

# GEMÜ

MAGAZINE FOR THE  
CUSTOMERS, PARTNERS  
AND FRIENDS OF THE  
GEMÜ GROUP

## news

### 02.23

#### Dear Readers,

We are happy to report that 2023 has been a successful year for GEMÜ. A heartfelt thank you goes to our valued customers and dedicated employees who have significantly contributed to this success. We made it through difficult times together with our customers. We value the trust you have shown us, especially in geopolitically challenging times.

It is important to us at GEMÜ to be a reliable, first-class partner offering credibility, quality and outstanding products. Our team successfully overcame any and all production challenges in 2023 and we would like to thank each and everyone for their commitment and hard work. It is apparent that our success is only made possible by a strong team.

In 2024, we will continue to focus on delivering the highest possible quality and first-class customer service. Quality always prevails and we are convinced that we can only inspire our customers if we also work at the highest level ourselves.

We are looking forward to celebrating our 60th anniversary in 2024. Since being founded in 1964, GEMÜ has undergone continuous further development and achieved impressive growth. Our journey has been characterized by consistent progress and further development, which helped us to establish ourselves as a globally leading company. Our ability to adapt to changes while still pursuing a logical innovation strategy enabled us to meet the changing requirements and expectations of our customers. Our history has been characterized by our passion for innovation and the pursuit of excellence. We are determined to continue on this path and also set new standards in future.

Our anniversary will go hand in hand with exciting surprises and innovations for our customers in the form of new products launched on the market. We look forward to presenting these new products at the AICHEM trade fair in Frankfurt in June.

We will do everything in our power to continue our pursuit of excellence and look forward to welcoming you in our new headquarters in 2024. We



are full of anticipation for this move, as the new headquarters will mark a new era for the GEMÜ Group. While there are sometimes clouds on the horizon, we can remain on a stable growth trajectory and look to the future with confidence thanks to the commitment of the entire GEMÜ team and the loyalty of our customers.

Thank you for your continued loyalty. We look forward to sharing exciting

new project with you. GEMÜ will remain focused on offering innovations, high quality and outstanding service.

  
**Gert Müller**  
Managing Partner  
of the GEMÜ Group

  
**Stephan Müller**  
Managing Director  
of the GEMÜ Group

## CLEAR. LINEAR. MEMORABLE. THE NEW GEMÜ LOGO

**After almost 60 years, GEMÜ is receiving a new logo. Reliability, resistance and innovation – these are some of the attributes that customers and employees associate with GEMÜ.**

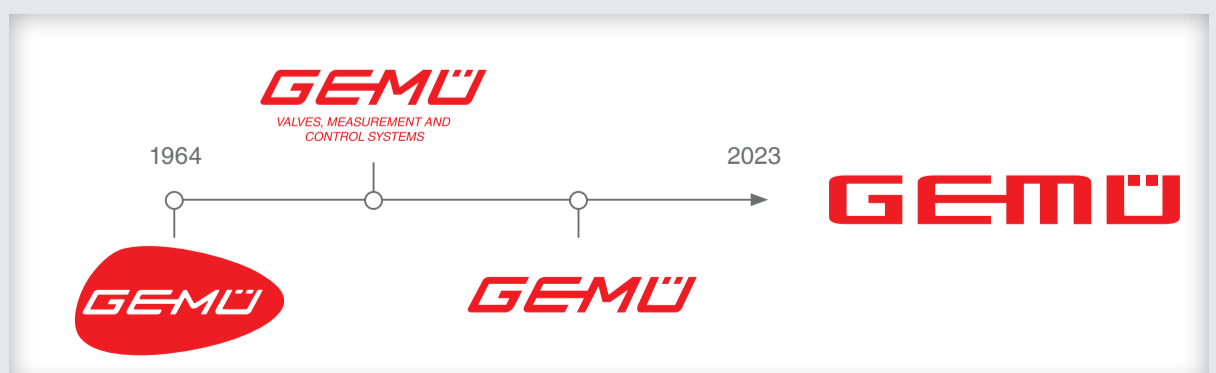
Continuity at GEMÜ means that the company and its employees further develop themselves every day. In the last 10 years alone, GEMÜ has developed substantially and continuously expanded its range of solutions. This enables the company to offer its customers comprehensive solutions and high-quality products and ensures that it is well-positioned for the future. The new building of the GEMÜ headquarters in the Hohenlohe business park also shows us the way forwards and symbolizes what GEMÜ stands for: Linear, solid and modern design, passion and reliability.


Just as the company has developed, the GEMÜ logo has now also undergone an evolutionary development. The lettering of the GEMÜ logo has hardly changed over the last few years. It was initially surrounded by an oval surface that employees affectionately dubbed the "GEMÜ egg".

Over the course of time, the GEMÜ logo was developed further, and red, free-standing lettering has been used in recent years.

At first glance, the changes seem marginal, as the red colour has been left unchanged. But if you look more closely, you can see that GEMÜ has changed each individual letter. The letters are now standing up straight. They symbolize stability and resistance, but, at the same time, they also symbolize dynamics and movement.

The GEMÜ logo gives customers and employees a sense of cohesion and reliability. It is a promise of quality. It is clear-cut, linear and memorable.



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# INNOVATION: SMART SERVICES SUSTAINABILITY IN THE DIGITAL AGE



In the fast-paced and interconnected world of today, intelligent service technologies are at the forefront of innovation and problem-solving. These intelligent systems, often referred to as smart services, have the potential to change the way in which we live, work, and interact with the world around us. Intelligent service technologies are no longer futuristic concepts, but instead part of our present-day lives. They help us to face the challenges of the real world and provide practical solutions for a wide range of problems.

### Added value in practical applications

Using cutting-edge advances in the fields of artificial intelligence, the Internet of Things (IoT), big data analytics and cloud computing, intelligent services have already made a profound impact. They provide useful insights, automate tasks and optimize decision-making processes, which ultimately improves the quality and efficiency of companies. GEMÜ uses the potential of this transformative power with a focus on innovative development and value-adding optimization.

### Practical experience

In the interview below, Werner Flögel, Strategic Innovation Officer, spoke to four specialists about their experiences with using AI-based predictive maintenance, known as Smart Service. In an exciting and innovative undertaking, the project team aimed to detect wear on motorized actuators via vibration analysis and apply the solution they developed, comprising sensors, safe transmission technology and AI analytics, directly in the production environment.

### DIFFERENT TYPES OF MAINTENANCE

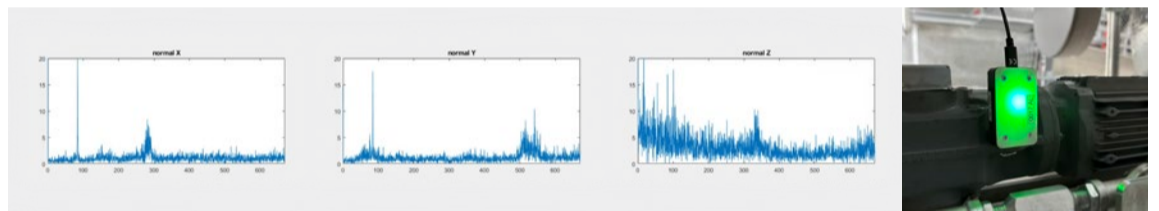
- ⇒ Reactive: Replacing a component if it is defective
  - ⇒ Time-based: Replacing a component at fixed intervals
  - ⇒ Usage-based: Replacing a component after a defined number of operating cycles
  - ⇒ Condition-based: Replacing a component when conditions are exceeded
  - ⇒ Predictive: Replacing a component in good time if wear is detected
- PROJECT SCOPE** ⇒ Condition-based and predictive maintenance

### AN EXCHANGE OF EXPERIENCE BETWEEN USERS AND SPECIALISTS

**Werner Flögel:** Thank you for joining me to talk about the topic of predictive maintenance as an exchange of experience between practitioners. We have with us:

- ⇒ Andreas Walter, Teamleader Operational Services
- ⇒ Marcus Mager, Engineer, Global R&D, Research & Predevelopment
- ⇒ Marcel-Luca Nees, Operational Service, Maintenance, Support
- ⇒ Maximilian Backenstos, CEO of the company DatenBerg GmbH, service partner

Data from the motor (Edge) STRUCTURE-BORNE SOUND SIGNAL



**Sensor:** Detection of vibrations and temperatures  
**Edge processing:** Carrying out the Fourier transform and throttling the signal  
**Communication:** Forwarding the data via MQTT network over WiFi

**Werner Flögel:** Andreas Walter, Andreas Walter, in your view, what impact has predictive maintenance made on the company?

**Andreas Walter:** In my view, predictive maintenance makes a crucial difference for GEMÜ. Using data and analysis to make predictions about when machinery, units or components need to be maintained enables us to carry out maintenance before a failure occurs. This helps us to improve productivity and reduce maintenance costs.

**Werner Flögel:** It seems particularly important to me that we are able to achieve genuine added value. This requires the correct solutions and technical conditions. Marcus Mager, how do you support this and what role do you play in the development of solutions for predictive maintenance?

**Marcus Mager:** As a developer, I work closely with specialists in each application, and specifically in this project I work with maintenance specialists. However, I also work with data analysts to develop sensors and data collectors that provide suitable data for evaluation. The continuously measured data is prepared for use by machine learning technologies in order to detect patterns and predict when maintenance could be necessary.

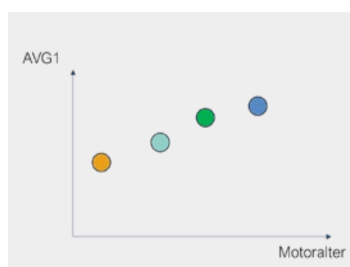
**Werner Flögel:** This sounds like a complex process, but one that has become routine and has been mastered. Maximilian Backenstos, can you

explain to us what you offer for predictive maintenance services?

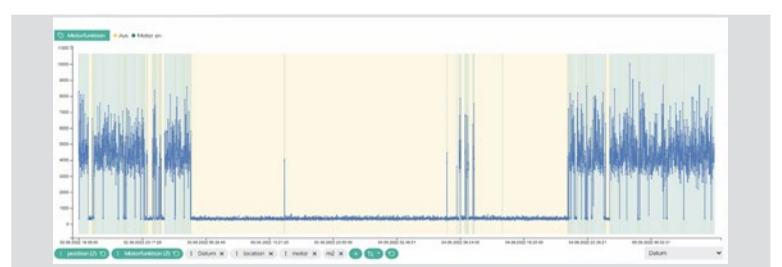
**Maximilian Backenstos:** We work together with our customers to understand their systems and business processes. We then collect data from sensors and other sources to create models that can predict when maintenance is required. We also offer continuous monitoring and support to ensure that our predictions are precise and effective. In this project, for example, we base our work on international standards such as 10816.

Specifically, we use models with more than 30 KPIs to determine wear detection. It seems relevant to me in this regard that experience enables standardizations that encourage reuse and productive applications.

Cloud evaluation (DatenBerg smartPLAZA software)



MANUAL ANALYSIS OF MOTORS



KPI ANALYSIS AND RANKING OF MOTORS

**Werner Flögel:** The developed technology seems to have been mastered. However, use of the technology requires specialists on-site to install the solutions. This brings us to Marcel-Luca Nees. How satisfied are you with the current state of the art? And can you tell us about your practical experiences in the course of setting up and installing sensors for predictive maintenance?

**Marcel-Luca Nees:** As a user in Operational Service, I have experienced first-hand how easy it was to install the components for predictive maintenance in our company. During the commissioning process, I was able to get an impression of how this modern technology can support productivity. To me, it is like an assistant that helps me to have controlled workflows rather than needing to deal with unplanned breakdowns.

**Werner Flögel:** A final word from Andreas Walter. Don't such positive impulses and future opportunities make you want to rejoice?

**Andreas Walter:** That is precisely where the progress lies. Whereas unplanned downtimes can be expensive and frustrating, predictive

maintenance enables us to predict and prevent breakdowns, which improves our efficiency and reduces our maintenance costs. A motor that can be repaired via predictive maintenance is also more cost-effective and sustainable than procuring a new one. That is a true turning point for us.

**Werner Flögel:** Thank you for taking the time to share your experiences regarding this important topic with us. It is clear that predictive maintenance is an effective tool for improving the reliability of systems and reducing maintenance costs.

GEMÜ already uses artificial intelligence for Smart Service.

It is only by implementing innovative ideas that we have the opportunity to discover new potential and opportunities.

And: To gain experience that allow us to develop further.

**The future belongs to Smart Services.**

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## WATER – A PRECIOUS COMMODITY FOR HUMANS AND THE ENVIRONMENT GEMÜ CAPABILITY IN WATER TREATMENT

**Water treatment is more than just a business field – it is our passion. Water, our planet's precious commodity, deserves to be protected carefully and used responsibly. As a long-term valve manufacturer in the water treatment market, GEMÜ has extensive expertise in delivering sustainable, efficient designs that ensure clean, safe water.**

GEMÜ valves, measurement and control systems are the result of decades of experience and first-class quality work. Independent, external institutes certify GEMÜ products and confirm they meet the highest standards. GEMÜ's wide range includes numerous products with relevant approvals in the field of water treatment, which highlight GEMÜ's leading position in the market.

A specific example of GEMÜ's contribution to water treatment is the ultra-filtration function for drinking water in Kazakhstan, a country with low precipitation levels. In the city of Stepnogorsk, GEMÜ helped to improve the quality of drinking water and increase treatment efficiency. A modern ultra-filtration plant equipped with GEMÜ valves can treat 48,000 cubic metres of water per day, safeguarding the water supply in the region.



GEMÜ is implementing targeted marketing campaigns to strengthen its position on the market even further. A good example is the water campaign focussing on industrial water treatment. GEMÜ is providing extensive information about products and applications through social media posts, informative downloads and webinars.

