Hennecke GROUP

INNOVATIONS

ISSUE 123

Hennecke customer magazine for technologies and trends on the polyurethane market

TOPLINE MK2

The premium class among high-pressure metering machines

ESG VALUES ARE AT THE HEART OF OUR TRANSFORMATION.

Dear customers, dear business partners,

Transformation and renewal are central topics in the Hennecke GROUP. In the last issue of INNOVATIONS, we already presented our path to Hennecke 2.0. In this issue, we show why the hot topic of ESG has been at the center of this transformation process from the very beginning. Because ESG values are the basis of our actions in all areas: In accordance with our Vision & Mission and in line with our Core Values, we want to be able to explain to future generations with a clear conscience how we do business in the Hennecke GROUP. We take responsibility – for our company, our employees, society and our environment with the products and services we offer on the market. The Hennecke Business System with its culture of success and Management by Objectives promotes transparency, authenticity and a trusting cooperation with our stakeholders as the basis of our actions. For this reason, Hennecke GROUP will already publish its first sustainability report at the end of the year, which will document in detail the goals we are striving for, the planned ways to achieve them, and the measures already implemented to accomplish them.

In order to also make it easier for our customers to achieve their ESG goals, we are continuously improving our product and service portfolio and adapting it to current and, above all, future requirements. On the one hand, this is reflected in new, even more efficient products characterized by lower energy requirements, higher precision or better raw material efficiency. On the other hand, through innovative and intelligent software solutions that open up entirely new worlds for our machines and plants with the Internet of Things (IoT) or artificial intelligence (p. 19). And it is not only the current product portfolio that benefits from this. Since Hennecke plants are often in use for several decades, they can also be raised to a whole new level again with new software.

One of the highlights of the year and our pride and joy is the presentation of the new TOPLINE MK2, the top model of our high-pressure metering machines, which now completes the range of Next Generation Metering Machines (p. 10). It is the impressive result of three years of development work, which is reflected in every detail of the machine. This premium product opens up undreamt-of possibilities for users and processors of polyurethane at a previously unattained level of quality.

We invite you to read about our current activities and products in this issue of INNOVATIONS. We hope you enjoy reading

Yours,

Thomas Wildt,
CEO Hennecke GROUP

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FOAMATIC IoT – Hennecke goes to a whole new level online

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Tracking down sustainable raw materials

HENNECKE‘S SUSTAINABILITY STRATEGY

The topics of sustainability and corporate responsibility have increasingly come into focus in recent years. The focus is on climate change, which is becoming increasingly present – but also on steadily rising energy costs and specific legislative requirements, e.g. to measure or reduce CO_2 emissions (European Green Deal). In this context, it is important to create transparency about sustainability-related risks and opportunities in the impact on people and the environment in the practice of companies.

In the new version of the legal framework, a company‘s sustainability and financial information have equal priority. This set of rules is divided into three areas: Environment, Social and human rights, and Governance, abbreviated to “ESG.” This means much more than just environment friendliness, even if this area is usually the focus of public attention. Rather, it is a comprehensive overall package with criteria for assessing the sustainability performance of companies in all areas in order to make them fit for the future in the long term.

Hennecke GROUP recognizes its responsibility and has been committed to a comprehensive package of measures in all areas since 2020. The goal is clearly defined: Shaping entrepreneurial success sustainably, for stakeholders and above all for a future worth living.

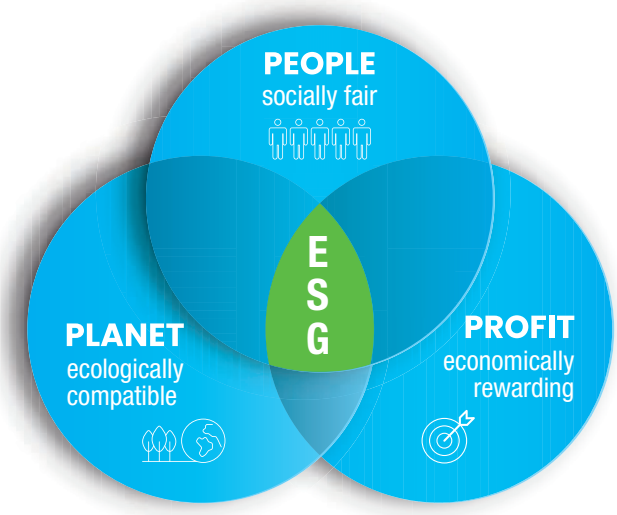
> *„Since 2020, we‘ve been investing 4 to 5 percent of our annual turnover in ESG-related topics.“*
>
> Thomas Wildt,
> CEO of Hennecke GROUP

ESG a central topic at Hennecke since 2020

While many companies still have the ESG reporting required by law from 2025 for larger companies with its more than 100 measurable and verifiable key figures on the topic of sustainability as a task ahead of them, Hennecke GROUP is a decisive step ahead here. “Since 2020, we‘ve been investing 4 to 5 percent of our annual turnover in ESG-related topics,” reports Thomas Wildt, CEO of Hennecke GROUP. The company will publish its first sustainability report as early as the end of 2023. Especially during the economically difficult phase of the pandemic, the time was actively used to invest, to drive the modernization of the company and to make it permanently fit for the future. In the middle of 2019, the Hennecke Business System (HBS) was created, based on the company‘s vision and mission. “The Hennecke Business System generates business sustainability. This is done by generating long term customer value – in other words by offering products and services that enable customers to reach their highest level,” declares Thomas Wildt. This was followed during the pandemic by the Hennecke Production System (HPS), a lean production system based on the Toyota model but thought further ahead – which already includes the components of employee orientation, environmental management and corporate governance.

People, planet, profit

The central idea is that a company can only operate on a sustainable basis if it takes into account "the three P's": people, planet, profit – values that already largely correspond to today's ESG. „ESG is a top priority at Hennecke. As a fundamental part of our corporate strategy, it's right at the top," affirms Thomas Wildt. This is why these core objectives are at the top of Hennecke's strategy pyramid and are then broken down step by step to the other levels, down to each individual department, employee and product. Thus, with the introduction, all products and services of the future were also defined, new machines were developed and old ones were taken out of service. The focus is always on the customer – who should be able to save raw materials and energy, work more ergonomically and have less maintenance with Hennecke machines. Numerous examples, such as the Next Generation of high-pressure metering machines, the use of Hennecke Blue Intelligence for greater energy and resource efficiency, and many new and further technical developments are proof of the successful implementation.



The "three P's" – People, Planet and Profit – are fundamental components of Hennecke's corporate strategy.

ESG – BRIEFLY EXPLAINED

ESG values promote transparency. They make companies measurable, assessable and comparable in their sustainability activities.

Environmental

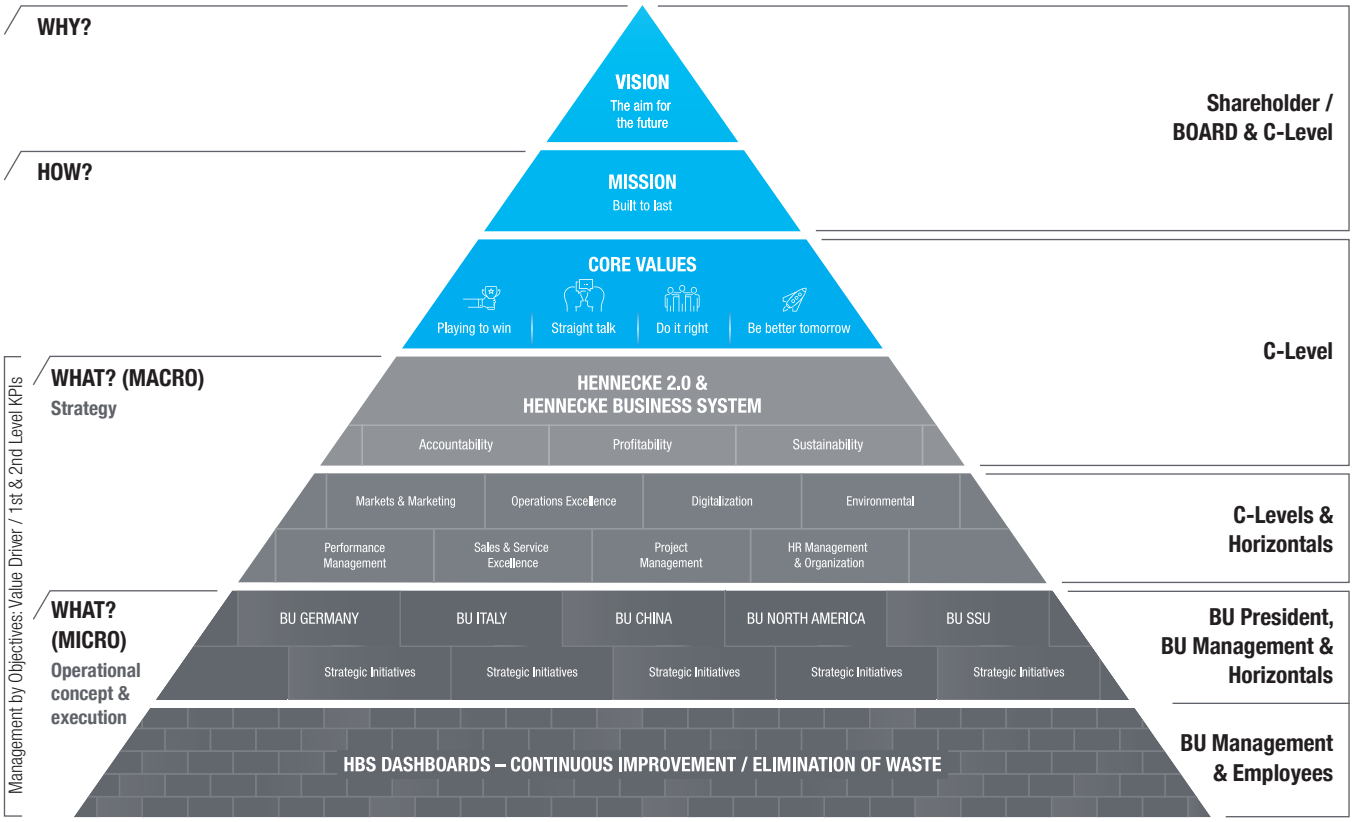
This area relates to the environmental impact of companies and covers topics such as climate protection and climate change mitigation, resource use and recycling management, waste management, the proper and professional handling of hazardous substances, or the prevention of soil and groundwater pollution. In short: the commitments and targets for reducing the ecological footprint and preserving biodiversity and ecosystems.

Social

This aspect deals with a company's relationships with its employees, customers, suppliers and society as a whole. Topics such as working conditions, human rights, equal treatment and equal opportunities (diversity, equity, inclusion), health and safety in the workplace, the safety of consumers and end users, and social commitment are relevant here.

Governance

This item describes the way in which a company is managed and controlled. This includes corporate governance and culture, ethical principles, fair business relations, integrity, transparency, board composition, independent auditing and compliance.



In Hennecke's strategy pyramid, the ESG core objectives are firmly anchored in Vision & Mission and the HBS and are broken down from there to all individual areas.

Environmental: Commitment to the environment

Ecological and economic sustainability have always been anchored in the company's DNA. Hennecke GROUP's ESG strategy makes it possible to create long-term sustainable added value for its customers that is ecologically compatible, socially just, economically rewarding and thus future-proof. On the basis of values and key figures, the successes are continuously reviewed and future development fields are identified at an early stage. The Environment area covers two aspects: on the one hand, the company's own handling of raw materials and energy in production, and on the other hand, the development of technologies that enable customers to produce with even greater resource and energy efficiency using Hennecke machines and systems.

