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ACHEMA Crowned with Success

QbCon® 1 Revolutionizes Pharmaceutical Technology

Process Monitoring with b.sure®

L.B. Bohle shines with QbCon® 1 at ACHEMA

World premiere and innovations attracted great interest

Dear readers,

We are looking back at what was a very exciting few months. At the beginning of June, ACHEMA 2018, the leading trade fair for pharmaceutical production and process technology, opened its gates in Frankfurt am Main.

Our booth, which we once again shared with Korsch AG as we did at Interpack, was busy throughout the entire week of the fair. We would like to take this opportunity to thank you for your visit, the informative discussions and the many interesting project inquiries.

At ACHEMA, we presented three innovations that instantly attracted a great deal of attention. The highlight of the fair was our QbCon® 1, the first truly continuous dryer with twin-screw granulator. In addition to the short residence time of the granules in the dryer at narrow residence time distribution, advantages include the resulting traceability in the continuous process and the uniform, reproducible drying of all granules of different sizes over the entire process duration. This technology is clearly superior to all other systems on the market. The discussions on site and the interest shown during and after the trade fair strengthen our conviction that QbCon® 1 is the optimum system for your entry into continuous granulation and drying. With 24/7 production, efficiency increases by up to 30 percent thanks to the truly continuous operation of QbCon® 1.

As a second innovation, we presented a newly designed lifting column. Our HS 1000 SL, which we showcased in combination with the BRC 25 roller compactor, is an automated, slim lifting column featuring a touch panel. It is specifically designed for confined spaces.

With the mobile app called "b.sure®", we presented an application which caters to the need for a proactive approach to service in a highly practical way. b.sure® enables systems with a programmable logic controller (PLC) to transmit operating and process data via a communication server to mobile devices and PC workstations. This ensures that machine operators can keep track of several systems and machines at once and respond quickly in the event of faults or deviations from setpoints.



But that's not the only news out of Achema. We gained a new powerful sales partner in Germany for machines and process technology – Propack® - Prozess & Verpackungstechnik. With this sales and service collaboration, we are absolutely convinced that Propack® will enable us to meet our customers' needs and service requirements in an even better way.

From September 18 – 20, 2018 we held our second workshop on continuous manufacturing in Ennigerloh. Our systems from the continuous QbCon® series were all demonstrated in production. More than 40 participants attended this workshop and were impressed at the end.

Let us also cast a glance into the future.

You, dear readers, are also part of our future, of course. We look forward to your continued support in the numerous projects we have and hope that we can contribute to your success with our machines, processes and innovations.

Best regards,

Tim Rammert

Thorsten Wesselmann



This year's ACHEMA in Frankfurt am Main was a great success for the Ennigerloh-based machine builder L.B. Bohle.

At the large shared booth with Korsch AG, interested visitors and customers were presented with a number of machines demonstrating current trends in solids production under the motto "Your Process in Mind".

L.B. Bohle focused on QbCon® 1, the world's first continuous twin-screw granulator with integrated real-continuous dryer, as an absolute trade fair highlight. The trade visitors were enthusiastic about the innovation because QbCon® 1 for the first time achieves continuous drying and granulation with very short and reproducible residence times in the dryer and stable granule quality in terms of moisture and particle size.

QbCon® 1 - the ideal entry into continuous wet granulation

"PAT enables inline tracking of the production process. Among other things, this leads to a constant production of high-quality products" reports Executive Director Tim Rammert. The entire process is controlled and monitored via a touch panel. QbCon® 1 has a small footprint and is suitable for the lowest throughput rates (nominal throughput: 0.5–4 kg/h). Depending on the product, the throughput can be increased even further.

For Lorenz Bohle, Chairman of the Advisory Board, it is particularly pleasing "that we were already able to arrange test series with customers at the plant, and the feedback on this new technology was very positive". >



Every day at the trade fair, QbCon® 1 and other innovations attracted numerous visitors to the ACHEMA booth.

L.B. Bohle showcases innovations

With the HS 1000 SL lifting column, L.B. Bohle presented another innovation. "Our new lifting column impresses with its extremely reduced footprint and enables gentle lifting, precise docking, precise swivelling and turning as well as the integration of containment devices, drum adaptors and other pieces of equipment", states Technical Director Thorsten Wesselmann regarding the advantages of the new lifting column.