A highlight of this campaign was a successful webinar in July 2023 focussing on "The optimized use of valves for membrane systems in water treatment", which was held in collaboration with Konradin Verlag.

### **GEMÜ valve designs are more than just plant components**

With special approvals for drinking water applications, such as approval from the DVGW (German Technical and Scientific Association for Gas and Water), NSF, ACS (Certificate of Sanitary Conformity) water approval and many more, GEMÜ ensures top quality and safety.

The requirements for industrial water treatment are extensive and GEMÜ's wide product range offers a large selection of components. The certificates and approvals prove that GEMÜ products meet the strict requirements of official bodies.

"We are proud of our role as a reliable water treatment partner and of our efforts to ensure clean, safe water for all. Our expertise, quality work and innovative capacity are key to a sustainable future for water resources all over the world," reported Dr. Carsten Persner, Market Segment Manager for Water, Business Unit Industry.

#### **Belgaqua:**

GEMÜ 611, 615, 629eSyLite, 639eSyStep, 649eSyDrive, 671, 687 and 685 diaphragm valves have approvals from Belgaqua.

#### **NSF:**

NSF approval has been issued for GEMÜ 610, 613, 617, 630, R647, R49, R677, R690, R693 diaphragm valves and butterfly valves in the R480 series.

#### **ACS and DVGW water:**

GEMÜ 610, 617, R647, R677, R690, and R629eSyLite, R639eSyStep, R649eSyDrive electrical designs in plastic have ACS water approval and DVGW water certificates.

#### **GEMÜ butterfly valves:**

Diaphragm code 28 complies with UBA-ELL guidelines. KTW and WRAS approvals have also been issued for GEMÜ butterfly valves.

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# CULTIVATED MEAT WITH GEMÜ VALVES FOR MANUFACTURING MEAT FROM CELL CULTURES

The world population faces enormous challenges that must be overcome in the coming years. In addition to geopolitical tensions and demographic changes, humanity also needs to tackle the problem of feeding over 9 billion people by 2050.<sup>1</sup>

Meat will be a particularly crucial foodstuff, as it makes up approximately 40% of the total protein intake of an average human. It is also expected that meat consumption will increase by more than 70% by 2050<sup>2</sup>, primarily due to the increased standard of living in emerging economies such as Brazil, South Africa and China. However, in view of climate change and threatening resource shortages, conventional meat production is not a viable solution for providing humans with meat to eat<sup>3</sup>. It is currently considered to be one of the main drivers of climate change. There are also health and ethical drawbacks to conventional meat production. There is therefore an urgent need for efforts to develop resource-saving solutions for efficiently and sustainably meeting the global demand for meat in future.

For this reason, scientists and researchers began to more intensively address the idea of creating meat in a bioreactor in the early 2000s. One such expert is the medical researcher Mark Post, who investigated this subject together with Maastricht University<sup>4</sup>. He was also the one who reached the first milestone of the growing cultivated meat sector in 2013 when he presented the first ever lab-grown meat burger in the world. He was also supported in this by the Google founder Sergei Brin. As part of a television program filmed in London, Mark Post presented the first ever burger patty assembled from tissues grown in a laboratory using cow stem cells. At that time, the burger costed approx. \$330,000 and was financed by a consortium of investors<sup>5</sup>. Following the presentation of the first lab-grown meat burger, interest in cultivated meat grew sharply among the population and a number of companies. This encouraged the founding of multiple companies being founded in this sector, and attracted greater investment, which in turn accelerated progress in the technology and the associated production costs. By 2022, a total of more than 2.9 billion USD has been invested in research and development for cultivated meat. There are now more than 150 companies and universities worldwide working on this research and development.<sup>6</sup>

To summarize the future of this market, thanks to the benefits it provides, cultivated meat represents an efficient and sustainable option for meat supply in the future. In addition, the increased investment in this sector and consumer research performed for cultivated meat indicates that there is interest in this concept among the population. Moreover, a new forecast by Market Research Future has shown that cultivated meat will become substantially more relevant over the next 10 years. The market report predicts a market growth from 0.33 billion USD in 2023 to 9.47 billion USD in 2032<sup>7</sup>. As a result, this sector, with GEMÜ as a component and system supplier, offers great opportunities for the future.

The production of cultivated meat is based on well-known biotechnological processes that are identical to those used in other large-scale applications for cell culture technology, such as in antibody therapy. The production process requires one of more bioreactors, which form the heart of the system. These are supplemented by auxiliary processes such as water treatment, steam generation, filtration, heating and cooling circuits and separators. These result in the following three areas of application for the bioreactor process where GEMÜ can provide optimal support for customer processes:

- ⇒ Aseptic applications that come into contact with the end product
- ⇒ Aseptic applications that do not come into contact with the end product
- ⇒ Non-aseptic applications

Aseptic applications are processes where it is important to maintain sterile conditions to prevent any contamination by bacteria, viruses or fungi. To ensure optimal growth conditions for the cells, the entire operating area of the bioreactor must be designed to be sterile. Process reliability can therefore only be achieved with aseptic valves. In the manufacture of cultivated meat in particular, this encompasses three areas of application:



- ⇒ Inoculation of the bioreactor with the inoculum (starter cells introduced into a culture medium for reproduction),
- ⇒ transfer of the cells between the individual bioreactors, and
- ⇒ cell harvesting, which is mainly controlled via a tank bottom valve.

The environment of the media which is successively supplied to the end product also requires a sterile plant design to avoid introducing any contaminants. One example of this is the culture medium supply.

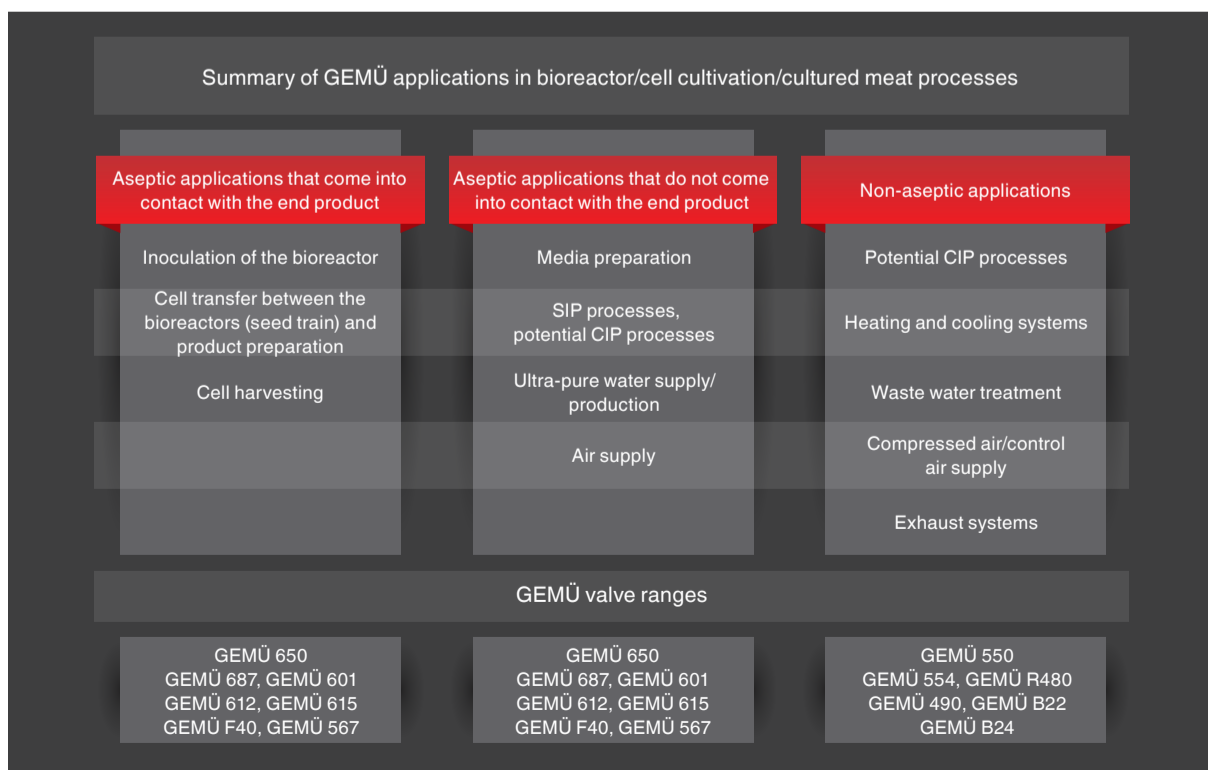
Aseptic applications and sterile processes are part of daily business at GEMÜ. With its comprehensive diaphragm and plug diaphragm valve range, the valve specialist always offers its customers an efficient and safe solution for use of its product. Non-aseptic applications comprises applications outside of the bioreactor process, where the equipment does not come into direct contact with the cell culture of the end product. These include heating and cooling systems, waste water treatment, compressed air and control air supply and exhaust systems. GEMÜ can provide support for these applications both with subject-matter expertise and with products such as globe valves, butterfly valves and ball valves as well as systems. With its broad product range, GEMÜ can offer the following applications of its products and systems for manufacturing of cultivated meat:

The global market for cultivated meat could grow by up to 51.9% year-on-year by 2032, according to a market report by Market Research Future<sup>9</sup>. The increasing scientific progress in the field of alternative proteins together with demand for meat substitute products and alternative proteins rising with the increasing world population are two important factors that will stimulate the market growth of cultivated meat. It is therefore also

necessary for end product manufacturers to improve their technologies in order to be able to meet the future demand for cultivated meat. Valves will be particularly important in this development. This is because components such as valves play a vital role in improving the efficiency of processes.

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<sup>1</sup> cf. <https://unric.org/de/weltbevoelkerung11072022/>  
<sup>2</sup> cf. Future of Cultured Meat Production: Hopes and Hurdles, Nawaz, 2021, S. 1  
<sup>3</sup> cf. <https://www.cultured-meat.shop/>  
<sup>4</sup> cf. Cultured Meat: Promises and Challenges, Treich, 2021, S. 6  
<sup>5</sup> cf. State of the Industry Report I Cultivated meat and seafood, 2022, S. 40  
<sup>6</sup> cf. State of the Industry Report I Cultivated meat and seafood, 2022, S. 17  
<sup>7</sup> cf. vegconomist, 2023, S. 38  
<sup>8</sup> cf. <https://www.bbc.com/news/science-environment-23576143>  
<sup>9</sup> cf. vegconomist, 2023, S. 40



# HOT WATER CASCADE SYSTEM

## STERILISATION OF LIQUIDS IN CLOSED RECEPTACLES

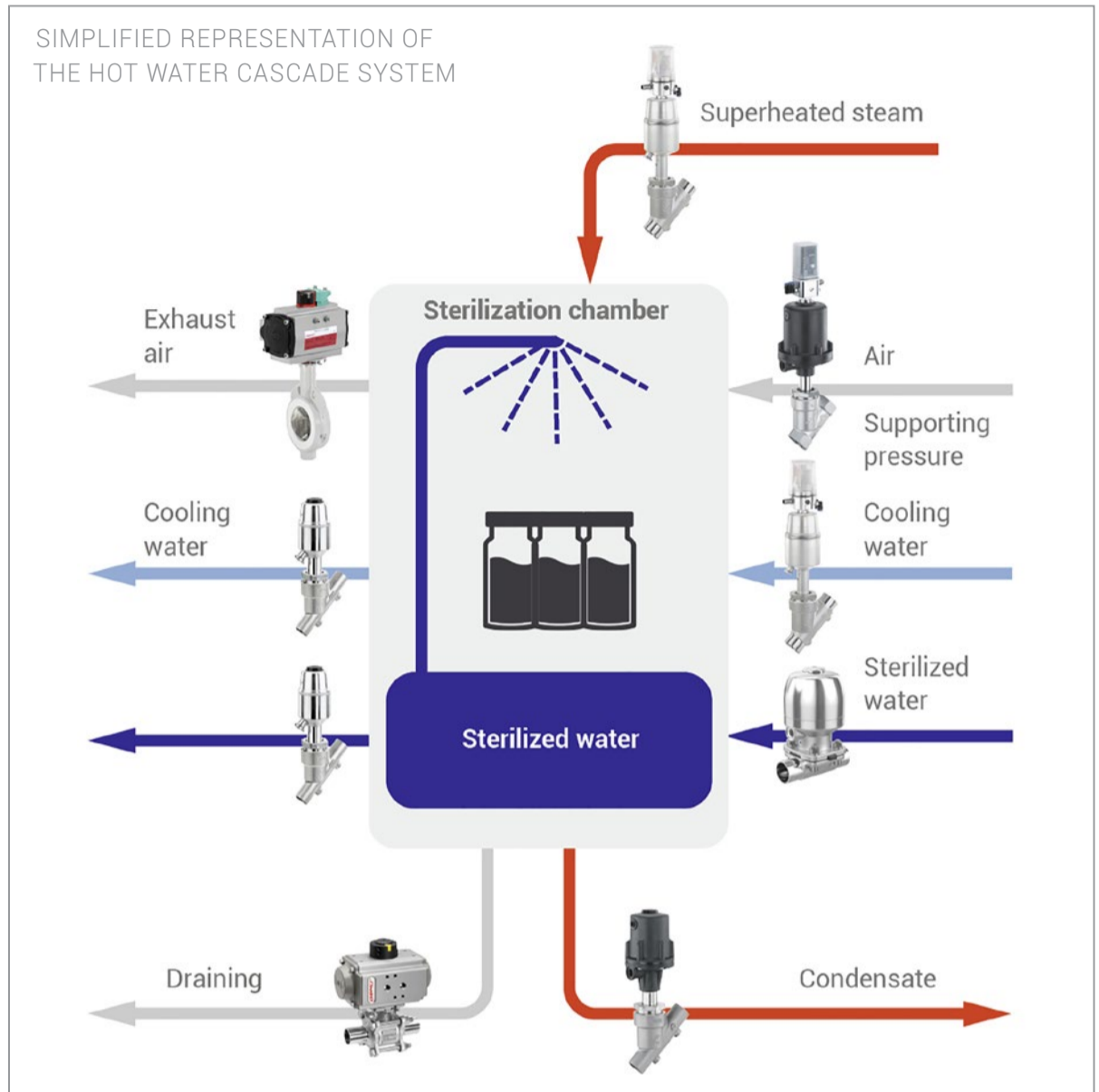
The sterilisation of liquids plays a large role in pharmaceutical and biotechnological production. The hot water cascade system developed by the MMM Group (Münchener Medizin Mechanik GmbH) enables liquids in closed receptacles made of glass or other temperature-resistant materials (such as ampoules) to be sterilised. Products such as the GEMÜ 650 BioStar diaphragm valve, GEMÜ 550 angle seat globe valve, GEMÜ 491 Edessa butterfly valve and the GEMÜ B44 ball valve are used for this.

