes”, funded by the Bavarian State Ministry for Education and Cultural Affairs, Science and Arts, between 2013 and 2016. Three different representatives of this modular system have been extensively surveyed in a second ORC system using hexamethyldisiloxane (MM) as the working fluid.

Using the extremely reliable new ORC test generator, turbines can be tested not only at design point, but also under partial load, so that operational and efficiency characteristics can be determined. The measurements taken verify further increases in efficiency so that a degree of efficiency of almost 75 % can be realised by the turbine. All participants have continuously sought to underpin theoretical calculations with concrete evidence from the laboratory. “Numerous publications in this field have been content with computer-based calculations and have failed to provide any experimental proofs. We have been able to close this gap and demonstrate the great potential for power generation even in small ORC systems”, emphasised Prof. Brüggemann.

The Green-Energy-Turbine (GET) product family from DEPRAG SCHULZ GMBH u. CO., whose design is primarily based on the outlined project, also demonstrates that the ambitious objectives have reached beyond the scientific domain. There are five different sizes covering electric power ranges of 3 kW to 175 kW. Due to its simple design, the GET turbine generator can be adapted quickly and cost-effectively in practice to varied power requirements, working fluids, pressures and temperatures. There are currently already around 100 machines working in the field.

Despite the successes already achieved, the project partners have set themselves even more ambitious goals for the future. In the most recent project funded by the BFS, an adaptive turbine with variable geometry is being developed and tested in the existing research system. “We hope to enable intelligent and efficient adaptation by the turbine to frequently occurring partial-load ranges” explains Prof. Weiß.

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## Symposium on Towards a Stronger Bioeconomy: Priorities and Collaborations in Biotechnology



Under the auspices of Health Institutes of Turkey (TUSEB), “Symposium on Towards a Stronger Bioeconomy: Priorities and Collaborations in Biotechnology” will be held on April 18-19, 2019 at Istanbul Lütfi Kırdar International Convention and Exhibition Center in tandem with “Cleanroom”, “Biotechnica”, “PharmaNext” and “Analytech” Exhibitions.

The aims of this Symposium are providing an exclusive platform for forming collaboration networks among universities, public institutions, start-ups and industrial companies working on health biotechnology, pharmaceuticals, advanced therapy medicinal products, biomaterials and medical devices, and determining the needs and solutions for advancing the R&D studies and production technologies in the field of healthcare. Different actors of biotechnology ecosystem will be brought together during the Exhibitions and Symposium which will provide opportunities not only to evaluate the global tendencies in biotechnology but also to discuss the destination of Turkey in bioeconomy, a globally hot topic.

The Symposium will consist of six sessions including “Biotechnological Drugs”, “New Approaches to Gene and Cell Therapies”, “Innovative Developments in Biomaterials and Tissue Engineering”,

“Innovative Approaches in Medical Devices and Diagnostic Kits”, “Investments and Incentives in Biotechnology Industry” and “Entrepreneurship Ecosystem in Biotechnology”. Additionally, Joseph DAMOND, the Executive Vice President of BIO (Biotechnology Innovation Organization), will give a keynote speech on “Globally Emerging Trends in Biotechnology”. Demo Day of “BIO Start-up 2019”, a startup accelerator program on biotechnology organized by Association of Research-Based Pharmaceutical Companies (AIFD) and ReDis Innovation will also take place within the scope of the Symposium.

Biomaterials and Tissue Engineering Society (BTES), Izmir International Biomedicine and Genome Institute (iBG-izmir), Industrial Relations at Pharmaceutical Manufacturers Association of Turkey (IEIS), Association of Research-Based Pharmaceutical Companies (AIFD), Istanbul Health Industry Cluster (ISEK), ReDis Innovation and Cleanroom Technologies Society of Turkey provide corporate support to the Symposium.



18th - 19th April 2019: bioexpo, Istanbul (Turkey)

AntExpo Org. ve Dan. Tic. Ltd. Şti  
Ümraniye, İstanbul  
Türkei

# AP&S participates in the Important Project of Common European Interest on Microelectronics (IPCEI)

On 18th December 2018, the European Commission approved the support of microelectronics within the IPCEI and paved the way for the promotion provided by the Federal Government with the total amount of 1 billion euros. Now companies from France, Italy, United Kingdom and Germany can be supported in their research and development activities until the first commercial use of the new microelectronic applications.



Gefördert durch:



aufgrund eines Beschlusses  
des Deutschen Bundestages

IPCEI's aim is to strengthen the microelectronic industry in Europe and Germany in the global competition. Microelectronics play a key role in the development and improvement of new technologies. The semiconductor elements make a significant contribution to the energy industry, IoT, automotive industry, autonomous driving, medicine, automation and to many other fields of application. Further participating companies from Germany are Bosch, GlobalFoundries, Infineon, Osram and Zeiss.

"The participation in IPCEI enables us to expand our technological know-how-position. As a supplier in the semiconductor industry we strive to ensure innovative equipment with state-of-the-art automation for the processing of next generation semiconductor devices. In this way we want to contribute to a higher level of process performance in the semiconductor manufacturing process," explains Jörg Hildebrand, leader of the Business Unit Batch Process at AP&S.

