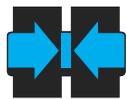


119 INNOVATIONS

» Customer journal for technologies and trends on the PU market

Hennecke
GROUP



Modular and with many new features SMARTFLEX continuous slabstock systems

New standards for an extremely broad range of applications

A double premiere for the MT-A mixhead series and the new generation of FLEXJET constant pressure injectors

Hennecke redefines itself

Creation of the Hennecke GROUP and transformation of global structures





Dates

PUTECH EURASIA

Istanbul
28.11. - 30.11.2019

PLASTIC EXPO

Tokyo
04.12. - 06.12.2019

AUTOMOTIVE WORLD

Tokyo
15.01. - 17.01.2020

PU TECH INDIA

New Delhi
01.03. - 03.03.2020

JEC WORLD

Paris
03.03. - 05.03.2020

POLYURETHANEX

Moscow
21.04. - 23.04.2020

KUTENO

Rheda-Wiedenbrück
12.05. - 14.05.2020

As at October 2019

Dear customers,
dear readers,

Orientation in terms of customers, processes and staff is one of the most important principles to me in my business actions. It is not without reason that these guidelines are also a central aspect in the future direction of our company. Above all, there is a new name that you will often come across in the world of polyurethane processing: the Hennecke GROUP. The new umbrella brand for our three core brands and the international network of our subsidiaries documents the new identity of our globally active company. This goes hand in hand with a transformation of the international company divisions to a highly effective organizational structure. We are redefining ourselves to be even more efficient for you in the future. You will find out how we are doing this from page 24. In addition, this latest edition of our customer magazine INNOVATIONS is packed full of innovative new products which will be celebrating their premiere at the K show 2019. The centerpiece here is the new mixhead and injector generation which is fit for the range of tasks associated with Industry 4.0 (see page 8). Another focus on our stand at the show is the new SMARTFLEX slabstock machine. This modular system lives up to its name and has many innovative features besides its compact dimensions (see page 4). As a pioneer of high-pressure technologies, we are particularly proud to present a metering machine that mixes elastomer systems under high pressure and in doing so offers completely new possibilities to processors (see page 12.) But let's return to our new name: I would like to personally introduce myself to you as the new CEO of the Hennecke GROUP. Machine and plant engineering has been a part of my professional life for 30 years now. Yet I was instantly impressed by the Hennecke portfolio and plethora of applications and technologies. As I mentioned at the outset, along with processes and staff, customer orientation is particularly close to my heart and therefore I am already excited about future cooperation and dialogue with you. I hope that I can impress you too with polyurethane processing the Hennecke way.

Yours,

Thomas Wildt,
CEO Hennecke GROUP

CONTENTS



4

Modular and
with many
new features

8

New standards
for an extremely
broad range of
applications

Efficient production
of fiber-reinforced
structural components

16



Hennecke
GROUP



24

Hennecke
redefines itself

COVER STORY

Premiere of the SMARTFLEX continuous slabstock systems

4

ENGINEERING

A double premiere for the MT-A mixhead series
and FLEXJET constant pressure injectors

8

High-pressure elastomer processing with the all-new ELASTOLINE HP

12

The new JETLINE for WCM applications by HENNECKE-OMS

16

PROJECTS

State-of-the-art composite center in Japan uses the STREAMLINE

20

Optimization of ceramic industrial filters at the Hennecke TECHCENTER

22

HENNECKE GROUP

Introduction of Hennecke GROUP and "Hennecke 2.0"

24

Hennecke Inc. moves North American company headquarters

28

New sales agent for the UK and Ireland

31

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INNOVATIONS | 119

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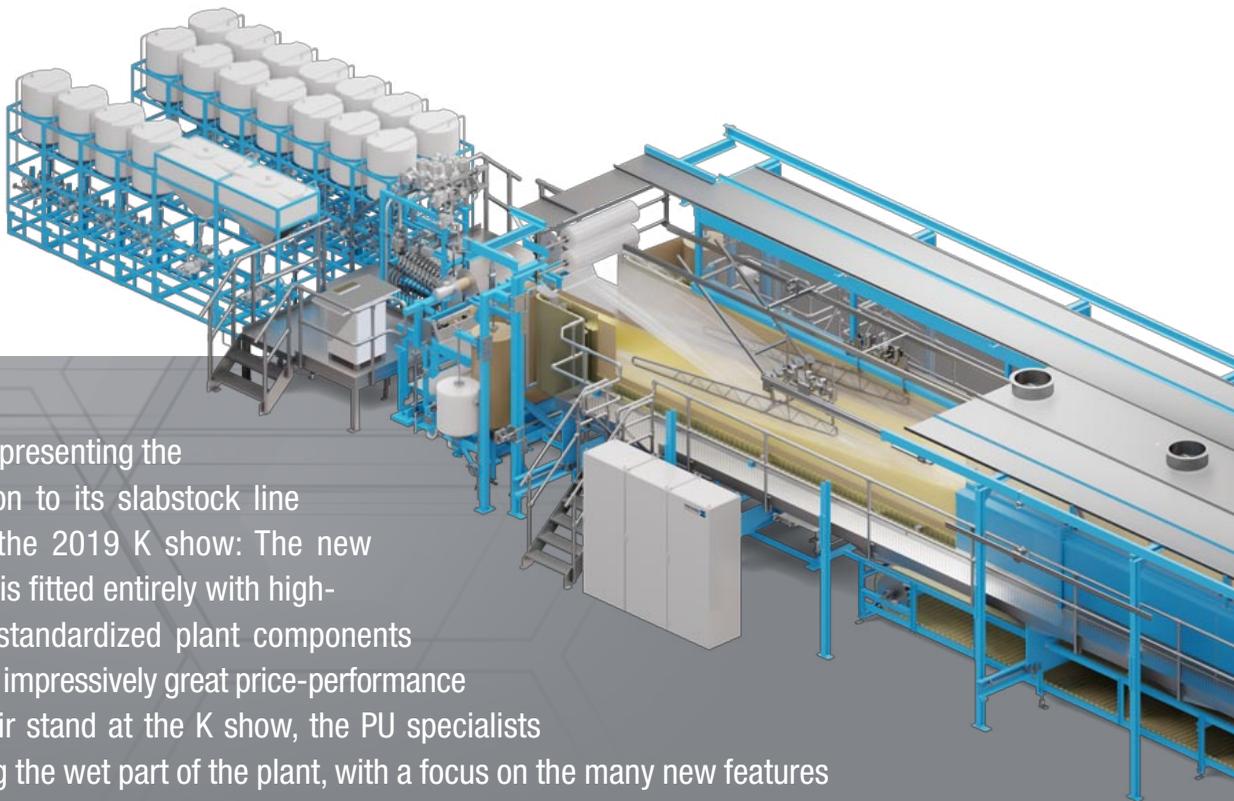
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Modular and with many new features:

Premiere of the SMARTFLEX continuous slabstock systems for cost-efficient production of high-quality flexible foams

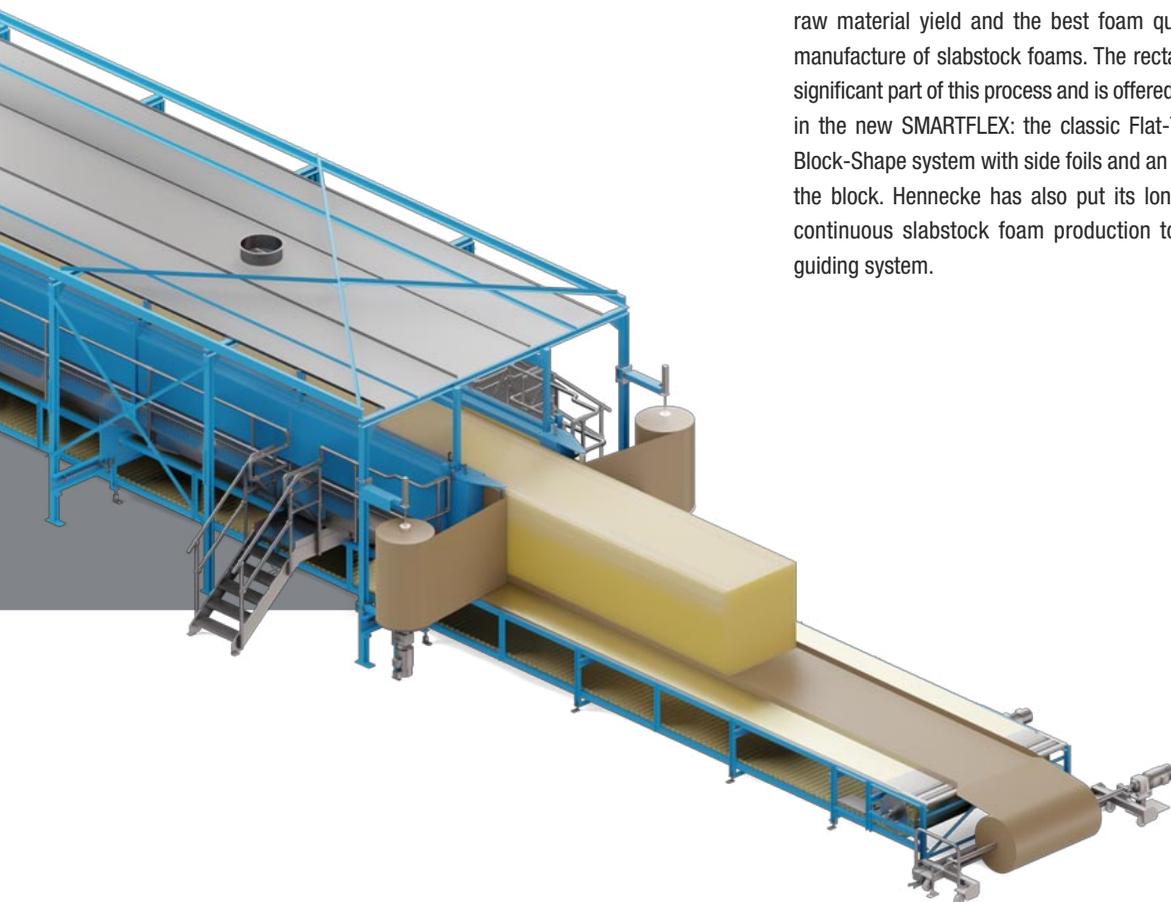


Hennecke is presenting the latest addition to its slabstock line portfolio at the 2019 K show: The new SMARTFLEX is fitted entirely with high-quality and standardized plant components and offers an impressively great price-performance ratio. On their stand at the K show, the PU specialists are exhibiting the wet part of the plant, with a focus on the many new features of the SMARTFLEX, including the new visualization and control software FOAMWARE.

