



Pfeiffer Vacuum supplies vacuum solutions for the world's largest and most powerful particle accelerator

- Long-standing partnership between CERN and Pfeiffer Vacuum
- Vacuum technology for probing the fundamental structure of the universe
- HiPace turbopumps for the Large Hadron Collider

Pfeiffer Vacuum has received yet another major order for turbopumps and turbo pumping stations from CERN. CERN is situated in Geneva on the Franco-Swiss border and is the largest center for particle physics research in the world. Its main business is fundamental physics - finding out what the universe is made of and researching the basic constituents of matter. The particle accelerator LHC (Large Hadron Collider) has a circumference of some 27 kilometers and is used for colliding proton and ion beams at nearly the speed of light. The accelerated particles travel in beam lines, which require ultra-high vacuum (UHV) conditions.

These beam lines are pre-evacuated with turbo pumping stations. Furthermore, turbopumps with a very high compression ratio for light gases are then responsible for generating the insulation vacuum. The insulation vacuum is necessary for the operation of the superconducting magnets at a temperature of -271 °C.

Andreas Schopphoff, Head of R&D Market Segment: "The cooperation between CERN and Pfeiffer Vacuum is based on many years of working together in a spirit of trust. We are very proud that CERN has chosen Pfeiffer Vacuum products again for its future projects. Since the pumps' application is one that has never been realized before, the technical requirements for this project are especially high. The new order is for HiPace turbopumps and HiCube turbo pumping stations that meet those high demands."

Arthur Pfeiffer GmbH developed the turbopump in 1958 with the objective of generating a hydrocarbon-free vacuum. Today, turbopumps from Pfeiffer Vacuum are considered the epitome of cutting-edge technology, dependability and ultra-high performance. At the time, CERN was one of the first customers to buy this innovative technology and has continued to



Pfeiffer Vacuum HiPace turbopumps

be a major user of Pfeiffer Vacuum products to this day. Generating the vacuum inside the LHC, measuring it and analyzing the partial pressure requires comprehensive vacuum technology, a major part of which is being supplied by Pfeiffer Vacuum.

CERN was founded in 1954 and now employs around 2,500 staff and hosts more than 10,000 visiting scientists from all over the world.

Pfeiffer Vacuum GmbH
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EU GMP Annex 1



Your Complete Source for EU GMP Annex 1

The European Commission very recently released their EU GMP Annex 1: 2017 draft for review and comment. Our experts have reviewed this document carefully and are ready to share their insights with you.

Get a summary of the EU GMP Annex 1 Draft Revisions by reading the paper below or watching the recorded webinar at the right.

Have a question? Submit your own question for one of our experts and they'll get back to you with an answer.

Our Advisory and Training Services are also available to you - to support you at every step of your process, whether it be non-compliance issues, setting up a new process, or training employees. Our team has the background and education you need.

Confused about the Annex 1 draft proposed changes how they might affect you?

Our experts answer over 40 common questions including:

- During cleanroom classification, is it mandatory to monitor viable and non-viable counts simultaneously?
- Can you choose not to use one of the microbiological sampling methods for qualification of a classified area?
- Does the removal of the 5 micron particle size from ISO 14644 mean the qualification time for Grade A and B will be vastly reduced?
- Have particle sizes greater than 5.0 been removed as a requirement of Grade A or B monitoring?

Get answers to these and other questions by filling out the form and downloading the paper. If you can't find the answer to your question, the contact information for an Annex 1 expert is included at the end of the paper.

The New EU GMP Annex 1 Revisions 2017: Review, Insights, and Feedback

Attend this webinar to:

- Get an expert review of Annex 1
- Get insights and feedback from experts on the Annex 1 draft
- Submit your comments and feedback (we will compile for the commission)
- Learn what the updated Annex 1 might mean to you

What's Included?

- Certificate of Attendance
- Summary of Experts' Comments
- Recorded Webinar

Presenters:

- Gilberto Dalmaso, PhD - Senior Advisor and Pharma Customer Advisory Team Manager
- Frank Panofen, PhD - Sterility Assurance/Microbiology Product Line Manager
- Daniele Pandolfi - Aerosol, Life Sciences Product Line Manager



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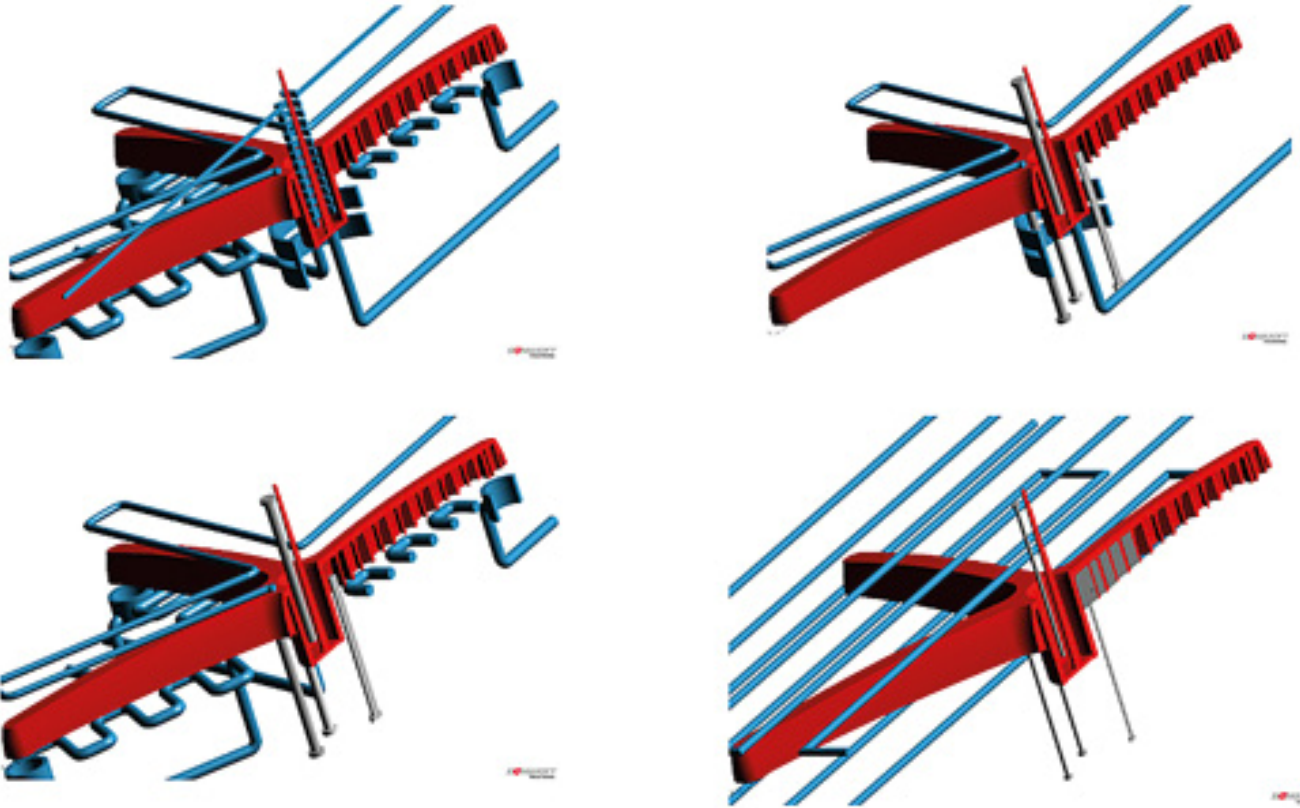
Dear subscribers,

we hope you enjoyed the Easter holidays a little bit and used them to relax, because now we are going straight back to the latest news of the cleanroom industry. While the Easter Bunny was busy distributing colourful eggs everywhere, we have been collecting - not eggs, but news, trends, innovations and novelties. And so in this April newsletter you will find a lot of clean room information that we have prepared for you. Immerse yourself in the flood of information and always keep an overview with reinraum online.

We wish you an inspiring reading and look forward to your feedback.

Yours sincerely,

Reinhold Schuster



The part (in red) had to be produced with a cycle time below 60 seconds. The Autonomous Optimization tool found out which cooling configuration delivered the desired cycle time at the lowest cost.

Autonomous Optimization Reduces Costs in Injection Molding

An example demonstrates the application of the Autonomous Optimization tool available in SIGMASOFT® Virtual Molding. The mold for a thick-walled part had to deliver a cycle time below 60 seconds, which could be realized with different tempering concepts. The best cooling configuration was found at the lower manufacturing cost.

Tempering problems account for around 60% of the total of quality issues in injection molded parts. With an ever increasing pressure on individual part costs and shorter mold development deadlines it is imperative to produce affordable, reliable and efficient mold solutions within the shortest possible time.

A new tool, released at Fakuma 2017 for the first time, allows mold makers to virtually identify the most efficient solution in their designs. SIGMA Engineering GmbH (Aachen, Germany) has released the Autonomous Optimization solution as part of its SIGMASOFT® Virtual Molding software. It helps the user to find the best possible solution out of all the possible combinations of a parameter set.

A base for an office roll chair had to be produced. The mold maker was confronted with the problem of designing the most efficient mold possible at the lowest cost. A cycle time below 60 seconds was targeted.