Hennecke is thinking in larger contexts: The company has joined the Science Based Target Initiative (SBTi), a cooperation of the Carbon Disclosure Project (CDP), the United Nations Global Compact (UNGC), the World Resources Institute (WRI) and the World Wide Fund for Nature (WWF). This initiative supports companies in aligning their actions to achieve the goals of the Paris Agreement. "We deliberately chose a global initiative because Hennecke GROUP has an export share of over 90 percent – the majority of which is outside the EU," Thomas Wildt explains this choice. Together with more than 6,000 international companies, the company is thus committed to gradually reducing its greenhouse gas emissions. The goal is to become CO_2 neutral by 2050.

Reduce, replace, compensate

To achieve this goal, Hennecke is pursuing three approaches. The first is to significantly reduce its own energy consumption. This is done through a variety of small and large measures. For example, at the production site in Italy, the entire lighting system was switched to energy-saving LED lamps, resulting in savings of more than 50 percent. At the German Group headquarters, the entire heating system is currently being renewed. But even small measures such as water-saving toilet facilities and intelligent light sensors are having a major impact overall. Secondly, fossil fuels are gradually being replaced by energy from renewable sources. On the one hand, this is done by purchasing electricity from renewable sources. However, Hennecke also produces its own electricity: another of the four worldwide sites was recently equipped with photovoltaic systems. Since then, the production sites in Italy and China now generate more than half of their own electricity requirements. The extent to which this is also possible in Germany and the USA is currently being examined. As it is likely to remain a major challenge in the coming years to generate all energy requirements in a CO_2-neutral manner, the remaining CO_2 emissions will be offset by suitable measures and projects in a third step.

50 percent green electricity as early as 2024

To prove that this is not just lip service, concrete, short-term goals have also been defined. For example, as early as 2024, half of Hennecke GROUP's global electricity requirements will come from renewable sources – the powerful solar plants are a first step in this direction. Further evidence of the company's sustainable actions is that Hennecke GROUP is certified according to the international environmental management system ISO 14001 at all its sites. ISO 14001 comprises numerous standards on various areas of environmental management, such as life cycle assessments, environmental indicators or environmental performance evaluations, and is reviewed every three years. The

company's headquarters in Germany will be the first to be certified in the first half of 2024, and preparations are underway at the other sites for certification in the near future. An additional component of the package of measures relates to the avoidance, reduction and recycling of waste. The volume of waste is to be successively reduced year by year in order to conserve resources.

Better ESG values thanks to Hennecke products

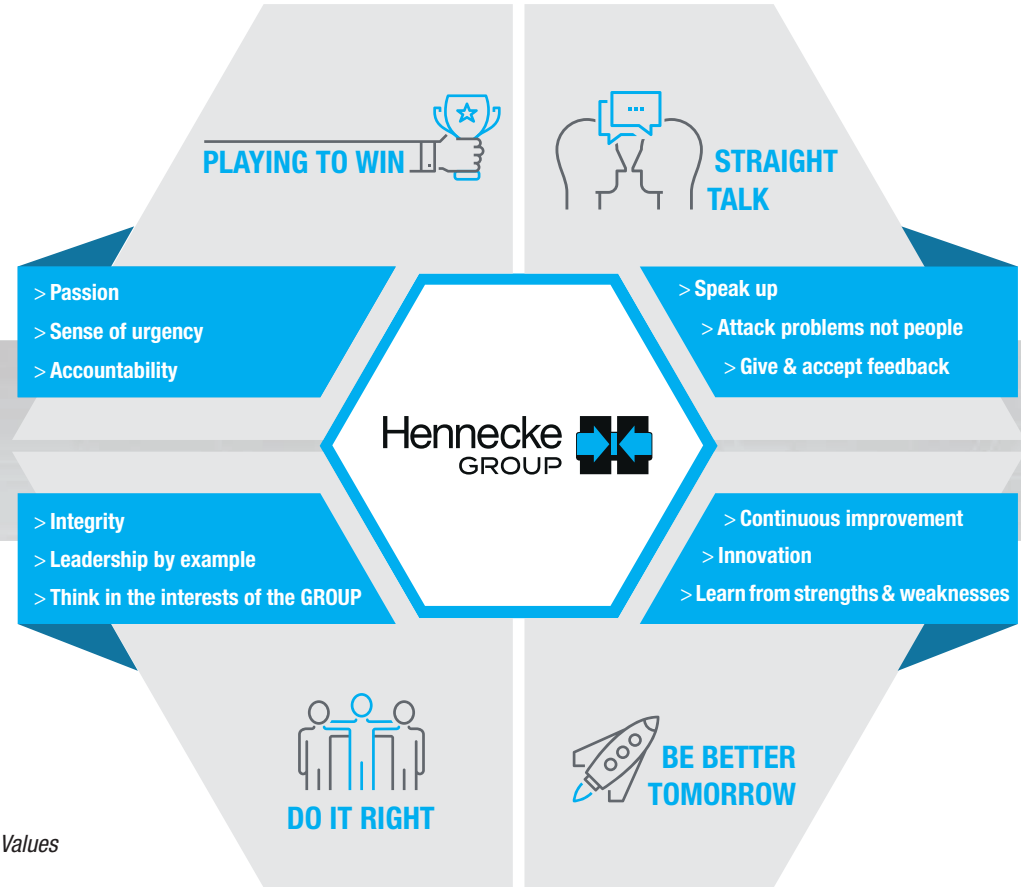
In the direction of its customers, Hennecke is also committed to developing products and services that are resource-friendly, low-emission and ergonomic. "Put more specifically, this means that every newly developed product must be significantly better than the previous solution in terms of its ESG properties," explains Sabine Rudolf, Senior Director Global Hennecke Business System & ESG. For example, it must consume less electricity or require less compressed air, work with environmentally friendly lubricants or be more ergonomic to operate. A current example is the Next Generation of high-pressure metering machines with numerous features that can increase resource efficiency and reduce energy consumption by up to 50 percent in standard applications. Furthermore, Hennecke machines and systems have always been characterized by their very long service life and can be used economically for decades thanks to a wide range of retrofit solutions. The sensible retrofitting of existing production plants in particular is increasingly the focus of the entire Hennecke product range.

In addition, the new "Environmental Technologies" product line was launched in 2022. This comprises new products or technologies as add-on or stand-alone solutions that enable customers, for example, to recycle, downcycle or even upcycle production residues and cuttings and thus generate new value from former waste. "At the latest with the considerable price increases for energy supply in many parts of the world, the topic of energy saving is also clearly in the foreground from the customer's point of view," reports Thomas Wildt. For this reason, the development department is currently working on further technologies that reduce energy consumption: for example, using heat exchangers to efficiently utilize the energy of exothermic reactions such as those that occur during polyurethane processing, or through developments that enable even more precise metering and thus raw material savings (see page 16).

Social: The focus is on people

The social area refers to the people at and around Hennecke: the employees, but also partners, customers and suppliers. Above all, the employees are the company's most valuable asset. Together with the research and consulting

On the roof of the Chinese plant in Jiaxing, Hennecke has installed a photovoltaic system that covers more than 50 percent of its own electricity requirements.



Hennecke's Core Values to drive success.

institute Great Place to Work (GPTW), the corporate and workplace culture is analyzed, made visible and further developed. The first employee survey on this was carried out in 2021, and since then 170 specific measures have been implemented across the Group with the aim of achieving Great Place to Work certification in 2025. These efforts are part of Hennecke's commitment to improving working conditions for employees and thus, for example, reducing the number of days lost through a reduction in the injury rate at its sites. Retaining employees and their know-how in the company is a high priority. One target successfully implemented to date is therefore to keep the fluctuation rate below 5 percent throughout the Group. Another key figure is to fill 70 percent of new positions with internal employees. To this end, all employees receive regular training and development opportunities in order to realize their own development potential in the best possible way.

The automated storage towers make work in the warehouse not only more efficient, but also more ergonomic.

Communication and transparency

A key factor in involving all employees is clear and open communication and corporate transparency. "New measures are not imposed from above, but are developed jointly in workshops. This not only increases acceptance, but also brings in a lot of valuable knowledge and ideas from the workforce," reports Sabine Rudolf. Particularly at sites where modernization measures are being carried out, this generates indispensable input on ergonomic requirements, the latest tools or other smart solutions. Equally important are the Group-wide communication updates that take place once a quarter. This ensures that every employee knows how the company is doing, where things are happening and what innovations are in the pipeline. In addition, numerous events such as open houses, innovation days, customer events, "Bring your kid to work" events, or targeted invitations from schools and universities round off the shared togetherness. Last but not least, Hennecke is also involved regionally at the respective sites in order to become actively involved in the local com-

Binding code of conduct in the worldwide Hennecke GROUP companies.

The Kunststoff-Initiative Bonn/Rhein-Sieg (Plastics Initiative Bonn/Rhein-Sieg) was honored by the German Federal Ministry of Economics and Technology as a regional industrial initiative in the communication category. Hennecke is a founding member.

munities. For example, by supporting sports or local history clubs or by getting involved in initiatives for a more sustainable future.

Governance: Focus on sustainable values

The topic of conformity with or compliance with guidelines, laws and standards is the focus of the Governance area at Hennecke. This includes, on the one hand, the certification of the quality management system according to ISO 9001:2015, with which Hennecke has already been certified since 1997, but also the certification of the energy management system according to ISO 50001:2018.

With the development and implementation of the Hennecke Business System, the Code of Conduct – a binding code of conduct – was also introduced in the worldwide group of companies. This serves as a binding guideline for making qualified and ethically justifiable decisions in daily work. In this way, Hennecke builds a foundation for mutual trust within the company, just as it does with customers, partners and within the local communities surrounding the sites located around the world. “Integrity, honesty and conformity help us in our decision-making processes and communication. The Code of Conduct is a clear commitment to sustainable corporate development,” reports Jens Frandrup, Vice President HR at Hennecke GROUP, of the launch. All employees have received a copy of the Code of Conduct as well as appropriate training. From now on, long-term and sustainable success is the declared corporate goal – strategically planned and not at any price. “Our aspiration is to create sustainable value for our partners and shareholders. We promote long-term profitability and good business practices along our entire value chain with the Hennecke Business System culture,” adds Sabine Rudolf. Precise procedures and control processes have been defined in order to be able to continuously monitor compliance with the targets set on the basis of key figures. Moreover, a dedicated ESG dashboard is currently being created that will present the respective ESG factors in addition to the financial information in market reporting.

Successful thanks to ESG

In summary, it can be said: With the transformation to the Hennecke Business System, ESG is a central component of the company and a key success factor. This proves that sustainability does not necessarily mean a restriction, but rather a gain. After all, sustainable business means long-term, plannable and secure action. This brings security not only for the company itself, but also for customers, service providers, suppliers and other partners. ■

TOPLINE MK2 – THE PREMIUM CLASS AMONG HIGH-PRESSURE METERING MACHINES

HENNECKE PRESENTS ITS TOP MODEL FOR THE MOST DEMANDING AND HIGHLY AUTOMATED SPECIAL APPLICATIONS.

With the introduction of the TOPLINE MK2 in the latter half of 2023, Hennecke will complete the "Next-Generation" series of its high-pressure metering machines. Following the introduction of the ECOPLUS MK2 in the previous year and the new HIGHLINE MK2 at the beginning of the year, the top model TOPLINE MK2 is the crowning glory of Hennecke's Next-Generation series. Alongside powerful basic equipment, it offers maximum flexibility and adapts to even the most complex process requirements thanks to numerous optional modules.

First choice for demanding tasks

The TOPLINE MK2 covers all conceivable PU applications. This is the case too when it comes to highly demanding raw material systems typically requiring the most exact temperature control possible. It is also the first choice for highly automated applications such as refrigerated furniture production, seat foams or roof modules for automotive production. It is used as a stand-alone solution or in all conceivable sys-

tem configurations where the highest quality, the greatest possible production and process stability as well as automation and scalability are required. "It's not without reason that the TOPLINE MK2 is also the basis and heart of a wide variety of large-scale production systems – these often including several metering machines at the same time," explains Patrick Brüninghaus, Director Product Management at Hennecke.