CEO of AP&S Alexandra Laufer-Müller about the project: "We are proud to be among the participating companies. We take the role and responsibility that comes up to us seriously. IPCEI provides the basis for an exceptional exchange of knowledge and experience between the industry's innovation leaders, to the involved value chains and throughout the entire EU. I'm sure that together we will achieve the goal of expanding and securing Germany and Europe as a research and manufacturing location for the semiconductor industry of tomorrow".

AP&S International GmbH  
D 78166 Donaueschingen

## From a single source



### Manual GEMÜ ball valves with integrated position feedback

The Ingelfingen-based valve expert GEMÜ is offering a technically advanced solution for ball valves for manual operation with suitable position feedback. And these are already pre-assembled, preset and tested.

At first glance, there are a multitude of ball valve and electrical position indicator providers. However, many of these providers offer either one or the other. As a result, the individual components therefore often have to be acquired from two different suppliers. This means that the two components must be assembled locally on the construction site before they can be placed in the plant – a process which is very time consuming.

GEMÜ is reducing the effort required on site and offering its customers manual-operated ball valves with an integrated

electrical position indicator. The pre-assembled valves save on the time and effort required for logistics and documentation and enable faster and simpler installation of the plant on site.

For the GEMÜ 711 and GEMÜ 740 3-piece ball valves, the GEMÜ 762 one-piece compact flange ball valve and the GEMÜ 797 high-pressure ball valve, GEMÜ is offering the GEMÜ LSF inductive dual sensors or the GEMÜ LSC limit switch box.

GEMÜ 762 - Compact flange ball valve with integrated LSC limit switch box

GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG  
D 74653 Ingelfingen

# Growth spurt for Endress+Hauser

## Group increases sales, earnings and employment in 2018

Endress+Hauser's business developed very positively across all regions and industries in 2018. The Group, one of the world's leading providers of process and laboratory instrumentation, automation solutions and services, reports new highs in net sales, income and employment.

According to preliminary figures, Endress+Hauser increased net sales by more than 9 percent to over 2.4 billion euros in 2018. Exchange rate effects prevented even better results. "In local currencies, we grew nearly 13 percent," said Chief Financial Officer Dr Luc Schultheiss. The family-owned company created new jobs primarily in production, research and development and services. At the end of 2018, Endress+Hauser had 13,928 employees worldwide, 629 more than the year before.

"The solid development in sales shows that we have held our ground well in the market," explained CEO Matthias Altendorf. The growth was spurred by innovations from across all fields of activity. "We supported our customers with more than 50 new products, solutions and services. We were able to break new ground through

our digitalization strategy, as well as in the measurement and analysis of quality-relevant parameters," said the Group's CEO.

### Good start to the new year

Endress+Hauser is expecting a somewhat weaker market dynamic for the current year. The Group is anticipating growth in the mid single-digit range, with earnings remaining at a healthy level. "The year has gotten off to a good start so far," reported Luc Schultheiss. Assuming the business remains well on track, the Group expects to create several hundred new jobs around the world.

Endress+Hauser will present its 2018 audited financial figures on 14 May 2019 in Basel, Switzerland.

Endress+Hauser AG  
CH 4153 Reinach BL 1



Matthias Altendorf, CEO of the Endress+Hauser Group.



Dr Luc Schultheiss, Chief Financial Officer of the Endress+Hauser Group.



Headquarters of the Endress+Hauser Group in Reinach, Switzerland.



# Lab Innovations returns to the NEC on 30 & 31 October 2019

## Save the date for the UK's only lab-dedicated exhibition showcase

More than 150 leading scientific suppliers and 3,000 attendees will descend on Lab Innovations on 30 & 31 October 2019 at the NEC, Birmingham, to discover, debate and discuss the latest scientific developments and equipment. Now in its 8th year, the UK's only trade show dedicated to the laboratory industry continues to enjoy support from some of the UK's leading scientific institutions and will this year boast its largest ever exhibitor and visitor base, providing more exciting product launches, innovation and discussion than ever before.

Analytix, Anton Paar, Cole-Palmer, Eppendorf, GAMBICA, IKA, Perkin Elmer, SLS, Shimadzu and Thermo Fisher Scientific are among the big industry players participating for 2019. Joining them will be a further +150 suppliers and manufacturers presenting the most cutting-edge equipment applicable to a plethora of industries including life sciences, pharmaceuticals, petrochemicals, materials science and food and drink.

"GAMBICA has exhibited at Lab Innovations since the start. We find it one of the most effective events for connecting our members with purchasers and distributors." Commented Jacqueline Balian, Head of Laboratory Technology Sector, GAMBICA.

Lab Innovations will this year be celebrating 2019 as the International Year of the Periodic Table, with the Royal Society of Chemistry focusing on this theme in their dedicated theatre and several related networking events taking place across the two days.

The Perkin Elmer-sponsored "Insights and Innovations" theatre will once again be organised by UK magazine Laboratory News and will provide insight into the latest discoveries and discuss best-practices and day-to-day challenges.

For cleanroom specialists, the Cleanroom Hub, in collaboration with Cleanroom Technology, will provide a dedicated zone for suppliers of cleanroom-specific equipment. It incorporates a seminar pod with 2 days of educational content for cleanroom professionals, a networking lounge and dedicated exhibitor pavilion. With a clear demand for this type of content at Lab Innovations following a 68% increase in cleanroom attendees in 2018, this zone is set to

create another buzz at this year's edition.