The mold maker selected the different parameters which he could vary in the mold to achieve the requested cycle time. The mold material, the layout and diameter of the tempering channels, a conformal cooling concept and high-conductivity pins were se-

lected as the variables. All the possible combinations of these variables gave a total of 40,000 different mold configurations. The autonomous simulation tool worked to find amongst these possible scenarios the ones that released a cycle time below 60 seconds.

Amongst the different possible design combinations delivering the target cycle time it was then possible to filter the ones with lower cost. For this particular application, it was found that conformal cooling was not necessary, and that the required heat dissipation effect to achieve the targeted cycle time could be obtained using high-conductivity pins with 4 mm and 10 mm in diameter. The required diameter in the water channels was found to be 6 mm.

The Autonomous Optimization available in SIGMASOFT® Virtual Molding is able to find the most effective mold design at the lowest possible cost. Not only cycle time can be optimized, but also part deformation, energy costs and molding defects can be minimized through the identification of the optimum parameter combination.

Cleanzone 2018: Safety, security and modern medicine in the spotlight – Offshoot makes its debut in Dubai



The requirements for purity in production processes continue to grow stricter, regardless of whether it is in the field of medical technology, the food industry, microtechnology or the automotive industry. At the international and interdisciplinary trade fair Cleanzone on 23 and 24 October 2018 in Frankfurt am Main, the industry will be presenting their innovations for these new challenges while helping trade visitors navigate the jungle of standards, guidelines and concepts.

The trade fair will be addressing safety and security in cleanrooms, with a particular focus on such things as digital access controls and counterfeit protection. Thanks to biotechnology and genetic engineering, the use of targeted therapies and custom diagnostics is becoming ever more common. The demands placed on cleanrooms by modern and personalised medicine and medical technology products are

another top theme at the trade fair. In addition, aspects such as the simulation of cleanroom processes and the use of the BIM method to plan production facilities will be discussed at Cleanzone 2018. By visualising airflows before construction has started, it is possible to identify sources of contamination in advance and take appropriate steps. Throughout all the themes, events and exhibitor presentations, two key drivers of innovation are evident: digitisation and energy-efficiency.

The members of the Cleanzone strategy commission met in January, and they were in agreement that the market for cleanroom technology looks very promising. The positive mood in the industry is also benefiting Cleanzone, and numerous national and international market leaders have already signed up for the trade fair, including basan/VWR, Briem Steuerungstechnik, BSR, Colandis, Contec, CRTM, the German

Cleanroom Institute (DRRI), Hydroflex, IAB, Kelvin Reinraumsysteme, KEK, MEC Industries, Micronclean, MK Versuchsanlagen, my.cleanroom.de, profi-con, pure11, Siemens, Spetec, TSI and vali.sys. This year marks the first time that the prestigious Hermann-Rietschel-Institut in Berlin is taking part. The institute researches themes of importance to the field of building and energy technology, and places a particular focus on cleanroom technology.

In addition to the exhibitors' presentations, Cleanzone also boasts numerous events. Trade visitors can obtain concrete proposals for their requirements here. The Cleanzone Conference, Cleanzone Plaza event stage, Expert Sessions, Cleanroom Talks, research area and ReinraumAkademie's CleanroomAward help promote knowledge transfer and foster an exchange between experts and business partners.

On 12 and 13 November 2018, Cleanzone Middle East will be making its debut in Dubai. As a result of stricter product quality standards, cleanroom technology is playing an ever more important role in the Gulf states. Middle East Cleaning Technology Week will be taking place at almost the same time – from 13 to 15 November 2018 – and focusing on textile care, building cleaning and car washes. These events offer outstanding synergies in the areas of textile care, hygiene and cleaning in particular.



cleanzone

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parts2clean 2018 on course for another successful show



- Display area in great demand
- Parts cleaning technology becoming increasingly mission-critical

Wherever industrial parts are manufactured or processed, parts cleaning technology is critical for the successful outcome of downstream manufacturing processes, and for the quality of the finished product. High standards of cleanliness are required, involving the removal of particulate residues and surface films – and the standards are getting more demanding all the time. In order to remain competitive, companies around the world are under pressure to clean their parts to the required standards at the lowest possible cost. They can only do this, however, by reviewing and optimizing their processes on a regular basis. parts2clean, which in 2018 takes place from 23 to 25 October at the Stuttgart Exhibition Center, is a prime international source of the necessary parts cleaning know-how as well as an ideal buyers' platform.

The market relevance of parts2clean is underscored by the fact that as many as 87 percent of the show's attendees play a role in their companies' procurement decisions. Moreover, "81 percent of the professionals who attended parts2clean in 2017 came with actual purchasing intent", remarked Olaf Daebler, Global Director of parts2clean at Deutsche Messe. "Nearly half were planning investments in excess of 100,000 euros." In 2017, the International Trade Fair for Industrial Parts and Surface Cleaning was attended by some 4,900 trade professionals from 41 countries.

Attractive special formats highlight the complete process chain

For participating exhibitors in 2017, all this added up to many targeted inquiries and promising new leads, as well as orders placed



on the spot. It therefore comes as no surprise that by mid-February of 2018, more than 80 companies had already made firm stand bookings for the next show, with virtually all the market and technology leaders in each display category on board. Taken together, these exhibitors have booked space equivalent to some 45 percent of the total area which was booked in 2017. These solution providers cover plant and installations, processes, process media and their conditioning for the degreasing, cleaning and pre-treatment of parts and components, handling and process automation, washer baskets and pallets, cleanroom technology, quality assurance, test methods and analytical procedures for cleanliness inspection, corrosion protection, preservation and packaging, as well as contract cleaning. While the range of exhibits addressing every link of the process chain is unparalleled throughout the world, parts2clean also highlights various special-interest themes such as deburring and cleaning in electronics production and medical technology, as well as ultra-fine cleaning and quality control in cleanroom environments. "The displays not only cover the latest in technology, but also the demands posed by global trends such as digitization, electromobility, miniaturization and lightweight construction, as well as the solutions capable of meeting these challenges", commented Daebler.

Industry Forum and guided tours in English and German

parts2clean is known to users around the world as a valuable source of orientation and know-how. The show's reputation owes much to the bilingual Industry Forum offering simultaneously translated lectures and presentations (in English and German) on every conceivable aspect of industrial parts and surface cleaning.

Guided tours will be offered on all three days of the show, in both English and German. Taking in specially selected exhibitor stands, the tours will give visitors the opportunity to get informed about topics of particular interest to them regarding every single step of the industrial parts and surface cleaning process. Participating exhibitors can present their products and innovations to a highly receptive audience, right at their stands, giving them a prime opportunity to generate interest and leads.

23rd - 25th October 2018: parts2clean, Stuttgart (D)

New solutions from Bosch Packaging Technology



Achema 2018

- **Pharma Liquid World shows the connection of a preparation system and filling machine, as well as robotic technology in aseptic filling**
- **From conti to containment: innovations from the Pharma Solid World**
- **Pharma Industry 4.0 applications live on show**

At Achema 2018, Bosch Packaging Technology presents its R&D, line and service competence, complemented by comprehensive Industry 4.0 solutions. "We combine mechanical engineering expertise and extensive pharmaceutical know-how in a unique way. This leads to customized solutions for a wide variety of markets and requirements," says Uwe Harbauer, member of the executive management and head of the pharma business unit at Bosch Packaging Technology. At Achema, visitors will be able to experience the wide range of solutions: "Divided into the Pharma Liquid and Pharma Solid World, we will show market novelties and portfolio expansions, digital solutions and services, which together result in optimally harmonized systems for all our customers' production processes."

Pharma Liquid World: connected systems and processes

In the Liquid World, visitors can witness a market debut: a preparation system combined with a filling machine for sterile injection solutions. Thanks to synchronized components, the integrated solution provides for an efficient design phase. It can then be realized and qualified quickly and easily in line with the Bosch line competence. Customers profit from reduced efforts, high time savings and, most importantly, a shorter time-to-market.

The new process system SVP250 LF for the production of injection

solutions was developed by the Bosch subsidiary Pharmatec. The conical shape of the process containers allows a broad production range of 15 to 250 liters and minimizes product loss. For product transfer from the preparation system to the ALF 5000 filling and closing machine, Bosch showcases preconfigured versions for different product characteristics, such as clear solutions or suspensions. Thanks to data exchange via the control panels, the process and filling systems communicate with each other, thus creating a connected system – also for future Industry 4.0 applications.

Focus on safety and flexibility

Bosch further demonstrates the especially safe biopharmaceutical processing with a customized MHD system for aseptic filling. While 100% in-process control provides for high quality, the system offers the highest flexibility regarding packaging types such as pre-sterilized vials and syringes thanks to the use of robotic technology in the isolator – and is equipped for further packaging types and changing processes.



ALF 5000 filling and closing machine: The ALF 5000 from Bosch ensures high process safety. For instance, the ampoule heads are removed sideways during closing, instead of from above. (Picture: Bosch)



CPS 1900 WTE und CPA410: The Carton Printing System 1900 WTE from Bosch features an integrated checkweigher and serializes the smallest closable unit (for example folding cartons). Moreover, Bosch offers the CPA for the aggregation of bundles, crates and pallets. (Photo: Bosch)

New solutions from Bosch Packaging Technology

Amongst other inspection technologies, the AIM 3 is showcased for the safe testing of glass containers. With a small footprint, the machine combines cosmetic and particle inspection as well as high-voltage leak detection of smallest cracks in the glass. Defective containers are already sorted out during pre-inspection to prevent glass breakage in the following inspection process. The automatic re-inspection makes sure that only defective products and containers are sorted out, thus reducing the false reject rate.