Comprehensive premium equipment

For the design of the new generation of high-pressure metering machines, Hennecke analyzed and summarized the range of applications among its customers. Thus, the new TOPLINE MK2 already covers more than 80 percent of all common applications in its basic configuration. Despite the extensive equipment features in this standard version of the premium model, customers benefit from a significantly shorter delivery time and high cost efficiency. "To be able to actually realize almost all feasible configurations in terms of production, we've put an emphasis on customization in the TOPLINE MK2," reports Jens Winiarz, Senior Director Sales Metering & Composites. Thanks to the multi-platform design, there are no limits to the options – meaning a wide variety of applications can be realized. Maximum flexibility in adapting to specific requirements makes the TOPLINE MK2 the first choice for individual and unusual customer requirements – for highly customized processes and special applications.

"Depending on the production scenario, energy savings of up to 50 percent are already possible in the standard configuration of the TOPLINE MK2."

Jens Winiarz,
Senior Director Sales Metering & Composites

The machine processes almost all PU raw materials and can also be adjusted to special features such as higher or lower raw material temperatures as well as special raw material systems – such as those with high viscosity. To this end, the TOPLINE MK2 features the TS5evo temperature control unit as standard: this ensures powerful and constant temperature control – even under the most difficult processing conditions. What is more, the top model of the series can be equipped with up to ten mixheads. All Hennecke mixheads are available for this purpose: from the MT 3 for low output rates and the smallest part weights to the MT 36-2 for extremely high output rates, multi-component mixheads such as the MT-A 22-4, the MN series for spray applications and the new MT 12-3 CC mixhead for fast color changes.

Highest flexibility for all special requirements

Thanks to its modular system, the "High Performance" machine can be upgraded with numerous options. The multi-platform design means larger tanks with a volume of up to 1,000 liters are available for large-scale production – as are 60-liter tanks for smaller components or quantities. The TOPLINE MK2 is pretty well prepared for all Hennecke peripherals that utilize the complete spectrum of modern raw material systems – thereby enabling an extremely diverse range of properties in the finished component. These typically include the PENTAMAT for metering flammable blowing agents such as pentane, the LAMBDAMAT for non-flammable blowing agents, the CARBOMAT for CO_2 loading of the polyol component, the AEROMAT for gas loading of the polyol component or the VACUMAT for efficient degassing of the raw materials for the production of high-quality compact components without air pockets. Future-proofing is guaranteed, because future peripheral equipment will also be perfectly matched to the top model from Hennecke.

The new TOPLINE also offers the greatest possible flexibility in terms of the boom: instead of the 3-meter standard boom, other booms with a longer reach or automated mixhead handling through the use of robotics are also available. Especially for highly automated productions, the TOPLINE MK2 offers optional motorized edge filters and thus ensures significantly less maintenance effort. Another highlight is the optional flow measurement by means of a mass flow meter. "This automatically measures the density of the raw material without the need for manual input. This is ideal for laboratory applications or in productions with frequent raw material changes," explains Patrick Brüninghaus.

Excellent energy and resource efficiency

The careful use of resources has always been anchored in Hennecke's thinking and actions – and with the "Next Generation" line-up it is moving further into the foreground. This is why the TOPLINE MK2 also benefits from Hennecke's "Blue Intelligence" technology – the latter comprising a whole package of measures for mechanical, hydraulic and thermal efficiency. This includes optimized components to reduce pressure losses, automatically determined pump lead times, intelligent standby timers, efficient pumps and much more. "Depending on the production scenario, energy savings of up to 50 percent are already possible in the standard configuration of the TOPLINE MK2," adds Jens Winiarz.

Top quality thanks to HX pump and latest nozzle generation

As befits a state-of-the-art model, the TOPLINE also offers all the other innovations that have already proven their worth in the HIGHLINE MK2. These include the latest nozzle generation from Hennecke, which stands for high metering accuracy, best mixing quality and first-class efficiency. Besides the HP series, the innovative HX pump generation is also used in the TOPLINE MK2: the world's first axial piston pump developed exclusively for PU applications. Hennecke's own development is based on decades of experience in polyurethane processing and offers noticeable added value. It is characterized by a significantly optimized design of the pump housing – enabling maximum bearing flushing thanks to a newly developed bearing seat. This ensures

efficient heat dissipation and at the same time prevents the reactive media from heating up. That provides clear advantages in terms of resistance, especially to the chemical attack potential of polyol materials. The pump also features significantly improved suction behavior. This is a real advantage when using highly viscous polyols.

"It's not without reason that the TOPLINE MK2 is also the basis and heart of a wide variety of large-scale production systems."

Patrick Brüninghaus,
Director Product Management

New control and IoT connection

Especially in combination with the diverse options offered by the new FOAMATIC software and the integrated "Blue Intelligence" technology, the HX enables high savings potentials and scores in terms of sustainability aspects. The FOAMATIC control software has also been completely redeveloped for the "Next Generation" series. Operation is via a high-resolution 12-inch HMI with a modern and intuitive visualization. Furthermore, other smart devices such as tablets or mobile phones can be connected thanks to optional WLAN connectivity. A major focus of the new FOAMATIC is on the topic of energy and raw material efficiency. For example, the software offers numerous setting options to optimally adjust standby or lead times or temperatures and thus achieve noticeable savings effects. In addition, the TOPLINE MK2 enables connection to the Internet of Things with the standard FOAMATIC-IoT equipment feature. The acquisition and storage of extensive process data offers Hennecke customers unimagined possibilities for evaluation, early detection and prevention of problems, as well as predictive machine maintenance. For example, specific operating states of the machines can be sent to the mobile phone via push message. Hennecke is once again a true pioneer in this area of application.

Since the software for all high-pressure metering machines of the "Next Generation" is from a single source and uniform across all machines, switching between the individual series is very convenient for the user. "This is a great advantage for growing productions and companies with several locations or in different countries. User training can be reduced to a minimum in such a scenario," says Oliver Girnstein, Director Service BU Germany. See page 19 for detailed information on FOAMATIC-IoT.

"Next Generation" – an investment in the future

The design and construction of the Next Generation Metering Machines was one of the company's largest development projects in the past 75 years. "In the process, the product portfolio in the area of high-pressure metering machines was not only optimized and improved, but also completely revised and rethought in a long development process under the aspects of energy efficiency, sustainability, productivity and digitalization," reports Patrick Brüninghaus. The entire development of the Next Generation portfolio is based on the "Hennecke Production System" (HPS). The focus of this lean production system involves interlinking individual production areas to enable synchronized, waste-free production oriented to the customer cycle. The extremely short delivery times in the standard range of next-generation machines would be inconceivable without the HPS.

"Hennecke Production System" cushions cost increases

A central goal of the revision was to offer preconfigured solutions that already cover a large part of the market requirements in the standard version. These new standards offer customers decisive advantages: they speed up production, shorten delivery times, reduce

The modular tank station with TS5evo temperature control unit for constant raw material temperatures even under the most adverse production conditions.

Highest efficiency with quiet operation: New development of hydraulics with premium components.

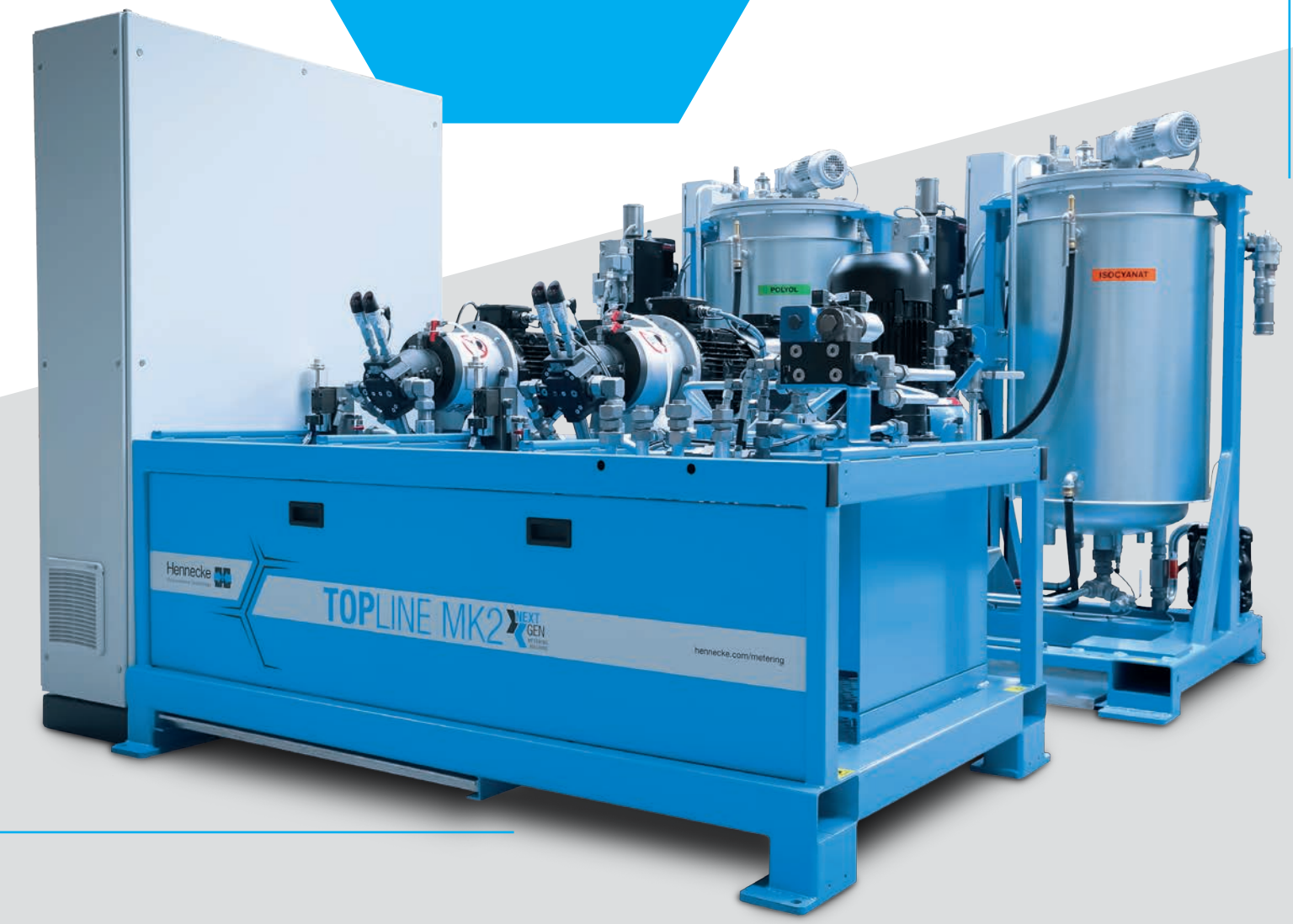
The new HX pump generation: precise, highly efficient and future-proof thanks to integrated sensor technology.

costs and substantially simplify the entire process from machine selection to commissioning. This is also reflected in the price. “We‘re very proud that the Hennecke production system is so effective. Despite its numerous improvements, the TOPLINE MK 2 is thus able to stand up to the general price increases and absorb a large part of the increased costs,” Patrick Brüninghaus is pleased to say. An important factor here is the use of common parts and part families across machines and series. This not only makes production significantly faster and more cost-effective – but also offers the user many advantages due to the better supply of spare parts and the use of uniform standards, especially if the user is already using other Hennecke systems. ■

Day tanks with optimum accessibility even when optionally equipped with suction for the use of flammable raw material systems.