First-time exhibitors at Lab Innovations will showcase new products in the adjacent "Lab News Village", where they will display products that have never been seen before at the event. Additionally, the well-received SLS pavilion will expand for its second appearance at Lab Innovations, providing an opportunity for 20 partners of the UK's largest independent supplier of laboratory equipment, chemicals and consumables to participate.

With sustainability high on the UK agenda and an increased demand for practical advice and solutions in this area, the 'Sustainable Laboratory' will return for 2019. This will provide an opportunity for attendees to speak with leading UK universities on how they made use of 'green' equipment and processes to achieve sustainable results.

Carolyn Jones, Lab Manager at the University of Birmingham commented on her success with finding sustainability solutions at last year's event: "I'm very interested in the sustainability side of things and looking at what people are doing to reduce their carbon footprint. It's good to see all equipment out and working on the stands, from all the big companies as well as smaller start-up companies. It's been a good day out and well worth attending."

New for 2019 is a bespoke meetings concierge service, providing visitors and exhibitors with the opportunity to pre-arrange meaningful meetings with exactly the companies and attendees they want to discover and do business with. This exciting new initiative will accentuate the event's position as the leading meeting place for Laboratory professionals and suppliers.

Phil Ellis, Equipment Services Manager, Aberystwyth Innovation and Enterprise Campus Ltd summed up his first visit and the importance of making connections: "This is the first time I have attended Lab Innovations and I have ended up coming both days due to the amount of connections we were making. Besides networking, Lab Innovations has given me the opportunity to keep up-to-date as the entire market is here. I will definitely come again."

The Lab Innovations Advisory Board will meet later this month to discuss further the details of the conference topics and the shape of the event. Gerald Law, CEO Innovation DB, member of the Lab Innovations advisory board says that: "The advisory board comes together a couple of times a year to define the direction of the annual event. This year the agenda will feature laboratory automation and informatics, the recruitment of young talent into STEM, the implications of Brexit, of course sustainability, and a lot more. Watch this space for further announcements!"



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

Cherwell Laboratories Ltd  
OX26 4XB BICESTER  
Vereinigtes Königreich

# Technology Days 2019

## Heading for the future with Arburg on the „Road to Digitalisation“

- **Great interest: more than 6,000 guests from 54 countries enthusiastic about the Technology Days**
- **Efficiency Arena: Overview of Arburg's digital components on the „Road to Digitalisation“**
- **Highlights and premieres: „AM Factory“, „arburgXworld“ customer portal, Gestic filling simulation, and much more**

The Arburg Technology Days have been around for 20 years now. Between 1999 and 2019, more than 93,000 invited guests from all over the world attended the highly regarded industry event. Between 13 and 16 March 2019, more than 6,000 visitors from 54 countries joined the event. Around 660 actively involved employees and trainees ensured that the Technology Days were a special event for everyone. The main focus was on the „Road to Digitalisation“, along which the guests were able to gather comprehensive information about Arburg's digital components for production-efficient plastics processing. More than 50 machine exhibits and turnkey systems, the Efficiency Arena and a special service presentation were also showcased. Highlights included the „AM Factory“ and the „arburgXworld“ customer portal. Expert presentations on current trends as well as guided tours of the operating factory rounded off the programme.

Since 1999, the Arburg Technology Days have proved to be a successful concept, making it the world's largest in-house event in the plastics industry.

### Large groups of visitors from abroad

The share of foreign visitors has steadily increased over the years, reaching 44 percent this year. In 2019, the largest groups from overseas were around 140 participants from North America and 110 from China. Most of the European guests came via the subsidiaries in France (around 200), Switzerland (around 190), Italy (around 160), and the Czech Republic (around 110) as well as the Netherlands and Austria (around 100 each).

### „Road to Digitalisation“: digital solutions made understandable

“We have been travelling on our ‚Road to Digitalisation‘ since Fakuma 2018, heading for K 2019. During the Technology Days, it was the overarching theme throughout the company. In this way,

we have reached another milestone and made a complex topic more tangible,” summarised Michael Hehl, Managing Partner at Arburg. „For example, our customers were able to experience in practice which tools using augmented and virtual reality we can provide to make training and service significantly easier in the future. Our new „arburgXworld“ customer portal has already become a reality, its apps offering highly practical advantages in terms of machine fleet, service and spare parts ordering, and will be available worldwide by the end of the year. And of course, with more than 50 machine exhibits we demonstrated impressively how injection moulded and additively manufactured parts can be produced efficiently“.

### “Road to digitalisation“ throughout the company

As a pioneer in the plastics industry, Arburg presented all that it is currently able to offer in terms of „smart machines“, „smart production“ and „smart services“ along the „Road to Digitalisation“. One highlight was the „arburgXworld“ customer portal which, after registration, can now be used by German customers free of charge



The world premiere of the „AM Factory“ drew the crowds. It allowed visitors to experience the added value that the Freeformer 300-3X offers in additive manufacturing with fully automated and IT-networked production cells. (Photo: Arburg)



The „turnkey solutions“ area with nine machine exhibits and valuable information on the subject of digitalisation proved very popular. (Photo: Arburg)

## Technology Days 2019

with the „Machine Center“, „Service Center“, „Shop“ and „Calendar“ apps. Arburg bundles its digital services via this service marketplace in the cloud. The apps can provide a quick overview of the machine fleet, enable easy ordering of spare parts with interactive navigation and allow the creation of service tickets around the clock.