Also on show in the Liquid World: the semi-automated MSA assembly machine from the Bosch subsidiary Moeller & Devicon. It is suited for the efficient assembly of multi-piece disposable pens or auto-injectors and underlines the competence in cartridge and syringe processing. The modular and scalable platform accounts for the trend towards smaller batch sizes. Thanks to standardized modules it can also be upgraded for larger batches and fully automated production, offering drug producers the flexibility to adapt to market demands.

Pharma Solid World: from conti to containment

Bosch expands the portfolio for continuous manufacturing with the new Xelum R&D. The entry-level unit will be presented to selected customers for the first time at Achema 2018. It is based on the Xelum platform, which was especially developed for continuous

production by the Bosch subsidiary Hüttlin. The Xelum R&D stands for short development times with a low API consumption rate. It offers customers the shortest way from development to continuous manufacturing – without time-consuming scale-up. In addition, Hüttlin underscores its pioneering role in batch technology: Solidlab 1 and 2, as well as the HDGC fluid bed system enable fast process times with little product loss and high yields.

The GKF 720 is another market novelty. Thanks to its washable containment, the flexible platform for small batches sets new standards in the safe processing of highly potent solid dosage forms. Customers benefit from fast product changes and short cleaning times with low water consumption.

The pharma portfolio is complemented by matching secondary packaging solutions. Amongst others, Bosch showcases the CPS 1900 WTE module with Tamper Evident function and integrated checkweigher for the reliable serialization of folding cartons. The new reworks station allows for easier handling of all serialization and aggregation data – even beyond production completion.

New Industry 4.0 solutions and comprehensive service portfolio

Apart from safety along the supply chain, Bosch's Industry 4.0 solutions also ensure transparency in production. Real-time information provides customers with all necessary data to monitor the machine status or process parameters. In addition to data services, Bosch showcases the new Pharma MES:SE. The starter edition of the browser-based software solution for GMP environments captures, stores and visualizes machine data. Just like with all other industry 4.0 solutions, Bosch combines the own software and processing expertise to offer customers a solution which is exactly tailored to the requirements of the pharmaceutical industry. Operators profit from quick reaction times in case of deviations. The Pharma MES:SE also helps to analyze and improve overall equipment effectiveness (OEE).

By capturing machine data, services such as predictive or preventive maintenance and remote service can be used more effectively. Thanks to Bosch's global presence with local service technicians and training centers, as well as the online ordering platform E-Portal, customers receive comprehensive worldwide after-sales services. "We support our customers over the entire machine life-cycle to increase OEE and to reduce downtime. With our integrated solutions from a single source, we excite our customers," Harbauer concludes.

11th - 15th June 2018: AACHEMA, Frankfurt am Main (D)



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Expansion of Industry 4.0 portfolio: The Industry 4.0 solutions from Bosch ensure high transparency in production. The new Pharma MES:SE captures, stores and visualizes machine data and helps to improve machine availability. (Photo: Bosch)

The virtual world conquers the manufacturing industry

AUTOMATICA in Munich from June 19 to 22, 2018

- Recording data in the “Smart Factory” in real time
- Implementing augmented reality meaningfully for plan processes
- Using artificial intelligence to program robots
- Providing concepts for working ergonomically in the manufacturing environment

Already at the last Automatica two years ago, the director of IPA, Professor Thomas Bauernhansl, described Industrie 4.0 as a development process which is advancing at a tremendous pace. He is convinced: “People who don’t concern themselves with it today will probably bitterly regret it tomorrow”. The good thing is: nothing has changed about this statement. However, what has changed is that companies have realized that they need to address the topic of digitization and – whether in the form of sprints or marathons – develop strategies, as well as define and take appropriate action.

At the Fraunhofer IPA booth No. 421 in Hall A4, the four cornerstones of Industrie 4.0 – production, product, IT and human – can be experienced in different ways within the general context of a digitized industrial world. With the aid of intelligent exhibits interacting with the cloud, visitors can find out which solutions the Stuttgart-based research institute offers for various parts of the industrial value chain.

Material flow simulations more realistic than ever

A separate demonstration area is dedicated to robot navigation. Here, Kai Pfeiffer and his colleagues show how mobile robots are networked with one another via the cloud. They map their environment cooperatively and plan their routes using the virtual image of the production facility (digital shadow). “With the specified safety margin, they bypass any obstacles spontaneously appearing without causing congestion, let alone collisions“, explains Pfeiffer.

If anyone wants to find out what other advantages the cloud navigation of modern Industrie 4.0 architectures has to offer, they need to put on augmented reality glasses. Suddenly, they realize that the actual demonstration area is much bigger than they thought. Virtual robots move around in the areas adjacent to the

booth and bypass visitors getting in their way without them even being aware of it. The reason behind this demonstration: using the data merged by the cloud navigation that it acquires via mobile robots and other sensors in the production hall, highly-realistic material flows can be simulated in realtime. Time-consuming and cost-intensive practical trials with robot systems have become a thing of the past.

Machine learning: practice makes perfect

The efficiency of automated handling is constantly improving. This is due to Felix Spenrath and his team, who are continuing to develop the tried-and-tested software bp3™ from Fraunhofer IPA on which the successful bin-picking process is based. “Thanks to better algorithms and new sensor technology, industrial robots are now even able to identify and grip flat, unsorted sheet metal parts“, says Spenrath. The information supplied by modern 3-D sensor systems is thus used to full advantage. The new, intuitive user interface facilitates and speeds up programming so much that investment costs for a handling cell are already amortized after just two years. A two-arm demonstrator at the booth illustrates the latest developments.

With the aid of machine learning, techniques to identify and singularize unsorted objects are constantly being perfected. In the research project “DeepGrasping“, a virtual learning environment is



Through machine learning, bin-picking is being further and further refined. In the research project “DeepGrasping“, a virtual learning environment is being created for robots. (Photo: Fraunhofer IPA/Rainer Bez)



From the data gathered by the cloud navigation from the mobile robots and sensors, material flows can be simulated in realtime – more realistically than ever before. (Photo: Fraunhofer IPA/Rainer Bez)

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being created. Before being put into operation, robots practice a wide range of grasping tasks in this environment on workpieces which they will need to perform once they have been commissioned. Neuronal networks learn from these simulated gripping tasks, thus continuously improving their process knowledge – based on the motto: “Practice makes perfect”. A presentation at the booth informs visitors about the Deepgrasping project and presents preliminary results.

Software drag&bot simplifies robot programming

Currently, robots are hardly ever used in small and medium-sized enterprises. The reason behind this: manufacturer-specific programming languages are so complex that experts must be called in to program a robot for new tasks. »In times of intuitively-operated smartphones and tablets, it is no longer acceptable to have to spend so much time and money on programming robots«, finds Martin Naumann.

Together with his colleagues, the researcher from Fraunhofer IPA has therefore developed the software drag&bot to minimize programming efforts. The trick: drag&bot provides complete programming elements, which can be put together quickly and intuitively via a graphic user interface to create complex robot applications. In addition, user and input aids make it easier to parameterize these elements. Consequently, expert knowledge is no longer needed to reprogram robots from different manufacturers. Naumann will be demonstrating how easy it is to use drag&bot with a robot cell at Automatica 2018. Interested parties visiting the booth can program handling or assembly tasks themselves with just a few clicks.

ROS-Industrial: Open source software suitable for industrial use

Thanks to a reusable software infrastructure, the “Robot Operating System” (ROS) makes it much easier to develop software, both for robots as well as for robot systems performing complex tasks. “The vendor-neutral standardized interfaces facilitate things. Through ROS, robotics has a common basis – like Linux for computers or Android for smartphones“, explains Mirko Bordignon.



The drag&bot software supplies complete programming modules, which can be put together quickly and intuitively via a graphic user interface to create complex robot applications. (Photo: Fraunhofer IPA/Rainer Bez)



Thanks to a reusable software infrastructure – the operating system “Robot Operating System” (ROS) – it is now much easier to compile software for industrial robots performing complex tasks. (Photo: Fraunhofer IPA)

End-users and system integrators no longer need to re-develop complex functions from scratch because they are provided by the open source software ROS – particularly when it comes to mobile navigation, planning gripping and robot movements, as well as simulation, machine vision and sensor processing.

Furthermore: ROS saves you money. A growing number of highly-developed software components is freely available. The developers group theirs and other components to create libraries and applications, adding the experience gained from numerous different research and industrial projects in the process. ROS-Industrial is the umbrella initiative, managed in Europe by Fraunhofer IPA, promoting such technology transfer of ROS to the industrial environment. A demonstrator at the booth presents hardware from leading OEMs and performs perception-controlled tasks – all programmed with ROS.