In order to be competitive on the market, processors must be able to offer their customers high-quality products with a wide range of specific properties. The combination of precise high-pressure metering and a powerful stirrer mixer makes Hennecke's continuous slabstock lines the perfect partner in the efficient processing of all commercial materials. Here the MULTIFLEX is Hennecke's best-selling slabstock line, guaranteeing the processor a highly efficient raw material yield and extremely good foam qualities in the continuous production of slabstock foams. Thanks to extensive standardization and an entirely modular design, Hennecke has been able to combine important distinctive features of the MULTIFLEX series with noticeably shorter assembly times in a new production system: the SMARTFLEX. This plant concept is aimed at polyurethane processors who have not yet been able to invest in the comparatively more complex MULTIFLEX system.

Hennecke achieves the fast assembly times through a consistently modular assembly and disassembly concept. The wet part of the SMARTFLEX is fully assembled at the Hennecke site in Sankt Augustin and all pump sets and electronic parts are parameterized and commissioned. The system is then disassembled into larger modules and transported to the customer in standard containers. The final assembly can then be carried out in a simplified process on site by a Hennecke technician. In this way, the assembly and disassembly of the SMARTFLEX is quicker than for example with the MULTIFLEX. The modular SMARTFLEX plant concept is also impressive from a qualitative point of view: The material flows through the mixer from bottom to top, which means it is possible to fill the mixing chamber before the foaming begins, so that the mixture expels any remaining air and thus prevents the formation of air bubbles which could damage the metering and mixing system. The mixer is mounted directly on to the feed table, which allows for a very short pipe line between the mixer and the dispenser. The dry part is the same as in the conventional foaming systems, with the exception of the feed table.

Hennecke's proven polyurethane technologies are of course also used in the SMARTFLEX. Through high-pressure technology and the liquid laydown technique, processors can achieve a highly efficient raw material yield and the best foam qualities in the continuous manufacture of slabstock foams. The rectangular block system is a significant part of this process and is offered into two different variants in the new SMARTFLEX: the classic Flat-Top system and the new Block-Shape system with side foils and an additional, optional foil on the block. Hennecke has also put its long-standing experience in continuous slabstock foam production to good use in the paper guiding system.



The lower paper is wound up underneath the laydown table. The paper is directed and turned up so that a deflection plate is formed. This MIXGUIDE system is also used in NOVAFLEX® processes. For this purpose, the MIXGUIDE deflection plate is pushed all the way to the front of the feed table. The system is designed for a maximum of 20 additives, eight polyols and four isocyanates. The additives are



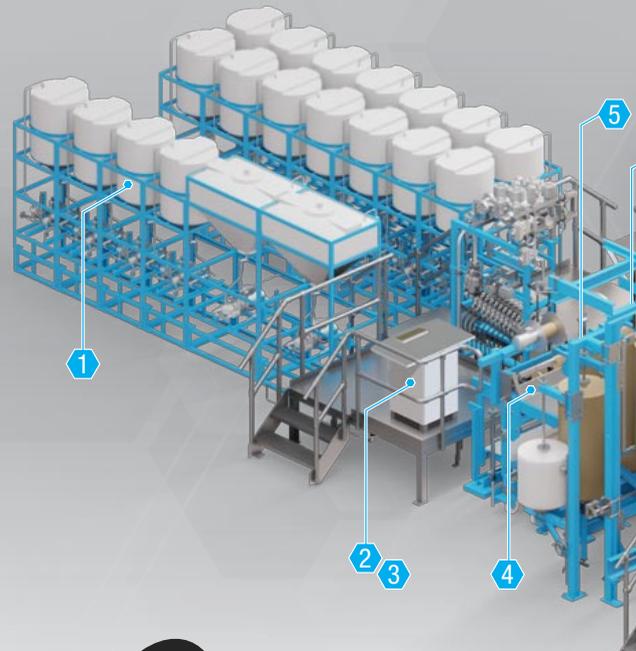
Innovative and compact paper guiding system with MIXGUIDE deflection plate

strictly installed with a rise so that the lines can easily be ventilated. This ventilation of the additive lines is important because recirculation lines have been intentionally omitted in favor of shorter pressure build-up times when starting the pumps. Non-return valves are installed directly behind the pumps. In the standard configuration, the additive lines are secured at 40 bar in order to be able to use the new SMARTJECTOR injectors. Additives with a large output range are stored in a tank farm. Tin is added directly to the mixing chamber via an injector, as is usual. In the SMARTFLEX systems, only the flow rates of the water, methylene chloride, isocyanate and tin are measured. Isocyanate, additives with a large output range and the polyols have a recirculation line. Here the polyol volume flow is

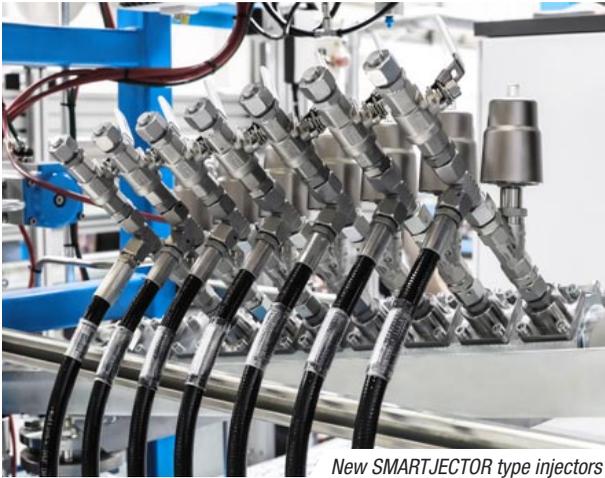
measured as the total polyol amount. This concept primarily serves as a safety function. Measurement of individual flows is offered as an option. Isocyanate is pumped under high-pressure as usual and metered into the mixing chamber using two combi-injectors.

The visualization and control software FOAMWARE is also new and has been deployed for the first time in the SMARTFLEX system. As a platform for the future, Hennecke is using the Visual Studio development environment for the new software and the high-quality Siemens industrial PC technology for the hardware. Further features of the new control system: integration of the complete functionality in a new development system, standardization of the basic functionalities, modular operating concept, extensive retrofit options, newly developed functions, maximum degree of freedom

Innovation for retrofitting



» Comprehensive services for an efficient production

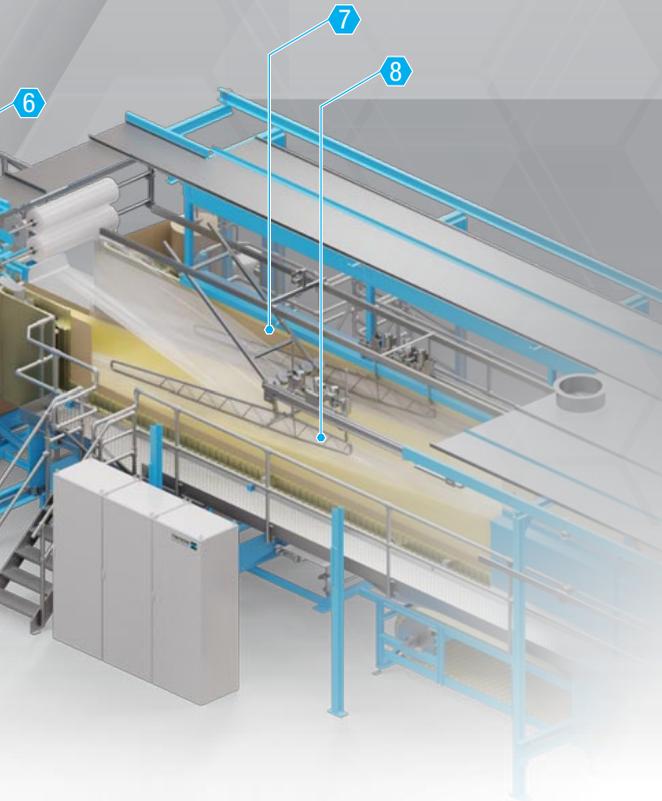


New SMARTJECTOR type injectors

for the future through customized modules and visualization on mobile devices. The intuitive software will be successively rolled out in all Hennecke slabstock systems. Presentation of the plant at the K show is also forward-looking. Using augmented reality, visitors will be able to submerge themselves in the world of the SMARTFLEX and take a good virtual look at the dry part.