On the subject of digitalisation, Arburg's OPC UA solutions were also presented, illustrating how they can be used for the online provision of process information to higher-level systems and digital services. Allrounders were equipped with an IIoT gateway (IIoT = Industrial Internet of Things), offering great flexibility for the implementation of, for example, Arburg Remote Service (ARS), the Arburg Turnkey Control Module (ATCM), „arburgXworld“ and the Arburg host computer system (ALS) through which all exhibits were networked. Each Allrounder in the Customer Center contained Arburg's six assistance packages as digital components. They actively support the operator and make it easier to work on the machine in line with the production requirements at hand – from start-up, set-up and optimisation, to production and monitoring, up to and including service. A hybrid Allrounder 920 H in operation was used to demonstrate the potential offered by a filling simulation that is integrated into the Gestica control system. For the first time, it became possible to visualise the correlation between filling level and screw stroke.

### From augmented reality to predictive maintenance

In the Efficiency Arena, Arburg experts demonstrated the virtual maintenance of an injection unit via AR data goggles and video calls. This allows complex maintenance work to be carried out safely and faults to be identified and rectified quickly. Real-time monitoring of the condition of wearing components (condition monitoring) and predictive maintenance can prove useful in preventing malfunctions and unplanned downtimes. Among other things, load-dependent toggle lubrication on electrical machines and the detection of contamination on vacuum valves were presented. In addition, the control system will in future be able to detect whether the correct cylinder module has been installed via a chip on the injection unit.



The „arburgXworld“ customer portal with its three central „Machine Center“, „Service Center“ and „Shop“ apps is a new digital Arburg product. (Photo: Arburg)

### Injection moulding highlights

Innovative applications in the automotive and lightweight construction sectors included injection moulding of rotor disks for servo-electric drive trains, as realised in the ProLemo research project, fibre direct compounding (FDC) of long fibre-reinforced lightweight components and physical foaming with Profoam. In addition, some customer applications from the automotive industry were on display. The largest component – a car front grille made of ABS – was produced on a hybrid Allrounder 1120 H with 6,500 kN of clamping force and Gestica control system.

In contrast, delicate micro dosing valves for medical technology weighed a mere 0.038 grams each. At the heart of the production cell was an electric Allrounder 270 A, equipped with a size 5 micro-injection unit, an LSR cartridge and a clean-air module. Another innovative application for medical technology was the production of labs-on-a-chip using assembly injection moulding. Using a Weber 2+2-cavity mould, an electric two-component Allrounder 520 A first produced two plates with connections for the fluidic supply plus two plates with fluidic channels. The mould then rotated electrically by 90 degrees, placing the two different plates directly on top of each other and joining them firmly together during the next injection process. In this way, a complete sealed lab-on-a-chip was produced in a total cycle time of around 35 seconds, including connections for the supply of fluidic solutions.

Cross-connectors made of PVC-U, which are used as connectors for dialysis tubes, were manufactured on a stainless steel electric Allrounder 370 A installed in the Arburg class ISO 7 clean room. The clean room machine meets the high hygiene requirements of ISO 13485 as well as FDA specifications and GMP guidelines.

### Popular turnkey solutions

The „turnkey solutions“ area with nine machine exhibits proved very popular. Two of these exhibits were equipped with the new ATCM (Arburg Turnkey Control Module) Scada system. As an example, the production of spirit levels on an electric Allrounder 470 A showed how the ATCM collects and combines the process and test data and visualises the key functions of the complete pro-



In expert presentations on the topics of „Road to Digitalisation“, automotive engineering, Freeformer and packaging, guests were able to obtain information on current topics and trends on a daily basis. (Photo: Arburg)

## Technology Days 2019

duction cell.

There was considerable interest in customer systems which Arburg implemented as primary contractor and which highlighted trends such as the manufacture of hybrid components and turnkey systems with optimised installation area. As one example, a hybrid Allrounder 470 H overmoulded metal contacts with PBT (GF30) to form connectors for sensors in motor vehicles. This was followed by 100% continuity, high-voltage and optical testing before the good parts were deposited ready for shipping. Arburg implemented a particularly small footprint around an electric Allrounder 520 A. The entire turnkey system including the Multilift Select robotic system and the conveyor belt integrated into the protective housing is just 500 millimetres wider than the machine itself. An electric Allrounder 470 A demonstrated how optimum efficiency can be achieved by optimally matching injection moulding machine, mould and automation. The machine produced two 30-ml disposable cups made of medical PP in a cycle time of around 2.9 seconds. The mould was from Hofstetter, the automation from Hekuma.

### Additive manufacturing: Freeformer and AM Factory

During the Technology Days, seven Freeformer 200-3X produced functional components from qualified standard granulates and special original materials, including materials with FDA approval for medical technology. One highlight was the new Freeformer 300-3X with three discharge units. It is the first machine capable of additively manufacturing resilient hard/soft combinations with support structure from three components. The exhibit produced movable gripper fingers made of ABS, TPE and support material – in a single step and without requiring additional assembly effort.