Mobile platforms: compact and maneuverable with steered standard wheels

Mobile robots and automated guided vehicles can navigate in all directions, pass through bottlenecks without a problem and not waste time maneuvering into position. Currently, these robots are usually fitted with Mecanum wheels or omniwheels. However, when it comes to wheel slip or odometry, as well as the ability to overcome loose ground, steps and thresholds, these undercarriages have their disadvantages. For many years, Fraunhofer IPA has therefore been relying on drive modules with steered standard wheels and will be presenting the third and latest generation at this year’s Automatica.

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“Since AGVs need to drive under loads to pick them up, they need to be as flat as possible“, emphasizes Theo Jacobs, who has designed the latest drive module. Although the structure above the wheels is extremely flat, it is nevertheless fitted with a top-quality suspension system. With two parallel wheels per module, it has a high power density: If necessary, the full power of the motor can be used to advance it. By controlling the two wheels independently, the module can be turned – thus doing away with the need for an additional steering motor. At the fair, Jacobs will be showcasing the latest drive module version at a test stand which enables endurance tests to be conducted on a range of surfaces with various types of surface irregularity.

Productivity increase of 10 % OEE for complex manufacturing and assembly systems based on self-learning optimization tool

When it comes to capital-intensive manufacturing and assembly systems, companies are forced to keep productivity as high as possible. Otherwise, the threat of cost pressure arises. However, many manufacturing systems cover many stations and work so fast that the human eye is unable to pinpoint the causes of failure. The smart system optimization tool from Felix Mueller and his team provides an innovative approach that has already proven significant productivity increase. The analysis tool identifies errors in interlinked manufacturing systems and automatically points out their cause and propagation in real time.

The key technologies are learning algorithms, which have been specially developed to analyze fast and fully automated production lines for discrete goods. To collect data “from the inside”, a high-performance connector is used to access data from the machine controller. In addition, intelligent cameras record relevant process features “from the outside”. A continuous data stream of all sub processes is created and transmitted synchronously to the analysis tool. This serves self learning algorithms to draw conclusions and supply information in the required format. The tool also identi-



Automated guided vehicles need to position themselves underneath loads in order to pick them up. For this reason, they need to be as flat as possible. The structure of the new omnidirectional drive module above the wheels is therefore very slim. (Photo: Fraunhofer IPA)



The experts have integrated drive modules at the elbows and shoulders to support high-torque movements. (Photo: Fraunhofer IPA)

fies relationships between errors and prioritizes them. In addition, it is suitable for automated machine benchmarking. This enables the maximum performance to be obtained from all machines in the same or different plants. Real applications in pharmaceutical, consumer goods and automotive production facilities have already stepped up their productivity by up to 15 percent.

The “e bike to put on” protects human health

IPA researchers help to relieve physical strain experienced by workers in production facilities. This becomes apparent with the Stuttgart Exo-Jacket, an exoskeleton for the upper body which gives the wearer additional strength without restricting his movements. The experts have integrated drive modules at the elbows and shoulders to support high-torque movements. Thanks to pressure sensors in the arm braces, an impedance control unit ensures that the exoskeleton moves smoothly in line with a person’s movements. An articulated chain with five axes of movement is mounted to the shoulder section. The chain follows all positions of the shoulder joint group. Consequently, the drive element is always in the same position as the shoulder at that moment in time. This enables complex movements in three directions: upwards, downwards and inwards. The jacket is even suitable for overhead assembly tasks.

Since the modules are only active when needed, it is also possible to save energy. In the mid-term, the scientists want to develop a modular kit for different areas of application. To do this, a development and simulation workflow based on motion data will be set up. A detailed musculoskeletal model is used to calculate strain relief. Companies can then create their own solutions to suit the task at hand.

“Virtual Fort Knox” is no longer alone but still unique

Already back in 2012, Fraunhofer IPA was working with medium-sized enterprises on “Virtual Fort Knox“ (VFK), an open platform offering IT services for manufacturing companies. Since mid-

The virtual world conquers the manufacturing industry

2017, the VFK research platform has been rolled out as a distributed hybrid platform at six further institutes in the Fraunhofer production alliance. It serves as a collaborative research platform for developing innovative manufacturing services, thus forming the basis of an open, realtime-capable operating system for industrial production. Joachim Seidelmann, head of DigiTools at Fraunhofer IPA, explains the declared aim as follows: "We want to implement Industrie 4.0 concepts that will enable users to improve their production processes."

At Automatica, VFK will be linked to the Festo CP Lab – a miniaturized circular conveyor system, which can be controlled in different ways. Group manager Daniel Stock adds: "We demonstrate how easy it is to connect systems in a flexible manner. In addition, in future enabled by the upcoming 5G technology, for example, we no longer focus only on realtime data fusion but also on control

via the cloud in order to offer users completely new possibilities in the future".

19th - 22nd June 2018: AUTOMATICA, Munich (d)



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Plastics Industry: Unbroken Demand



Fakuma Brings Together Current Range of Offerings and Concrete Demand

16th - 20th October 2018: FAKUMA 2018, Friedrichshafen (D)

From sports cars to consumer products, from ophthalmic lenses and packaging materials right on up to yoga mats – today, more and more products are made of high-tech plastic materials. End-user requirements with regard to precision, durability and weight are increasing along with demand for low-cost items. Top-quality supply will once again meet with unbroken demand at the Fakuma international trade fair for plastics processing at the Friedrichshafen Exhibition Centre from the 16th through the 20th of October, 2018.

Technical Trade Fair Presents Innovations in Plastic

The international plastics industry is doing very well. More and more products are being manufactured today with the help of plastics and composites. Simultaneously rising demand for better and better performance, as well as top-quality, necessitate a consistent innovative spirit and an unceasing stream of new development. This is also made apparent at Fakuma. Whether injection moulding, extrusion, thermoforming, foaming or 3D printing is involved – raw materials producers, machine builders and manufacturers of precision parts will present all they have to offer in the way of innovation throughout the entire value chain in Friedrichshafen. "As the world's number one event for plastics processing through injection moulding, numerous exhibitors take advantage of Fakuma in order to unveil their new products to the public for the first time", confirms project manager Annemarie Schur.

Private trade fair promoters P.E. Schall GmbH & Co. KG will once again count on their time-tested combination of technical innovation and practical application at Fakuma 2018 – a philosophy which has led to the success of all Schall trade fairs. After all, the la-

test developments of universities and scientific institutes are only as valuable as the benefits they provide for industrial applications.

International Industry Meet Brings Experts Together

Speaking of new developments: The fact that everyone who's anyone in the field of plastics processing anywhere in the world will come together at this industry meet is made apparent by the rising levels of internationalism at this repeatedly booked out trade fair as well. Expert visitors, specialists and decision-makers journeyed to the last Fakuma in 2017 from more than 120 countries. 48.375 expert visitors accepted the invitation of the roughly 1900 exhibitors to attend the event in Friedrichshafen on Lake Constance where Germany, Austria and Switzerland meet – and the numbers continue to rise. In addition to innumerable participants from Germany and elsewhere in Europe, above all the number of visitors from Asia is increasing.

Top Issues: Efficiency and Digitalisation

One of the major issues currently occupying the world of plastics is efficiency – with regard to energy-saving processing steps, electrified and thus more economical machines, and more efficient processes. The users intend to get these challenges under control through, amongst other things, the increasing implementation of digitalisation. And in an age of lightweight design and the climate change, materials efficiency is also a significant factor. Beyond this, solutions will be presented in October which are occupying many of the plastics processing industry sectors such as innovative recycling, digitalised processes and "green" materials.

P. E. Schall GmbH & Co. KG
D 72636 Frickenhausen

Come be amazed by laboratory technology, analytics and biotechnology

analytica supporting program

From April 10 to 13, Munich is once again the meeting point of the laboratory industry: analytica, the leading international trade fair for laboratory technology, analytics and biotechnology, offers many highlights in the supporting program in addition to the exhibition and the top-class scientific conference program.

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Direct sharing of knowledge and exchange with experts are the focus of the various events. Susanne Grödl, exhibition director of analytica, describes the diversity of the supporting program: "At analytica, visitors experience worldwide debuts, the latest developments in exciting live demonstrations, subject-specific forums, informative special exhibitions as well as special theme days. All program items highlight one thing: the practical suitability of modern analytics."

NEW: The Digital Transformation forum

Intelligent laboratory systems, individual networking, the integration of the laboratory in the corporate structure: Being able to take these steps successfully calls for intelligent digitalization so that the laboratory think tank becomes even more efficient.

With the new Digital Transformation forum in Hall B2, analytica specifically addresses these issues and offers all visitors a realistic view today into Laboratory 4.0 of the future: Topics addressed include big data handling, bioinformatics, digital networking and working effectively in the laboratory. The Digital Transformation forum offers expert lectures and discussion panels on all days of the trade fair. The two associations Life Science Research as well as SPECTARIS support the forum with interesting contributions and discussion panels. In addition, the established "Biotech" (Hall A3) and "Laboratory and Analysis" (Hall B2) forums offer best-practice lectures as well as useful tips for daily laboratory work.

Live Labs: Insights into daily laboratory work

In the Live Labs Food Analysis (Hall A3) and Material Analysis (Hall B1), visitors can experience all conventional procedures or specific methods in a real laboratory environment. In the Live Labs, the work steps from sample preparation to sample measurement to analysis and assessment of the results are shown.