Due to the higher specific heat capacity of water compared with air (approx. 25%) or steam (approx. 50%), the hot water cascade system is very gentle for the product. The products are exposed to heat over a fairly short time period, and so the advantages of the hot water cascade system lie in the comparatively short lead times. These are due to the low heating and cooling times.

The process is as follows: The chamber containing the item to be sterilised is filled to a pre-defined level (below the item being sterilised) with deionized sterilisation water. This water then circulates through a steam-heated heat exchanger. It cascades over the item being sterilised at a rising temperature. This efficient method of transferring heat enables the item to be heated up in a quick and gentle way. In the subsequent cool down phase, the sterilisation water flows through the now water-cooled heat exchanger and cools the item being sterilised down to a specific temperature. Throughout the process, temperature-controlled supporting pressure generated by sterile-filtered compressed air prevents the tightly sealed receptacles from bursting or becoming deformed.

The pneumatically operated GEMÜ 554 globe valves control the supporting pressure and are used for condensate draining. The process of filling the sterilisation chamber with sterilisation water is controlled by a pneumatically operated GEMÜ 650 BioStar diaphragm valve. Both the steam heating and

SIMPLIFIED REPRESENTATION OF THE HOT WATER CASCADE SYSTEM



water cooling processes in the heat exchanger are controlled using pneumatically operated GEMÜ 550 angle seat globe valves. By contrast, GEMÜ 490 Edessa butterfly valves (not shown in the diagram for clarity) are used in the circulation line for opening and closing, as these have significantly more compact installation dimensions yet very high flow rates in comparison with angle seat globe valves of the same nominal diameter.

Furthermore, to meet the stringent process requirements, they are fitted with highly resistant PTFE plastics and FDA-approved silicone as a seal material. Venting and pressure compensation before the sterilisation chamber is opened are ensured by a pneumatically operated GEMÜ 491 Edessa butterfly valve. A pneumatically operated GEMÜ B44 ball valve is

used to drain the sterilisation water that is no longer to be circulated.

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## FLARE FITTING

### A SECURE CONNECTION

**New training video!**  
High-purity PFA tubes are connected securely to a fitting or valve by being heated with hot air. This process is called the "flare process" or simply "flaring"..

GEMÜ's new training video explains the process step by step. Find out here how simple the handling and assembly are. The video not only shows the correct procedure to follow, but also points out potential error sources to ensure the process is trouble-free. You can find the video at: [www.youtube.com/gemugroup](http://www.youtube.com/gemugroup)





# ENGINEERING EXCELLENCE OPTIMAL PRODUCTION CONDITIONS FOR PLASTIC BUTTERFLY VALVES

**In the field of technical solutions, there are always challenges that require innovative approaches. Our most recent success story concerns the development of a plastic butterfly valve that is specially designed for use in hot water circuits for wellness spas. These butterfly valves enable safe and reliable control of the water supply to the wellness bathtubs and shower areas in a leisure pool.**

**The following operating parameters were key to the design of the GEMÜ 423 butterfly valve made of PP-H:**

Medium: Hot water and clean water  
Operating pressure and temperature: 2.5 bar at 80 °C

There were other criteria that needed to be taken into account. The material resistance at high temperatures was crucial. The butterfly valve was created using PP-H plastic, which is not one of the standard materials for GEMÜ plastic butterfly valves. The valve design also needed to enable welding in order to minimize leaks. Additionally, the valves needed to operate with electrical actuation in order to prevent noise in the leisure baths due to air compressors. Electric valves operate without compressed air and therefore constitute a quiet and practical solution.

### The engineering process

The engineering process was the key to this success story. For the first time, a simultaneous engineering approach was used in close collaboration with the GEMÜ Plastic Technology Center. A wide range of simulations and tests enabled the design of the butterfly valve to be optimized to establish ideal production conditions. This was particularly important because this component was a custom-made product.

An efficiency test was carried out before production started. In order to be able to offer the butterfly valve in the material PP-H, it was necessary to select a manufacturing process that provided excellent results in terms of both cost-effectiveness and production quality. Two options were available for this: A pure machining process with a production time of 30 minutes, or an injection moulding process that requires just 3 minutes as well as reworking involving approx. 3 minutes of machining. The resource consumption also offered impressively low resource consumption, as the pure machining process involved the removal of substantially more material.

### Step 1: Feasibility

A feasibility study was carried out at the outset of the project. Normally, butterfly valves such as these are manufactured from PVC using an injection moulding process, whereas manufacturing from PP-H represents a particular challenge. The mechanical differences required a wide range of simulations performed by the GEMÜ Plastic Technology Center as well as additional in-house tests for leak-tightness and ensuring component strength.

### Step 2: Prototype development

A machining process was used for prototype development in order to ensure that a butterfly valve made of PP-H operates in the same way as one made of the standard material PVC. Leak-tightness and burst pressure tests were performed in-house with successful results.

### Step 3: Simulations for changing the manufacturing process

The injection moulding process was selected for series production, as it is more cost-effective for high quantities. Simulations by our Plastic Technology Center helped to develop the ideal design for the injection moulding process. It was ensured that the injection mould was optimally filled during the injection process, which prevented burns. Based on the simulation results, the diaphragm gate process was chosen. This enabled the GEMÜ 423 butterfly valve made of PP-H to be offered to the customer at an attractive price. It is now used in a leisure bath in France to control the hot water supply.

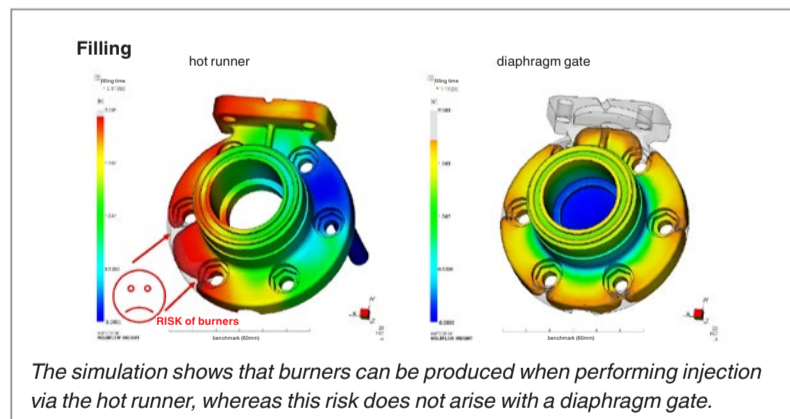
„We are proud of our in-depth design and manufacturing capabilities. This success shows that we are able to offer customised solutions at a cost-effective price point. Our customers benefit from our ability to use tests

and simulations to flexibly establish the optimal production conditions and adapt tools to suit specific production processes. We are more than just a manufacturer – we are a partner for customised solutions,” reports Kevin Sifer, Team Leader Projects and Design, Industry business unit.

This success story exemplifies the GEMÜ passion for engineering and innovation. The GEMÜ Team looks forward to the next challenges.

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GEMÜ 423 made of PP-H in the hot water circuits of wellness bathtubs



# GEMÜ MULTI-PORT VALVE BLOCK AS A FILTER BASE

## SIMPLE PERFORMANCE OF PUPSIT FILTER TESTS

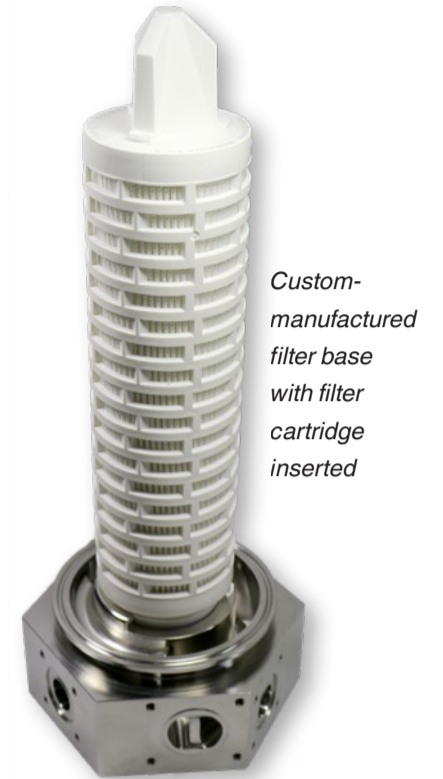
Filter systems are essential in the pharmaceutical industry. In aseptic production plant, additional process valves, fittings or other connections are often required around these filter systems. For example, filter sterilisation requires a sterile steam supply and a way of removing condensate. Other connections and process valves are needed for implementing the specified integrity tests (e.g. bubble point test, diffusion test, water intrusion test).

According to EU GMP Annex 1, section 8.87, the integrity of a sterilised filter system should be verified by integrity testing before use. Accordingly, a filter element must be subject to integrity testing after installation and sterilisation but before use. In conventional constructions, the process valves or fittings required for this have to date been welded directly onto filter bases individually or in prefabricated subassemblies.

GEMÜ aims to optimize this application and develop individual filter bases tailored to specific customer requirements for a wide variety of scenarios, including for bioreactors, for example. It has proven beneficial here to manufacture the entire filter unit, comprising filter base, valves, fittings and connections, from stainless steel block material. In GEMÜ multi-port valves, the valve seats of the process valve are integrated into the valve block. This results in a space-saving construction and substantially less dead space between the valves. It also means time-consuming welding work is no longer necessary. The connections for the filter cartridge and the filter hood are also integrated directly into the block, adapted to the respective application. By offering these stainless steel, customised multi-port valves as the base of filter housings, GEMÜ is now enabling PUPSIT filter tests (Pre-Use Post Sterilisation Integrity Tests) to be carried out easily.



Conventional construction of a filter base with process valves welded on



Custom-manufactured filter base with filter cartridge inserted

To make installation simpler, all process connections are integrated directly into the block on the basis of DIN11864-2 (aseptic connections). The subsequent pipes are fitted with the appropriate counterpart so they can be easily screwed onto the housing with an additional O-ring gasket. Alternatively, butt weld spigots or other process connections (e.g. Tri-clamp) could be incorporated. It is also possible to integrate a temperature sensor.

For configuration purposes, GEMÜ ideally requires an extract of the functional diagram (R+I) and the precise specifications of the process

connections, particularly for the filter cartridge and the filter hood (specification sheet).

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# NEW GEMÜ BBOF BALL VALVE SERIES

## FOR THE CHEMICAL INDUSTRY AND OTHER DEMANDING APPLICATIONS


The new ball valves in the GEMÜ BBOF series cover a wide range of applications in the chemical industry thanks to their configuration and the available construction and actuator versions.

In the standard version, the media wetted seat seals are made of RPTFE (reinforced PTFE). This provides them with high material resistance when exposed to changing media and enables a wide range of applications and a high level of safety when using dangerous media. The stainless steel balls are suitable for use in applications at temperatures between -20 °C and 180 °C. This makes them suitable for use with hot process media, for example. The two-piece ball valve design does not feature many places that could potentially become leaks.

The ball valve has a fire safe design in accordance with API 607 and DIN EN ISO 10497, with the housing and shaft seal made of graphite. A risk of fire can exist in any type of production plant. In certain sectors and processes, however, valves are exposed to emergency situations to a larger extent than in others. In these areas of application, a fire safe valve such as the GEMÜ BBOF is the right choice. This ball valve is available in nominal sizes DN15 to DN200 with flanged connections ANSI class 150 and PN40/PN16. Alongside applications in the chemical industry, this ball valve type can also be used for heating systems and HVAC applications.

The new GEMÜ BBOF series includes the GEMÜ B2F manual ball valve, the GEMÜ B4F pneumatic ball valve and the GEMÜ B6F motorized version.

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GEMÜ B2F manually operated ball valve from the new GEMÜ BBOF series

## NEW VIDEO – DIAPHRAGM REPLACEMENT

This video shows the diaphragm replacement of the two-piece GEMÜ Code 5M PTFE diaphragm in the GEMÜ 650 BioStar diaphragm valve.


Compared with the previous GEMÜ Code 5E diaphragm that is tightened until a slight bulge can be seen, the GEMÜ Code 5M diaphragm is fitted level and parallel to the valve body. A compression is not visible externally.



The video presents all relevant process steps in a comprehensive and easy-to-understand manner, as a supplement to the installation instructions.

You can find the video at: [www.youtube.com/gemugroup](http://www.youtube.com/gemugroup)



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# INTELLIGENT VALVE SOLUTIONS FOR THE SEMICONDUCTOR INDUSTRY

## AUTOMATED PROCESS CONTROL IN CLEANROOMS

In the high-complexity world of semiconductor production, millimetre precision and reliable process control are indispensable. Our success story focuses on a leading world-wide manufacturer of innovative solutions in the area of advanced process control – a solidly established customer of GEMÜ that nevertheless has mainly ordered products from the GEMÜ standard range up to now.