The added value that the Freeformer 300-3X offers in fully automated and IT-networked production cells could be seen at the

world premiere of the AM Factory. As an example, the complex turnkey system individualised vacuum grippers for chess pieces in six versions – „on demand“, fully automated and 100 percent traceable. After marking it with a DM code and plasma treatment, the Freeformer 300-3X completed an aluminium gripper plate with a functional TPU geometry adapted to the desired chess piece according to the 3D print job. The next process step was a tactile functional test of the gripper. Handling of the gripper plates, loading of the build chamber and functional testing were performed by a six-axis robot. Using the DM code, the data could be accessed at any time on a product-specific website.

### Programme of side events: Service, presentations and factory tours

The main focus of the special service exhibition was on digital solutions from Arburg. This included the new „arburgXworld“ customer portal and the Arburg Remote Service (ARS). The latter was presented using a hydraulic Allrounder 320 C Golden Edition. With regard to the customer portal, service experts gave practical examples of the advantages offered in terms of searching and ordering spare parts, creating tickets and communicating with service technicians.

Arburg's expert presentations, given in German and English, on „Automotive engineering“, „Freeformer“, „Packaging“ and „Road to Digitalisation“ were attended by more than 1,400 participants this year. In addition, more than 1,900 guests took part in over 200 in guided factory tours. There were also numerous foreign groups who enjoyed a guided tour of the factory in their national language, accompanied by the respective representatives from their Arburg subsidiaries or trading partners.

ARBURG GmbH + Co KG D 72290 Loßburg



More than 6,000 invited guests from 54 nations came to Loßburg for the Arburg Technology Days, held from 13 to 16 March 2019. Around 35 machine exhibits were on display in the Customer Center alone. (Photo: Arburg)



# Mass production with amorphous metals

The injection molding machine manufacturer Engel Austria and the technology company Heraeus are at the Hannover Messe 2019 to symbolically kick off the mass production of high tech components with amorphous metals. Possible fields of application are for example automotive, aerospace, medical technology, industry, lifestyle and electronics sectors.

The new Amloy range of amorphous materials by Heraeus uses injection molding to create products with properties that were previously mutually exclusive. Reduced cycle times, by up to 70 percent, and unattainable standards of product quality are opening up many new areas of application.

Zirconium-based Amloy alloys and copper-based materials are leaving the successful pilot phase and are ready for mass production. Amloy from Heraeus is a new line of amorphous metal alloys that are optimized also for injection molding. At the Hannover Messe 2019, Heraeus and Engel will be demonstrating live the Amloy brand's potential for delivering components that combine high mechanical durability with high reliability, low wear, scratch resistance and reproducibility. They will be producing Amloy screwdriver bits multiple times each day from April 1-5, 2019 at Booth E32 in Hall 3.

Amorphous metals get their name from their randomly arranged - amorphous - molecular structure. Amloy components are hard yet highly elastic, and have a low wall thickness while remain-

ing durable, light and robust. Amloy is highly resistant to corrosion and is biocompatible in line with ISO 10993-5. With this combination of properties, Amloy is superior to steel, titanium and many other materials and opens a broad spectrum of applications. Fields of application include break-proof lightweight frames for portable electronic devices, durable instruments for minimally invasive surgery, stable suspensions and wear-resistant drivetrain components for the aerospace industry, premium decor elements for automobiles, and abrasion-resistant watch components. Heraeus is currently working on additional Amloy alloys based on titanium, iron and platinum.

## Fit-for-purpose in a single step

Amloy components are made in a fully automatic production process using Engel's newly developed AMM injection molding machine from the hydraulic victory series. The injection speed is 1,000 mm/s as standard and makes very small wall thicknesses possible. The cycle time is up to 70 percent shorter than with previous amorphous metal injection molding solutions, and the required heating power is reduced by 40 to 60 percent. In a single step, one or more fit-for-purpose components are produced from Amloy blanks in 60 to 120 seconds, depending on size and geometry. With a surface fineness of 0.05  $\mu\text{m Ra}$ , manual reworking or further surface finishing are not necessary for most applications.

Injection molding of amorphous metals is also superior to MIM (Metal Injection Molding) and CNC machining. MIM processing of metal-plastic powders requires further work steps, such as debinding and sintering. The higher material shrinkage impairs reproducibility. CNC machining requires considerably more time and generates a large amount of waste.

## Available without a license

With this cooperation, the partners Engel and Heraeus are expanding their amorphous metal expertise. In 2015, Engel presented its first injection molding solution for the processing of amorphous metals. Heraeus has been conducting research and development on amorphous metals for about three years. With this cooperation, Heraeus is closing a production gap and is the only provider worldwide capable of fully processing amorphous metals: melting and forming, 3D-printing, injection molding. All Amloy materials and the Engel victory AMM injection molding machines



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01st - 05th April 2019: Hannover Messe, Hannover (D)

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# Gx Elite vials and RTF vials – top quality and performance for the filling line

## Gerresheimer at PDA in San Diego

With its Gx Elite and Gx RTF vials, Gerresheimer is presenting two new type I vials made from borosilicate glass at booth 115 at the PDA Annual Meeting March 11-13) at the Marriott Marquis in San Diego (CA).

### Top of their class

“The Gx Elite vials are the result of a careful product development process spanning several years. This has also impressed our customers,” says Edward Troy, Vice President Sales & Marketing Primary Pa-



ckaging Glass at Gerresheimer, emphasizing the extent to which avoiding glass-to-glass contact in the production process can affect the quality of the vials. The highly shatter-resistant vials are extremely durable and free of cosmetic defects. They also boast an incredibly robust structure, while their resistance to delamination protects the drug inside. Simple handling and a range of packaging options ensure that Gx Elite vials can be supplied for end-to-end use on various filling lines. This cuts costs while improving quality, as countless past and ongoing tests by notable customers have shown.