Patented innovations for fast and simple retrofitting bringing decisive advantages to your production at an attractive price-performance ratio.

We continually enhance our 360°RETROFIT service with further innovative measures such as the cutting-edge features of our all-new modular-built SMARTFLEX production line:



- 1 Additional or mobile (autarkic) metering line
- 2 Performance rack IPC with Win10® and 4K operator panel
- 3 **FOAMWARE** process data acquisition & visualization
- 4 **MIXGUIDE** deflection plate
- 5 **SPOUT-EX** mixer enhancement
- 6 **NOVAFLEX®** for CO₂-blown polyether-based foams
- 7 Block height and rise profile measurement
- 8 Block-Shape system

New standards for an extremely broad range of applications

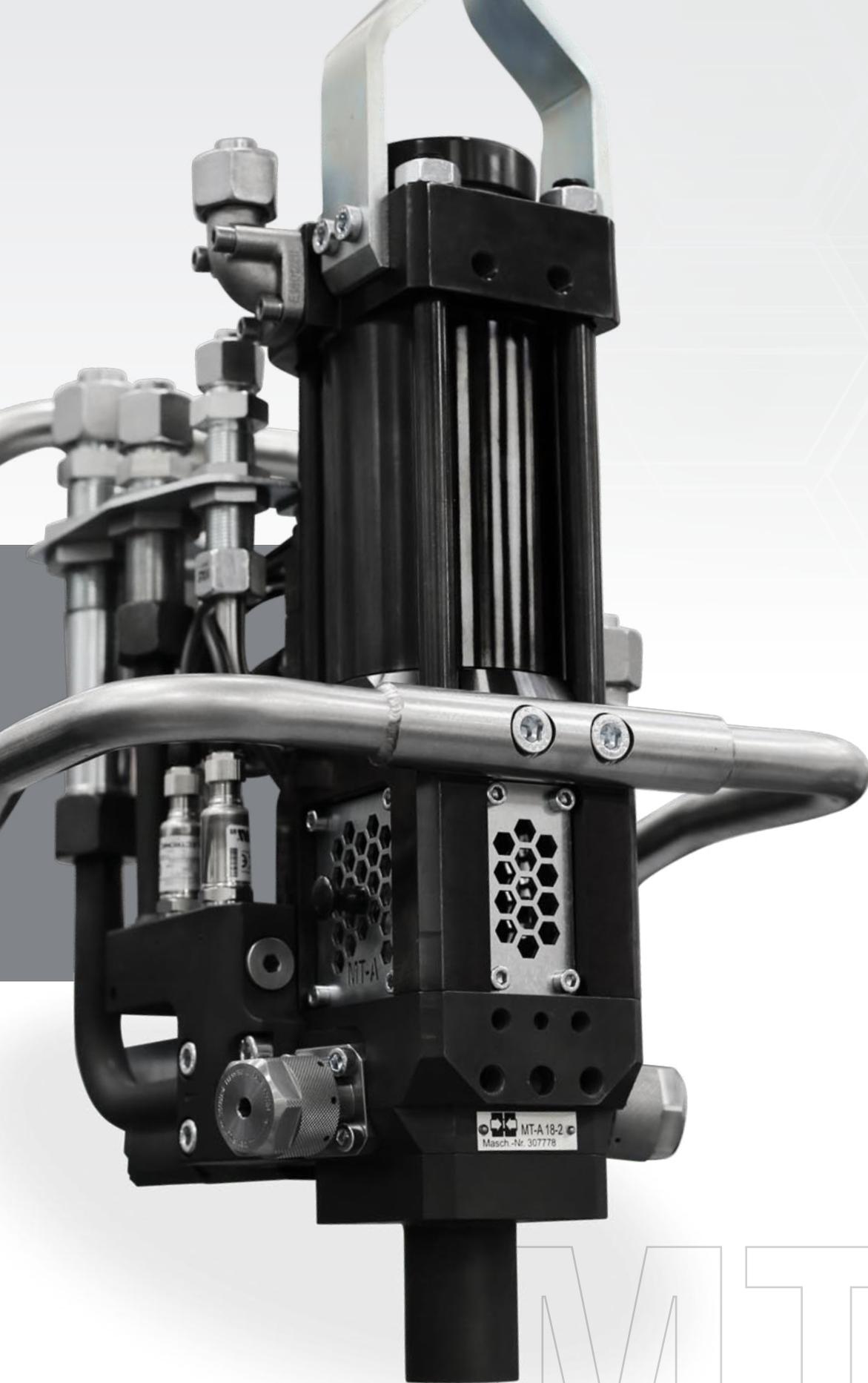
A double premiere for the MT-A mixhead series and the new generation of FLEXJET constant pressure injectors

Mixheads make a significant contribution towards quality and efficiency in the production of polyurethane products. The development and manufacture of these mixheads requires a high level of expertise and many years of experience. Over the years Hennecke has successfully become the world leader in this area. Every mixhead bearing the name Hennecke Polyurethane Technology is a 100% in-house product which earns the label Made in Germany. Now, after around ten years, Hennecke has considerably enhanced the well-known MT mixhead series whilst maintaining its proven construction features. The new MT-A mixheads have an impressive functional design and offer a wide range of applications in process technology. Equipped with a smart sensor module, the MT-A series is also well-prepared for the spectrum of tasks linked to Industry 4.0.

Due to their high precision and durability, the high-pressure MT mixheads have been proven in all applications for ten years and are therefore very well-established in the sector. Operators even use Hennecke MT mixheads in other manufacturers' metering machines. One of the main reasons for the development of the MT series was the change in the raw materials processed by the MT mixheads. Today, many processors use aggressive raw material

systems with significantly higher viscosities and greater chemical reactivity. For the new parts of the MT-A mixheads for two and multi-components, Hennecke now uses further optimized materials and high-quality coating processes which have been extensively tested by the company under many different production conditions.





MT-A

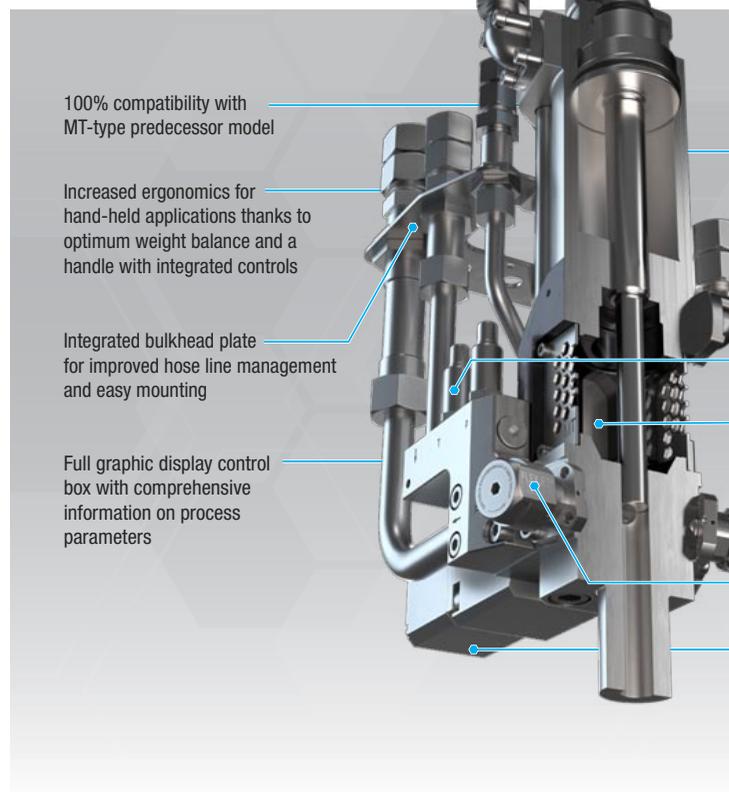
The high-quality materials and surface treatments provide for high durability, even under difficult production conditions. Another new feature of the mixhead is an innovative cleaning and lubrication concept. An enlarged opening to the spacer tube affords generous access without dead space and facilitates manual cleaning. Even surfaces also make this working step much easier. Besides manual cleaning, the customer can choose between two options: integrated minimal lubrication inside the spacer tube or circulation lubrication of the entire spacer tube area.

The real eye-catching features of the two-component MT-A mixheads are the integrated sensor technology for process monitoring and the improved hose line management through standard integrated bulkhead plates. If required, the mixhead system can be quickly and easily separated from the machine. Operation of the two-component mixhead has been considerably improved thanks to a new ergonomic operator panel with optimal fully graphic display. The operator can retrieve further information about the process parameters and the temporal operating sequences of the metering process. The operator panel is integrated directly into the handle. However, Hennecke has done even more for the ergonomics of hand-held applications: due to optimal weight equilibrium, the mixhead suspension is balanced in the center of gravity, for both vertical and horizontal attachment. The two-component mixheads of the previous series can be directly replaced by the new MT-A mixheads. No modification work is required.

The multi-component mixheads, for example the four and six-component models for moulded foam applications, have been optimized for highly automated, large-scale production and can be used for an extremely wide range of applications, as well as for the straightforward processing of diverse raw material viscosities. For highly viscous polyols in particular, due to the reduction of pressure losses when feeding the material, there is more pressure energy available to the injectors for mixing. In addition to the mixing chamber, the mixing injectors also play a significant role in the effective mixing of polyurethane systems with high-pressure impingement mixing technology at the highest possible rate of efficiency.