TOPLINE MK2 AT A GLANCE

- Processes almost all PU raw materials
- Boom with longer reach
- Wide range of applications possible
- Optional motorized gap filter
- Greatest possible flexibility



HOMOGENEOUS MIXING OF SOLID AND LIQUID COMPONENTS

PU- OR PIR-BASED COMPOUNDS FOR FLAME RETARDANCY AND SUSTAINABLE RIGID FOAM PRODUCTION.

2022, Hennecke has introduced the “Environmental Technologies” product line with machines and add-ons for more sustainable production. New is the ECOFILLER PLUS, which enables in-line metering and therefore extremely homogeneous mixing or compounding of liquid with solid components. In this way, shredded cutting residues and production waste can be fed back into the production process, enabling waste-free production. In addition, other solids, such as powdered flame retardants, can also be incorporated absolutely homogeneously into the formulation.

The sustainable Environmental Technologies product area has been a focus of the Hennecke GROUP for two years. It aims to offer customers environmentally friendly technologies and services along the polyurethane processing chain. An important issue here is the avoidance of production waste or the recycling of this waste into the production process. Within this framework, Hennecke-OMS – the sandwich panel specialist within the Hennecke GROUP – has developed the ECOFILLER PLUS with a cross-divisional team, which is now offered as an add-on to the existing metering units. It is suitable for the most common rigid foam applications within sandwich panel production and is the perfect addition to Hennecke-OMS’ PANELMASTER production lines in the Hennecke GROUP product portfolio. “The new ECOFILLER PLUS lets users create decisive added value – while significantly improving the range of properties in their end products when producing polyurethane compounds. For example, in terms of sustainability,” explains Pierpaolo Azzalin, Head of Sales Hennecke-OMS.

Waste-free production possible

Even in the very raw-material-efficient production of sandwich panels, trim waste is produced depending on the shape and type of the end product. This waste not only wastes valuable raw materials, but also has to be disposed of and thus causes avoidable costs. This is where Hennecke’s new development comes in: It makes it possible to return the trimmings to the production process. The ECOFILLER PLUS is able to very quickly combine the liquid components of the polyurethane compound with the recycled solid materials in powder form. “As part of our sustainability strategy, we not only take care to reduce waste ourselves – but also aim to help our customers produce on a more sustainable basis by recycling valuable raw materials in order to protect the environment and save costs,” says Andrea Mariani, President BU Italy.

Fire retardance: simple and safe

Another important application scenario for ECOFILLER PLUS is the improvement of the fire behavior of products based on polyurethane (PU) or polyisocyanurate (PIR). The regulations and requirements for materials – especially in the manufacture of insulation boards – are becoming increasingly stringent and present manufacturers with special new challenges. By using liquid and solid raw material components, ECOFILLER PLUS enables users to develop, test and incorporate flame retardant compounds into the PU or PIR formulation for mass production. Moreover, the process enables manufacturers to decisively improve the fire behavior of the end products with their own and self-developed formulations. One example of this is insulation boards with a flexible face layer for the energy insulation of house walls.

This application should also not be underestimated with regard to the climate crisis. The industry needs sustainable flame retardants that can be tested with ECOFILLER PLUS under the real conditions of mass production. More importantly, in the field of building insulation, there is a greater demand than ever for products that must be highly efficient not only in terms of properties such as stiffness, density and thermal conductivity – but also in terms of fire retardance, regardless of the application. Residential buildings, industrial buildings and cold storage rooms are just a few examples. So far, the strictest regulations apply in Asian countries, but the Western world will also raise the bar in the coming years and demand adjustments from manufacturers.

Combining solids and liquids homogeneously

The particular challenge in the development of ECOFILLER PLUS was to achieve a completely consistent homogeneity of the solid and liquid components so that the concentration of the solid components is constant at every point of the end product. This guarantees not only consistently high quality, but also a uniform fire protection effect at all points of the end product. The key to this lies in the different sections of the ECOFILLER PLUS and its innovative mixing system.

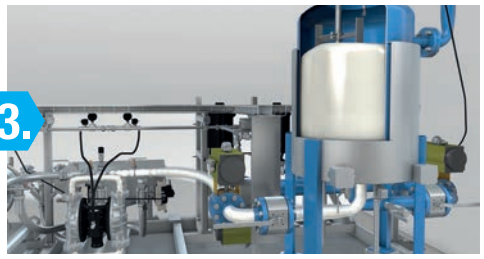
The solids metering unit has a capacity of 110 liters. Here, powder metering is carried out in the dynamic mixer by means of an innovative hopper system, a twin screw feeder and a volumetric pump, which is precisely controlled by special electronic load cells underneath the funnel. The polyol is metered by a metering pump, and the individually adjustable flow rate is automatically controlled by special flow meters in a closed circuit – depending on the programmed formulation. As soon as the desired flow rate is reached, the solid and liquid components are transported by a conveyor screw to the actual mixing area. Here, specially arranged pins and counter-pins ensure effective and uniform mixing of the two components.

On the outlet side, the homogeneous mixture now passes almost without pressure into a tank, where a suction diaphragm pump prevents backflow. From there, a conveyor screw transports it to the agitator tank. In this 250-liter double-shell tank made of carbon steel, a special agitator ensures that the solids are permanently well mixed with the liquid – thus ensuring perfect quality until they are used in the next production batch. The integrated temperature control system ensures that the temperatures in both the raw material and the mixing tanks are always kept constant and within an optimum process window, regardless of external conditions.

THE PROCESS IN BRIEF

1. The solids in powder form and the polyol are prepared for the mixing process and then fed into the mixing chamber.

2. In the mixing chamber, specially attached pins and counter pins ensure fast and uniform mixing of the media.



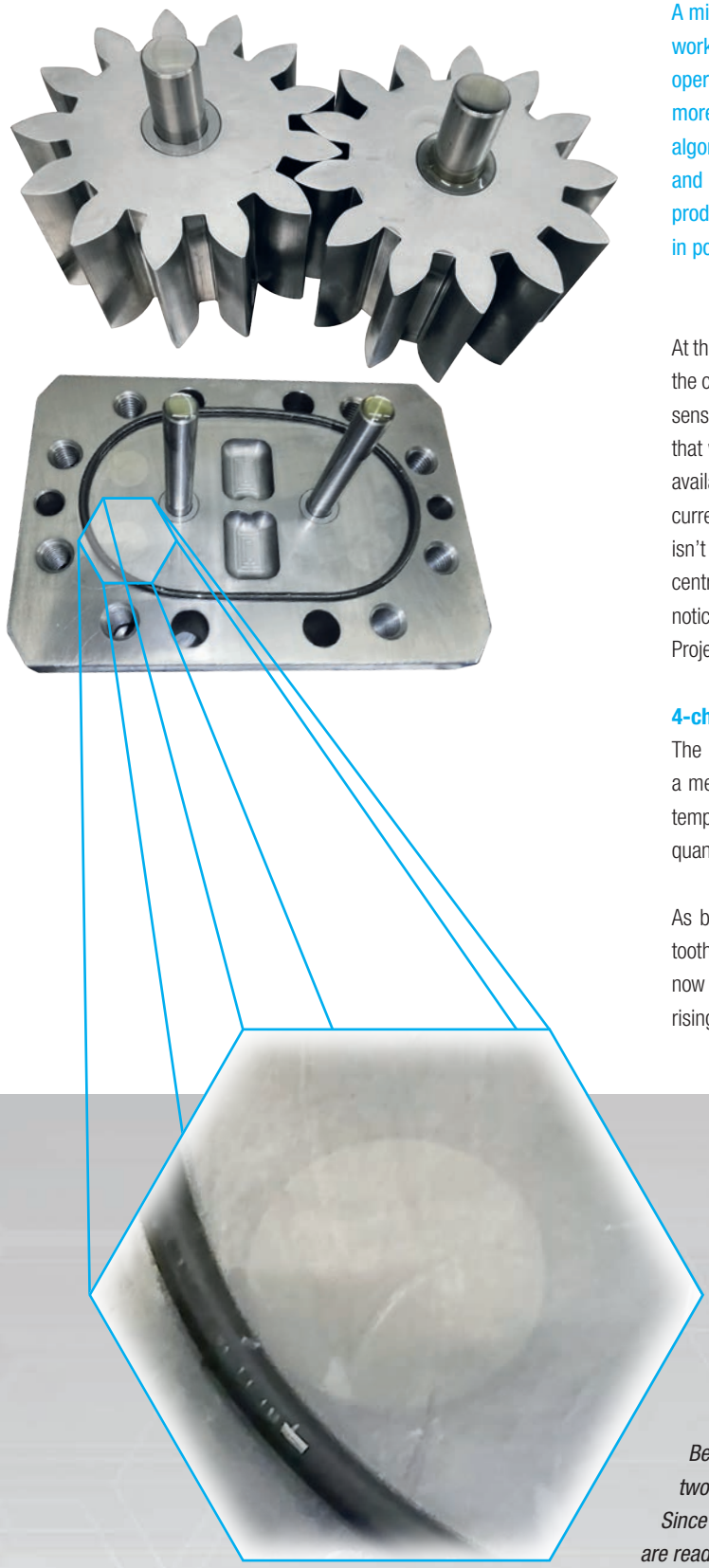
3. In the “final” tank, the finished mixture is optimally conditioned and stored until it is used in the next production batch.

Versatile

The ECOFILLER PLUS can operate in a flow range of 1.66 to 18.2 l/min and process materials with viscosities from 5,000 to 20,000 mPas and powder sizes from 50µm to 200µm. This allows it to be used for many different solids to be processed and numerous end products. In addition, formulations and the ratio of polyol to powder can be adjusted at any time during production via the HMI. The ECOFILLER PLUS not only guarantees immediate, optimal and uniform mixing of solids and liquids, but also significantly shortens mixing time for faster production. ■

HIGH-PRECISION MEASUREMENTS AND AI OPEN UP NEW DIMENSIONS

Hennecke's polyurethane experts are continuously working on making machine and system technology even better and more efficient. A milestone was set by the Research department – which is currently working on enabling high-precision measurements in the metering operation of high-pressure metering machines and recording even more comprehensive process data. In combination with an intelligent algorithm, they will enable the user to eliminate natural fluctuations and inaccuracies while raising production to a new level. Even if series production readiness has not yet been reached, unimagined possibilities in polyurethane processing are already emerging.



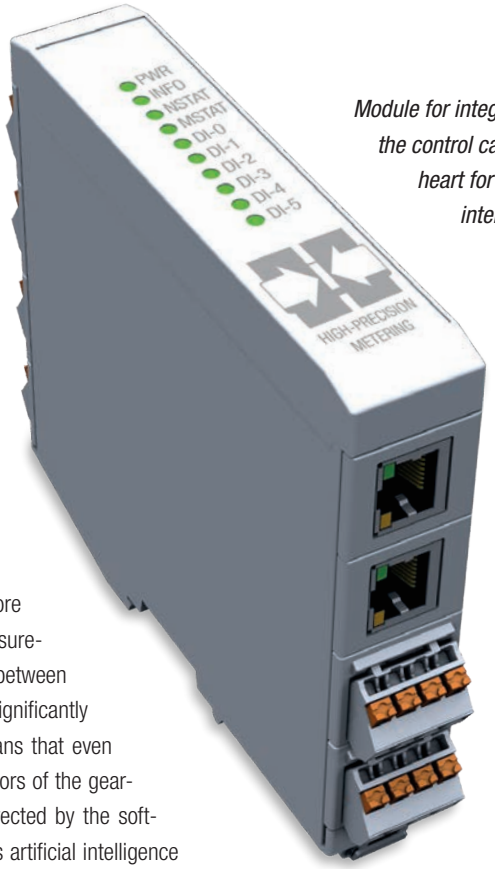
At the heart of the ongoing development is a new module that is integrated into the control cabinet and collects and interprets the measurement data from the sensors already present in the plant. These are processed using an algorithm that works with artificial intelligence and is capable of learning. The data thus available is more dynamic, precise and comprehensive than any process data currently available. "For applications where high precision is essential, this isn't just a further development – but a real milestone. We've put the concentrated polyurethane expertise of Hennecke into the development and will noticeably improve the production processes," promises Tobias Santos Barros, Project Leader Systems and Software Engineering at Hennecke.