During the production process, a silicon wafer passes through multiple chemical baths. In these baths, concentrations and temperatures must be kept at a consistent level. The continuous monitoring and analysis required for this is implemented via a sampling process. Over time, the chemicals begin to run out and the concentration is reduced – which is where a "topping up" process comes into play. This process involves feeding in the necessary components again. This is precisely where the GEMÜ valve comes into play. A valve is used for each medium mixture or each basin.

The customer has developed a state-of-the-art PC-based analysis and automation system, customised for the semiconductor industry. This fully automatic system enables real-time monitoring and precise topping up of process fluids, galvanic electrolytes and cleaning baths. This means that the expensive laboratory process is no longer needed. The system is located in a cleanroom and plays a crucial role in the production of microchips.

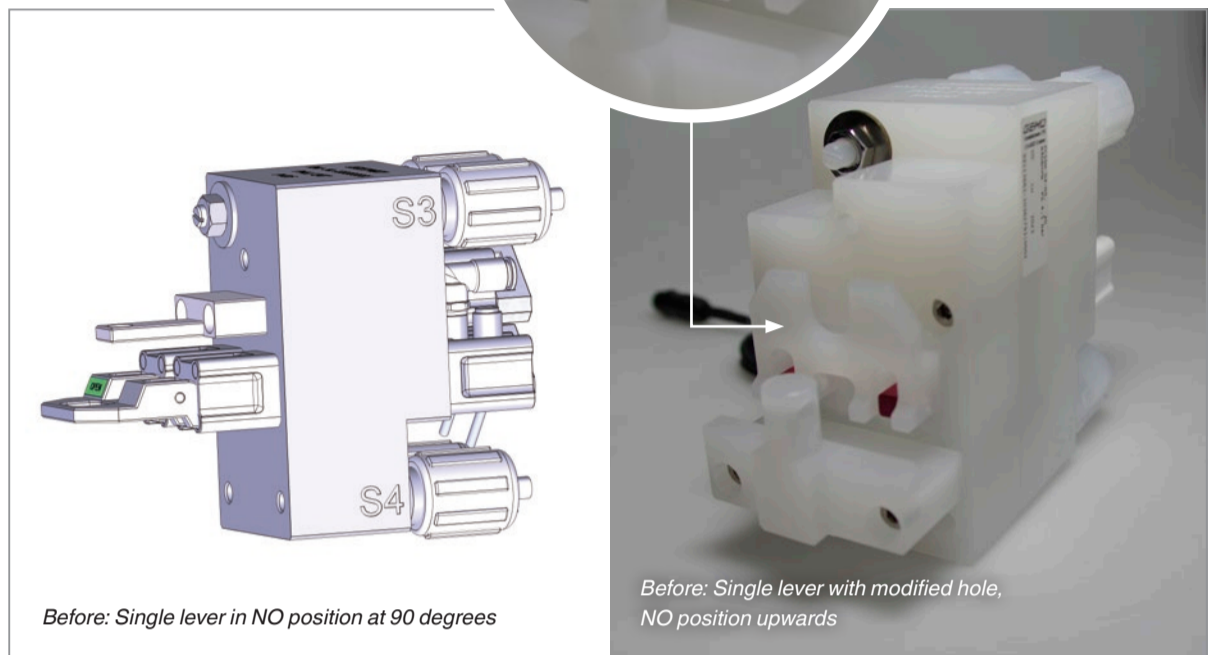
In the past, the customer relied on an extremely laborious and expensive pinch valve of their own design. GEMÜ worked together with the customer to develop a substantially easier and more efficient solution that brought together all the requirements in one valve. The process reliability also needed to be increased. Speed was important. The customer wanted to move into the implementation phase as quickly as possible.

### Maximum efficiency in the smallest of spaces

The task was clear: Designing a compact valve block with 3/8" pillar connections and a total of five GEMÜ C50 and C51 iComLine actuators of actuator size 0A1 with a maximum size of 50x100x80 mm. The special feature of the design is that it should be possible to close both manual valves at the same time with a single lever.

But why was this specifically so important to the customer? The lever acted as a safety circuit. If the lever was turned and both GEMÜ C51 iComLine valves closed, the system was shut down. With a conventional hole, the lever would always be at 90 degrees from the system. GEMÜ went one step further and changed the hole and therefore the NO position of the hand lever to prevent the system being shut down unintentionally.

The speed of the GEMÜ experts was a clear benefit. They were able to present an initial valve block design within just two days. After a few adjustments, three valve blocks were supplied for testing, one of which was immediately subjected to endurance testing at a large international semiconductor manufacturer. These tests were successfully completed within a very short time and approved by the end user. This enabled GEMÜ to stand out from the competition. However, further development of the valve block was not to end there.



### The key to fine adjustment

The wide variety of pressure requirements in the end user's systems required the integration of an additional needle valve in the valve block. In close and above all direct collaboration with the customer, a needle valve was developed within a few days and was also integrated into the block valve. The tests performed on the valve block by the customer themselves were successful, to the complete satisfaction of both the customer and GEMÜ.

The end user also substantially benefits from the increased process reliability and the user-friendly operation of the valve, which in turn results in even more precise manufacturing.



In addition to the custom developments already performed, the final customer requirement was to implement an electrical position indicator on the GEMÜ C50 butterfly valves. GEMÜ C12a, an optical light barrier, proved to be the ideal solution.

### The success speaks for itself – on both sides

Development of this special valve block was a challenge. As always, GEMÜ demonstrated exceptional flexibility and innovation. The sample valve blocks have already proved the reliability of the GEMÜ solution. The success factors were quick response times, geographical proximity and above all direct communication. Approx. 1000 of these valve blocks have been purchased to date.

This success story reflects the versatility and innovative capacity of GEMÜ. It demonstrates that custom and complex solutions can also be developed specifically for applications where there is limited space available. Valve combinations involving other plastic materials or stainless steel for pharmaceutical applications are also possible. This makes GEMÜ the ideal partner for a promising future.

The GEMÜ valve solution is a replacement for the customer's expensive in-house design and enables substantial space savings. The installation time has been significantly reduced, and it is easier to operate. The compact design has eliminated several installation steps. All of these improvements have resulted in significant cost reductions for the customer.

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## GEMÜ SERVICE EXTENDS PORTFOLIO SPECIALIST PLANT SCREENING

The GEMÜ Service team is deployed daily to carry out maintenance and repairs to process plant on its customers' premises. Often, ideas for improving process sequences or installation are mentioned during conversations with operators on site.

These ideas are picked up at GEMÜ and developed into appropriate measures. In order to separate demand for such measures more effectively from classic service jobs, GEMÜ is now extending its service portfolio to include specialist plant screening. The aim of the new offering is to analyze existing industrial plant in order to identify potential for technical optimization and draw up specific suggestions.

## PAPERLESS GOODS DISPATCH AND DIGITAL PRODUCT DOCUMENTATION

GEMÜ introduced paperless goods dispatch and digital product documentation for deliveries from Germany for all of its customers in September 2023.

This digitalization milestone supports customers' processes and makes it easier to access availability data and certificates, operating instructions and data sheets for GEMÜ products. It is quick and easy to access and download all of the data for a delivery thanks to the addition of a QR code and/or web address on the delivery note and packaging.

The implementation of this process is also helping to meet GEMÜ's sustainability goals by significantly reducing the use of resources. It is saving more than 17 million pages of A4 paper from being printed and consumed each year. That corresponds to over 80 tonnes of CO<sub>2</sub> equivalents avoided per year.

With this measure, GEMÜ has cut approx. 2% of its emissions and improved its current CO<sub>2</sub> footprint accordingly.

Thanks to forward-looking project planning and a proactive information strategy, as well as the support of all business units and all corporate divisions, it has been possible to implement the change to deadline. Not least, the project has marked another step towards achieving a fully paperless shop floor. Through the Operational Excellence strategy,

The following three types of screening are planned in the expansion stage:

### 1. Basic plant screening

In basic plant screening, the GEMÜ Service team carries out a visual inspection of the relevant plant components. The focus here is on valves and automation components. The inspection identifies obvious wear and tear, potential leakages or mechanical problems, as well as potentially critical issues concerning the risk of contamination.

Measures for maintenance, optimization and replacements are then suggested in a report.

### 2. Data-based analysis

Data-based analyses use specialist instruments such as ultrasonic flowmeters and thermographic cameras. They check the plant components, particularly valves and flow controls, as well as their performance.

A detailed technical report is then prepared, providing precise data and analyses for every component inspected. In this case too, GEMÜ makes recommendations for optimization, e.g. for valve opening degrees, optimized automation components or elastomer materials.

### 3. Digital analysis

GEMÜ will also offer digitalized plant screening in the future. This type of screening uses modern sensor technology and artificial intelligence to monitor plant components continuously and identify patterns that could indicate imminent failures. The following technologies are used, among others:

**Remote maintenance via sensors:** Modern sensor technology enables the continuous data capture of valve parameters such as flow rates, pressures, temperatures and wear.

**Digital data analysis:** The data is analyzed using advanced algorithms. This enables patterns to be identified that may indicate imminent valve failures, for example.

**AI-assisted predictions:** Artificial intelligence is used to predict future maintenance requirements or the optimal time to replace valves. This enables companies to introduce maintenance measures at an early stage, avoiding failures.



All in all, plant screening from GEMÜ offers customers a unique opportunity to optimize their plant and maximize its long service life. The different screening levels allow customers to tailor the analysis to their own requirements.



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further measures are to be taken in the coming months that will contribute to the responsible use of resources.

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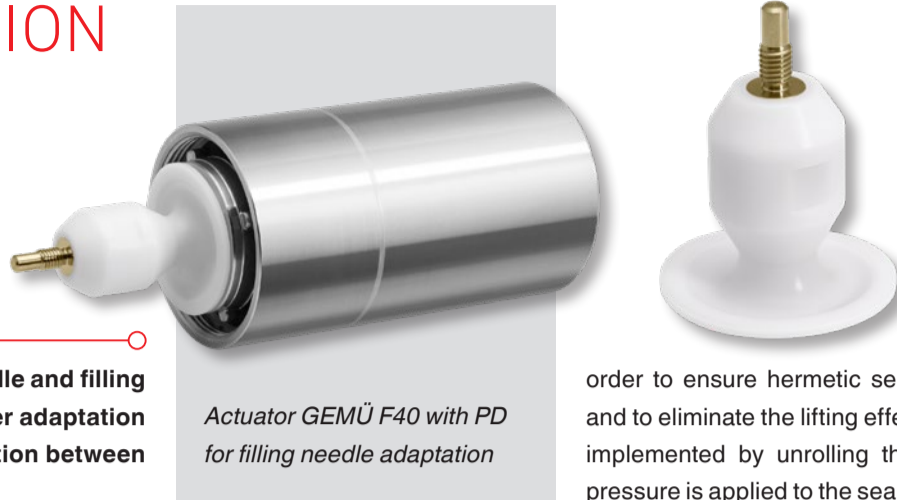
## INNOVATIVE ADAPTATION TECHNOLOGY FOR MORE HYGIENIC FILLING

With its innovative, patented seal system for filling needle and filling pipe systems, GEMÜ has brought to market the first ever adaptation option for filling needles that ensures hermetic separation between the actuator and medium.

On the basis of the GEMÜ F40 and GEMÜ F60 servoDrive filling valves, tried and tested PD technology (plug-diaphragm technology) has been expanded to include a new PD version with a stainless steel thread, which is pressed directly into the PTFE in the sintering process. With the new seal system, no more flushing behind the gland packing seals is consequently required. The danger of contamination due to lubricants from the actuator or due to the lifting effect is also completely ruled out. The new GEMÜ PD, in combination with GEMÜ F40 and GEMÜ F60 high-performance actuators, improves the hygiene and performance of every filling application with filling needle and/or filling pipe systems, across all media and containers.

Filling needle and filling pipe systems are often used in the fluid filling applications of liquid and viscous media. This principle is used primarily in the cosmetics industry, for filling pharmaceutical products and in the foodstuff industry, for example for dairy products, juices and sauces. In these systems, the filling pipe is dipped into the container to be filled and slowly withdrawn during the filling process in order to fill the container from the bottom to the desired level. This prevents the fluid from spurting and stops the container being overfilled. The filling needle and/or filling pipe system sealing takes place directly at the filling point. The opening operation is performed by withdrawing the needle with the seal, and closing is performed by pressing the needle with the seal against the pipe opening again.

Linear valves are usually used for this at the moment, where the needle is adapted to the valve spindle. The seal against the actuator positioned above is



Actuator GEMÜ F40 with PD for filling needle adaptation

ensured via gland packing. Consequently, there is always a risk of the lifting effect occurring, in which the medium can be drawn upwards into the gland packing when the valve is opened. In addition, lubricants from the actuator may get down into the medium via the gland packing along the spindle. There is a constant risk of contaminating the medium to be filled.

To counteract this phenomenon, many different technical improvements have been made in the past. For example, there are systems in which the area behind the seal can be cleaned at regular intervals by flushing. The quality of seal materials has also been improved continuously and adapted to suit different media. GEMÜ chose a completely different approach and, together with a development partner, developed a seal based on PD technology in

order to ensure hermetic separation between the actuator and medium and to eliminate the lifting effect entirely. In this solution, the valve stroke is implemented by unrolling the flexing area of the PD, and a constant pressure is applied to the seal using compressed spring washers to ensure permanent leak tightness with the actuator.