The new FLEXJET constant pressure injector generation represents a Hennecke development that fulfills better than ever all the requirements of modern polyurethane systems in terms of metering accuracy, mixing quality and service life of the components. Its user and repair-friendly design also facilitates maintenance and servicing. This results in reduced operating and maintenance costs. There is nothing standing in the way of a simple replacement: like the two-component mixheads, the FLEXJET injectors are 100% compatible with the respective predecessor MT mixhead models.



100% compatibility with MT-type predecessor model

Increased ergonomics for hand-held applications thanks to optimum weight balance and a handle with integrated controls

Integrated bulkhead plate for improved hose line management and easy mounting

Full graphic display control box with comprehensive information on process parameters

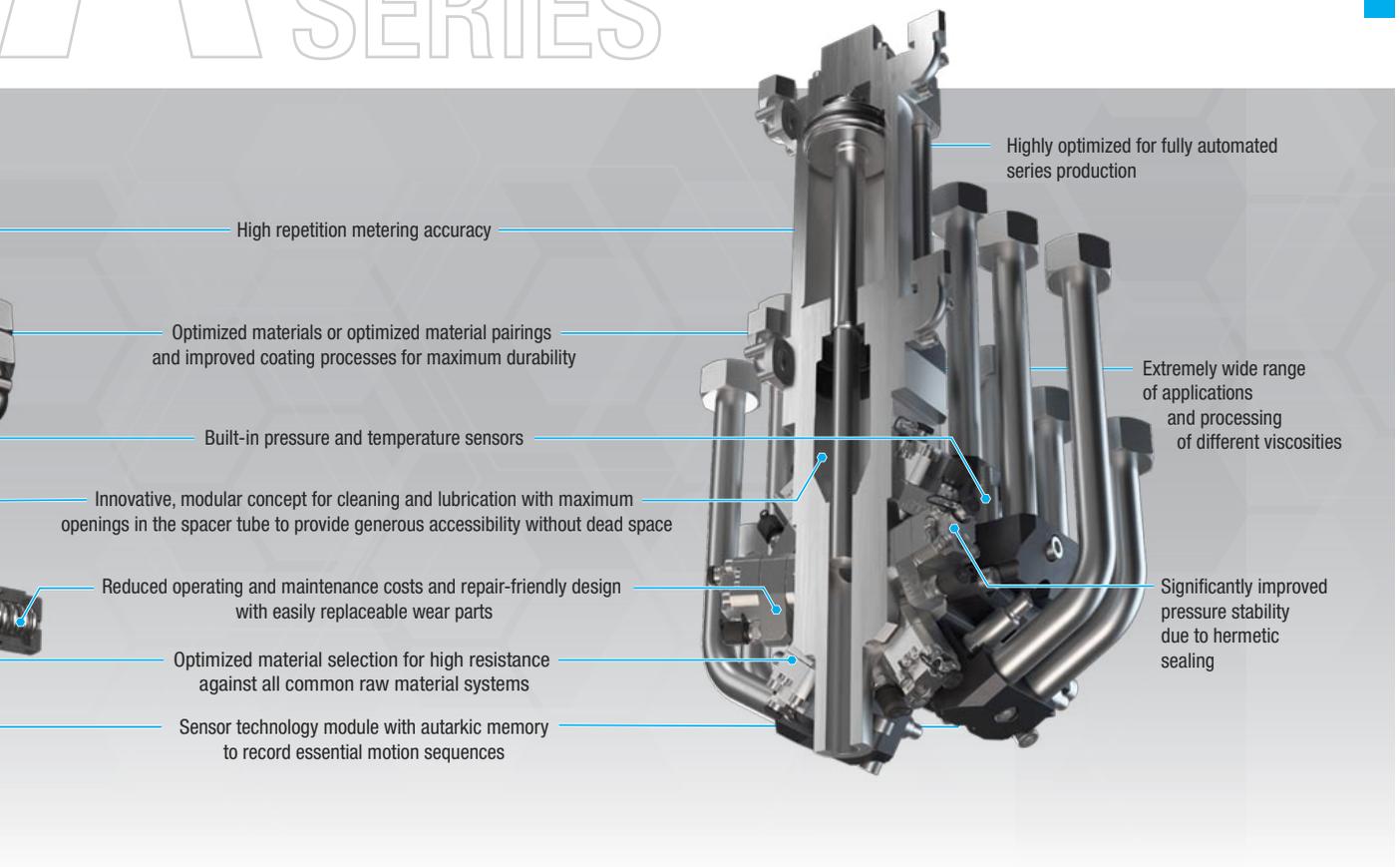
Besides reworking the established spring-loaded injectors (FLEXJET SL), there is a new version which is specially tailored to meet the requirements of the technically challenging multi-component mixing technology: the FLEXJET GL injectors. The hermetic sealing of the media-carrying piping system is a special feature of this injector series.



New FLEXJET constant pressure injector generation

Hennecke is planning an individual retrofit concept for the introduction of the new mixhead and injector generation which will be tailored to meet customer requirements with the customer service department. The first models in the MT-A series – the MT-A 18-2 and the MT-A 22-6 MF – and the new FLEXJET constant pressure injectors will be available from Q1 2020.

A MIXHEAD SERIES



High repetition metering accuracy

Optimized materials or optimized material pairings and improved coating processes for maximum durability

Built-in pressure and temperature sensors

Innovative, modular concept for cleaning and lubrication with maximum openings in the spacer tube to provide generous accessibility without dead space

Reduced operating and maintenance costs and repair-friendly design with easily replaceable wear parts

Optimized material selection for high resistance against all common raw material systems

Sensor technology module with autarkic memory to record essential motion sequences

Highly optimized for fully automated series production

Extremely wide range of applications and processing of different viscosities

Significantly improved pressure stability due to hermetic sealing

The next evolutionary step in elastomer casting:

Hennecke's new ELASTOLINE HP avoids material and solvent losses during production whilst opening up brand new possibilities in processing

The ELASTOLINE low-pressure metering machines for elastomer casting have been an established, state-of-the-art product range for decades. However, low-pressure processing has one distinctive disadvantage: for technical reasons, material and solvent losses occur during the pre-shot and flushing shot stages of the production process. Furthermore, it is virtually impossible to fill a closed mould using a low-pressure stirrer mixhead. Thanks to Hennecke's new ELASTOLINE HP high-pressure elastomer casting machines, these processing disadvantages are a thing of the past.

When it comes to processing polyurethane-based casting systems and raw materials, the name ELASTOLINE is synonymous with high-quality end products. Low-pressure ELASTOLINE machines reduce the amount of manual work involved, improve industrial hygiene and streamline operational processes. The high-quality design of all assemblies ensures that these system benefits continue to be reaped in the long-term, even in harsh production environments. Hennecke already offers two different types of customized ELASTOLINE low-pressure metering systems: one for MDI and TDI raw material systems (ELASTOLINE F), and one for Vulkollan® or NDI raw material systems (ELASTOLINE V). The compatible low-pressure MEL mixheads are supplied with hydraulic injector control for extremely short and synchronous switching cycles. They ensure that the processor achieves superior formulation constancy.

The parts produced with these systems can be divided into solid and cellular elastomer products. Compact polyurethane elastomers are suitable for a variety of moulded parts, high-quality wheels and rollers and also semi-finished products for mechanical processing. These parts are used when maximum abrasion resistance as well as mechanical and physical strength are important. In contrast, due to their excellent material properties, the polyurethane elastomers with a micro-cellular structure are used when considerably greater deformation and lower compression hardness are required compared to the solid elastomers. Up to now, elastomer processors have suffered from material losses during production of these parts - such losses are unavoidable in low-pressure processing for technical reasons.

ELASTOLINE HP



At production start, the mixhead must be overfilled for the pre-shot in order to dispel air from the mixing chamber and set the so-called stoichiometric mixture ratio despite the different viscosities. At the end of production, the mix head is completely full with material and needs to be emptied and rinsed to prevent the elastomer reaction mixture from curing in the mixer. The concluding flushing shot is different for each system.