4-channel measurement brings precision and dynamics

The innovation is based on a series of changes. A lot of data is relevant for a metering process: volume flow, mass flow, material density (depending on temperature and media pressure), current mixing ratio, shot length, dispensing quantity per shot, and various mixing head-dependent times.

As before, the volume flow is determined using a gearwheel counter. Each tooth that moves over the sensor sends an electrical pulse. However, up to now this has only been a single-channel process. One sensor detects the rising edge of the electrical pulse. However, two sensors are installed in the

Below the gearwheels (in the lighter circles) there are two sensors that register the movement of the gears. Since both the rising and the falling edge of the pulses are read out, a total of four channels are recorded.



Module for integration into the control cabinet: heart for the acquisition and interpretation of sensor data.

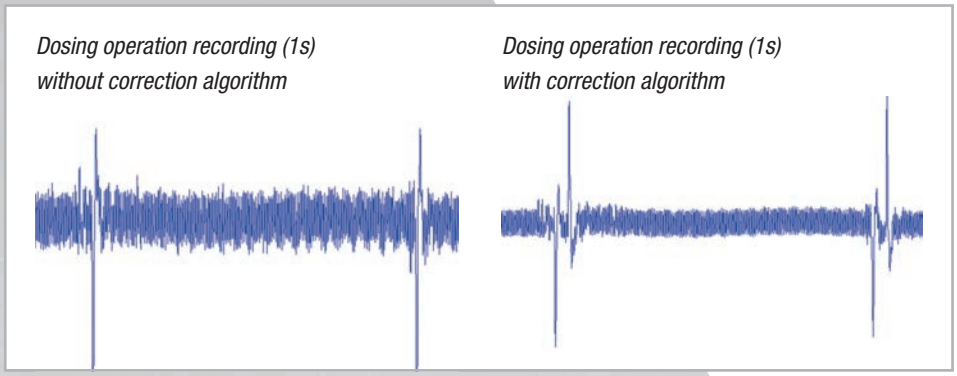
gearwheel counter, both of which are now used with the aid of the module. In addition, they each detect the rising and falling edges of the pulses. This results in a 4-channel measurement that captures significantly more and more dynamic data than the classic 1-channel measurement. This eliminates the previous interpolation between the signals – while the "measurement noise" is significantly reduced by a sophisticated algorithm. This means that even the smallest manufacturing or rotation angle errors of the gearwheels can be detected and automatically corrected by the software immediately. To do this, the algorithm uses artificial intelligence to learn to distinguish between measurement noise and actual external influences. Likewise, the software can, for example, detect and compensate for a change due to a manufacturing scatter between two gearwheels – such as when a gearwheel or the gearwheel counter has been replaced.

Intelligent live calculation of accurate process data

Based on the continuously determined temperature values and the respective media pressure, the module also continuously determines the current media density. Another highlight is the first absolutely precise recording of the shot length – in other words the duration of a metering process, with the aid of the pressure signal. This is because the pressure signal clearly indicates the beginning and end of the metering process (triggered by the overlap of the media flow) – the decisive factor here is that the pressure sensor reacts in the microsecond range. In the conventional process, there are otherwise always small and undefined delays between the triggering in the control system and the actual start of the shot as well as the recognition of the end of the shot. Thanks to the highly precise data from the pressure measurement, the shot duration can now be determined with pinpoint accuracy. In combination with the mass flow rate, the software uses this to calculate the correct metering quantity. "For the first time, we can ensure that the measured and weighed quantities really match," says a delighted Lars Etschenberg, Head of Operational Excellence Engineering. This is because the new development enables the engineers to significantly reduce the previously common measurement tolerance of 1 to 1.5 percent to values between 0.1 and 0.5 percent.

Multiple advantages in production

Each individual metering process can be displayed and evaluated with high resolution in terms of quantity, duration and weight. The user benefits from this new precision in many ways. For example, irregularities in production or possible missing parts can be detected directly. In the production of safety components, it is now finally possible to create a process control chart for quality management thanks to the new module. Efficiency can also be increased, because the more accurate measured values mean that fewer raw materials have to be used to achieve the required minimum volume. "But I'm



Mass flow signal recording: Significant improvement of signal-to-noise ratio by AI-assisted signal processing.

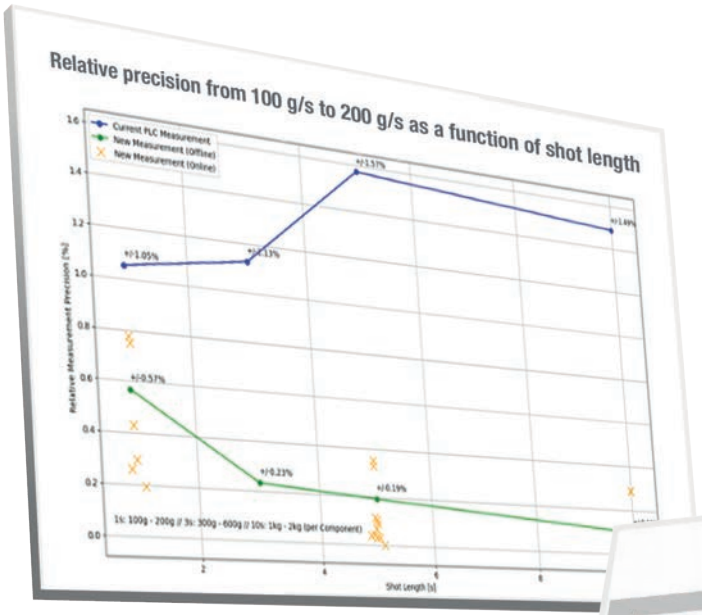
convinced that our customers will find many more applications where they can benefit from the precise measurement data," Lars Etschenberg is certain. What's more, long-term recording of the process data also makes it possible to read changes in production or in the material – typically due to wear. Valuable insights that pay off in the areas of maintenance and servicing. Plus there's no need for calibration or runtime correction of the mixhead at the start of production.

Product development close to completion

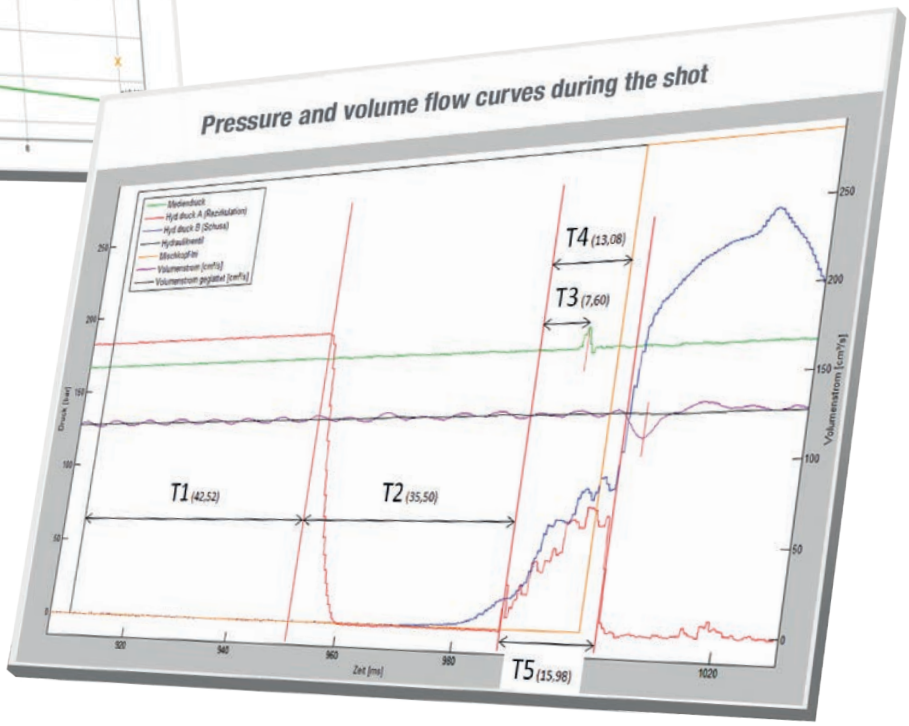
The hardware and software components of the high-precision flow measurement are about to be ready for the market. The patent has already been applied for, tests are underway, and no complex hardware is required apart from the module. "We're getting much more out of the existing sensor technology – by applying intelligence, expertise and experience. Our customers will probably benefit from this as early as the second quarter of 2024," Tobias Santos Barros emphasizes. The technology is simply integrated into existing plants by forwarding the data to the PLC. Of course, the interface logic can also be easily adapted via BUS adapter to various automation systems such as those in use at Hennecke, so that the US market will also benefit from the technology. ■

"We've put the concentrated polyurethane expertise of Hennecke into the development and will noticeably improve the production processes."

Tobias Santos Barros,
Project Leader Systems and Software Engineering



Thanks to the module and its intelligent algorithm, the measurement tolerance can be reduced from 1 to 1.5 percent to 0.1 to 0.5 percent.



Precise measurement of media pressure and volume also allows shot duration and other times to be accurately determined.

HENNECKE GOES TO A WHOLE NEW LEVEL ONLINE

NEXT GENERATION OF METERING MACHINES WITH IOT CONNECTION

Hennecke's new FOAMATIC control software grasps the opportunities offered by digitalization – connecting next-generation high-pressure metering machines with the Internet of Things (IoT) to optimize production processes. Under the name FOAMATIC-IoT, Hennecke now offers users outstanding options for increasing efficiency and reducing costs.

More and more technical devices are connected to the Internet: Who hasn't forgotten the laundry in the washing machine or not closed the refrigerator door properly? Modern devices report operating states via push messages – making households more effective through digitization while saving valuable energy and much more. These are just some of the ways where the Internet of Things can provide help and support in everyday life. The digitization and networking of devices in specialty mechanical engineering is therefore all the more important and offers numerous new opportunities there: from data analysis to production optimization and predictive maintenance. IoT provides the intelligent connection between people, machines and industrial processes by collecting, storing and analyzing production and process-relevant data. It offers users transparent insights into previously unused amounts of information, which they can harness to make production more flexible, efficient and individualized. Along with the above examples – this offers remarkably practical advantages in day-to-day production applications. Selected metering machines in Hennecke's Next-Gen series can typically send a push message when the day tank is ready to be refilled or a component needs to be replaced soon.

IoT-ready thanks to FOAMATIC

In order to meet current requirements and future-proof the machine control system, Hennecke has developed the FOAMATIC control software for its Next-Generation metering machines from scratch. FOAMATIC consists of an HMI (Human Machine Interface) – in other words the user interface – and programmable logic controller (PLC). With the FOAMATIC-IoT equipment feature, the prerequisites for important innovations such as WLAN connectivity and IoT connectivity have also been integrated to not only facilitate operation, but also enable advanced digital data storage and evaluation. Best of all, hardware and software IoT integration for information and evaluation of relevant machine data for the FOAMATIC-IoT functional range is already integrated as standard on selected metering machines. This means that customers can also decide at a later date whether they want to take advantage of the digital world at any time.

Simple operation via graphical user interface

The HMI impresses with its modern, graphic design and intuitive operation. Users always have all the relevant data in view – a well thought-out 3-click menu quickly taking them to any desired detailed menu with three clicks. Besides this, the metering machine can not only be controlled via the integrated 12-inch display, but can also be networked with other devices via WLAN. This means that it can also be operated via a smartphone or tablet – or the data can be visualized on a large monitor with network connection. In the control system, special emphasis was placed on integrating the Hennecke Blue Intelligence System for more efficient use of raw materials and energy. This includes numerous intelligent functions such as stand-by timers, innovative pump controller, lead times, temperature control and much more – allowing the relevant settings to be customized to perfectly suit individual needs.