In the Material Analysis Live Lab, experts from industry and science give talks and live demonstrations on the latest developments, for example from the areas of sample preparation, substance classes or quality assurance. Companies such as Carl Zeiss, LAUDA Netzsch and Thermo Fisher Scientific will be there. The Food Analysis Live Lab features innovations in pesticide and residue analysis, possibilities for detecting antibiotics and other pharmaceutical agents and mycotoxin analysis. Exhibitors such as Analytik Jena, Carl Zeiss, Hirschmann Knauer and Thermo Fisher Scientific

present their products and solutions within the framework of the Food Analysis Live Lab.

The lectures take place from Tuesday to Thursday at 11:00 a.m., 1:00 p.m. and 3:00 p.m. each day as well as on Friday at 11:00 a.m. and 1:00 p.m.

Personalized medicine - Where is the journey taking us?

At the Personalized Medicine Theme Day on April 13, experts from biotech, pharma and IT diagnostics companies, associations and clusters will discuss the current status and the future direction of personalized medicine. The events will be kicked off by Dr. Friedrich von Bohlen und Halbach, Managing Director and co-founder of dievini Hopp BioTech holding GmbH & Co KG who will start the Personalized Medicine theme day with a glimpse into the future. This will be followed by an extensive lecture program which will address, for example, the benefits provided by approaches such as precision medicine and also what economic effects this will have on the healthcare system. A panel of the lecture program additionally addresses the megatrend of digitalization and the associated question of how useful smart data can be obtained from big data ("One in a million - your data will be king" | 12:45 to 2:00 p.m.).

No experiments when it comes to occupational safety and health

How can accidents in the laboratory be avoided? This question is posed by the special exhibition on occupational safety and health at analytica. The practice-oriented experimental lectures clearly show how important occupational safety is in the laboratory.

The special exhibition was held at analytica 2016 for the first time with its own space in Hall B2. More than 1800 visitors learned how quickly a hazard or accident can occur in the laboratory and how one can protect oneself and also colleagues and employees. The experimental lectures at the special exhibition area in hall B2 each last about 30 minutes and are held every day at 11:00 a.m. and 3:00 p.m. in German and at 2:00 p.m. in English.

In addition, analytica, in cooperation with Klinkner & Partner, offers the proven continuing education and training sessions, the analytica Job Day with a comprehensive overview of courses of studies and careers in the natural sciences, as well as the Finance Day with information about financing options for start-ups.

10th - 13th April 2018: analytica, Munich (D)

Vario TIP FSS – The necessity of cavity sorting

From 24 to 27 April 2018 Waldorf Technik introduces itself at the Chinaplas 2018 in Shanghai, China and is focusing on the topic “pipette tips cavity-sorted in racks”. For this purpose, the patented automation system Vario TIP FSS will be presented at the booth of Engel Austria in Hall 5.1H / Booth E71. Producing with 32 cavities. With its slimline design, the system opens up the market to the MedTec injection moulders in new performance classes and keeps the space requirement in the clean room low.

For the first time, a highly integrated production cell for manufacturing pipette tips under cleanroom conditions is presented. This exhibit is the result of cooperation between Europe and China. Engel (Schwertberg, Österreich), Waldorf Technik (Engen, Germany) and Wellmei Mold (Dongguan, China) have combined their know-how and experience with medical precision parts and tailored the system solution exactly to the specific requirements of the Chinese processors.

The automation solution developed by Waldorf Technik removes 32 pipette tips from the mould in sync with the injection moulding process and loads groups of 96 pipette tips, sorted by cavity, into racks. Every 18 seconds, 96 pipette tips are discharged from the production cell, which is enclosed to create a cleanroom environment.

The Vario TIP from Waldorf Technik is the patented and worldwide leading system concept, for example in the production of pipette tips, cuvettes or reagent wells. These products are laboratory consumables that must fulfil high quality requirements and they demand cavity sorting in the packaging unit to guarantee delivery reliability in every case.

Massive reduction of rejects by replacing individual missing parts:

In the patented Vario TIP system, individual parts are checked prior to packaging and individual missing parts are replaced by good parts. This way error-related rejects with sporadic errors can be reduced by about 90 % on average compared to conventional devices.

Testing Technology:

The concentricity of pipette tips at the thin end, this means the even wall thickness distribution, as well as the horizontal injection rate (flash) are two of the critical quality features that are difficult to detect with normal camera testing. Waldorf Technik has developed its own procedure for this test: Faulty parts are also rejected immediately after detection.

Run-Out-Forecast:

Waldorf Technik goes a step further with its new technology to predict the development of the concentricity of the pipette tips per cavity.

In a statistical procedure, a prognosis curve is determined, which enables the manufacturer to procure the spare parts for the affected cavity in the mould weeks before the critical concentricity tolerance is exceeded, in order to replace these in good time without any additional downtime as part of tool maintenance.

This avoids today's practice of discarding the defective cavity at the time of the failure (scrap), locking (validation problem) or stopping the system until the problem is solved (loss of production).

Waldorf Technik once again sets new standards in the field of automation for laboratory consumables.



24th - 27th April 2018: Chinaplas,
Shanghai (China)

Chillventa AWARD goes into its second round

Following the successful premiere of the Chillventa AWARD in 2016, NürnbergMesse and publishing house Bauverlag have every reason to host the high-calibre competition again and present the award at an official ceremony at Chillventa in October. The award recognises unique projects by teams of experts in the four categories commercial refrigeration, industrial refrigeration, air conditioning and heat pumps. The sending out of the application documents now marks the official start of the Chillventa AWARD 2018.

Chillventa is more than “just” an internationally established and renowned trade fair. It’s where projects are initiated, trends are set and innovative products are introduced to the market. Without doubt Chillventa is currently the largest and most important international trade fair for refrigeration technology and the segments air conditioning, ventilation and heat pumps. For 2018 too, all signs are pointing to success, with the organisers once again expecting to see an increase in both display area and exhibitor numbers, as industry insiders and experts from all over the world gather in Nürnberg. “Chillventa Connecting Experts” really means what it says.

“There are very few sectors that are as innovative and inventive as the refrigeration, air conditioning, ventilation and heat pump community. The presentation of the Chillventa AWARD in 2016 was further proof of this. The success of the award premiere and the excellent feedback from the industry were reasons enough for us to decide to host the competition again in 2018. We are looking forward to the submissions from which we will choose the best, most exciting and most innovative projects in four categories to receive the Chillventa AWARD. Chillventa is an ideal platform for an award of this quality,” say Chillventa AWARD initiators Christoph Brauneis, editor-in-chief of trade journals KKA and tab, and mem-

ber of the jury, and Daniela Heinkel, Exhibition Director Chillventa at NürnbergMesse.

Chillventa AWARD acknowledges the achievements of teams of experts

The Chillventa AWARD is presented by NürnbergMesse in collaboration with Bauverlag, the publisher of trade journals on refrigeration and A/C (KKA Kälte Klima Aktuell) and building services (tab – Das Fachmedium der TGA-Branche). The Chillventa AWARD recognises the achievements of expert teams (designers/planners, system engineers, clients/operators) that have realized a highly impressive project in respect of functionality, energy consumption and technical innovations as a result of their exemplary collaboration that exceed technical standards. In its evaluation the jury – in keeping with the Chillventa motto “Connecting Experts” – will consider in particular how project stakeholders work together from conceptual formulation, planning and system engineering to operation of the system. In any project submitted for an award the quality achieved through partnership-driven design must be transparent and documented.

Alongside these criteria, the Chillventa AWARD also takes account of the above mentioned aspects functionality, energy consumption and technical innovation. The jury’s evaluation also considers factors like adherence to budget and schedule, environmental aspects and certifications etc. Any form of refrigeration, A/C or heat pump system (new or rebuild) realised in Europe is eligible for a Chillventa AWARD. Any project for which the entrants are directly responsible and which has been completed by the submission date for the AWARD may be considered. The completion of the project must not be more than two years before the closing date.

Who can apply for the Chillventa AWARD?

Clients/operators, designers/planners and system engineers, as individuals or in consortia, with an office located in a European country, are eligible to participate, whereby any partners involved must be explicitly named. Manufacturers of components and systems from industrial or commercial enterprises are not eligible. However, eligible entrants may receive support with their submission from industrial and commercial enterprises.

The Chillventa AWARD Jury – a high-calibre panel of experts

- Christoph Brauneis, senior editor, KKA and tab magazines
- Professor Michael Deichsel, Georg Simon Ohm Technical University



Chillventa AWARD goes into its second round

- Rolf Harig, Harig GmbH
- Dr Rainer Jakobs, IZW Information Centre for Heat Pumps and Refrigeration
- Professor Dr.-Ing. Ulrich Pfeiffenberger, University of Applied Sciences Mittelhessen, FGK Association for Air Conditioning and Ventilation in Buildings
- Bertold Brackemeier, Senior Manager Public Relations, Nürnberg-Messe

Second round of award ceremony at Chillventa 2018

The Chillventa AWARD will be presented in the four categories commercial refrigeration, industrial refrigeration, air conditioning and heat pumps. The winners in each category will be honoured during Chillventa on 16 October 2018.