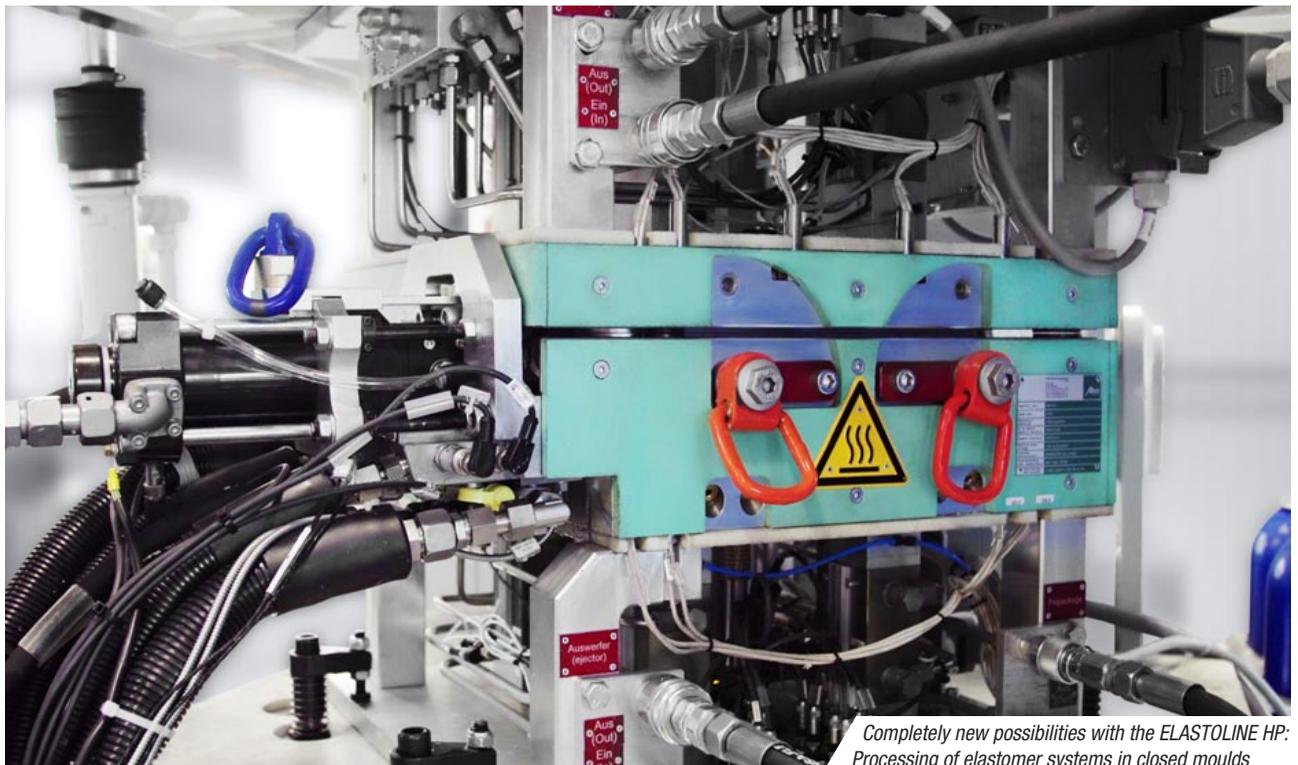
Production without material loss

The major advantage of high-pressure metering with the new ELASTOLINE HP is that material and solvent losses are avoided during production. The exact material quantity required for the production run is mixed in a high-pressure mixhead. The amounts involved in the mixing chamber volume are by no means trivial: material savings through the use of high-pressure technology can add up to a five or six-figure Euro sum per year, depending on the production scenario! As well as saving costs, the high-pressure concept also contributes to sustainability and environmental protection by conserving resources. Furthermore, high-pressure elastomer processing effectively eliminates the formation of aerosols at the workplace; these usually arise when rinsing the low-pressure mixhead. Extraction and disposal of aerosols is not necessary, meaning of course that less work is involved and costs are lower.

Elastomer processing using high-pressure machines has not been possible up to now. Thanks to decades of experience in developing and manufacturing low and high-pressure metering machines, Hennecke is the expert in elastomer high-pressure processing with high-precision and continuous temperature control. Elastomer

processing often requires extremely high temperatures which must be strictly maintained in the entire metering system, from the tanks and hose lines to the mixhead. Through advances in high-pressure mixing technology, Hennecke has brought the ELASTOLINE HP to the market, with a selection of mixheads that efficiently convert the delivery pressure in the processing of highly viscous media into mixing energy. Thanks to a sophisticated mixing chamber geometry for optimized turbulence and the arrangement of the injectors in a double V shape, it is now possible to process materials and mixing ratios that could only be handled using the low-pressure process in the past.

Another huge advantage of the ELASTOLINE HP is that it enables elastomers to be processed in closed moulds. These moulds also have many benefits which include multi-cavities, functional integration and over-moulding. With the help of the ELASTOLINE HP, they too can now be used for elastomer processing. On the one hand, this option arises of course from the omission of the pre-shot and flushing which is determined by the system; on the other hand, filling a cavity using a low-pressure stirrer mixhead would simply not be possible



*Completely new possibilities with the ELASTOLINE HP:
Processing of elastomer systems in closed moulds*

due to the resulting back pressure. Hennecke has already placed several elastomer production plants using closed moulds with prominent customers. In addition, the compact design of the ELASTOLINE HP's high-pressure mixhead means that it can be mounted on to a mould at almost any angle or on to a closed mould. And this opens up completely new possibilities and further savings potential in the production of elastomer parts. Low-pressure systems were initially also used for classic polyurethane processing. They ensured process stability compared to the common manual mixing. The first high-pressure metering machines developed by Hennecke in the 1950s quickly became the standard in polyurethane processing due to all their benefits. The market launch of the ELASTOLINE HP marks the next evolutionary step.

Intuitive and ergonomic

The operational concept of the ELASTOLINE HP includes exclusively high-quality components which have been designed with user-friendliness in mind. Such as the sophisticated 12-inch latest generation touchscreen panel, which is not located in the control cabinet, but is placed in the work area, providing ergonomic benefits to the user. Complex processes are depicted in a logical and simple manner thanks to the user-friendly visualization which also assists the user in the event of a fault.

As a standard feature, the ELASTOLINE HP is equipped for the metering of two components plus an optional additional component. Three types of mixhead enable mixture discharges of 10 cm³/sec up to 600 cm³/sec. The efficient temperature control allows for a component processing temperature of 45 °C - 100 °C. Other versions are also available on request.

At Hennecke's in-house TECHCENTER, a three-component ELASTOLINE HP is ready and waiting to give elastomer producers the chance to optimize their existing production processes with the new technology, or to develop entirely new products or production processes. Hennecke customers can rely on support from experienced application engineers.

»» NO WASTE

»» NO SOLVENT

»» NO WORRIES

Customized for the efficient production of fiber-reinforced structural components using WCM:

The new JETLINE by Hennecke-OMS

HP-RTM technology is the top choice for realizing complex, fiber-reinforced structural components. There is however another cost-efficient process that can be used for producing parts with a more simple and two-dimensional structure - the so-called Wet Compression Moulding (WCM). Compared to the HP-RTM processes, WCM applications score points for their shorter cycle times. Hennecke GROUP customers can now benefit from the growing market and specific advantages of this new processing method with a specially adapted metering machine system using proven low-pressure technology from the Italian PU specialists HENNECKE-OMS: the JETLINE.

WCM technology represents a highly efficient production method for volume production of simple, two-dimensional and fiber-reinforced structural components. In this process, the reactive mixture is applied - either manually or automated - on to the semi-finished part as a fluid film. This takes place either in a separate workstation using a robot-controlled application, or directly in the mould. In a separate workstation, the fiber fabric is guided under the WCM injector of the mixhead by one or more robots and the reactive mixture is applied to the fiber fabric. The robot then places the wetted semi-finished part precisely into the mould. The press closes together with the mould, ensuring that the reactive

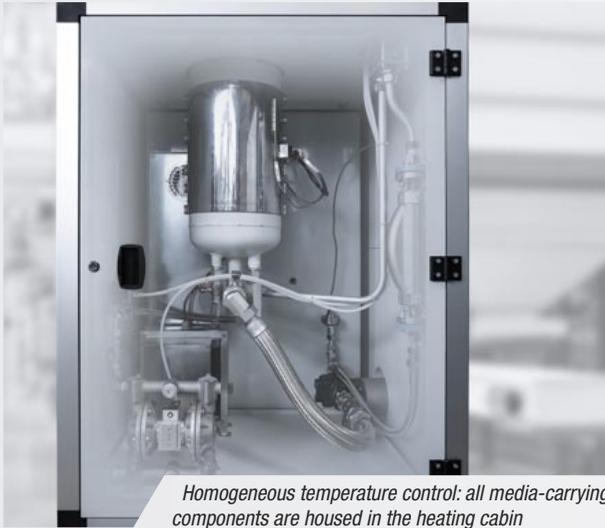
plastic is distributed evenly. After curing, the finished part can be removed for trimming. Compared to HP-RTM technology, the WCM process places significantly fewer demands on production, particularly with regard to the complexity of the mould. In addition, the time in the press and consequently the cycle time can be reduced.



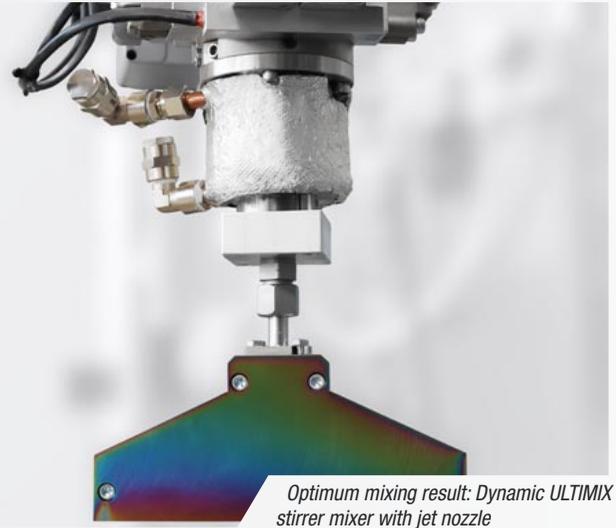
ETLINE



JET



Homogeneous temperature control: all media-carrying components are housed in the heating cabin



Optimum mixing result: Dynamic ULTIMIX stirrer mixer with jet nozzle

Up to now, Hennecke's STREAMLINE systems have been used for WCM processes. A thoroughly developed product that has recently undergone a comprehensive update (see infobox) and is precisely adapted to the process availability of serial applications in HP-RTM, CLEARMELT and WCM processes. However, if a metering machine is required only for WCM applications, the STREAMLINE, with its wide range of uses in process technology, becomes quickly oversized. Low-pressure technology can also be used for the open application of the fluid film in WCM processes. And this is where the JETLINE can score points, as the robust machine system has been specially optimized for use in WCM applications.