The PD technology is currently being used successfully in GEMÜ diaphragm globe valves for hygienic and aseptic filling and control applications. The newly developed PD now offers customers a unique way of adapting the filling needle directly to the PD, creating a fully aseptic filling needle and filling pipe system.

The new sealing system can be supplied with the robust, pneumatically operated GEMÜ F40 filling valve, which is well established on the filling market and is suitable for multiple fast cycle duties, long downtimes and high output quantities. The motorized GEMÜ F60 servoDrive diaphragm globe valve with freely programmable filling curves is ideal for applications requiring very fast opening and closing cycles where intermediate positions have to be reached in milliseconds with accuracy down to the micrometre. In this way, even critical media can now be filled at a speed and accuracy never seen before thanks to the innovative adaptation technology. With this technology, GEMÜ is offering customers a solution for elevating filling process safety to a much higher level.

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## NEW DVGW GAS APPROVAL FOR QUARTER TURN VALVES ALSO APPLIES TO HYDROGEN APPLICATIONS

GEMÜ butterfly valves in the GEMÜ R480 series and the GEMÜ B20 ball valve have been awarded gas approval by DVGW, the German Technical and Scientific Association for Gas and Water.

The butterfly valves are available in nominal sizes DN 25 to DN 600 and can be ordered with the "G" special function with immediate effect. The GEMÜ B20 ball valve in nominal sizes DN 8 to DN 65, which also has the "G" special function, is suitable for use with combustible gases. A type examination was carried out for both quarter turn valves in accordance with DIN EN 13774.

The GEMÜ R480 and GEMÜ B20 are suitable for use with different gases, such as natural gas and biogas (the main component of which is methane), propane and liquid gases containing butane. They are approved for gas production, treatment and injection. This includes use for combustible gases in gas families two and three in gas burners and gas appliances. It also includes the use of hydrogen. The DVGW approval confirms the ability of these valves to work reliably and precisely in different gas environments.

The GEMÜ R480 butterfly valve is certified and listed under registration number DG-313CQ0540, and the GEMÜ B20 ball valve under registration number 22-00143-AB01-130.

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# EFFICIENT SOLUTIONS

## GEMÜ IS REINFORCING ITS PRESENCE IN THE HYDROGEN SECTOR

In 2023, GEMÜ has concentrated on increasing its visibility in the emerging hydrogen sector and consolidating its presence in this important industry. As part of this effort, the valve specialists at GEMÜ are continuously working to develop its product range to satisfy the requirements for numerous applications, such as water treatment for various electrolysis processes or gas treatment.

Electrolysis is a crucial step in hydrogen production and requires a great deal of treated water and electrical current. GEMÜ has established an excellent reputation in the area of water treatment. Drawing on its many years of experience in this sector, the valve specialist is an active participant in various hydrogen projects.

A prominent example is the "Electrolysis made in Baden-Württemberg" development project, wherein GEMÜ worked together with the Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW) in Stuttgart to successfully implement a system demonstrator with an impressive electrolysis output of up to 1 megawatt. High-quality GEMÜ globe valves and ball valves were used in this project.

The versatile GEMÜ range of valves, measurement and control systems consistently plays a decisive role in this project and others similar to it. For example, GEMÜ plastic diaphragm valves and flowmeters have been successfully used in off-shore hydrogen electrolysis projects in France, as have GEMÜ valves in a large-scale German project for water treatment via ion exchangers.

The applications of hydrogen extend across various sectors, including fuel cells in the transport sector. A successful project regarding heat management in fuel cells for trains utilized butterfly valves supplied by GEMÜ, and the results won over an established fuel cell manufacturer.



1-MW electrolyzer (source: ZSW)



GEMÜ 537 in an electrolyte circuit (source: ZSW)

In order to further promote transformation towards a hydrogen industry, GEMÜ is a member of international associations such as "Hydrogen Europe" and regional platforms such as "H2BW". GEMÜ also took part in international hydrogen trade fairs this year, including "Hydrogen Live" in the United Kingdom, the "H2 Hydrogen Expo South America 2023" in Brazil and the "Hydrogen Technology Expo" in Bremen, Germany.

GEMÜ is proud of the projects that have already been successfully implemented in the hydrogen sector, and looks to the future with confidence. The valve specialist continues its efforts to offer innovative solutions in the hydrogen sector and to actively contribute to creating a sustainable future.


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# SIL FOR GEMÜ BALL VALVES

## RELIABILITY OF SAFETY FUNCTIONS

The GEMÜ industrial ball valves in the GEMÜ BB02, GEMÜ BB06, GEMÜ BB07 and GEMÜ BB0F series as well as the GEMÜ B20 ball valves are now part of the GEMÜ products that have been assessed according to SIL.

This assessment according to SIL covers functional safety and is used to evaluate systems in relation to the reliability of safety functions. The result is safety-relevant design principles which must be complied with in order to minimize the risk of a malfunction. SIL itself is a measure of the probability that a system will correctly fulfil the required safety functions for a specific time period.

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GEMÜ BB0F

GEMÜ BB06

GEMÜ BB02

GEMÜ BB07

GEMÜ B20

# THE SEMICONDUCTOR ECOSYSTEM

## INSIGHT INTO THE WORLD OF SEMICONDUCTORS

The same topic appears over and over again in the headlines: European Chips act, support for semiconductor companies in Europe, microchips and their role in the issue of digitalizations. Nonetheless, this incredibly large global sector remains a mystery to many people. The fact that this industry conceals a highly complex ecosystem is less well-known. The following article is therefore intended to illuminate this issue a little.



The semiconductor ecosystem is a highly specialized global network. It comprises companies that specialize in the development and manufacturing of semiconductors, as well as suppliers, service providers, research institutes and teaching institutions. Some of the most well-known companies in this area are Intel, TSMC (Taiwan Semiconductor Manufacturing Company), Samsung Electronics and ASML. This ecosystem is immensely significant and influences the world in many ways. Everyone interacts with microchips and other semiconductor products in their day-to-day life.

### Facets of the semiconductor industry

For GEMÜ and its Semiconductor business unit, two sectors of the ecosystem play an important role. GEMÜ participates in this ecosystem with its components and system solutions, and the GEMÜ CleanStar series enjoys an absolutely dominant role in the industry. In order to understand how the individual companies collaborate, they must be broken down into their sectors and segments.

### Semiconductor manufacturers

The manufacturers of semiconductors are the core of the ecosystem. They invest considerable sums in research & development to produce more and more powerful and energy-efficient chips. These companies operate cutting-edge production facilities known as fabs or foundries (foundries = contract manufacturers like TSMC, without proprietary products like Samsung). In these facilities, the semiconductors are produced on silicon discs, known as wafers, and then sold in billions. One such fab can cost up to 10 billion dollars. The operators of these fabs are the end users for GEMÜ.

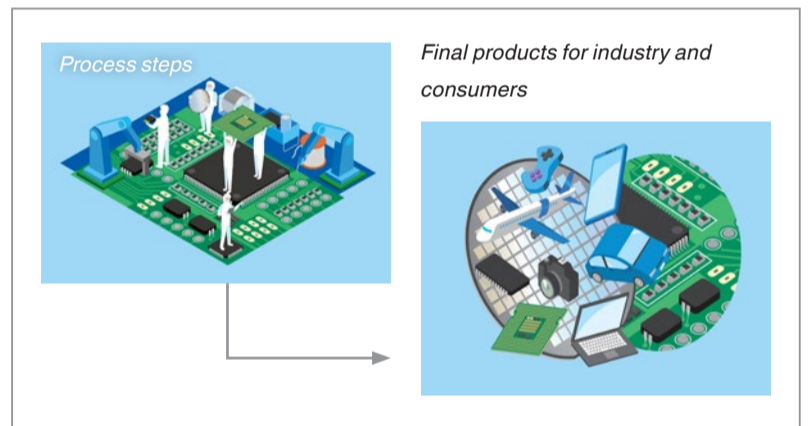
### Suppliers and service providers

Suppliers and service providers play a crucial role in the semiconductor ecosystem. They provide the machines, tools and materials required for manufacturing semiconductors. Companies like Applied Materials and Lam Research are global leaders in providing manufacturing equipment for the semiconductor industry. Without the highly specialized services and products provided by these companies, production of semiconductors would not be possible. GEMÜ is strongly represented in this sector with its Semiconductor business unit. GEMÜ counts these companies among its customers.

In addition to these two groups, the ecosystem also comprises the following sectors:

- ⇒ Design and development
- ⇒ Software and tools
- ⇒ Packaging and integration

All companies that are part of this ecosystem are synonymous with the process steps that are necessary to manufacture the microchips that have become so valuable.



### Growth drivers and opportunities for the economy

In order to seize these opportunities, all players in the sector are strongly reliant on international collaboration. Supply chains are global, and companies from different countries work closely together to develop and produce the latest technologies.

The semiconductor industry is a prime example of the need for global collaboration in our high-tech modern world.

Automotive	Energy	Industry
E-mobility is our future. Semiconductor technology is used not only in the electronic systems of vehicles, but also in storage media.	Our environment is our greatest asset. It is vital that we protect it. This is why renewable energy sources are needed, and establishing them in a sustainable way requires advanced chips.	AI, big data, Industry 4.0 – these are all issues that play an increasingly important role in our industrialized world.

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## NEW AREAS OF APPLICATION

### EXPLOSION PROTECTION APPROVAL FOR GEMÜ 1441 CPOS-X




The GEMÜ 1441 cPos-X positioner is available with explosion protection approval for gas environments with immediate effect.


The GEMÜ 1441 cPos-X positioner now has a much wider scope of application for the most varied control applications thanks to intrinsically safe (Ex ib) explosion protection approval (ATEX/IECEX) for gas in zone 1 (II 2G) environments.

Instead of alternative solutions, the GEMÜ 1441 cPos-X positioner developed in house can now be used directly in potentially explosive gas environments. The GEMÜ 1441 cPos-X electro-pneumatic positioner is suitable both for single-acting and double-acting pneumatic process valves with linear and quarter-turn actuators, and features an impressive smart app control concept, simple commissioning and comprehensive, customisable configuration options.



GEMÜ 1441  
cPos-X

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#### Challenges, but also potential

The semiconductor ecosystem is faced with a variety of challenges and opportunities. The increasing complexity of semiconductor technology due to ever smaller structure sizes requires advances in manufacturing technologies, materials science and design. At the same time, sustainable raw materials procurement and reducing the environmental footprint are highly important. Companies in the industry are working on environmentally friendly production methods and increasingly relying on renewable energy sources.

On the other hand, huge opportunities are presenting themselves. The growing demand for electronics in fields such as artificial intelligence, the Internet of Things (IoT) and electromobility is driving development of increasingly efficient chips. This opens up new markets and business opportunities for companies in the semiconductor sector.

#### The role of SEMI Europe

As part of the worldwide SEMI association, SEMI Europe is an important organisation that represents the interests of the semiconductor industry in Europe. SEMI Europe promotes collaboration between companies, research institutes and governments, and advocates for promotion of semiconductor technology in the region.

#### Semiconductor technology – a driving force for progress

The semiconductor ecosystem is a fascinating and extremely complex network that is only possible thanks to our modern electronics. It is crucially important for economic development and technological progress in the world of today. Engineers and experts from the semiconductor sector play a key role in this ecosystem by developing the latest technologies and finding innovative solutions for overcoming the challenges faced by the industry.

GEMÜ is a part of this strange yet fascinating universe, where it makes a valuable contribution and aims to grow further along with the industry. GEMÜ contributes to this exciting development with commitment and enthusiasm. In future, the semiconductor ecosystem will continue to shape our world and make a substantial contribution to fighting climate change.

## BALL VALVES FOR OXYGEN APPLICATIONS

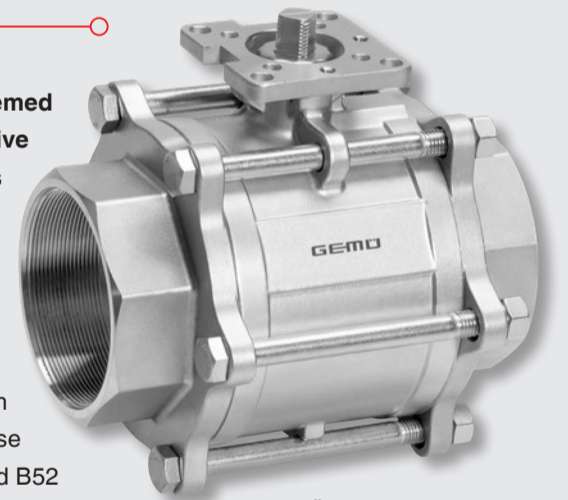
### EXTENDED VALVE RANGE

**GEMÜ extends valve range for highly flammable gases. GEMÜ BB02, B22, B42 and B52 ball valves have been deemed "suitable for use with oxygen" following a comprehensive examination by the Federal Institute for Materials Research and Testing (BAM). This marks a valuable addition to the existing range of solutions, which already includes globe and diaphragm valves as well as butterfly valves for oxygen.**


The ball valve series was examined in strict compliance with DIN EN 1797 and ISO 21010, and clear conditions for safe use were defined during this process: GEMÜ BB02, B22, B42 and B52 ball valves are suitable for the use of gaseous oxygen provided the operating temperature does not exceed 60°C and the maximum operating pressure is 30 bar. PTFE seals and O-rings made from fluorinated rubber (FKM) are used as the seal materials. GEMÜ customers can order the special "O" version of the ball valves for use with oxygen.

BAM emphasised the need for particular caution when handling oxygen, as it is a highly flammable gas. Because of this, all media wetted components in the ball valves for use with oxygen are carefully cleaned and inspected. Both the seal materials and the auxiliary materials such as lubricants and screw locking agents comply with the strict BAM regulations.