Review and outlook: Chillventa success story continues

The KPIs from Chillventa 2016 were impressive. Chillventa achieved its best results ever with a total of 32,206 trade visitors from 118 countries. This represented an increase of 5.3% over the previous event. Another pleasing statistic was the total of 981 ex-

hibitors. Even now, a good six months before the start of the trade fair, the indications for Chillventa 2018 are excellent. "Already, everything is suggesting that Chillventa 2018 will see renewed growth. We are very confident of at least repeating, if not surpassing, our already excellent results for display area and exhibitors," explains Daniela Heinkel, Exhibition Director Chillventa at NürnbergMesse. For more information go to: www.chillventa.de

International refrigeration and A/C network

With the leading Chillventa trade fair and European Heat Pump Summit in Nuremberg, ACREX India and the European Pavilion powered by Chillventa at the China Refrigeration show, NürnbergMesse has in recent years established an impressive worldwide refrigeration, AC, ventilation and heat pump network. The focus of this network is also on "Chillventa Connecting Experts".

16th - 18th October 2018: CHILLVENTA 2018, Nuremberg (D)

NürnbergMesse GmbH
D 90471 Nürnberg

New approaches to microplastics analysis at the analytica conference 2018

Current issues and approaches to solving problems in analytics will be the focus of the analytica conference in Munich from April 10 to 12, 2018. In 45 sessions, experts report on application-related findings from their research – such as new, more reliable approaches to the analysis of microplastics in water. The scientific program of the analytica conference is organized by Forum Analytik, consisting of the Association of German Chemists (Gesellschaft Deutscher Chemiker, GDCh), the Society for Biochemistry and Molecular Biology (Gesellschaft für Biochemie und Molekularbiologie, GBM) and the German Society for Clinical Chemistry and Laboratory Medicine (Deutsche Gesellschaft für Klinische Chemie und Laboratoriumsmedizin, DGKL). The analytica conference takes place in the context of the analytica, the leading international trade fair for analytics, laboratory technology and biotechnology, on the grounds of Messe München.

Modern analytical methods reveal problems that our industrialized world brings about: Plastics, made up of polymers, are becoming ever more popular. Due to low production costs, there are increasing numbers of disposable items made of plastics, which then – if the recycling systems or the waste disposal fail – enter the environment. There, the polymer particles are subject to physical and chemical weathering. Smaller and smaller particles are formed, which are finally only a few micrometers in size. Many such particles, known as microplastics, end up in aquatic systems and eventually in the oceans.

The analysis of microplastics poses some challenges. After sampling, the microplastics particles must first be separated from the much more abundant natural particles. The remaining particles must be correctly analyzed for polymer type, number of particles, size and even shape. Initial approaches that evaluated the particles produced highly distorted results. Therefore, three alternative approaches have been developed further to better meet the requirements of microplastics analysis in water: FTIR, Raman and py-

rolysis–GC-MS methods. All three approaches will be presented by experts during the session, and their advantages and weaknesses will be discussed.

The analytica conference accompanies the 26th analytica, the leading international trade fair for laboratory technology, analytics and biotechnology, from April 10 to 13, 2018, in Munich. The conference will take place at the ICM – International Congress Center Munich, on the fairgrounds of Messe München. Other sessions will focus, among other things, on the use of analytical methods in food chemistry and toxicology, as well as on the handling of big data. Admission is free for visitors of analytica. The joint booth of Forum Analytik will be located in Hall B2, 504.

10th - 13th April 2018: analytica 2018, München (D)

Messe München GmbH
D 81823 München

Intelligent Solutions for more Quality and Process Consistency

ENGEL at Plast 2018 in Milan

Consistent quality, permanent availability, maximum output – it takes more than reliable machines to securely achieve these criteria of success. The perfect interplay between injection moulding machine and process technology, automation and periphery, digitalisation and networking is what allows plastics processors to fully utilise efficiency and quality potentials and continuously increase their competitive edge. At the Plast 2018 in Milan, Italy, from May 29 to June 1, the injection moulding machine manufacturer and systems solution provider ENGEL will present challenging injection moulding applications and multiple Expert Corners to demonstrate how this looks in practice.

29th May - 01st June 2018: PLAST 2018, Mailand (I)

Automotive: In-mould coating for high-gloss and scratch-proof exterior parts

At the Plast 2018, ENGEL will bring the evolved clearmelt in-mould coating technology to Italy for the first time. When it comes to the integrated process for the extremely efficient production of high-quality surfaces, automobile manufacturers have so far focused mainly on vehicle interior applications. However, at its booth in Milan ENGEL will be producing D-pillars for a SUV model. The high-gloss exterior claddings will be produced painted alternately in black and metallic silver on an ENGEL duo 2460/500 injection moulding machine. In addition to the extremely high quality appearance of the components, extremely scratchproof surfaces are another advantage that clearmelt technology provides for the exterior area. Testing in a car wash has shown the sample parts to be very robust.

In the clearmelt process, at first a thermoplastic base carrier is produced in the injection moulding machine, then coated in poly-

urethane in the second cavity of the same mould. The process can be easily combined with IML, allowing for the use of decorative and capacitive foils as well as wood veneers. In a single step, clearmelt technology thus provides pre-finished vehicle components that do not need to be varnished or post-processed in any way. The polyurethane topcoat provides the high degree of gloss and the scratch resistance. clearmelt is currently the only process on the market that delivers various surface structures, scratchproof and ready for installation. Embossed structures – leather grain, for example – are also precision moulded.

In the clearmelt process, it was initially only possible to process colourless polyurethane in this high degree of efficiency, but now ENGEL's partner Hennecke (St. Augustin, Germany) has split the isocyanate and colour processing across two systems, allowing for the processing of various colours in quick succession. With the new Colourline and Multi-Connect Systems by Hennecke, the colour change only takes 15 minutes. The complete PUR process is controlled through the CC300 operating panel of the ENGEL injection moulding machine.

The highly integrated and completely automated process is the result of close cooperation between a total of four companies. Besides ENGEL and Hennecke, Schöfer (Schwertberg, Austria) and Votteler (Korntal-Münchingen, Germany) are involved.

Packaging: Highest performance meets maximum energy efficiency

The packaging exhibit is all about high performance in conjunction with very short cycle times. 500 ml food containers will be produced on an all-electric ENGEL e-motion 440/160 injection moulding machine featuring a 2-cavity mould by Glaroform (Näfels, Switzerland). Thanks to in-mould labelling (IML), the production cell will be outputting ready-to-fill packaging. For the IML automation, ENGEL is collaborating with two Italian partners: Campetella (Montecassiano) and Viappiani (Segrate).

The ongoing development of the e-motion has firmly established the machine series in the area of high-performance applications in the packaging industry. The current machine generation is able to achieve cycle times of well under three seconds and injection speeds of more than 500 mm per second, thereby combining maximum performance with maximum energy efficiency. The closed system for toggle levers and spindles guarantees optimal, clean lubrication of all moving machine components at all times



At the Plast, the highly integrated manufacturing solution for the production of needle holders will be presented in a clean-room version. The 16-cavity mould is running on an e-victory 170/80, with a viper 12 linear robot handling parts. (Images: ENGEL)

Intelligent Solutions for more Quality and Process Consistency

and complies with the strict cleanliness requirements of the food industry.

Medical: Maximum integration with a minimal footprint

Highly integrated, compact production cells minimise the system footprint and increase surface productivity. These features really pay off in the clean room. For this reason, ENGEL redeveloped its stainless steel pipe distributor for the cavity specific handling of small injection moulding parts so that the handling system now fits completely into the expanded safety gate of the injection moulding machine. At the Plast, ENGEL will present the new, extremely compact solution with the production of needle holders for 1ml safety syringes on an ENGEL e-victory 170/80 injection moulding machine. An ENGEL viper 12 linear robot will remove the delicate polystyrene parts from the 16-cavity mould – made by Fostag (Stein am Rhein, Switzerland) – and transfer them to the distribution system. In order to ensure batch traceability down to the level of individual cavities, the injection moulded parts will be packed in cavity-specific bags. For this purpose, 16 bags are hung in a cart located directly beneath the pipe distributor. Individual shots can be extracted for quality control purposes.

For unmanned clean-room operation – during the night-shift, for example – two carts can be alternated in sequence, with a buffering system enabling the fully automated switch. The entire periphery for this is integrated into the CC300 control unit of the injection moulding machine. Thanks to shared data storage, the CC300 can precisely coordinate the movements of the machine and the robot with each other, thus optimising overall efficiency. In addition to this, there are also especially short robot paths due to the tie-bar-less clamping unit of the e-victory machine. In this application, both of these factors contribute to the short cycle times of six seconds.

With a shot weight of only 0.08 g and varying wall thicknesses, the delicate needle holders require extremely precise process control. Since fluctuations in the melt volume can immediately result in rejects, iQ weight control from the inject 4.0 programme of ENGEL will be used. The software analyses the pressure curve during the

injection process in real-time and compares the measured values with a reference cycle. Based on these results, the switchover point and the injection profile are adapted to the current conditions, thus maintaining a consistent injected volume during the entire production run. This way, fluctuations in the environmental conditions and in the raw material compensated for within the same shot, before resulting in rejects.