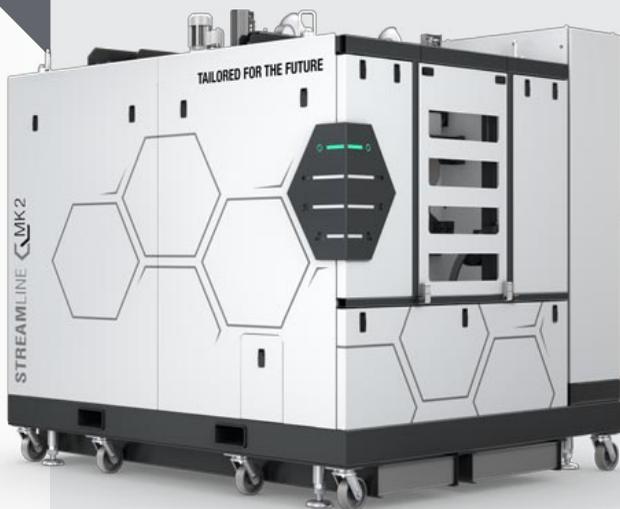
Focusing on a specific process does not mean that JETLINE customers have to make sacrifices: HENNECKE-OMS have installed exclusively high-quality and proven parts into the metering machines, such as the SIEMENS control system modules including a large touchscreen operator panel. The newest company in the HENNECKE GROUP has decades of experience in the area of low-pressure technology. This expertise is now concentrated in the JETLINE.

JETLINE

The work tank for the A component is housed in a heating cabinet and tempered homogenously using circulating air. The A component recirculation lines to the mixhead are also heated. The auxiliary components are stored in double-walled work tanks. A dynamic ULTIMIX stirrer mixer is used to ensure an optimum mixing result. A 180mm jet nozzle is deployed as a dispenser. Here the nozzle is reliably cleaned after every shot using compressed air and through additional rinsing with the A component. As an option, a solvent station is available for effective cleaning of the mixhead chamber. If release agents are to be used in the production, the JETLINE can additionally be fitted with a release agent station. Furthermore, an automated filling device for the components is supplied so that the machine can produce without interruption. For interested customers, the JETLINE can be closely examined and tested in the Hennecke TECHCENTER at the site in Sankt Augustin.



The all-rounder for HP-RTM, CLEARMELT and WCM applications: the STREAMLINE MK2



Building on the sale of over 70 STREAMLINE machines in the first generation, developers, manufacturers and raw material suppliers have been able to develop, in many ways crucially, a variety of processes in the manufacture of fiber-reinforced structural components and in efficient surface finishing using polyurethane, leading to diverse serial applications. The second generation of the machines has been significantly enhanced using the experience of dozens of production systems and advance product developments: Production flexibility has increased thanks to the space saving layout of the machine on a mobile frame which can also be lifted by crane. The plant automation is also particularly flexible: The STREAMLINE MK2 is equipped with a wireless operator panel which enables on-the-spot operation of all process parameters, independent of location. The efficient heating configuration is also impressive with its innovative detailed solutions: the heating and metering cabins are joined together using quick-locking mechanisms which allow for easy dismantling. This ensures that all main components such as the high-pressure pumps can be exchanged very quickly. The STREAMLINE MK2 also has a special honeycomb-shaped status panel with integrated LED lights which enable the operator to determine the current status of the machine at a glance.

Hennecke machine technology is the choice for KURIMOTO, Ltd.

New state-of-the-art composite center in Japan



The demand for composite products is also steadily increasing in Japan. With the aim of providing better support to its many composite applications customers, this summer Hennecke's Japanese customer KURIMOTO opened a new composite center at its site in the Japanese prefecture Shiga. KURIMOTO is using Hennecke machine technology for metering reactive materials in the state-of-the-art application technology center.

With a population of almost 130 million, the island of Japan represents the third largest economy in the world. Japan is one of the most important target markets for composite applications for KURIMOTO and Hennecke, not least because of the particularly strong Japanese automotive industry, in which appropriate lightweight solutions are in ever greater demand. The automotive industry in Japan employs over five million people and in 2018 alone it generated a turnover of more than 500 billion euros. In 2018 over nine million cars rolled off Japanese production lines. China and the US were the only countries to produce more cars than Japan in the same time period. But the automotive industry is not the only important target market: Japan is considered to be a

high-tech country with a multitude of relevant industry sectors for those offering composite solutions. It is not without reason that the headquarters of three of the world's largest carbon fiber producers TEIJIN, TORAY und MITSUBISHI RAYON are located in the 'land of the rising sun'. The rapidly growing demand for composite solutions was the main reason behind KURIMOTO's decision to set up a brand new, larger composite center in the Shiga prefecture. Together with customers and other partner companies, the aim is to speed up the development process and make it even more efficient. A key requirement here is to manufacture and develop prototype parts under real production conditions right up to the stage of serial production.

In the new composite center with a surface area of 2300 m², KURIMOTO offers customers a variety of technologies for the mass production of composite parts. These include a carbon LFTD plant, a 200 kN pultrusion machine and two hydraulic presses for HP-RTM and WCM processes. The presses have a closing force of 4,700 kN or 10,000 kN. The latter is a complete in-house development that will also be on offer to KURIMOTO customers in the future. The metering of the reactive raw material systems is carried out by the STREAMLINE high-pressure metering machine, already well-established in the market and used in the previous KURIMOTO technical center. In order to offer discerning customers an even better selection from the comprehensive technology portfolio, the Hennecke metering machine has been extended for the move to the new composite center to include a robotic wet shot function for WCM applications, in addition to the HP-RTM process. By setting up the new composite center, developing in-house press technology and collaborating with the Hennecke GROUP on technologies, KURIMOTO is now a one-stop supplier of composite solutions on the market and a competent partner for its customers in the areas of product and process development, in addition to offering all the systems required for the production process. And Hennecke - as well as making enormous technological advances in the areas of HP-RTM and WCM, leading to the new STREAMLINE MK2 machine generation - has also invested in a new subsidiary company in Japan. Hennecke's many Japanese customers have received even more intensive support from here since the beginning of 2019. A six-person team works in the heart of the Japanese capital Tokyo to meet the needs of the local customers and offer improved services in their own language.

As a Hennecke GROUP site, the new local presence provides access to the whole product portfolio of the core brands of the Hennecke GROUP. Besides optimized customer service, Hennecke Japan is placing greater focus on the country-specific requirements for new machine business. This is how a large number of available machines and plants will be on offer in the future with control system technology that has been adapted to the Japanese market.



Metering of the reactive raw material systems is carried out by the STREAMLINE high-pressure metering machine

Further plans for the subsidiary involve a local storage facility for replacement parts that are required during critical outage periods. Hennecke's investment in its Japanese subsidiary is not only beneficial to KURIMOTO: the newly established local presence means that the group is even better placed to drive forward further exciting projects in the Japanese composite market.

KURIMOTO

The traditional Japanese company with headquarters in Osaka was founded 110 years ago and employs over 2000 staff across the globe. KURIMOTO's expertise is divided into six product lines: ductile iron pipes, valves, plant engineering and machinery, materials and machinery, construction materials, and plastic products. Thanks to a high level of diversification, KURIMOTO has access to an excellent network in many different branches of industry.

From concept to serial part in record time:

Using polyurea to optimize a ceramic industrial filter at the Hennecke TECHCENTER

Polyurethane specialist Hennecke is well-known for providing innovative systems and technologies that are geared to meeting customer requirements in all conceivable applications. This would not be possible without intensive and continuous research and development at the in-house TECHCENTER. This example from Nanostone Water GmbH demonstrates how a ceramic industrial filter with a polyurea coating was developed for serial production at the TECHCENTER in close cooperation with the customer.



Uncoated ceramic industrial filter

Nanostone contacted Hennecke in mid-2016 with an unusual request. The front of a ceramic industrial filter was to be sealed with polyurethane or polyurea. The challenge of this project was to avoid closing up the many nano-coated channels and to only wet the unprotected web structure between them, so that they may longer withstand the abrasive or chemical influences on the medium to be filtered and thus effectively increase the filter service life. Hennecke rose to the challenge and together with Nanostone simulated possible spraying distances, outputs and robot traveling speeds. Assuming that a certain material surface tension could provide a solution to the problem, tests were planned at the TECHCENTER to ascertain if the theory applied in practice. This involved using a MICROLINE - a high-pressure metering

machine for the precise metering of the tiniest outputs - together with a robot-controlled MN6 spray mixhead. The first shots looked very promising and the desired physical effects were confirmed.



Automated polyurea spray application for coating the filter front side

It was even possible to process two different systems and thus determine their advantages and disadvantages. During the testing period, the optimal process parameters were identified and prototypes were produced for further testing and a field trial.

The results exceeded expectations and so Nanostone Water GmbH decided to invest in a production plant. In under just six months, Hennecke had manufactured the plant, assembled it at Nanostone and integrated it into the existing synchronized serial production. The process-related knowledge gained from the preliminary testing could be passed on to the plant operators at Nanostone. This is an impressive example of the opportunities provided by the TECHCENTER

at Hennecke. In less than two years' development time, an idea and initial enquiry have been transformed into a production plant for optimized serial parts.