With these ball valves, GEMÜ can now offer another safe solution for handling oxygen. The result of the BAM examination confirms the quality and reliability of GEMÜ products and demonstrates the company's commitment to customer safety.



GEMÜ BB02

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## GEMÜ CHINA ENVIRONMENTAL ENGAGEMENT INAUGURATION OF THE PHOTOVOLTAIC PLANT

The new GEMÜ China photovoltaic system was officially inaugurated on 10th August 2023. Zhen Xiao, Managing Director, Jin Yang, Operation Director, Lily Liu, HR & Administration Director, Elsa Chen, Head of ESG Program, and the management team of the KALEPOWER Group took part in the celebrations.



With the completion of this photovoltaic system, the GEMÜ Group has actively responded to the national policy of green transformation and taken another concrete step towards the strategic goal of a climate-neutral company.

The installed output of the photovoltaic system is 617.1 kWp. The main system consists of 1125 PV modules, 11 PV inverters and 2 grid-connected PV low-voltage compartments. The auxiliary system comprises a communication system, a monitoring system and a water purification system. Following commissioning of this gigantic project, approx. 610,000 kWh of emission-free photovoltaic power can be provided for the company's energy consumption needs. It is expected that the system will save 5483 tons of coal and reduce CO<sub>2</sub> emissions by approx. 12,336 tons over the course of its 25-year operating time.

As a leading company in the field of valves, measurement and control systems, the GEMÜ Group strives to create a win-win situation between the company and society, and is committed to the "Green Production,

Green Partner" concept. The environmentally aware company follows a system for energy saving and environmental protection that is intended to permeate all aspects of the company and the value chain. This includes the concept of green product design, reduction of the carbon footprint throughout the product lifecycle and raising awareness of environmental protection among employees. GEMÜ China is committed to sustainable improvement of environmental conditions and is an active participant in carbon-neutral projects (such as the Jiangxi Le'an Carbon Neutral forest conservation project, which neutralized 2381 tons of CO<sub>2</sub> emissions in 2021). Furthermore, the company uses various environmentally friendly facilities such as cogeneration plants, adiabatic cooling systems, electric vehicles and charging stations. This year, GEMÜ China also joined the ESG Alliance of the German Chambers of Commerce Abroad (AHK).

Zhen Xiao, Managing Director of GEMÜ China, explained at the end of the celebration: "Economy, ecology and sustainability are concepts that the GEMÜ Group has pursued for over 50 years. We will continue to implement

a strategy of sustainable development, spearhead transformation to a green economy and thereby contribute to ensuring that the global dual climate goal is achieved as quickly as possible!"

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## GEMÜ DISTRIBUTOR CELEBRATES ANNIVERSARY 15 YEARS OF MULTIVALVE KFT.

GEMÜ distributor Multivalve Kft. celebrated its 15-year anniversary in October 2023. Multivalve Kft., which has its headquarters in Hungary, is supported by GEMÜ Austria. On the occasion of its 15-year company anniversary, Multivalve Kft. not only celebrated its success but also honoured the commitment and work of its team, which contributed to the company's many years of success.

Multivalve Kft. has been the exclusive distributor of GEMÜ products in Hungary since 2008. The company had its start in a small office with a wood-burning oven. The move to a new, strategically well placed location in 2013 marked a milestone for the company. In addition to offices, the new headquarters also include a showroom where different GEMÜ products are presented.

The customer base includes some of the country's biggest companies, with virtually every industrial sector being represented. This is a demanding task, but the Multivalve Kft. team is well equipped to master new challenges with the comprehensive support provided by GEMÜ Austria.

The success story of Multivalve Kft. is inspiring and demonstrates that perseverance, commitment and teamwork result in long-term company success. The Multivalve Kft. team is looking forward to many more successful years!



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# NEW DOCUMENTATION AND MAINTENANCE STANDARDS

## CONEXO AT BWT PHARMA SERVICE

GEMÜ customer BWT Pharma Service is a global market leader in the area of water treatment. With roughly 5,500 employees worldwide on every continent as well as 10 production centres and 8 R&D centres, BWT has a huge water treatment and purification portfolio. From small items of softening equipment for homes to large plant for industrial applications, BWT offers an incomparably wide range of solutions.

They include, for example, the manufacture and global sale of plant for generating ultra pure water and water for injection purposes in pharmaceutical applications. The company also offers plant engineering, project management from planning to final qualification and all associated services. BWT highly values the continuous improvement of every process.

In 2021, inevo solutions won BWT as a collaboration partner, convincing the company of the benefits of digitalization solution CONEXO. Besides the purchasing, engineering and customer service departments, the management of the pharmaceutical division was also successfully persuaded of CONEXO's advantages.

In a first step, the CONEXO portal was ordered solely for the customer service application, primarily for paperless diaphragm replacement. During the implementation process, a whole series of other maintenance processes emerged that could be digitalized using the CONEXO system. Before things were taken any further, all of the stakeholders involved agreed that a comprehensive analysis of the CONEXO system's potential was required. In collaboration with the University of Applied Sciences Northwestern Switzerland (FHNW), a Master's thesis entitled "RFID technology for optimization of the construction and qualification process of pure water systems" was commissioned. The results, delivered around ten months later, essentially underpinned the following conclusion:

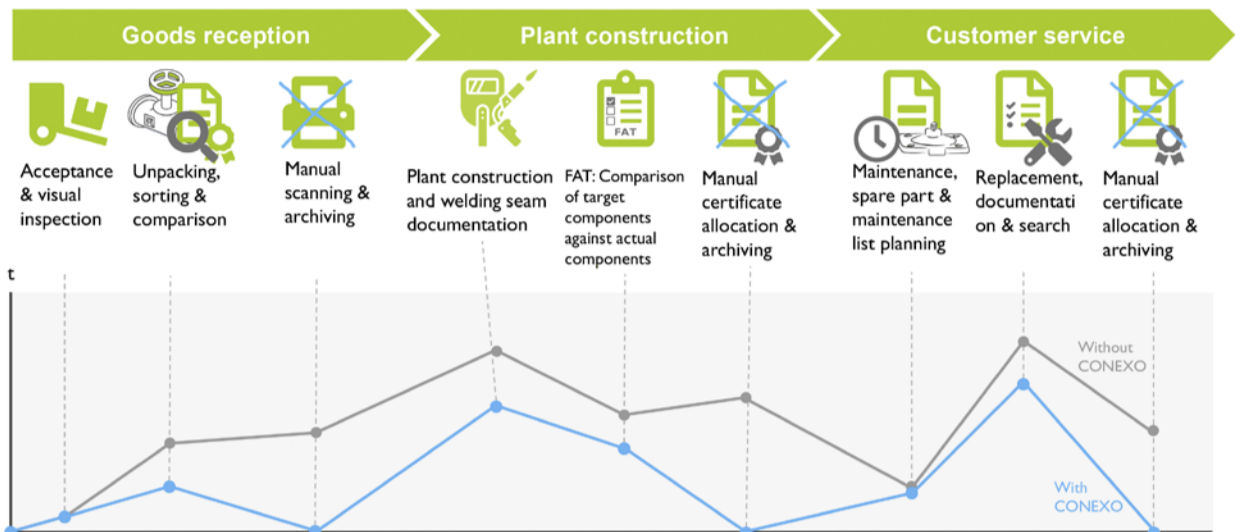
CONEXO is an optimal solution for BWT to fully digitalize all plant engineering processes. The huge time-savings potential from digitalizing every process was shown in detail, extending from the incoming goods department, to warehousing, picking and installation, including work preparation and acceptance processes, through to all after-sales processes.

Bearing in mind the importance of extremely high system availability for modern pharmaceutical plant engineering companies, the market potential to be developed from digitalizing all of these processes can only be guessed at. Even just the fact of being able to reduce the customary data management and documentation costs incurred in the pharmaceutical industry by around 70% is very impressive.

With this knowledge in mind, the management of BWT decided to enter into a very close collaboration with the inevo solutions team to implement CONEXO in all of the abovementioned areas. The decision was followed by several intensive weeks and months with the CONEXO project manager appointed by BWT, where standard processes were gradually analyzed, understood and modified by the partners to enable the required digitalization. A whole range of new interfaces, functions and applications specially developed for BWT emerged in this process.



The result achieved to date has had an enthusiastic response internationally within BWT:



The newly defined maintenance process is a great example that shows the numerous advantages of integrative digitalization with our CONEXO solution.

### 1. Planning

Service jobs are triggered by the BWT AG ERP system. This generates information on the time period and the personnel and spare part requirements for a maintenance job. At the same time, the work plan is created on the CONEXO portal, including all sub-tasks.

### 2. Preparation

In the background, the required spare parts list is compared against the existing stock on hand, and if necessary any outstanding parts are ordered. If some of the spare parts are not CONEXO-enabled, the incoming goods department takes on the task of labelling these components with a suitable QR code. Then the spare parts are provided for each service job.

### 3. Implementation

The service technician uses the CONEXO app (offline-enabled) in the function of a supervisor and can view a table showing the scope of the service job and specific step-by-step instructions for each sub-task.

### 4. Documentation and assessment

All products to be maintained are identified, entered and, if required, evaluated via the QR code and RFID tag during maintenance. The data from the CONEXO app for the required maintenance documentation is transmitted automatically to the CONEXO portal. Upon login (user-based), the maintenance process is completed with a digital signature.

### 5. Reporting

The full maintenance documentation is then generated in PDF format from the CONEXO portal and transmitted to BWT's in-house ERP system or to the end user.

As project manager Stefan Blank from BWT Aqua in Aesch put it:

"The documentation is married to the component. It is simple, yet ingenious. The CONEXO portal and CONEXO app are evolving into a technical portal for all BWT departments. Users are recognizing the advantages very quickly. The laborious search for documents and certificates and the effort required to file documents for a project are now a thing of the past. That is all done automatically now."

A survey by Statista showed that digital document management saves two working hours every day. A time-saving of two hours also matches our experience. That means employees have two more hours to take care of their actual work, which leads to safety and satisfaction.

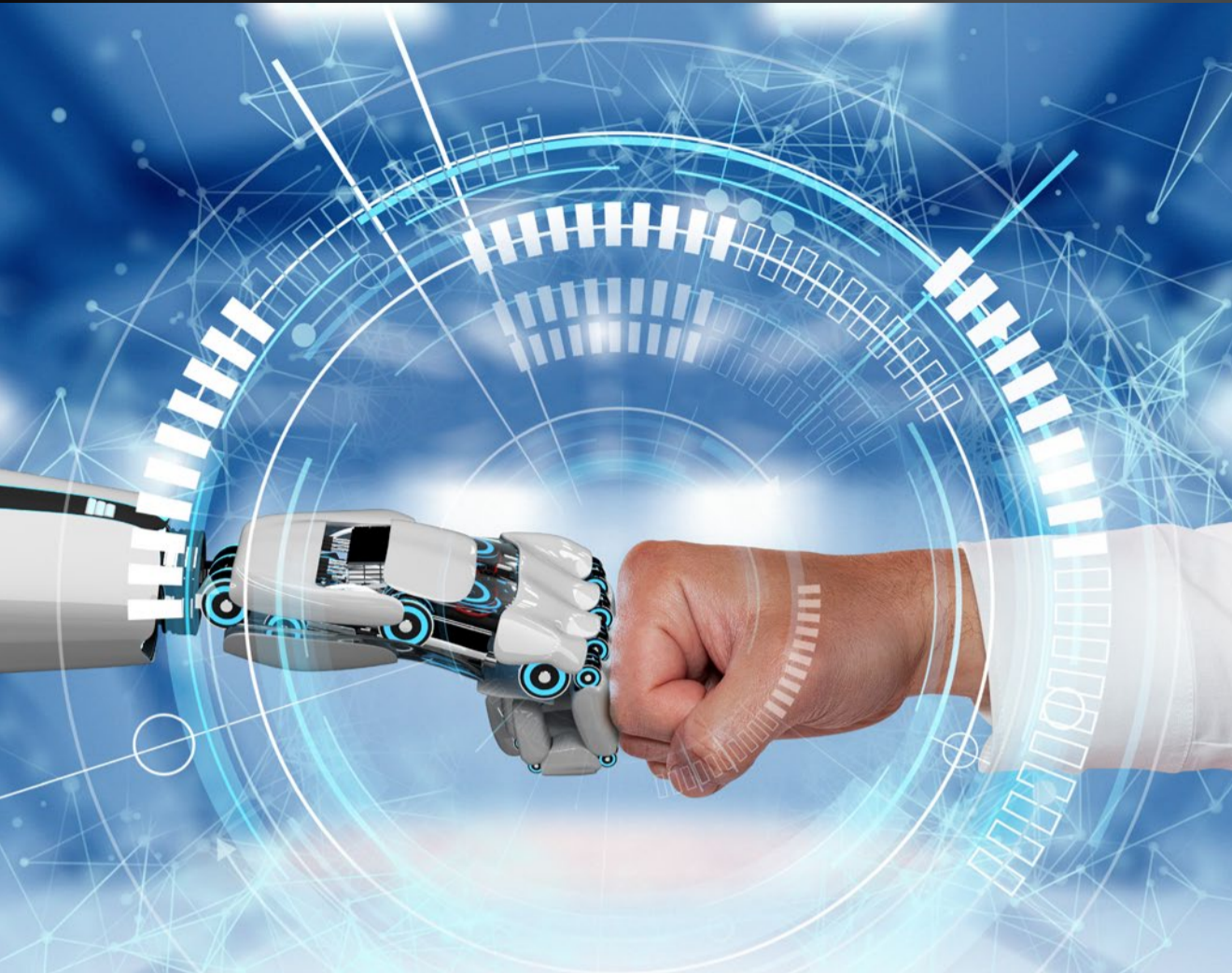
BWT is grateful to inevo solutions for its extensive support and excellent advice.