IoT data offers unimagined depth of information

A major advantage is the large amount and depth of information, as numerous production data from the sensor systems of the high-pressure metering machines can be collected and securely stored on a cloud platform. The storage solution means that not only information on the last 100 shots can be retrieved, as before, but also data on the entire production period – thereby providing a much more accurate picture of production and products, machine availability and processes, energy and material usage, and maintenance and servicing. Further support is provided by instant notifications with which the machine can communicate specific operating conditions to the operator via push messages. “Storage in the cloud makes the entire production process more transparent and reliable. All data can also be accessed and analyzed independently of time and place. This allows production managers to gain a clear overview of the machines at any time via the dashboard – giving them access to both live data from current production and all previous production data,” reports Alexander Peters, Director Engineering & Development at Hennecke and responsible for the development of the software. That’s an enormous advantage – not only for

companies with several production sites. In addition, the system is future-proof and prepared for the later use of AI and machine learning.

All information available anytime and anywhere

The IoT dashboard, i.e. the user interface, displays all current and historical production data and makes it comparable and analyzable. This typically includes raw material consumption, energy consumption, tank levels, maintenance intervals or good and bad parts counters as well as any fault alarms. The upshot: production processes can be monitored, optimized and efficiently streamlined. All process data is continuously transferred to the cloud and can be selected and compiled using various filters. This allows more reliable planning – for instance when the data indicates that filters need to be cleaned or replaced. That helps to reduce machine downtime and optimize spare parts management. "A major advantage is that all data can be linked and correlated. This is an important step towards predictive maintenance," says Jens Winiarz, Senior Director Sales Metering & Composites.

Data security has top priority

Hennecke Cloud Services were developed with the highest security standards for sensitive user data in mind. A leading German company was won as a partner, on whose certified and proven infrastructure the platform is based with an AWS backbone. Data storage is based on the General Data Protection Regulation (GDPR), processing is subject to the ISO 27001 cybersecurity standard, and access management meets the requirements of the National Institutes of Standards and Technology (NIST). "It's vitally important for the customer to remain sole owner and user when it comes to the data," Alexander Peters affirms. "The secure cloud system gives the user sole access to their data at all times via the network connection – no one else can see or retrieve it."

FOAMATIC IoT

Free trial access for users of the HIGHLINE MK2 and TOPLINE MK2

All new generation high-pressure metering machines from the HIGHLINE MK2 platform onwards are prepared for the use of FOAMATIC-IoT. Customers benefit from user-friendly and intuitive application. Hennecke has a special offer ready for the market launch of the new IoT world: For a period of six months, customers can test the IoT offering themselves completely free of charge and receive unlimited access to all currently available IoT functions. "What's more, we're continuously expanding the spectrum and developing further applications and new packages, for example in the area of predictive maintenance or ESG," reports Christian Zahn, who is responsible for Customer Value Service at Hennecke.

In short, the FOAMATIC offers the user numerous new functions and an innovative IoT connection in addition to a new intuitive machine control with WLAN integration. The new machine generation is fit for Industry 4.0 and offers unprecedented optimization possibilities. Continuous data acquisition and storage on the secure cloud platform provide new insights into production processes and thus numerous analysis options. This not only improves production quality, but also enables savings in raw material and energy consumption at the same time – a major benefit for all Hennecke customers. ■

Hennecke's Blue Intelligence with numerous settings for more efficient use of raw materials and energy is integrated in the FOAMATIC as standard.

The intuitive, graphical user guidance facilitates operation despite the wide range of setting options. The well thought-out user guidance makes it possible to reach all menu items with just three clicks.

INNOVATIVE CONTROL SYSTEM FOR SLABSTOCK AND MOLDED FOAM

Hennecke machines are distinguished by their extreme durability and often decades of use. In contrast to plants made of steel and high-quality, permanently resilient components, the life cycles of the electronic control software are usually much shorter. At the same time, the plants are constantly being further developed and expanded. This in turn brings with it new requirements for the software, which is continuously updated accordingly. With FOAMWARE, Hennecke 2021 has introduced a completely new development of the control software in the area of plant technology, which is now also available for the molded foam product area alongside the variant for slabstock lines.

The previous process data recording and monitoring system (PDE) or PURTRONIC for slabstock and molded foam line is already around 20 years old and – despite constant updates – no longer up to date. In addition, the security of the underlying operating system can no longer be guaranteed because Microsoft has discontinued support. The bottom line: Hennecke's developers had to adapt the control software to current – and especially future – needs in order to keep the system operation for its customers future-proof and operationally reliable in equal measure. The result is the current FOAMWARE, which represents a completely new development. The new user interface impresses with intuitive user guidance that does not puzzle previous Hennecke custom-

SIMATIC Quad-Core industrial PC of the latest generation

Large 32-inch UHD monitor

Remote Service Router for secure online support

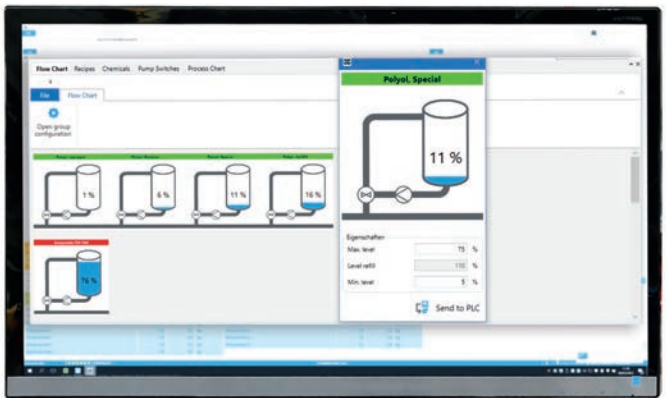
Uninterruptible power supply

Ergonomic PC desk

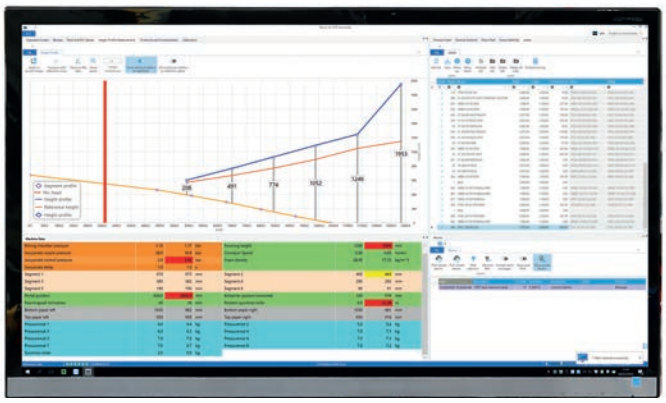
Air conditioning unit

Laser printer

FOAMWARE



Clear display of all fill levels of the individual raw materials.



The RISE PROFILE MEASUREMENT visualizes the rising process and ensures constant production of optimum foam blocks.

ers during the changeover, a wide range of functions and the possibility of integrating numerous useful plug-ins and additional options. “During the development of FOAMWARE, we worked closely with our customers and users to integrate their current and future requirements for the control system,” reports Eugen Kern, Team Leader Service Sales BU Germany.

State of the art hardware

The control software is available in two versions: FOAMWARE Slabstock – which has already been established on the market for around two years – and FOAMWARE Molded Foam, which will be available from October 2023 in place of the previous PURTRONIC. Both applications are based on the same system and are adapted to the actual application scenarios. Extremely powerful hardware equipment serves as the basis: the free-standing operator console with a SIMATIC Quad-Core industrial PC of the latest generation and a 32-inch UHD monitor enables ergonomic working and a good overview of a wide range of parameters – optionally, up to three additional monitors can even be connected. Also integrated are a printer, an uninterruptible power supply, an air conditioning unit and a remote access router for online support.

Extensive additional benefits for users

The range of functions of the previous control system has been extended by numerous new features. For example, the standard scope of delivery of the FOAMWARE already includes visualization of the Flow Chart, Process Chart and Calibration Manager, as well as other software tools for the effective analysis of target and actual values. A real highlight is the “Magic Eye” function for slabstock lines, which detects metering deviations and other irregularities in the running process and makes them visible immediately. “This enables the operator to react more quickly and provides active support in deciding whether production must be stopped or can be continued. This ultimately saves time and raw materials,” explains Markus Häsler from Hennecke Service Sales. What is more, the new system works much faster than the previous PDE or PURTRONIC – so recipe changes or the adjustment of individual discharge quantities can be implemented more quickly. Another highlight of FOAMWARE is the detailed calibration function, which ensures more precise metering and faster achievement of the setpoint values and ensures that the system always runs in the optimum process window.

These values can also be archived and analyzed with the help of the “Calibration History” – keyword “Predictive Maintenance”. This makes it possible to recognize more quickly whether a pump is slowly wearing out and needs to be replaced, for example, or whether a calibration was carried out incorrectly.

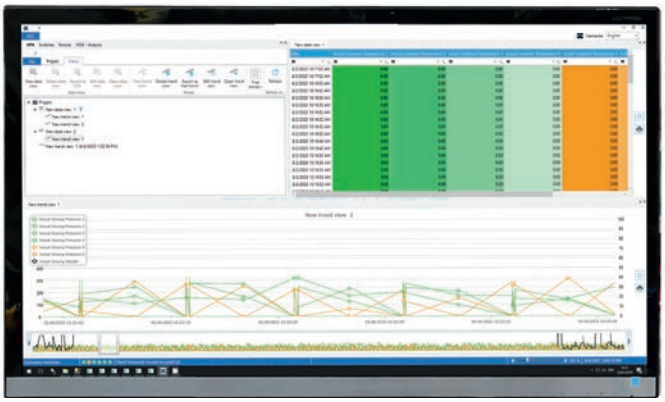
The integrated database enables absolutely secure, local storage of production data, metering programs or formulations. A sophisticated error analysis provides a comprehensive overview of all current and completed error messages; the chart analysis with its diverse filter options facilitates evaluation and process optimization.

Plug-in concept with optional extras

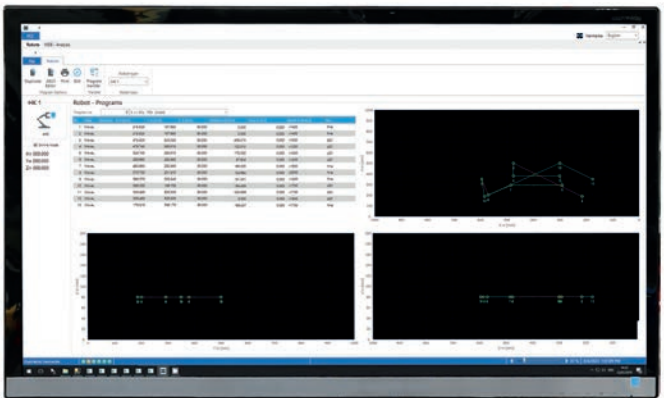
FOAMWARE impresses with its extensive plug-in concept, into which various useful optional modules can be integrated depending on the application scenario and individual requirements. For instance, the Hennecke Process Analysis (HPA) enables comprehensive graphical evaluation of production data in a customer-specific view in the form of tables, diagrams and trends. Users can import or export data and connect to higher-level production systems via an optional third-party interface, which provides connectivity to SAP etc. Furthermore, Hennecke is constantly developing additional optional modules such as the web service – thereby enabling production monitoring on mobile devices such as tablets or cell phones. This is an ideal solution for maintenance and production personnel and includes information about ongoing operation, current chemical consumption, error messages, and an alarm history.

Slabstock foam in perfection through optional modules

For slabstock foam production, the FOAMWARE Slabstock is ideally suitable for Hennecke’s innovative hardware enhancements. The RISE PROFILE MEASUREMENT visualizes the foam height at various points in the rising process, ensuring better and more consistent production of optimal foam blocks. Up to 30 data points from different sensors are displayed and deviations in temperature, humidity or activators are immediately detected.