Hennecke TECHCENTER: from research & development to production



At its headquarters in Sankt Augustin, Hennecke runs a fully equipped 1000 m² technology center. Here you can find a variety of different machines operated by application engineers, making it possible for interested customers to develop their own new parts or to redefine existing parts. Not only can prototypes be made for pilot production, and initial tests carried out on new products, but also existing products can be improved and reproduced using other production processes. Process technology engineers are actively involved in the development process and if necessary can also provide support services such as simulations or calculations. The machine portfolio currently includes the following systems:

- 2-component MICROLINE 45/45 for small-quantity spray applications with MN mixheads or casting applications with the established MT mixheads
- 4-component high-pressure TOPLINE HK and TOPLINE HT metering plants, with 4-component MN10-4 mixheads for processing spray systems for PREG, LFT or open spray applications. In addition, sandwich panel feed tables with a panel gripper, glass-fiber cutter, 600 ton press, 2.5 m rotary table and Fanuc robot on a traversing axis
- 3-component STREAMLINE for manufacturing structural elements in the HP-RTM process
- 6-component high-pressure machine with 40 ton mould carrier and Fanuc robot with multi-component mixhead for producing different foams
- JFLEX for continuous production of slabstock foams
- 3-component ELASTOLINE HP for processing elastomer raw material systems under high-pressure
- 3-component ELASTOLINE FP for processing elastomer raw material systems under low-pressure
- 2-component TOPLINE HK 650/650 for processing rigid, flexible and integral skin foam systems under high-pressure
- 2-component HIGHLINE 130/65 for processing rigid, flexible and integral skin foam systems under high-pressure

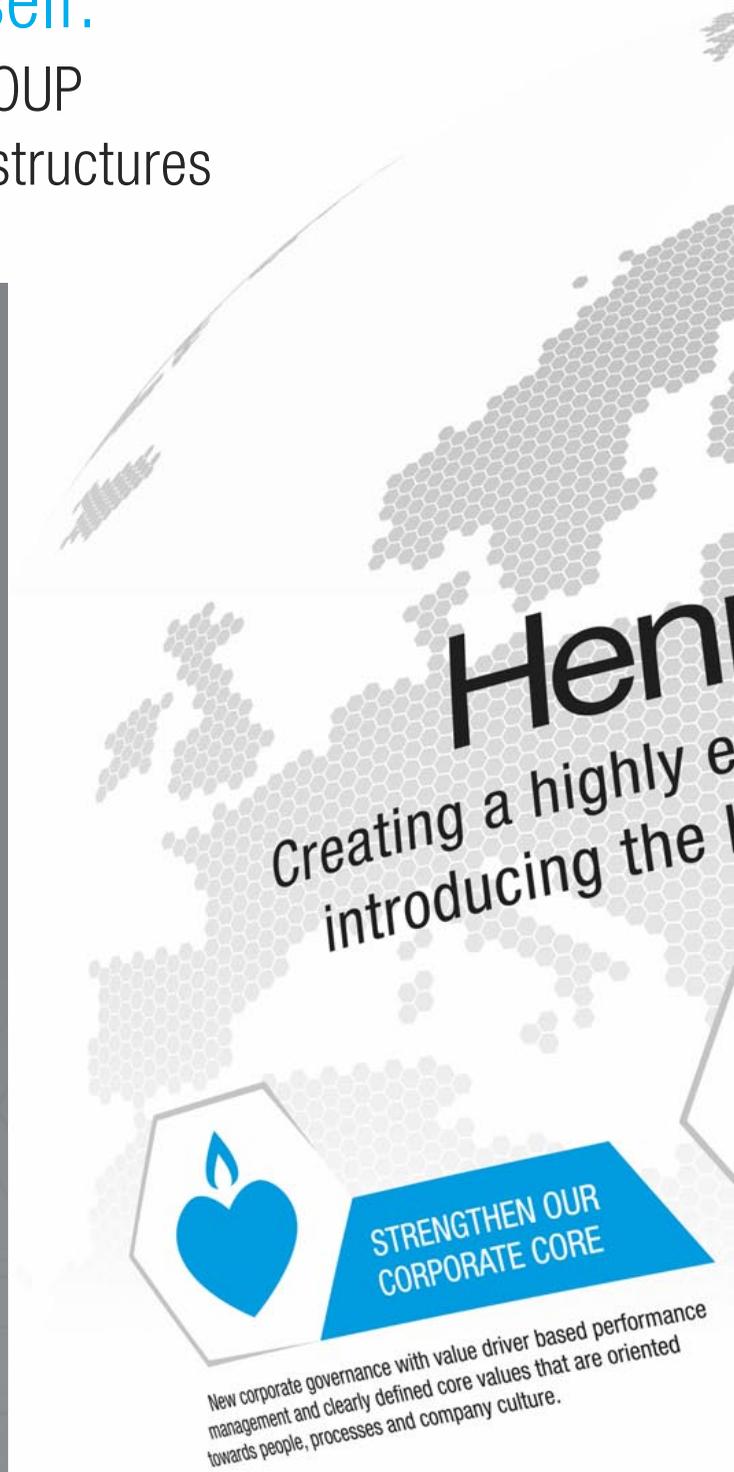
Due to the growth in new application areas and more extensive processes, existing machines are constantly being designed, tested and further developed for serial production at the TECHCENTER.

Hennecke redefines itself:

Creation of the Hennecke GROUP and transformation of global structures

Continual growth of the Hennecke brand, the acquisition of HENNECKE-OMS S.p.A in Italy and the related development of a joint international sales and service network have necessitated the creation of a unified brand identity which acts as an umbrella brand for all product portfolios: the Hennecke GROUP. The new corporate identity is much more than just a change in external communication.

In the course of the realignment, the complex international Hennecke organization will also be streamlined and become considerably more effective. From September 2019, in place of a group of different companies, a network of clearly structured business units will provide for new synergy effects. Under the name "Hennecke 2.0" Thomas Wildt, the new CEO of the Hennecke GROUP, is actively driving the transformation of the polyurethane specialists towards a highly effective organizational structure, both internally and externally.



ennecke/2.0

Effective organizational structure by Hennecke Business System (HBS).



DELIVER PROFIT AND GROWTH TO OUR CUSTOMERS

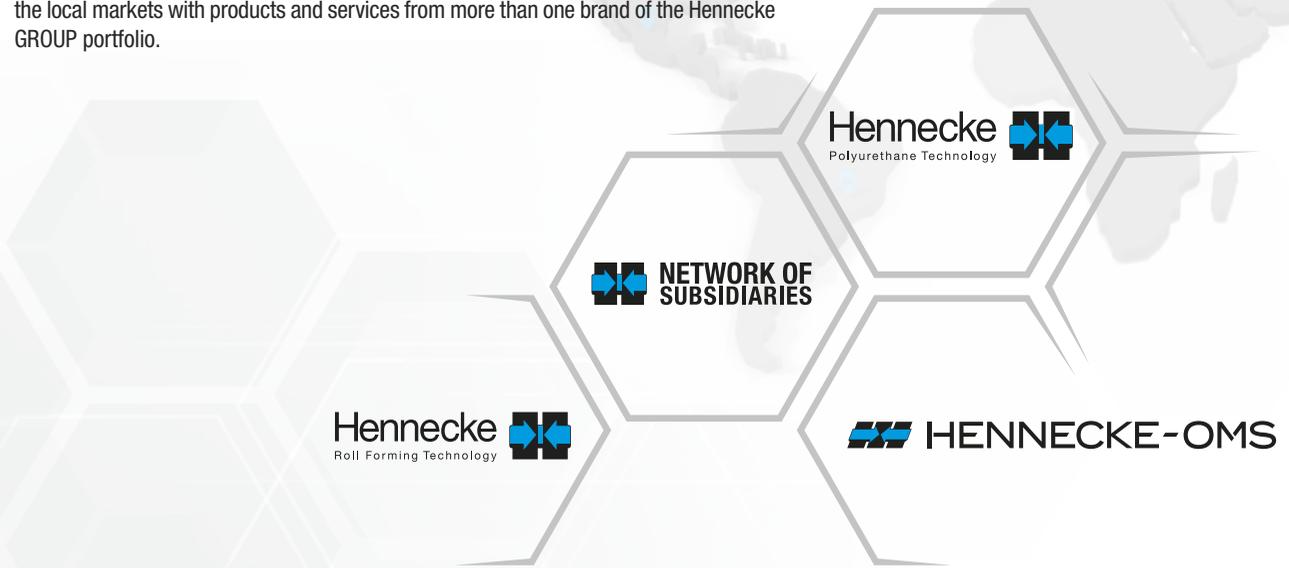
Network of business units with global excellence center structure for machine and plant technology as well as the service portfolio.



GENERATE SUSTAINABLE EXCELLENCE

Continuous improvement for long-term customer value and pioneering innovation for our products and services.

The new brand identity of the Hennecke GROUP comprises two fundamental aspects: a combination of the three independent product portfolios of the brands *Hennecke Polyurethane Technology*, *HENNECKE-OMS*, *Hennecke Roll Forming Technology* and the global network of production sites and sales and service offices who supply the local markets with products and services from more than one brand of the Hennecke GROUP portfolio.



"The core brands and the branding of the individual products and services are of course remaining and continue to be clearly identifiable", promises Wildt. Consequently, the organizational units that are responsible for the product portfolio of one individual brand in the group will continue their operations with this brand only. Particularly from the point of view of the international network, the unified brand identity enables considerable synergies as well as clearly structured communication with the global Hennecke customer base.