The service process described above has been the new service standard at BWT Aqua AG in Switzerland since the start of 2023. Even more optimization potential is being developed, and manageability improved. In the future, the system is to be rolled out gradually at all BWT sites that deal with pharmaceuticals. With CONEXO, inevo solutions has successfully made a significant contribution to the digital service strategy of BWT AG.

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## ANOTHER STEP TOWARDS DIGITALIZATION

### GEMÜ 4242 COMBI SWITCHBOX WITH NEW ASI-5 INTERFACE

The GEMÜ 4242 combi switchbox has been completely reworked to incorporate numerous innovations. Thanks to the universal adaptation capability, fitting to a large number of pneumatic linear and quarter turn actuators from the GEMÜ product range is possible.

One of the stand-out innovations in the new GEMÜ 4242 combi switchbox is the innovative travel sensor for valve position detection. This system is based on the use of magnets and associated Hall sensors. As a result, it is contactless and entirely wear-free. The sensors detect the magnetic field of the moving magnets and enable the position of the valve to be determined with extremely high precision. This pioneering system will replace conventional potentiometers in future.

- Traceable** due to location function
- Visible** due to programmable high visibility LEDs
- Smart** read-out from the sensor system and operation via the GEMÜ App
- Flexible** for combination with single or double acting linear actuators or quarter turn actuators
- Versatile** thanks to various materials and sizes
- Reliable** due to automatic end position programming
- UV resistant** thanks to a plastic cover made from polycarbonate
- Explosion-proof** for use in ATEX, IECEx or NEC-compliant plants
- Communicative** via an AS-Interface, DeviceNet or IO-Link interface
- Rotatable** M12 plug for orientation of the angled connections
- Without play and tension-free** for recording the valve stroke

The tried and tested direct process valve actuation by the internally installed pilot valves has been retained. That means customers do not need to connect and actuate additional pilot valves, as everything takes place in the combi switchbox itself. This saves installation time and effort and enables the product to be used more efficiently.

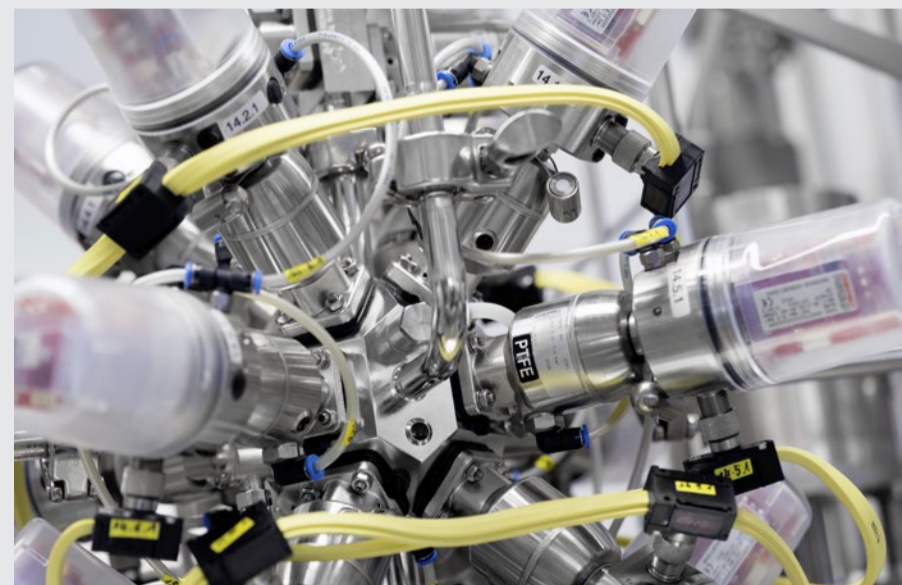
The valve position and various error and program statuses are indicated by programmable, high visibility RGB LEDs. That allows users to read the current status of the product quickly and easily. This simplifies monitoring and error diagnosis significantly. In addition, the product has innovative, autonomous end position control. The manual initialization used to date is now no longer required. This saves a huge amount of time as well as significantly reducing potential errors.

Another highlight of the new GEMÜ 4242 combi switchbox is the ability to commission and operate it via bluetooth using the GEMÜ app. With this innovative function, users can adapt and configure the devices to the application in question easily and intuitively. In addition, up-to-date operating values and sensor data can be accessed without anyone having to stand directly by the equipment. This saves time and increases efficiency.

The newly developed ASI-5 interface is one of the central innovations, creating numerous advantages. ASI-5 has been further developed as digitalization has progressed and demand for data transmission has grown, and it is currently the most state-of-the-art communication technology for connecting sensors and actuators quickly and easily. ASI means Actuator Sensor Interface and it is connected to the plant control system via a single two-wire flat yellow cable. Data for communication and energy for the power supply can both be transmitted simultaneously thanks to the unshielded two-core cable. This greatly simplifies the wiring and reduces the need for components. Contacts (piercing technology) are provided by means of contact blades or pins, which penetrate the plastic of the sheath and cores and ensure safe contact. Because of this, there is no need to prepare the cables beforehand, which simplifies installation and enables participants to be moved to any position.

Use of ASI-5 can significantly reduce cabling requirements, as less cabling is required and the maximum cable length is increased from 100 to 200 metres without an additional extension using a repeater. In addition, ASI-5 allows an AS-Interface to be configured in any topology, such as a line, star or tree.

The AS-Interface network comprises multiple components, including a master, one or more participants, a power supply unit and the AS-Interface cable. An ASI gateway, which prepares the data for digitalization, is used



for control and communication in the network. With an ASI gateway, up to two ASI circuits can be controlled from a single gateway. In addition, an IO-Link master can be connected to the gateway. The gateway has a higher-level connection to a control device, which is responsible for the control logic (program). Different manufacturers can be used on one network without any problems.

One of the most important improvements in ASI-5 is the much bigger data bandwidth. It means that up to 96 participants can now be operated in one ASI network, compared with the previous maximum of 62 participants.





# FIVE YEARS OF INEVVO SOLUTIONS SOFTWARE - MADE IN HOHENLOHE

inevvo solutions celebrated its five-year anniversary on 1 October 2023. The team consisted of eight employees when the company was founded, three of whom took on the development of CONEXO.

The inevvo team has since grown to eighteen employees. The product range has also increased from the original three applications (CONEXO portal, CONEXO app for Android and CONEXO app for iOS) to more than twenty today. These include:

- ⇒ CONEXO Portal
- ⇒ GEMÜ App iOS / Android
- ⇒ WebView Evoguard
- ⇒ License Manager
- ⇒ Identification Link Generator
- ⇒ Maintenance Checker
- ⇒ CONEXO Lite App GEMÜ iOS / Android
- ⇒ CONEXO Lite App Interroll iOS / Android
- ⇒ CONEXO Lite App inevvo iOS / Android
- ⇒ CONEXO App iOS / Android
- ⇒ WebView GEMÜ
- ⇒ WebView Rembe
- ⇒ Online Data Converter
- ⇒ Customer Style Editor
- ⇒ PDF Report Generator

Many of the new software products in inevvo solutions' range focus on "digital name plates" and target the relevant customers.

As a result, the inevvo solutions team has become deeply immersed in the field of digital name plates, digital product passports, the Asset Administration Shell and IEC 61406 in the last two years through active involvement in the DIN/DKE Standards Committee as well as in the IDTA and DDCC. Companies that use solutions in these areas now make up the majority of inevvo's customer base.

### Read on for some facts and figures:

- ⇒ More than 2.8 million components are currently equipped with a CONEXO-compatible QR code or RFID tag.
- ⇒ More than 50,000 product scans have now been carried out worldwide using the CONEXO system.
- ⇒ inevvo solutions has had a brand new homepage since 01/01/2023.
- ⇒ The first inevvo student, Patrick, completed his degree in September 2023 and has held a permanent position on the inevvo team since October.
- ⇒ The first inevvo apprentice started their apprenticeship on 1 September 2023.

One thing has stayed the same over the last few years, however: the entire team is still highly motivated and everyone shares the same goal of establishing inevvo successfully on the market.



Properties	ASi-3	ASi-5
Participants per master	Up to 62 participants	Up to 96 participants
Cycle time	5 ms cycle time for up to 31 participants	1.2 ms cycle time for up to 24 participants
Data bandwidth	4 bits	16 bits
Process data per participant	Up to 4 bytes of process data	Up to 32 bytes of process data
Number of I/Os	496 I/Os	1536 I/Os
Range	Up to 100 metres	Up to 200 metres
Compatibility	Not forwards compatible with ASi-5	Backwards compatible with all ASi generations, can be connected to IO devices

This makes it possible to transmit much more information in a very short time and opens up completely new opportunities for the configuration and scalability of ASi networks.

Another big step forwards is a reduction in the cycle time from 5 ms to 1.2 ms. This means communication between participants is much faster and more efficient. At the same time, the data bandwidth has increased from 4 bits to 16 bits per participant for each cycle. That is a milestone for the future of ASi networks, as more cyclic (up to 32 bytes of process data per participant) and acyclic data (up to 256 bytes per participant) can be input and transmitted. This results in improved plant control and monitoring. The background to this is parallel transmission instead of the previous serial communication, i.e. multiple bits are transmitted simultaneously, in other words in parallel.

Every ASi-5 participant is provided with a unique address, the ASIID. This allows it to be identified by the master and to communicate with an ASi-5 master via the network.

ASi-5 is compatible with ASi-3 and IO-Link devices. Both ASi-3 and ASi-5 work on the same cable, ensuring they can be configured together.

This mixed use offers a sustainable approach that protects resources. Users can still rely on the extensive ASi-3 product range while also switching to ASi-5 products gradually. This means that ASi-5 devices can be integrated into existing systems easily, without major modifications or investments being needed. This is particularly important for companies that already have infrastructure in place and want to upgrade their systems gradually. Precision-fit, future-proof applications can be implemented cost-effectively as a result.

The integration of a versatile sensor system in the combi switchbox enables unexpected interruptions to be avoided. These sensors make it possible to detect status changes and anomalies early on. They capture data such as the temperature, humidity, acceleration, current consumption and supply voltage. The data can be read via the communication interface and GEMÜ app. In addition, the sensor data collected is to be compressed in the device itself in the future and stored throughout the service life.

By continuously monitoring the system status, potential problems can be identified early on and resolved before an interruption occurs. The sensor data

delivers valuable information about the status of the plant and enables preventive maintenance. Analyzing the data collected enables trends and patterns to be identified that could indicate future problems.



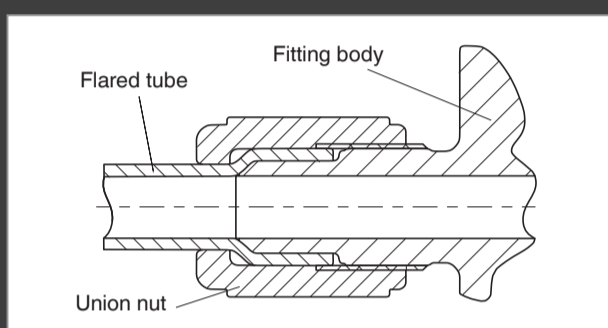
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# OPTIMIZED FLARE CONNECTIONS GREATER SAFETY AND FLEXIBILITY WITH NEXUS CONNECT®

In the semiconductor industry, flare connections are an established standard in the area of media distribution. However, this connection type reaches its limits in applications with extreme pressure and temperature requirements. GEMÜ now has a solution: The Nexus Connect® connection, an innovative solution that not only provides higher safety and reliability, but also ensures seamless compatibility with existing fitting systems.

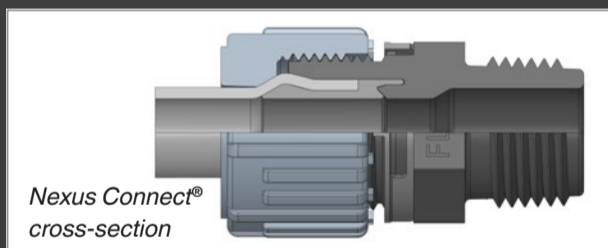
One of the most widespread connection types in the semiconductor market is the flare connection. This is a tube-clamp connection. The flared tube (see Flare Video instructions, page 5) is placed on the flare connection of the valve or fitting and fixed in place with a union nut. The seal is created at the precise point where the tube is pressed together with the fitting body via the tightened union nut.



The flare connection has become an established standard among many customers over the years, and is primarily used in the supply area of semiconductor plants. In the modules used in this area, media are transferred in huge quantities and the correct ratio to the actual manufacturing processes – into the process area. This is where the process steps required to create a microchip are performed.

The requirements for the connections vary depending on the area of application. For the supply area, the primary requirement alongside resistance and purity is the Kv value, whereas in the process area, small size and precise dosing of the media are the crucial factors. However, the pressure and temperature conditions are different between these two areas, as they are substantially higher in the process area. The conventional flare connection is not designed for this temperature/pressure ratio in most cases. For this reason, components referred to as optimized flare connections, also known as insert-style connections, have been developed in recent years. In these components, an additional insert/sleeve is pressed into the tube. This design achieves a higher pressure/temperature rating.

GEMÜ already offers the optimized flare connections that are currently available on the market for GEMÜ CleanStar and GEMÜ iComLine valves. However, until now, it was not possible to offer these connections consistently throughout the entire HP product range and supply suitable fittings for them to customers.




This possibility has now been achieved with the Nexus Connect® connection. This optimized flare connection has been developed by Fit-Line Global®. This fitting manufacturer, with whom GEMÜ has successfully collaborated for many years already, is now offering high-quality fittings as a supplement to the GEMÜ FlareStar fitting range.