Technical Moulding: LSR and PBT precisely combined in a tie-bar-less machine

Multi-component processes with liquid silicone (LSR) and thermoplastic resins are continuing to gain ground. In many applications, only the integrated ENGEL combimelt process makes it possible to bond thermoplastics and silicone together in stable layers. One example of this are coupling cushions that serve as windshield fasteners for rain sensors. During the trade fair, the two-component parts will be produced using PBT and LSR on an ENGEL victory 200H/200L/160 combi injection moulding machine with an integrated ENGEL viper 40 linear robot. The 4+4 cavity mould for these applications is made by Rico (Thalheim, Austria).

Manufacturing two-component parts optimally leverages the efficiency potential of the victory machine's tie-bar-less clamping unit, which allows large, bulky moulds to be mounted on relatively small machines. For many applications, that makes it possible to invest in smaller injection moulding machines than the mould dimensions would traditionally require. Automation is a second efficiency factor. The ENGEL linear robot can reach the cavities directly from the side and operate safely without having to circumvent any protruding edges. Thirdly, the extremely high process consistency constructively ensured by the tie-bar-less clamping unit factors significantly into the high degree of overall efficiency. The patented force divider enables the moving mould mounting platen to follow the mould exactly while clamping force is building up and ensures that the clamping force is evenly distributed across the platen face. Both the outer and inner cavities are therefore kept closed with exactly the same force, reducing mould wear and raising product quality. The burr-free, zero-waste, rework-free, and fully automatic processing of LSR is the key element in the economic manufacturing of high-tech products from liquid silicone.

inject 4.0: Self-optimising injection moulding machine

When it comes to pushing the envelope of what is technically possible, digitalisation and networking are leading injection moulding processing into the future – this once again becomes apparent at the exhibition booth of ENGEL at the Plast 2018. In its machine exhibits and in multiple Expert Corners, ENGEL will present repeatedly proven as well as new products from its inject 4.0 programme. The modularity of the inject 4.0 approach makes it especially easy for plastics processors to take advantage of the opportunities offered by Industry 4.0. With the production of inject 4.0 logos on an ENGEL emotion 80 TL injection moulding machine, ENGEL will demonstrate how individual solutions can already provide a great deal of benefit. The CC300 machine control is capable of simulating process fluctuations; the automatic readjustments by the intelligent assistance systems can then be tracked on the display of the machine. While iQ weight control maintains consistent injected melt volume throughout the entire injection moulding process, iQ

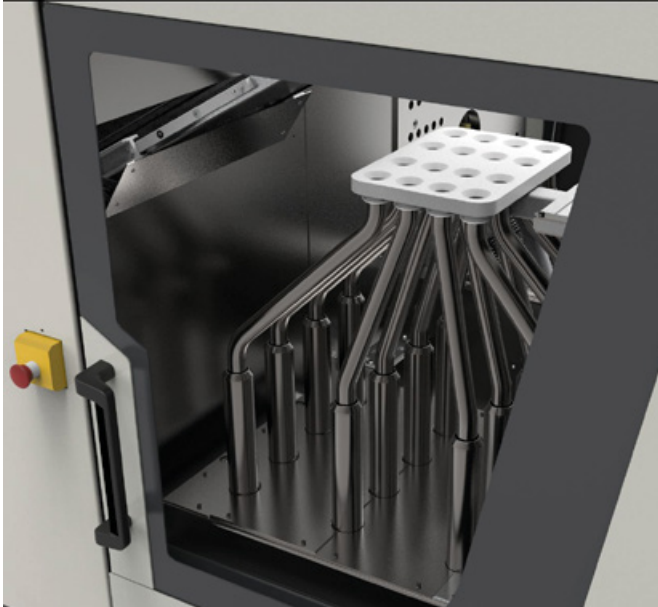


At the Plast, the highly integrated manufacturing solution for the production of needle holders will be presented in a clean-room version. The 16-cavity mould is running on an e-victory 170/80, with a viper 12 linear robot handling parts. (Images: ENGEL)

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clamp control monitors the mould breathing in order to calculate and automatically adjust the optimal clamping force.

iQ flow control, the third assistance system, connects the injection moulding machine, which is equipped with the e-flomo electronic temperature control water distributor, to the temperature con-



Compact integration: The pipe distributor fits in the machine's safety guard.
(Image: ENGEL)

trol unit, enabling the speed of the pumps to automatically adjust to the actual requirements. This results in higher energy efficiency. Together with its partner HB-Therm, ENGEL has developed its own line of temperature control units called e-temp.

Among other things, the Expert Corners at the booth will further focus on MES authentig and the new customer portal e-connect, which ENGEL is presenting at the Plast for the first time in Italy. The goal of development was to provide even more specific information to the customers, to get in touch with them even faster, and to provide them with even more support in meeting the challenges of Industry 4.0. All machines and systems solution supplied by ENGEL from the first order onwards are stored in the system and their current status can be viewed. For a maximum overview, the operator can simulate the individual structure of his machine park in the system and also assign the production facilities to different halls or departments online. Support and service requests can be submitted online, which is not only more comfortable for the user, but also speeds up order processing. As soon as the customer has submitted the request, it is automatically forwarded to the service team, which can start working on it without delay.

The new customer portal supports the online support and remote maintenance as well as all the other service products from the inject 4.0 programme of ENGEL, such as e connect.monitor for condition-based, predictive maintenance.

ENGEL AUSTRIA GmbH
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Extremely positive feedback from the Russian market

upakovka and interplastica attracted 24,900 trade visitors

29.01. - 01.02.2019: upakovka, Moskau (R)

The positive feedback received lately from the Russian market and, in particular, from the packaging industry and the related processing industries as well as plastics and rubber has now been confirmed very emphatically at the two trade fairs upakovka - Processing and Packaging and interplastica (the 21st International Plastics and Rubber Trade Fair). The upswing in major market segments is leading to strong demand for packaging as well as plastic and rubber. The manufacturers of these products are investing as much as they can in modern production technologies and materials, in order to be able to satisfy the increasingly exacting requirements made by their customers. More than 900 companies from 30 countries presented their innovations at the two trade fairs in the AO Expo-center in Krasnaja Presnja from 23. to 26. January and were unanimous in reporting a tremendous response and impressive business success. 24,900 experts, mainly from all over Russia and from the neighbouring countries, visited upakovka and interplastica. 23,000 visitors were registered in 2017.

Werner M. Dornscheidt, CEO of Messe Düsseldorf GmbH, was satisfied with the trade fairs: "To the extent that the Russian economy is developing positively and reliably, Russian companies are taking advantage of the two leading industry showcases. This is where they can get to know the new developments on the world market and enter into intensive negotiations with the suppliers directly. The exhibitors that maintained a consistent presence in Russia under poorer market conditions as well are now benefitting to a particularly large extent from their good contacts in the industry. In addition to the conclusion of many sales contracts, the high quality of the demand was a very important sign that an economically attractive future is beginning."

The trade visitors were in turn very impressed by the wide range of innovative products and services on show that gave them a valuable insight into trends and future market opportunities. The improvement in the rouble exchange rate is now helping to enable Russian companies that had to defer necessary purchases in the recent crisis years to invest in the modernisation of their production.

Extremely positive feedback from the Russian market

Import Subsidies Continued

Russia is one of the biggest sales markets for food worldwide. After restrained consumption during the years of recession, consumers are now increasingly taking to high-quality and pre-packaged foods as well as convenience products again. Furthermore, soft drink sales are up.

In Russia the policy of subsidizing imports in the food sector continues unabated. Russia's agricultural production is also rising rapidly. So as to process these products further Russian and international enterprises are stepping up their investment in the installation and expansion of their local production capacities. The increased food output will not only be sold in the domestic market but is also meant to be exported in increasing amounts. This boosts the demand for food processing and packaging machinery as well as for beverage production and filling.

Germany continues to be Russia's most important supplier of food machinery and packaging machinery with a market share of just under 30%. In some segments of the market this percentage is even substantially higher. Over the first 11 months of 2017, German exports to Russia rose even further reaching a value of EUR 341 million, 13% more than in the previous year. German exhibitors at upakovka - Processing and Packaging 2018 therefore expect good post-fair business and demand to continue rising over the coming months.

The situation for Italian companies is similar - they were represented in higher numbers at their national pavilion this year than last. The Italian machinery manufacturers' association UCIMA has supported upakovka officially since this year's edition.

Successful Special Themes

After the premiere last year, upakovka 2018 also had an extensive innovationparc conference agenda in store for visitors for the complete duration of the trade fair. The first day of the trade fair featured not only lectures on brands, packaging and the latest trends in the beverage industry but also a slot on SAVE FOOD, dealing with the reduction of food losses and waste by means of packaging (technology). The session was hosted by Eugenia Serova, Director of the Russian FAO Office. Over the course of the trade fair, the theme of Industry 4.0 was also addressed. Here, VDMA, the German Mechanical Engineering Industry Association, presented the challenges and know-how surrounding the trend theme that lured to so many trade fair visitors to the innovationparc. The various lectures on flexible packaging also met with great interest.

"The positive response to the innovationparc and SAVE FOOD shows that we had our finger on the pulse when adapting the special themes for upakovka as part of the interpack alliance. Russian user industries are showing great interest in current trend themes and are extremely attractive for suppliers due to their high market potential especially in the food sector," says Bernd Jablonowski, Global Portfolio Director Processing & Packaging at Messe Düsseldorf.