Wildt was appointed Chairman of the Management Board (CEO) of the Hennecke GROUP in April 2019. The business graduate brings to the company a wealth of experience from small and medium

businesses, corporations and the private equity sector. "As part of the Hennecke 2.0 project, we will reorganize Hennecke and transform the company to be more effective in the future", explains the established expert in international machine and plant engineering. The decisive factor here is that the central corporate processes will now be organized decentrally. Divided into four Centers of Excellence, each site of the new Hennecke GROUP will concentrate on its core strengths. The advantage for customers: shorter delivery times for standardized products, individual metering machines and complex complete systems for polyurethane processing - all from one source. "Hennecke is decentralizing its organizational complexity. This includes the closure of two sites that up to now had taken on services for the system business of the core brands", stresses Wildt. "What was

Individual product portfolios within the Hennecke GROUP



High-pressure Metering Machines, Mixheads, Elastomer Casting Machines, Slabstock Lines, Moulded Foam Lines, Technical Insulation Lines, Spray Application Lines, HP-RTM Lines, CLEARMELT Lines, VARYSOFT Lines



Continuous Sandwich Panel Lines, Continuous Insulation Board Lines, Discontinuous Sandwich Panel Lines, High-pressure Metering Machines, Low-pressure Metering Machines, Elastomer Casting Machines

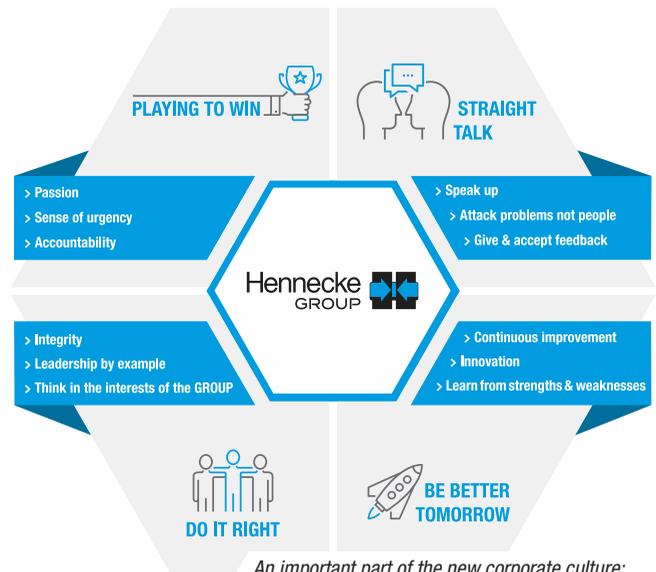


Sandwich Panel Roll Forming Plants
Trapezoidal Sheet Roll Forming Plants
Special Roll Forming Plants

previously planned and built at several sites in parallel will now be produced at only one center of excellence. This will make the entire corporate group more competitive". Hennecke's broad spectrum of customers will particularly benefit from the resulting synergy effects. "We are taking an important step forwards with the Hennecke GROUP and concentrating on the things that have made us so successful in the past," explains Wildt. "This includes our excellent individual metering machines and extensive services. We will also integrate the individual companies more substantially into the Hennecke network."

Development, planning and manufacture of all high and low-pressure polyurethane machines and all available mixhead systems will be concentrated at the German headquarters in Sankt Augustin. The centerpiece of the entire portfolio as well as thousands of processing plants worldwide will thus continue to be "made in Germany." The site in Milan, Italy is concentrating on the business with comprehensive system solutions for the continuous production of sandwich panels. The site in Pittsburgh, US will be responsible for tank farm technologies for the entire system business of the Hennecke GROUP. The Hennecke GROUP companies in Jiaxing and Shanghai, China are specializing even further in the development and production of the "dry parts" for the whole Hennecke GROUP. By dividing itself into different centers of excellence, Hennecke can - as one of the few PU systems manufacturers on the market - now offer its customers entire systems from one source. "We are regionally very diverse with Europe, the NAFTA region and Asia, and also in terms of the industry sectors of our customers," says Thomas Wildt.

Customer benefits are the top priority in every step taken by the Hennecke GROUP. All the companies are organized in such a way that they can better adapt themselves to the continual market changes in the future by adopting a self-learning approach. Wildt states: "a self-learning process organization is in a position to correct itself and to take the right measures to operate processes along the planned path with maximum efficiency." Standardized processes and tools will help to ensure successful implementation of these measures.



The Hennecke Business System (HBS) has been rolled out globally at management level across the Hennecke GROUP. The managers and staff of the entire Hennecke GROUP are being trained with the help of process mapping and standardized problem solving processes so that in future all projects and services are provided on schedule to the highest quality standards.

Through the reorganization with Hennecke 2.0, the group will be characterized in global markets by greater efficiency and professionalism. The Hennecke GROUP will not enter into any high risk business: "The process orientation allows us to recognize potential technical and commercial risks at an early stage, to analyze these risks and to mitigate them together with our customers," emphasizes Wildt. In an increasingly unpredictable global business climate, this represents another important guarantee for long-term economic success in the future for the Hennecke GROUP.



Visit us: www.hennecke-group.com

New purpose-built facility south of Pittsburgh: Hennecke Inc. moves North American company headquarters

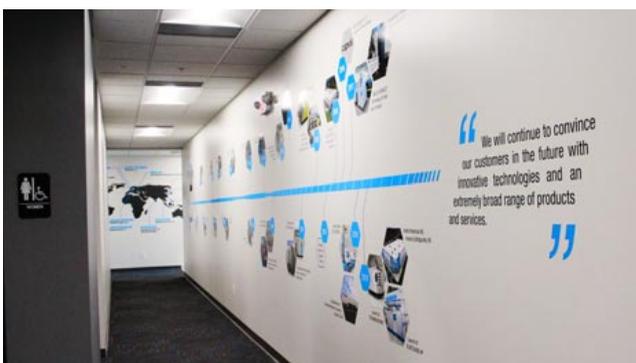
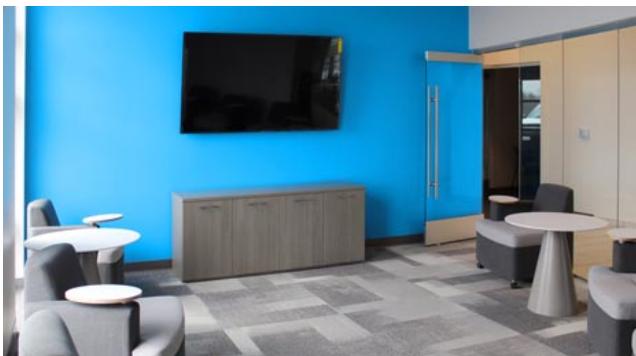


Hennecke GROUP moved its North American company headquarters to a new purpose-built facility south of Pittsburgh, Pennsylvania. The new headquarters in Bridgeville features more office and conference space, a research and development laboratory, a modern parts warehouse and areas for machinery repair and mixhead rebuilding services. Modern construction methods and better use of space resulted in a more efficient and sustainable structure.



“This building better represents the innovation and leading polyurethane technology that we provide,” said Lutz Heidrich, General Manager of Hennecke Inc. “We even used some of the materials that our customers make in the construction process.” The new building is insulated with continuous, foil-faced polyiso panels made by Hunter Panels, a Carlisle Construction Materials

company. It also contains hot water heaters manufactured by Bradford White. Both companies are Hennecke customers. Hennecke’s new headquarters features an R&D laboratory with low-pressure and high-pressure polyurethane processing machines that can be used for raw materials testing, customer trials, equipment training and demonstrations. A state-of-the-art warehouse, which incorporates automation and space-saving use of vertical lift modules (VLM) holds Hennecke’s North American parts inventory. In the spacious office area, conference and engineering zones were designed to foster communication and collaboration. The North American headquarters is one of many Hennecke GROUP locations worldwide. Besides its corporate headquarters in Germany, the Hennecke GROUP operates facilities in China, India, Italy, Japan, Mexico, Russia, Singapore, South Korea and Thailand.



On-site service from dedicated PU experts: New exclusive Hennecke GROUP sales agent for the UK and Ireland



On 1st April 2019 CTM UK Ltd. became the exclusive agent for the entire Hennecke GROUP product range in the UK and Ireland and is now offering a comprehensive range of services that focuses on the machine and systems technology portfolio of Hennecke Polyurethane Technology and HENNECKE-OMS.



CTM Managing Director Ruth Wootton and Rolf Trippler, Managing Director Sales of Hennecke GmbH, at the contract signing in Sankt Augustin.

CTM UK Ltd. is located in northern England in the town of Barnsley, South Yorkshire. The company's team of specialists provide competent on-site advice on all aspects of PU production and on the extensive product range of one of the leading global suppliers of machines and systems for polyurethane-based applications. CTM has 14 key personnel on hand including experienced engineers, PLC programmers for software support and electrical engineers for electrical support. Besides the company's long-standing PU experience, expertise and technical

knowledge, CTM provides customers with easy access to all-new stock replacement parts from Hennecke and HENNECKE-OMS, to Hennecke GROUP's on-line remote support services and to all future system enhancements. In short, CTM offers a complete and ongoing service with solutions for all aspects of PU handling and production, all from a single source. For more information about the sales and after-sales portfolio of CTM, visit www.ctmukltd.com.

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