Fit-Line Global® has more than 30 years of experience in designing and manufacturing fittings, which underlines their specialisation and expertise in this sector. Thanks to the well-established collaboration and excellent test results of the Nexus Connect® connection, GEMÜ has decided to integrate this component into its product range. By doing so, the company is taking an extra step to expand its product range and optimally prepare it for use in the process area. Together with FitLine Global®, GEMÜ intends to establish Nexus Connect® on the market and introduce it to customers.

One excellent feature of the Nexus Connect® connection is its compatibility with the most widely used optimized flare connection at present. This means that customers can integrate GEMÜ valves or fittings into their existing systems without needed to replace other components. The two connection types can be combined easily and smoothly, as has been proven by test data from Fit-Line Global®.

In parallel with the complete fitting range offered by GEMÜ, the entire product range will now be gradually equipped with the Nexus Connect® connection. The introduction of this connection begins with the GEMÜ CleanStar series, which will initially be available with welded on adapters as well as in the compact SpaceSaver version. In the future, the Nexus Connect® connection will also be available in a machined version on the GEMÜ iComLine series as well as the GEMÜ PC50 blocks.

The goal in future is to introduce this connection type across the entire GEMÜ product range in order to be able to consistently offer a single optimized flare connection with the Nexus Connect® with fittings suitable for all GEMÜ products. This step promises to substantially improve potential and market share, particularly in the process area.

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## WELCOME TO THE WORLD OF GEMÜ 45 NEW APPRENTICES AND STUDENTS

**Training for 45 new apprentices and students at GEMÜ and inevo solutions began on 1st September.**

Every year, GEMÜ focuses on the subject of "getting to know each other" in the first week of September. The agenda included visits to locations and a joint excursion, as well as product and IT training courses.

The highlight of the week was the GEMÜ Rally, which was held together with the members of the previous training years. The participants were challenged to show creativity and team spirit at many different stations in and around the Ingelfingen headquarters of the valve specialist GEMÜ. The week came to a relaxing close with water games and a communal barbecue.

The new apprentices and students are a valuable addition to the GEMÜ Team, and we are all looking forward to support them in their training and studies.

The training offered by GEMÜ now encompasses 15 commercial, technical and industrial training professions as well as almost 20 different options for dual and cooperative courses of study. More information is available at: [www.gemu-group.com/ausbildung-studium](http://www.gemu-group.com/ausbildung-studium)

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# GEMÜ WINS SEAL "GERMANY'S BEST JOBS WITH A FUTURE"

Quality, innovative capacity, reliability and resilience are all highly valued at technology company GEMÜ. As a result, the valve manufacturer offers high-quality solutions to its customers and a stable, reliable working environment to its employees. Because of this, GEMÜ has been awarded the seal "Germany's best jobs with a future" by DEUTSCHLAND TEST in cooperation with Focus Money.

IMWF, the German management and economic research institute, investigated more than 6,000 companies in this connection. Three criteria – sustainability, cost efficiency and working environment – were included in the ranking, accounting for a third each. To conduct the analysis, German-speaking domains were searched through for previously selected keywords, and the text was entered into a database. In a second step, the text was analyzed in a three-stage process using artificial intelligence, and, based on the results, the companies were rated according to a points system. The winner in each industry was given 100 points.

GEMÜ scored 73.3 points in the machinery and plant construction category, winning the award "Germany's best jobs with a future".

"We have been developing, producing and marketing high-quality valves, measurement and control systems and customised system solutions for liquids, vapours and gases for almost 60 years. With our highly qualified, dedicated staff, we have evolved into the global market leader. To ensure we stay successful in the future, we are investing extensively in research & development and are continuously expanding our range of solutions. As a result, we are growing all the time. The new GEMÜ headquarters in the Hohenlohe business park is currently under construction, a state-of-the-art building that will guide us into the future," explains Gert Müller, Managing Partner of the GEMÜ Group.

 **Ivona Meißner**  
Specialist Corporate Communication  
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## NEW TRAINING PROFESSIONS AT GEMÜ

In response to the increasing demand for qualified skilled workers, GEMÜ has expanded its range of training opportunities.

Starting from this year, the valve specialist has also offered training for the vocational professions of surface coating technician, warehouse specialist, industrial mechanic, and electronics technician for operating technology. It has also introduced the study programmes of business administration – digital business management, applied computer science, business information systems – business engineering, data science and artificial intelligence, chemical and biological engineering, industrial engineering and management – electrical engineering, and electrical engineering – infotronic systems.

### Surface Coating Technician

This is for anyone interested in the removal of materials in order to produce functional surfaces or the chemical and electrochemical deposition of metals and alloys. Activities include planning, controlling and optimizing workflows and evaluating results.

### Warehouse Specialist

This is for anyone who enjoys organizing, working in a team and ensuring smooth procedures at GEMÜ. Activities include operating forklifts and other transport systems and computer-based work using the installed merchandise management system. You can gain the vocational training qualification as a warehouse specialist in just two years and immediately start your career.

### Industrial Mechanic

This is for anyone who is passionate about machinery, plants and their safety. The activities of an industrial mechanic include organizing and checking production runs, as well as installing and networking machinery and production facilities, for example.

### Electronics Technician for Operating Technology

This is for anyone who enjoys tinkering with and repairing technical end devices and who is interested in electronics and software. Activities include creating and commissioning plants and installations, as well as monitoring, servicing and repairing plants and installations, for example.

### Bachelor of Arts: Business Administration – Digital Business Management

The Business Administration – Digital Business Management study programme is a broad-based course that combines the fundamentals of business administration with extensive IT skills. This enables students to

support the commercial development of companies and to establish the conditions for successful digital transformation processes in practice. This study programme at DHBW Bad Mergentheim (Bad Mergentheim Cooperative State University) addresses the hugely and increasingly important matter of modern information and communication processes as drivers for change processes in the processing industry ("Industry 4.0").

### Bachelor of Science: Applied Computer Science

The Applied Computer Science study programme at DHBW Bad Mergentheim (Bad Mergentheim Cooperative State University) is a broad-based course focused on teaching different technical skills for a wide range of technical IT areas within industrial enterprises. Students learn how to develop software, how to ensure the success of projects, how to handle huge amounts of data, where artificial intelligence is required and much more besides.

### Bachelor of Science: Business Information Systems – Business Engineering

The study programme at DHBW Heilbronn (Heilbronn Cooperative State University) is perfect for anyone who would like to work in a future-oriented area of IT but does not want to spend all day programming. It is also for anyone interested in economic topics but who does not want to study for a conventional business administration degree. The programme combines economics with work in the future-focussed area of HR IT.

### Bachelor of Science: Data Science and Artificial Intelligence

Artificial intelligence and data science are the key technologies of the digital transition and will enable many innovative products and developments to be created. The study programme at DHBW Mosbach (Mosbach Cooperative State University) enables our students to significantly advance the digital transition and to shape the future of it.

### Bachelor of Science: Chemical and Biological Engineering

The Chemical and Biological Engineering study programme at DHBW Mannheim-Eppelheim (Mannheim-Eppelheim Cooperative State University) combines technical and scientific approaches. It provides insights into chemical, biological and physical process and outlines how these processes are used in plants in the pharmaceutical, food engineering and cosmetics industries, for example.

### Bachelor of Engineering: Industrial Engineering and Management – Electrical Engineering

More and more products nowadays contain automation and digitalization components. In order to provide customers with the best possible advice and to continuously refine products, employees in Sales and Product Management increasingly need to acquire knowledge of electrical engineering. The study programme at DHBW Mannheim-Eppelheim (Mannheim-Eppelheim Cooperative State University) is intended to lay the foundation for this.



### Bachelor of Engineering: Electrical Engineering – Infotronic Systems

The electrical engineering study programme with a focus on infotronic systems at DHBW Mosbach (Mosbach Cooperative State University) is where hardware meets software and humans become part of the information flow. The area of infotronic systems combines fundamentals of electrical engineering in automation with advanced content from information and communication technology, computer science and business information systems. This is supplemented by elements of engineering and content from operational information and process management. Students are trained as application-oriented engineers, particularly in the development and project planning of automation and information technology solutions within our company.

## 2024 training dates

### ONLINE TRAINING

#### SPECIALIST LEVEL

##### ⇒ Product training in valve designs

- PV1000GBON Valves for the biotechnology, pharmaceutical, foodstuffs and cosmetics industries  
*29th April 2024, 1:00 pm – 5:00 pm*
- PV1100GBON Single-use valves for the biotechnology and pharmaceutical industries  
*30th April 2024, 1:00 pm – 5:00 pm*
- PV2000GBON Valves for high purity, semiconductors and critical media industries  
*27th May 2024, 1:00 pm – 5:00 pm*
- PV3000GBON Diaphragm valves in the chemical and processing industries and water  
*06th May 2024, 1:00 pm – 5:00 pm*
- PV3004GBON Globe valves in the chemical and processing industries and water  
*07th May 2024, 1:00 pm – 5:00 pm*
- PV3001GBON Ball valves in the chemical and processing industries and water  
*03rd June 2024, 1:00 pm – 5:00 pm*
- PV3002GBON Butterfly valves in the chemical and processing industries and water  
*04th June 2024, 1:00 pm – 5:00 pm*
- PV4000GBON Automation components and accessories for linear valves  
*13th May 2024, 1:00 pm – 5:00 pm*
- PV4001GBON Pneumatic quarter turn actuators and automation components for quarter turn valves  
*05th June 2024, 1:00 pm – 5:00 pm*
- PV6000GBON Special bodies for diaphragm valves and multi-port valves  
*28th May 2024, 1:00 pm – 5:00 pm*

##### ⇒ Product training in measurement and control system

- PM0101GB Measurement devices and measurement principles for pressure, temperature, level and volumetric flow  
*10th June 2024, 8:00 am – 5:00 pm*
- PM0201GB Positioners: Function and application  
*11th June 2024, 8:00 am – 5:00 pm*
- PM0301GB Process controllers: Function and application  
*12th June 2024, 8:00 am – 5:00 pm*

##### ⇒ Product training in electrical actuators

- PE1000GBON Motorized linear actuators  
*14th May 2024, 1:00 pm – 5:00 pm*
- PE2000GBON Process solenoid valves  
*15th May 2024, 1:00 pm – 5:00 pm*
- PE3000GBON Motorized quarter turn actuators  
*06th June 2024, 1:00 pm – 5:00 pm*

### ONLINE TRAINING

#### ALLROUNDER LEVEL

##### ⇒ Basic technical principles of valve designs

- GV0101GBON Functional principles of valves and their selection criteria (basic module)  
*08th April 2024, 1:00 pm – 5:00 pm*
- GV0102GBON Plastics in valve and pipeline construction  
*09th April 2024, 1:00 pm – 5:00 pm*
- GV0103GBON Metals in valve and pipeline construction  
*10th April 2024, 1:00 pm – 5:00 pm*
- GV0104GBON Pipe connectors and assembly information  
*11th April 2024, 1:00 pm – 5:00 pm*
- GV0105GBON Explosion protection, ATEX / IECEx  
*18th April 2024, 1:00 pm – 5:00 pm*
- GV0106GBON Surface finishing in plant engineering  
*12th April 2024, 1:00 pm – 5:00 pm*

##### ⇒ Basic technical principles of application technology

- GA1000GBON Procedures and processes in the biotechnology, pharmaceutical, foodstuffs and cosmetics industries  
*15th April 2024, 1:00 pm – 5:00 pm*
- GA2000GBON Procedures and processes in High Purity, semiconductor and critical media  
*16th April 2024, 1:00 pm – 5:00 pm*
- GA3000GBON Procedures and processes in the chemical, processing and water industries  
*17th April 2024, 1:00 pm – 5:00 pm*

##### ⇒ Basic technical principles of measurement and control systems

- GM0101GBON Introduction to electric systems, electronic systems and pneumatics (basic module)  
*22nd April 2024, 1:00 pm – 5:00 pm*
- GM0102GBON Measurement variables and measurement principles in process engineering (basic module)  
*23rd April 2024, 1:00 pm – 5:00 pm*
- GM0103GBON Control circuits: Their construction and function  
*24th April 2024, 1:00 pm – 5:00 pm*



### SERVICETRAINING

#### SPECIALIST LEVEL

##### ⇒ Qualified service fitter for GEMUE valves and automation components

- SM1001GB\* Servicing and changing replacement and wearing parts in diaphragm valves for hygienic and sterile applications, attachment and readjustment of valve accessories.
- SM2001GB\* Servicing and changing replacement and wearing parts in HP CleanStar diaphragm valves, attachment and readjustment of valve accessories. Expert manufacture of ultra pure PFA tube connections for the GEMÜ FlareStar/TubeStar tubing and fitting system
- SM3001GB Servicing and changing replacement and wearing parts in globe valves, attachment and readjustment of valve accessories
- SM3002GB Servicing and changing replacement and wearing parts in elastomer butterfly valves, attachment and readjustment of valve accessories
- SM3003GB Servicing and changing replacement and wearing parts in diaphragm valves for industrial applications, attachment and readjustment of valve accessories
- SM4001GB Installation and commissioning of valve accessories such as stroke limiters, electr. position indicators and positioners

\* On-site briefing, approx. three hours, appointments by arrangement, minimum five participants

#### EXPERT LEVEL

##### ⇒ Service training for GEMUE diaphragm valves

- ET1001GB Training as authorized service expert for GEMÜ diaphragm valves  
*19th June 2024, 8:00 pm – 5:00 pm*  
*Suitable for external service and maintenance personnel with the skills of an experienced mechanic (face-to-face-training).*

The training courses will be held in German.

Subject to changes!

#### Technical Training

Service Department  
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Telefon +49 (0) 7940 123-420

## TRAINING

BEGINNER



PROFESSIONAL