Clear graphics visualize the current production process.



Optimal for highly automated applications with integrated robot control.

AUTO-FLAT is the fully automatic version of the FLAT-TOP system and enables the production of slabstock foam with an absolutely even surface. Independent of the specific know-how of the operator, this results in a constant and reproducible foam quality. This avoids waste and thus saves valuable raw materials. The prerequisite for use is the use of the FOAMWARE.

Optimized for automatic molded foam production

The slabstock foam version of FOAMWARE – already hugely successful on the market – has also been adapted for the molded foam sector. In addition to various specific process-relevant overviews and detailed controls, FOAMWARE Molded Foam also offers special optional add-on modules. Since automated robot systems are increasingly being used in molded foam production, the software offers a separate module for this purpose. Allowing simple and intuitive selection of the robot type and programs, it features an ASCII editor so that changes can be made conveniently – even without knowledge of the robot language. All data adjustments can be made directly during production and visualized in the software.

Analysis of plant downtimes is provided by the non-production option. This clearly displays the duration of the various operating modes (automatic, manual, stoppage) of the current and past shifts and automatically records the causes in the event of downtimes. The web service is also under development for FOAMWARE Molded Foam, which makes production monitoring available remotely in the form of a specially programmed website and offers extensive visualization options with tables, diagrams and measuring instruments.

Bringing old systems up to date

The current FOAMWARE is not only the new standard equipment for all new plants, but can also be integrated as a retrofit into all existing plants to replace the old control system. In addition to the visualization software, the available retrofit solutions also include all necessary hardware components. “In this way, even plants that are more than 20 years old can be raised to a completely new level and continue to be used efficiently,” explains Markus Häsler, who has already equipped numerous aging plants with the new software. Depending on the conditions on site, this involves either a standard retrofit solution or an individual adaptation. This not only guarantees optimum performance, but also ensures that the company is up to date in terms of IT security, as the PDE operating system will no longer be supplied with security patches by Microsoft in the future. Additional options such as RISE PROFILE MEASUREMENT are also in high demand, according to Markus Häsler. ■

SWITCH NOW – DISCONTINUATION OF THE OLD PDE

Hennecke’s technical support for PDE of slabstock lines commissioned before January 1, 2019, will end on December 31, 2023. Systems commissioned after January 1, 2019, will receive extended support until the end of 2024. However, customers who order a new FOAMWARE slabstock before these deadlines will benefit from guaranteed support until the new control system is installed.

The PDE PURTRONIC for molded foam lines will also be discontinued in the near future. More info to follow.

Users who would like to ensure the future security of their existing systems are requested to contact Hennecke Service.

TRACKING DOWN SUSTAINABLE RAW MATERIALS

INTERNATIONAL RESEARCH PROJECT ON BIO-BASED POLYURETHANE FOAMS

At Kaiserslautern University of Applied Sciences, Department of Applied Logistics and Polymer Science, a team led by Prof. Dr. Gregor Grun and Prof. Dr. Sergiy Grishchuk is researching the use of bio-based or recycling-based raw materials in semi-industrial polyurethane processing as part of the international EU project BIOMAT. Hennecke's LABFOAM pilot plant is being used for the numerous practical tests.

Sustainable raw materials and the reduction of CO_2 emissions in the production of flexible foams and other polyurethane products are becoming increasingly important. Many companies from industry and trade are asking themselves how they can reduce the proportion of petroleum and environmentally harmful blowing agents in their production. This is why BIOMAT was launched in 2021. In the EU-funded project, scientists from eight nations are researching the development of sustainable foams and composites with a high proportion of renewable raw materials. The aim of BIOMAT is to reduce the greenhouse gases produced in the manufacture of foams and composites by 30 to 50 percent and to replace more than half of the material used with renewable raw materials. This research project requires numerous trials with various new raw materials in a wide range of formulations to investigate the respective foaming behavior, durability and other properties of the products. In order to obtain reproducible results and, in particular, to avoid the time-honored "cup tests", a Hennecke LABFOAM was put into operation at the Pirmasens campus of Kaiserslautern University in 2022. The machine system is the ideal partner for test series and product innovations in the field of polyurethane processing.

The system is controlled via FOAMWARE and is thus identical to the operation of large continuous systems.

Simulation of a large industrial plant

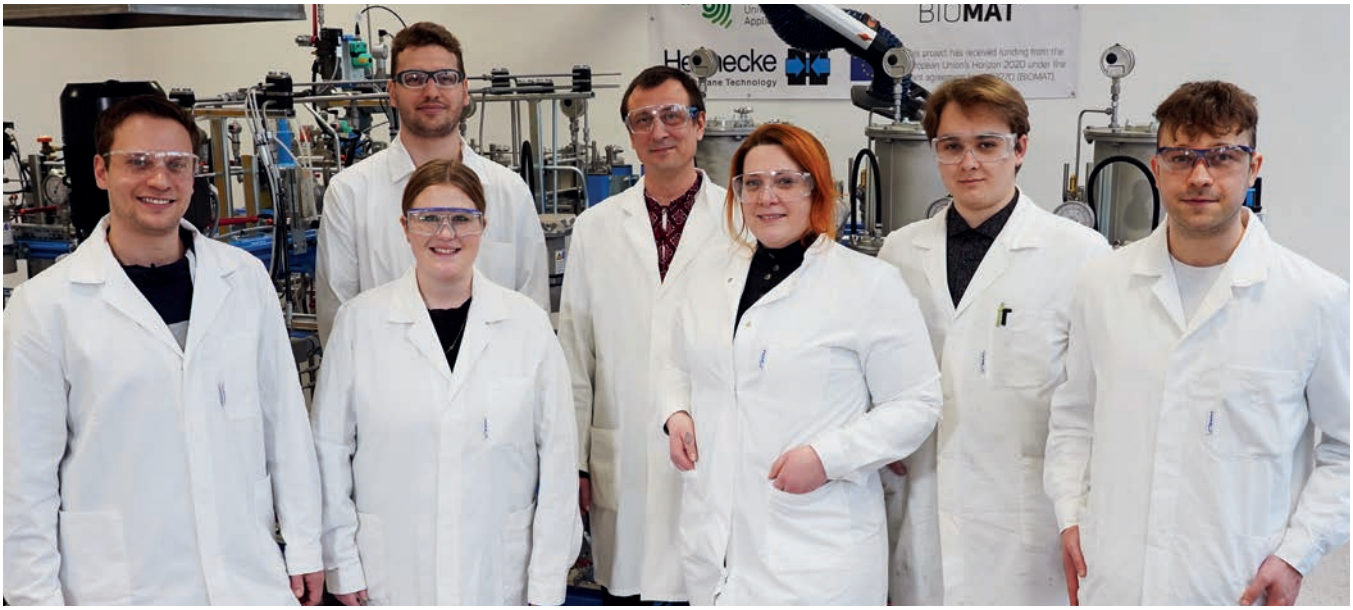
Developing and testing new formulations on a conventional slabstock plant is a resource-intensive undertaking. This is why Hennecke has developed the LABFOAM, which – to put it simply – replicates the reactive part (wet end) of a continuous production plant on a small scale, thus enabling test series with low output quantities. Nevertheless, it achieves results that are almost equivalent in quality to those of a continuous production plant. The high-precision high-pressure metering pumps and the proven Hennecke mixing technology are used. In addition, each individual metering line is designed to process an application-specific range of raw materials, so that an equally wide range of possible test series can be realized. With minimal raw material input, the results of highly scalable industrial production can thus be precisely simulated and tested.

Biopolyols from organic waste

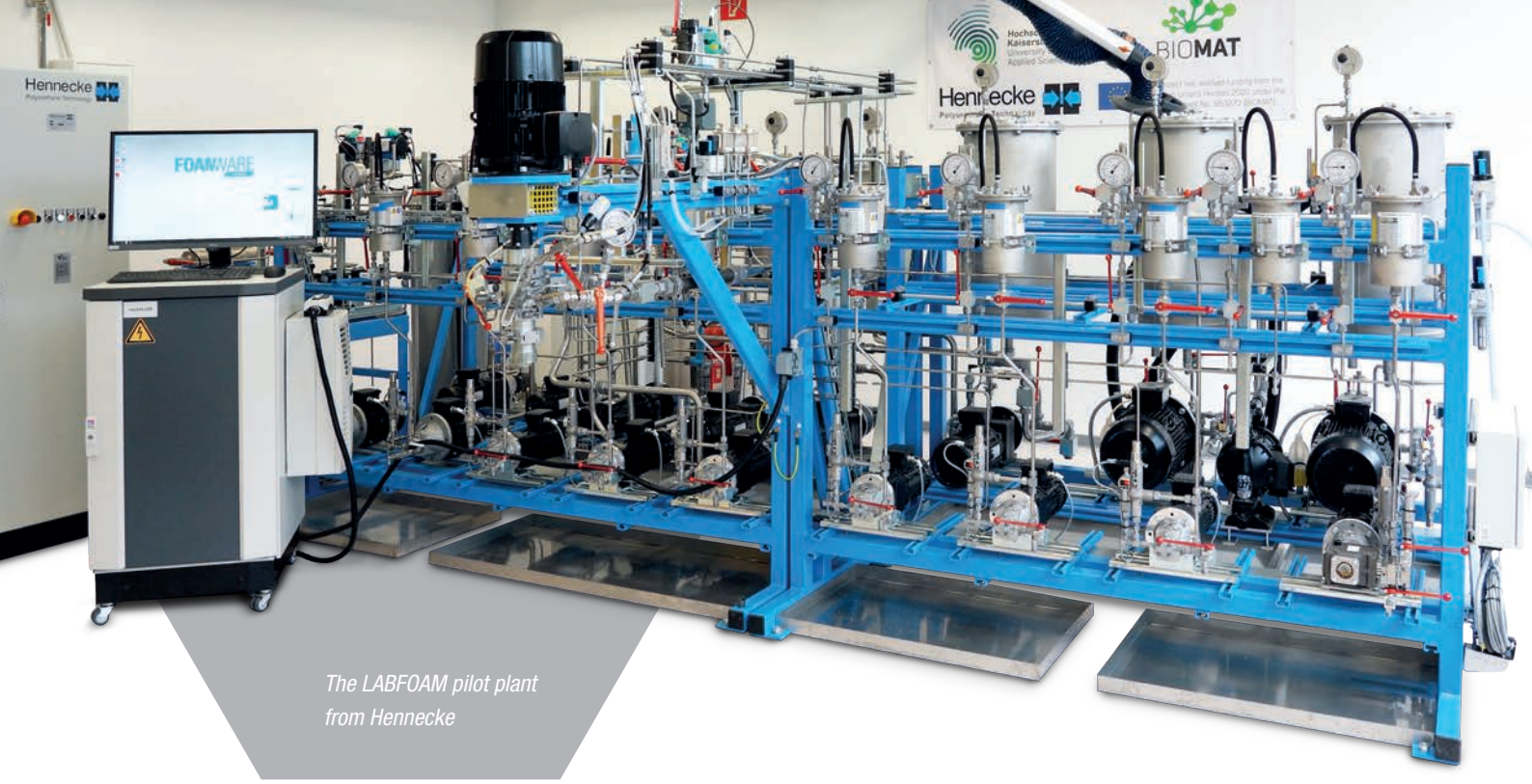
At the Pirmasens Campus, the material properties and potential applications of biopolyols are now being investigated – also on behalf of specific industrial companies. “Biopolyols are preferably obtained from organic waste,” explains Prof. Dr. Gregor Grun. These can be fatty acids, triglycerides, sugars or other suitable organic residues. However, many of these materials are currently still difficult to obtain commercially. A particular challenge in the use of biopolyols is also that they consist of secondary hydroxyl groups and therefore react comparatively slowly. At the same time, attention must be paid to the low flowability of many biopolyols, for which, however, LABFOAM is excellently suited, since it is designed for viscosities of up to 35,000 mPas. In addition to the extraction of biopolyols, research in the polymer department in Pirmasens also includes the synthesization of biopolyesters in order to produce materials that are as compostable as possible or to improve the recycling of polyurethane foams.