### Gx RTF injection vials: two manufacturers – one packaging

The Gx RTF injection vials are made from type I borosilicate glass. They meet all current requirements of the applicable ISO standards and pharmacopoeias (USP and Ph. Eur.). By using the Ompi EZ-fill packaging format, the risk of glass-to-glass contact, which could result in breakages, cosmetic defects, and particle contamination, is minimized.

Gerresheimer's two areas of expertise – the moulding of vials made from tubular glass and the ready-to-fill process for pre-fillable syringes – are combined with recognized Ompi EZ-fill packaging technology for the new Gx RTF vials. The result is vials

that are washed, packed in trays or in nests and tubs, and sterilized before being delivered to pharmaceutical customers. This enables our customers to start filling them straight away without the need for any intermediate process steps.

The new injection vials meet our customers' increasing desire for comprehensive solutions. By establishing a standardized packaging platform for sterile vials, Gerresheimer is fundamentally simplifying the process for the customer.

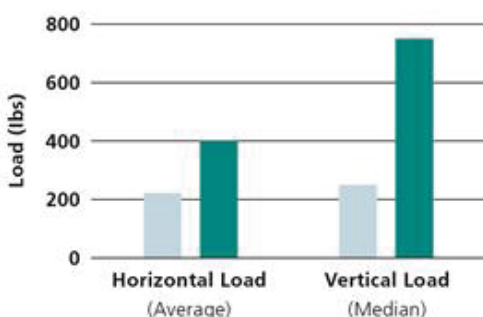
### Flexibility through various packaging configurations

The new product currently exists in the 2R, 6R, and 10R formats for nests and tubs as well as in formats for 4 to 13.5 ml as trays. Further formats will follow. The new packaging solution allows the vials to be used from the development phase of new medications to small or large-scale production.

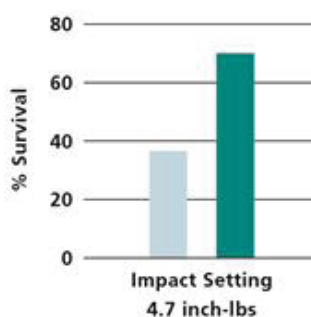
Injection vials set the benchmark for primary packaging for parenteral drugs. Gerresheimer's come in all sizes and comply with the relevant international standards and pharmacopoeias. The company's range includes solutions for bioengineered drugs and other specialist pharmaceuticals.

Gerresheimer AG  
D 40468 Düsseldorf

### Compression Testing



### Sidewall Impact Testing



Standard Gx® Elite



# REFCOLD INDIA makes an impactful debut



## Sets a benchmark as a dedicated industry platform for Refrigeration and Cold Chain in India

REFCOLD India 2018 concluded its premiere three day edition successfully at the Mahatma Mandir Exhibition Centre in Gandhinagar, Gujarat between 22nd and 24th November, 2018. More than 150 companies across varied sections of the refrigeration & cold chain industry showcased their latest products creating a vast base of business prospects under one roof. REFCOLD is India's first dedicated international exhibition and conference on cold chain, industrial refrigeration and reefer transportation.

The event organized by The Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE) and NürnbergMesse India has successfully met its objective of providing a platform exclusively for the refrigeration & cold chain industry. The show has also enabled the global investment community to connect with stakeholders in Refrigeration & Cold Chain sector in India.

REFCOLD India 2018 was inaugurated on 22nd November by Shri Vijay Rupani, Hon'ble Chief Minister of Gujarat State. While speaking at the inauguration, the minister said, "REFCOLD India 2018 is a great show with professional visitors & exhibitors from around the globe. I am sure it will be useful for all the stakeholders achieving the common goal of doubling farmer's income by 2022. I wish all the success."

### Concurrent Events at REFCOLD India

- REFCOLD Emerson Awards Night - The

award night rewarded innovative & outstanding energy efficient projects in the Cold Chain and Refrigeration Industry.

- Daikin Global Poster Competition - REFCOLD provided a platform to the national and international students to demonstrate their innovative research.

- REFCOLD Entrepreneur's Conclave - Creating an ecosystem for entrepreneurship through this conclave by industry experts.

- REFCOLD Business Summit - This event aims to provide great business opportunities to exhibitors to connect with top

industry buyers.

- REFCOLD Innovation Hub - platform for exhibitors and partners to showcase their innovations which has power to transform the Cold Chain and Refrigeration Industry.

Ms. Sonia Prashar, Chairperson of the Board & Managing Director of NürnbergMesse India Pvt. Ltd said: "We are delighted with the success of the first edition of REFCOLD India show. The overall feedback from the exhibitors and visitors has been extremely positive as this show has provi-



## REFCOLD INDIA makes an impactful debut

ded an exclusive platform for a well-rounded growth of the Refrigeration & Cold Chain industry in India. We strive to raise the bar on this show in the upcoming editions as we endeavour to plan, implement, market and create value for our exhibitors and visitors alike.”

The exhibition had the presence of Industry leaders including Emerson, Kirloskar, Carrier, Voltas, Blue Star, Hitachi, Daikin, Isuzu.