The next upakovka in Moscow will run from 29 January to 1 February 2019 - again running concurrently with interplastica.

Exhibitors Testimonials upakovka 2018

Danaflex

„At upakovka 2018 for the first time ever Danaflex presented digital printing for flexible packaging. The trade fair has been very successful and productive. Talks have been held with our long-standing partners and customers. The stand has been attended by a large number of new prospective clients, particularly those who are just starting up their businesses and need small runs of flexible packaging. (...) upakovka is a perfect solution for the companies looking for a comprehensive solution for their business - from the equipment to the packaging supplier. (...) Danaflex will take an active part in upakovka in future and would like to wish great success to the organisers.”

NISSA, Mikhail KUVSHINOV, Development Director NISSA Centre

(...) "In cooperation with the trade fair organisers we have managed to bring our message home literally to each visitor in the form of a digitally packaged biscuit, which has become a part of the trade fair material package. I would like to thank the organisers for the professional preparation and holding of the trade fair and what is more the conference is worth mentioning as a separate positive point. The trade fair venue and time also seem very fortunate." (...)

Aleksey Kirichenko, Sales Manager, KRONES:

upakovka is the only trade fair in Russia we take part in. Any trade fair for us is an opportunity to meet our clients. This saves a lot of time, more so in view of the size of Russia. This year the trade fair is good, a lot more fast-paced than last year. One can sense that there is a rebound and more concrete interest in the equipment, more specifically, interest has been shown in innovation products. As part of innovationparc we have made a presentation and the fact that our report has been referred to and further questions have been asked indicates that the information goes in the right direction. There is feedback, so our participation has been worthwhile.

Sergey Berendeev, Sales Manager, ROBOPAC:

"The trade fair results are very good, we have noted a large flow of clients, have gathered a lot of information. The market is growing now, and we see great interest in the packaging equipment among clients."

Alexander Puzikov, President of Packmash Association, Commercial Director of Bestrom

"We have not missed a single trade show and are not going to do this. Whatever the case the trade fair is communication with other companies. Far from all can be found on the Internet. It is unlikely that anything may substitute the trade fair, at the end of the day people want to see everything live. That is why it is very important that they can do it in one place. (...) There are competent people, company heads who make direct decisions. On the third day of the trade fair there are still as many people as before, therefore I hope the trade fair will be rewarding."

Gerresheimer to unveil innovative vials made from glass and plastic at the PDA in Orlando

Gerresheimer's booth at the PDA Annual Meeting – to be held at the Loews Sapphire Falls Resort in Orlando from March 19 to 21 – is to focus on innovative glass and plastic vials for parenteral drugs that place high demands on the barrier properties and, by extension, the safety of their primary packaging.

Gerresheimer has invested many years in developing and producing its plastic MultiShell vials and glass Gx Elite vials in order to offer its customers primary packaging solutions that are ideal for sensitive active substances.

“It is absolutely crucial for drugs to be packaged properly in order to ensure drug stability,” says Edward Troy, Vice President Sales & Marketing and product expert for glass. “The question of whether to use glass or plastic vials depends on the application. We aim to work with our customers to find the best possible solution for their parenteral drugs.”

Gx Elite glass vials – glass of the very highest quality

Gx Elite vials' quality and performance is a result of proprietary techniques employed in the manufacturing process. As a result of these proprietary techniques, the Gx Elite vials have a significant improvement in glass strength and reduced cosmetic defects. A vial which resists delamination protecting the valuable drug product.

MultiShell – plastic of the very highest quality

“The kind of powerful active ingredients that are being developed nowadays need shatter-resistant packaging and improved barrier protection,” says Franck Langet, explaining the properties of the Gx MultiShell vial. With its innovative multilayer structure made from COP and PA, this transparent vial is a unique packaging solution that meets all these requirements. Gerresheimer offers vials holding 2, 5, 10, 15, 50, and 100 ml, which are also available as

ready-to-use versions including validated gamma sterilization. Gerresheimer supplies both COP multilayer and monolayer containers.

Ultra-modern production processes – worldwide standards

Gerresheimer operates with the world's latest technologies and monitoring processes from the development stage right through to production and packing for delivery. Gerresheimer uses cutting-edge clean room technology to guarantee optimum cleanliness for its products in terms of particles and germs. With bases in Europe, Asia, and the Americas, Gerresheimer specializes in manufacturing primary packaging for pharmaceuticals in line with the relevant pharmacopeias. All its factories are currently certified to standards including ISO 9001.

Gx and MultiShell are registered trademarks of the Gerresheimer Group.

Gerresheimer AG
D 40468 Düsseldorf



Gx Elite vials' quality and performance is a result of proprietary techniques employed by the manufacturing process.



The transparent, shatter-resistant MultiShell vial has an innovative multilayer structure made from COP and PA.

Humidity Transmitters with Ethernet Interface



The EE310 and EE360 industrial transmitters can now be integrated into a network via Ethernet interface.

Beside the RS485 interface with Modbus RTU protocol, the EE310 humidity and temperature transmitter and the EE360 moisture in oil transmitter from E+E Elektronik now feature an Ethernet interface with Modbus TCP protocol.

The EE310 and EE360 represent the latest generation of industrial transmitters from the Austrian sensor specialist E+E Elektronik. A multi-functional 3.5" TFT colour display provides a comprehensive overview of the measurement task and allows the user to perform all settings directly on the device. An integrated data logger stores up to 20,000 values per measurand.

Ethernet and RS485 Interfaces

As a standard, the measured data is available on two voltage or current outputs. The devices can be optionally fitted with an RS485 module with Modbus RTU protocol or with an Ethernet module with Modbus TCP protocol. The interface settings can be performed with a PC using the free configuration software or directly on the device via display and push buttons. The Ethernet module features Power over Ethernet (PoE) and an IP65 rated RJ45 connector. Both interface modules are available also for retrofitting.

EE310 Humidity and Temperature Transmitter

The EE310 measures relative humidity and temperature and calculates dew point temperature, frost point temperature, wet-bulb temperature, water vapour partial pressure, mixing ratio, absolute humidity and specific enthalpy. The transmitter is available for wall or duct mount, as well as with remote probes. The probes can be employed up to 180 °C (356 °F) and 20 bar (290 psi). Pluggable probe versions allow for quick and easy replacement.



Image 1: EE310 humidity and temperature transmitter (wall mount)
(Photo: E+E Elektronik GmbH)

EE360 Moisture in Oil Transmitter

The EE360 is dedicated for monitoring the moisture content in hydraulic, lubrication and insulation oils as well as diesel fuel. The device measures water activity (aw) and temperature (T), and calculates the absolute water content (x) in ppm. The stainless steel probe can be installed into the process with an ISO or NPT slide fitting, which facilitates the accurate control of the immersion depth. Using the optional ball valve, the probe can be mounted or removed even without process interruption.

Service-Friendly Design

The modular IP65 enclosure facilitates installation and maintenance. The active part of the device, which accommodates the electronics and the probe, can be replaced within seconds while the back cover and the electrical connection remain untouched.



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Image 2: EE360 moisture in oil transmitter with ball valve mounting set
(Photo: E+E Elektronik GmbH)



Gerresheimer is now also expanding the development center in Wackersdorf to include glass products

Gerresheimer Medical Systems is expanding its Technical Competence Center (TCC) at the Wackersdorf location. The company is investing tens of millions in creating 3,000 square meters of additional space for the development and industrialization of glass products, such as syringes and carpules. The task area of the Technical Competence Center is thus being expanded beyond the previous area of focus of plastics to include the additional material of "glass." Construction began recently, and the project should be completed by the end of the year.

Gerresheimer AG offers pharmaceutical and medical technology products of plastics and glass in its Medical Systems business unit. The strategy of the company to merge its competence for both materials under one roof is now also being expanded to the development and industrialization areas. The Technical Competence Center (TCC) in Wackersdorf was previously responsible for the development and industrialization of products made of plastics. Innovative glass products, such as pre-fillable syringes and cartridges will also be prepared for series production here in future. The establishing of glass competence in the TCC will expand the technology portfolio at the Wackersdorf location. The Technical Competence Center bundles all areas required for the technical and process organization realization of products. Twenty-five new jobs will be created by 2020 for this purpose.

One focus of the expansion is the establishing of small batch production for pre-fillable glass syringes and cartridges. Here it is possible to produce pre-series modules from glass forming to ready-to-ship, washed, and siliconized ready-to-fill systems. The focus is on syringes and cartridges for especially sophisticated, biotech-

nologically manufactured medication, clinical samples for approval, or prototypes for process and technology development. At the same time, glass competence is also being established in the Automation Systems area (special machine engineering) in order to develop innovative technologies for glass forming and automation. New generations of glass forming lines for syringe production will in future originate in a cooperation between the Bünde and Wackersdorf locations. "In addition to the expansion of the technology portfolio, the expansion of small batch production and automation systems in Wackersdorf, we should also focus on large batch production at our location in Bünde, which previously had to be interrupted at considerable expense and effort for development projects and start-ups for new products," comments Manfred Baumann (Global Executive Vice President Sales & Marketing, Administration & TCC, Management Board, Gerresheimer Regensburg GmbH) on the expansion.

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