LABFOAM – a good choice

There are several good reasons why the university chose the LABFOAM laboratory equipment from Hennecke. Particularly important to the research team were the automation capability, the independent metering lines and the individually adjustable parameters for the up to 25 different raw material components. “Another impressive plus point with the LABFOAM is the patented NOVAFLEX technology for the production of CO_2 blown foams. This does away



The BIOMAT team at Kaiserslautern University of Applied Sciences, Polymer Chemistry Working Group, led by Prof. PhD. Sergiy Grishchuk.



The LABFOAM pilot plant from Hennecke

with the need for blowing agents that are harmful to the environment and health – a unique benefit among laboratory equipment," emphasizes Prof. Dr. Sergiy Grishchuk. At the same time, the system also impresses with its small footprint. The diverse application possibilities find sufficient space on less than ten square meters.

Plant control via FOAMWARE is identical to the operation of continuous production plants. "With just a few clicks, we can create new formulations with a wide variety of components and additives, send them to the machine and start testing," reports Philipp Haag, a doctoral student on the team and one of the LABFOAM operators. Compared to mixing by hand, this means a significant advantage in terms of accuracy, time savings, raw material consumption and quality of the foam.

65 percent bio-based content already possible

The results of the first year of use are promising. For example, it is already possible to produce flexible foam with a bio-based content of around 65 percent without compromising on quality. "Another crucial aspect of LABFOAM is that it's not limited to the production of flexible foams," adds Prof. Sergiy Grishchuk. This is reason enough for the researchers to also investigate the use of organic materials in semi-soft PU foams or in rigid foams, such as those used for insulation in building elements with a sandwich structure. "I can also imagine other types of prepolymers – such as epoxy prepolymers – being processed and studied in the plant," reports Prof. Sergiy Grishchuk.

The BIOMAT project managers are pleased to be able to train students in the field of polymer chemistry as part of this research and development project and to give them the opportunity to familiarize themselves with industry-related processes at the plant. This benefits not only the students, but also numerous employers in the polyurethane processing industry, who attach great importance to practical experience.

For Hennecke, too, the transparent exchange of knowledge and information with Kaiserslautern University of Applied Sciences offers important added value, especially with regard to new market requirements relating to sustainable raw material solutions. ■

CONTACT

Interested producers or processors can contact Kaiserslautern University of Applied Sciences directly regarding raw material development and for inquiries about test series:

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A FLYING START WITH THE HIGHLINE MK2

The PKS company from Stapelburg in the northern Harz region is one of the first companies to receive the new HIGHLINE MK2 from Hennecke's Next Generation series. Owner Markus Leßmann has been using the machine since June 2023 and reports on his initial experiences.

The latest technology combined with years of experience ensure constant top quality.

For more than 30 years, the company PKS (short for Projects in Plastics and Foam) has been producing highly specialized molded foam parts for a wide range of industries. For the past 15 years, the company has focused on small series of the highest quality for use in medical technology. For example, PKS now produces cold foam cushions for a wide variety of medical treatment units. "But anyone who can supply the demanding medical sector also has the right solutions for special requirements in other industries," assures Markus Leßmann. For instance, the PU experts also manufacture integral foam parts for selected customers in the automotive and shipbuilding sectors. Another exciting topic will be production with environment friendly raw materials, Leßmann is certain. The company's unique selling point, however, is the manual production of even the smallest series with part weights between 40 and 3,000 grams in premium quality – even under difficult conditions such as demanding part geometries or special fire protection requirements. Furthermore, alongside the actual production, the Nordharz company also offers its customers expert advice and design of foaming tool molds.

Changeover to Hennecke machine

Markus Leßmann, who studied mechanical engineering, has been with PKS since 2020 and has also been the owner of the company since the beginning of 2022. In the fall of 2021, he set out to find a replacement for the company's own high-pressure metering machine, which was now almost 20 years old and was increasingly causing problems – not to mention that finding spare parts was becoming difficult too. At Fakuma, he met Philipp Sterzenbach and Berthold Schimmelpfennig, two sales engineers at Hennecke, who were able to advise him in detail and convince him of the advantages of the high-pressure metering machines from Sankt Augustin. The exchange between the PU specialists continued – and when they met again a year later at the K trade show, Hennecke was there presenting its Next Generation and the brand new HIGHLINE MK2. It was not only performance and price that convinced Markus Leßmann: "I appreciate the detailed evaluation of production data and figures, which is why I was also enthusiastic straightaway about the machine's IoT connection and the associated possibilities," he reports – so he ordered the innovative metering machine while still at the trade show.

On-the-fly changeover to new production level

Commissioning and integration into production took place in mid-June 2023 and was literally a flying changeover without prior test runs. "The old system was dismantled on Monday, and production was already running on the new machine on Friday," says Markus Leßmann. This is all the more remarkable because not only did the boom of the old system have to be reassembled, but it was also the first Hennecke metering machine ever at PKS. Nevertheless, the replacement went smoothly and without complications. He is particularly positive about the communication with the Hennecke sales department, which quickly provided a competent answer to all questions that arose: "You notice immediately that Philipp Sterzenbach and Berthold Schimmelpfennig are not

PKS produces highly specialized cold foam pads for a wide range of medical treatment units.

just salesmen, but technicians through and through. They know the machine inside out and can help immediately."

Convenient control with many options

Of course, switching to a new machine from a different manufacturer takes some getting used to at first, but the employees quickly became familiar with the intuitive visualization of the FOAMATIC control system. For example, its 12-inch display clearly shows the entire machine process on the main screen. "In the event of problems, a solution can be found within a few minutes – much faster than before, when you had to work your way through all kinds of menu items," reports the Managing Director. What is more, many settings can be individually adjusted via the software in order to optimally adapt the machine to one's own needs. For example, Markus Leßmann has already individually adapted the error tolerances to his needs and set the intervals of the cleaning strokes exactly to his own production.

Greater efficiency and energy savings

A clear efficiency advantage is provided by the automatic startup programming, thanks to which the HIGHLINE MK2 is ready to start at exactly the desired time every morning. Here the machine is started automatically, after which the raw materials undergo temperature control and the hydraulics are then prepared. "This effectively gives us an additional 45 minutes of production time every day. This is clearly noticeable and pays off directly," the entrepreneur is pleased to say. Another noticeable saving can be seen in energy consumption. Right off the bat, the Hennecke machine saves 15 percent energy compared to the previous system. "If we experiment a little more with the settings, even 30 percent savings are probably possible," estimates Leßmann. He discovers that the Next Generation offers only the most modern plant technology in many places: in the automatic cleaning function and the integrated pressure and temperature measurement of the mixheads, the modern pump technology with frequency converter, the highly efficient motors, and much more.

Expansion of production is already planned

However, the most important thing for the company boss is always the quality of the products manufactured – and the foaming result achieved is perfect with the new HIGHLINE MK2. Leßmann's customers agree, and so there are already further inquiries that could be optimally served with the machine. For this reason, the entrepreneur is already planning an expansion with a second Hennecke production line in the near future – for example with a larger mixhead to be able to produce other component sizes as well. Especially when additional Hennecke machines come into play, Markus Leßmann would like to benefit from the IoT connection. This allows the machines to be evaluated and compared easily and conveniently, even over longer periods of time. ■

Ceremonial handover of the first batch of HIGHLINE MK2 to customers during the Next-Gen event. From left to right: Jens Winiarz, Markus Leßmann, Rolf Trippler.

NEW CFO

Yves Souguenet has been the new CFO of Hennecke GROUP since April 1, 2023. The internationally experienced financial manager has a solid background in accounting and internal auditing and also brings broad experience in the management of companies in the specialty plant engineering sector. The business graduate and certified tax consultant was previously Managing Director and CFO at a leading company for industrial compressor solutions. He ideally complements the management team and ensures that Hennecke GROUP is positioned for long-term profitability within the framework of the 2.0 strategy. ■

PERSONNEL

There was an organizational change in **Engineering at the BU Germany** (Sankt Augustin site) on May 1: The three engineering divisions Systems Engineering, Mechanical Engineering and Electrical Engineering were merged and transferred to a new matrix organization. **Alexander Peters,** who was previously responsible for Electrical Engineering at BU Germany, has taken over management of the division with more than 70 colleagues. In **Customer Service, Mahmoud Karime** took over the role of Senior Director Global Service on July 1 from **Edgar Knobloch**, who left Hennecke for a well-deserved retirement after 15 successful years. Karime is an experienced electrical engineer and has been with Hennecke for four years. He has been responsible for worldwide service sales for the past three years. He has already achieved considerable success in this position and will undoubtedly play an important role in the further development of the service area. ■

WEBSITE RELAUNCH

Hennecke's new website went live in March 2023 at **www.hennecke.com**. Instead of previously having multiple websites for Hennecke GROUP's core brands, the new website now combines everything under one roof. Customers benefit from the consolidation, as all products, services and direct customer contact are now available via a single platform. In addition, the PUR Guide for the entire Hennecke portfolio has been updated – a practical online tool that can be used to determine the optimum machine based on the end product. To ensure that all customers can find their way to Hennecke at any time, former domains are redirected to the appropriate location on the new pages. ■

SPARE PARTS WEBSHOP

As part of the expansion of the 360°CONNECT service portal, the digital portfolio of the 360°SPARE PART SERVICE was also comprehensively revised and a new spare parts web store was integrated. Hennecke customers benefit from intuitive user guidance with spare parts prices in real time (not yet available everywhere), quick and easy identification of required mechanical as well as electronic components and information on their availability. This also further simplifies the inquiry and ordering process for customers. ■

NEXT-GEN EVENT

In 2022, the Next Generation metering machines already celebrated their successful premiere at the K trade show. The first batch of the HIGHLINE MK2 – still sold at the trade show – were delivered in May 2023 during a ceremonial machine handover. Customers and press representatives visited the site in Sankt Augustin and gained a detailed insight into the production of Hennecke-style metering machines. The focus was on the innovative lean production as well as the sophisticated logistics concept, which make it possible to produce machines of the "NEXT-GEN" series in only five days. ■

OPEN-HOUSE LIVE FOAMING

As part of the INTERZUM trade fair in Cologne in May 2023, Hennecke invited interested customers to Sankt Augustin to experience the further developed slabstock technology in the ultra-compact plant portfolio live. Numerous visitors from all over the world experienced the JFLEX slabstock foam plant at Hennecke's TECHCENTER producing a high-quality viscoelastic foam in a perfect rectangular shape. The participants were very impressed by both the fine-cell foam structure achieved and the plant performance with this demanding raw material system. ■

TRADE FAIRS 2024

JEC WORLD
MARCH 05–07
PARIS

UTECH EUROPE
APRIL 23–25
MAASTRICHT

INTERZUM BOGOTÁ
MAY 14–17
BOGOTA

FOAM EXPO NORTH AMERICA
JUNE 25–27
NOVI

FORMÓBILE
JULY 02–05
SAO PAULO

PU CHINA / UTECH ASIA
JULY 17–19
SHANGHAI

CAMX
SEPTEMBER 09–12
SAN DIEGO

FAKUMA
OCTOBER 15–19
FRIEDRICHSHAFEN

HONEY WORLDWIDE

Now that busy bees are also active at Hennecke's Italian site in Verano Brianza, there are now bee colonies at all four Hennecke GROUP production sites. They help pollinate the flowers in the surrounding area and thus make a valuable contribution to nature. At the same time, the insects are busy producing honey, which is harvested, bottled and provided with self-designed labels. These honey jars are a popular customer gift – and the feedback is consistently positive! ■

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