REFCOLD India 2018 was supported and endorsed by global bodies like UNEP, IIR, ASHRAE, GFCCC (Global Food Chain Council). These distinguished organisations have encouragingly backed this event and have held a joint session at REFCOLD India.

### The discussion of United Nations Environmental programme was about the following:

- Understanding the Sector: International Institute of Refrigeration (France) -

### UNEP Technology Briefs

- Building Local Database: UNEP-GFCCC Model
- Montreal Protocol and Cold Chain: an overview of challenges and opportunities by UNEP
- Sustainable Refrigeration Technologies in the Marine & Off-Shore Fisheries Sectors by UNEP

Workshops, Technical Seminars and Interactive panel discussions were conducted on subjects of interest including Cold Chain and Refrigeration; Self-Audit of a Cold Store and Determination of COP, Efficiency Improvement – Insulation, safety in Operation, Best Practices in O & M Refrigeration Plant, Trouble Shooting, The Fire Losses due to inherent use of Metal Sandwich Panels – The myths, Facts and solutions, etc.

REFCOLD India received an extensive support from dignitaries from the Government of Gujarat and Government of India with their active participation and endorsement:

ment:

The array of visitors included an infinite range of Food Manufacture & Supply, Fruit & Vegetables, Meat & Dairy, Seafood & Fish, Frozen & Chilled Foods, Agriculture & Horticulture, Wholesale Distribution & Retail, Transportation, Pharmaceuticals & Healthcare, Cold Storage Owners, Ports, Shipping companies, Horticulture departments, Hotels & restaurants, Pharma Laboratories, Pharma companies, architects, consultants, project managers, contractors, suppliers, manufacturers, facility managers, end users and Government officials.

The second edition of REFCOLD India 2019 will be held in Hyderabad at the HITEX Exhibition Centre, from the 21st November – 23rd November 2019.

### 21st - 23rd November 2019: REFCOLD India, Hyderabad (Indien)

NürnbergMesse GmbH D 90471 Nürnberg

# Hohenstein Academy 2019

## The learning experience - [www.hohenstein-academy.com](http://www.hohenstein-academy.com)

Since March Hohenstein is paving the way to modern learning worlds with the e-Academy. Digital and independent of time and location, the Academy thus offers access to valuable content from all areas and competences of the company to anyone who is interested. There are webinars, webcasts, tutorials and further digital formats in the following subject areas:

- Textile basic knowledge
- Comfort and performance



The Academy, the heart and centre of Hohenstein's expertise, is taking the step into the digital age. (© Hohenstein)

- Clothing technology
- Safety and sustainability
- Laundering and cleaning
- Medicine and healthcare

The Academy is constantly expanding its digital offer. Fresh and new formats are always available - wherever and whenever you need them. This new offer provides the user with numerous benefits. Those interested no longer have to travel to Hohenstein



There are webinars, webcasts, tutorials and further digital formats in six different topic areas. (© Hohenstein)

to experience and learn new things first-hand. Therefore, the Academy has devoted itself to the concept of blended learning. For example, the Academy will provide the traditionally well-attended basic laundry technology course modularly and will offer content both digitally and at events on site. Please find details in the course overview. Here, you will also find the courses of the subject areas comfort and performance. The experts teach in a tried and tested manner both on site in Hohenstein and, on request, at the customer's facility. Hohenstein hopes that the realignment and digitization of the Academy will give it new impetus, above all, in the area of commercial laundry. The completely rebuilt Academy will also develop a comprehensive course programme for proper linen care on behalf of the German Certification Association.

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# Highly Accurate Feeding Solution for Growing Demands of Continuous Processing



## Coperion K-Tron Displays Innovative Feeder Design for the Pharmaceutical Industry

09th - 11th April 2019: POWTECH, Nuremberg (D)

02nd - 04th April 2019: Interphex, New York (USA)

At this year's Interphex (April 2 to 4, 2019, booth 2558, New York/USA) as well as at Powtech (April 9 to 11, 2019, hall 4, booth 4-290, Nuremberg/ Germany) Coperion K-Tron will display the next generation of its highly accurate, gravimetric K3-PH feeders for the pharmaceutical industry. These modular feeders have been specially designed to meet the growing demands of continuous processing. Thanks to the use of a smaller D4 platform scale incorporating the patented and highly accurate Smart Force Transducer (SFT) weighing technology, they require significantly less floor space compared to previous models. Depending on the process and requirements, several feeders can be grouped into a cluster, for example for continuous processes such as

direct compression (CDC), extrusion, wet and dry granulation, and continuous coating as well as traditional batch processes.

### Easy handling and better product quality

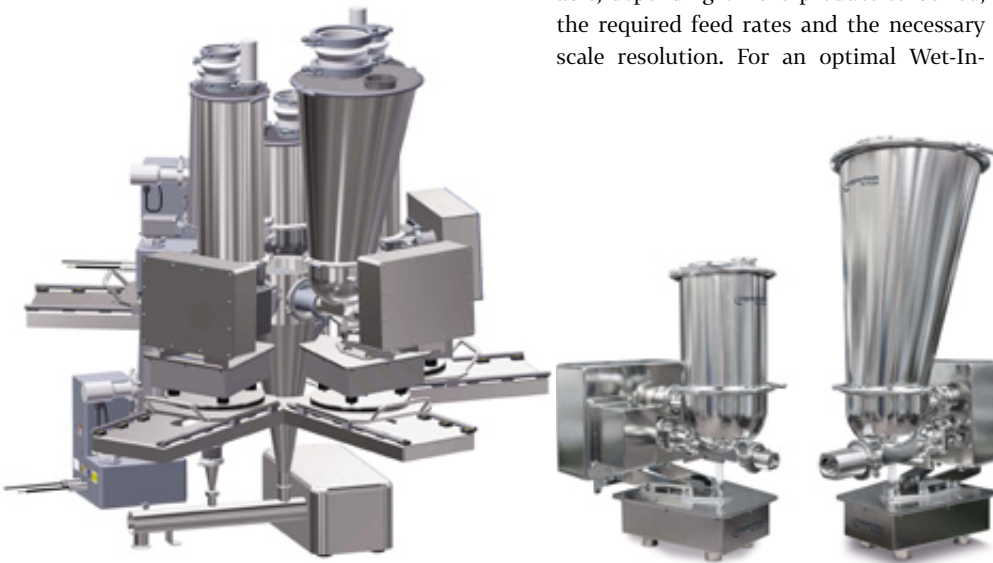
The modular design of this innovative feeder line simplifies cleaning and reduces changeover times. The „Quick Change“ design, whereby the feeder bowl can be quickly decoupled from the feeder drive, also enables simple and fast product changes. By simply releasing two clamps, the used feeding unit can be removed and replaced with a clean one.

The three available Coperion K-Tron feeder types QT20, QT35 and QS60 (twin and single screw) can be used with the same scale and drive units. They are interchangeable, depending on the product to be fed, the required feed rates and the necessary scale resolution. For an optimal Wet-In-

Place (WIP) result, every unit has an integral two degree pitch facilitating maximum drainage during the cleaning process. In addition, the feeder bowls and hoppers feature a new improved seal design for optimal product containment. The complete line of equipment is engineered to meet the rigid requirements of the pharmaceutical industry, including strict adherence to cGMP guidelines and standards as well as the use of FDA approved materials of construction. Initial industry reactions to the design include very positive comments on the use of a single gearbox for the complete speed ranges of all feeder models.

### High-accuracy weighing with patented SFT technology

The new D4 platform scale features the same state-of-the-art sanitary design of the established Coperion K-Tron D5 scale. Smooth, crevice free surfaces prevent deposit of dust and product residue and enable easy cleaning. The redesign of the scale from a round design to a trapezoid design features a much smaller footprint and facilitates an optimized multi-feeder arrangement. This is especially useful in areas with limited space, where multiple ingredients must be fed into one process inlet. At the heart of the new D4 scale, Coperion K-Tron's patented SFT single wire weighing technology provides a highly accurate weight signal with a resolution of 1:4,000,000 in 80 ms. The electronics include linearization, temperature compensation and a digital low-pass filter to reduce the effect of plant vibration. The 100% digital design eliminates the need for calibration.



Coperion K-Tron's new QT20 and QT35 pharmaceutical feeders with redesigned trapezoid scale shape and significantly smaller footprint are optimized for multi-feeder clusters around a process inlet. (Image: Coperion K-Tron, Niederlenz, Switzerland)

The new K3-PH line of feeders in modular design has been specifically designed to meet the growing demands of continuous processing in the pharmaceutical industry. (Image: Coperion K-Tron, Niederlenz, Switzerland)

# Modbus and BACnet Temperature Sensors for Building Automation



**The temperature sensors from E+E Elektronik now also feature RS485 interface and can therefore be easily integrated into a network.**

The temperature sensors of the Austrian sensor manufacturer E+E Elektronik are now available with RS485 interface. The Modbus RTU and BACnet MS/TP protocols facilitate the integration into a bus system. The installation-friendly, IP65 / NEMA 4 enclosure is ideal for heating, ventilation and air conditioning systems.

The highly accurate and reliable E+E temperature sensors are optimized for building automation. The product range includes duct or immersion sensors (EE431) for temperature measurement in air and liquids, strap-on sensors (EE441) for mounting on ducts and pipes, wall mount sensors for indoors and outdoors (EE451) and

temperature sensors with remote probe (EE471).

### Easy Mounting, High Protection Class

The clever enclosure design allows for easy and fast installation. Thanks to the external mounting holes, the sensors can be mounted with closed cover. This saves time

and protects the electronics from construction site contamination and mechanical damage. Due to the high protection class IP65 / NEMA 4 the temperature sensors are appropriate also for harsh environment.

### Active and Passive Temperature Measurement

The E+E temperature sensors are available with active or passive output. The active sensors are fully user configurable and adjustable. They feature current or voltage output or RS485 interface with Modbus RTU or BACnet protocol. The passive sensors offer a wide choice of temperature sensing elements, such as Pt1000, NTC10k or Ni1000.

### Comprehensive HVAC Portfolio

In addition to temperature sensors, E+E Elektronik's HVAC product range includes sensors for relative humidity, CO<sub>2</sub>, air velocity and differential pressure. Thus, the company offers all relevant measurands for building automation.



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The temperature sensors EE431, EE441, EE451 and EE471 are now available with RS485 interface with Modbus or BACnet-protocol. (Photo: E+E Elektronik GmbH)

### Impressum:

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