As another modern piece of technology, the pharmaceutical experts presented the monitoring application called b.sure®, a platform for all PLC systems. It allows machine operators to monitor process data at all times on their mobile device.

Thorsten Wesselmann outlines an advantage of the app: "With b.sure®, deviations from process parameters or error messages can now be detected at an early stage at authorized end devices or PC workstations without direct access to the operating panels of the system". In addition, the app includes a maintenance mode with notification function that provides information about upcoming maintenance and calibration.

Cooperation with Korsch AG once again successful

Bohle's other best-sellers at the trade fair booth received great feedback as well. The BFC 50 Tripan film coater with three exchangeable drums aroused great interest

due to its containment equipment. Furthermore, visitors learned about the extensive granulation program of L.B. Bohle. At ACHEMA, the specialists presented the VMA single-pot granulator and the BRC 25 roller compactor.

The KA 280 tablet checker was not only a visual highlight at the booth, but visitors were able to experience a live demonstration. The machine was displayed in full operation. Numerous visitors showed great interest in the best-seller, which enables highly efficient and precise control of sugar and film coated tablets, lozenges or capsules.

The BTM 150 hammer mill was also very well received by the public, as it was exhibited in Frankfurt for the first time with a touch panel.

Tim Rimmert sums up the company's successful presence at the leading trade fair: "We attracted an outstanding number of visitors at the ACHEMA and the cooperation with Korsch AG was once again excellent. Numerous customers and interested visitors approached us with various projects, proving that once again our presence at the ACHEMA trade fair is always highly beneficial ". "We will certainly benefit from this next year as well."



The extensive granulation range of L.B. Bohle – here the BRC 25 – met with enthusiasm.



The special machines were explained to numerous interested visitors from Asia.



The KA 280 tablet checker impresses with precise control of sugar and film coated products.

QbCon® 1 combines the three continuous processes of raw material dosing, twin-screw wet granulation and drying.

Three continuous processes combined in one system

QbCon® 1 sets new standards in the pharmaceutical industry



At AACHEM, with QbCon® 1, L.B. Bohle Maschinen + Verfahren GmbH presented a means for solids production in the pharmaceutical industry to combine the three processes of continuous raw material dosing (mixing of excipients and active ingredients), continuous twin-screw moist granulation and continuous drying in one plant including integrated control.

QbCon® 1 is designed for a throughput of 0.5 kg/h to 4.0 kg/h, so that the system can be used e.g. for the research and development of new drugs where only very small quantities of unique active ingredients are available.

QbCon® 1 meets the main quality requirements of continuous manufacturing in the pharmaceutical industry with regard to:

- short residence times of the granules in the dryer with simultaneous narrow residence time distribution ("plug flow", with extremely low back-mixing of particles);
- traceability of the materials used (excipients and active ingredients) in a continuous process;
- uniform, reproducible drying of all granule particles of different sizes;
- long service life of the exhaust air filters, without interruption of the drying process or filter change.

QbCon® 1 – Revolutionary system for solids production

Currently, only quasi-continuous dryers operating in batches exist on the supplier market for the pharmaceutical industry. These

systems are prone to filter blocking, which leads to frequent process interruptions, cleaning or replacement of the filters.

With the QbCon® 1, the first real-continuous dryer with a long uninterrupted process time (> 8 h, "24/7") is now available on the market.

The unique selling point of QbCon® 1 lies in the real-continuous dryer. Although there are several semi-continuous or quasi-continuous dryers (with several drying chambers operating in parallel) for granules on the market at the moment, none of them meets the high quality requirements of the pharmaceutical industry.

QbCon® 1 has a clear advantage over semi-continuous dryers

In addition, semi-continuous dryers cannot deliver the promised benefit of reducing waste products that do not meet specifications to the extent of the fully continuous dryer of the QbCon® 1. Due to the high volume of material, which stays in different chambers during semi-continuous drying, it is not possible to remove small partial quantities from a continuous stream. In fact, the opposite is true with current dryers on the market. Due to the high degree of mixing, whole or partial batches must be discarded when there is doubt.

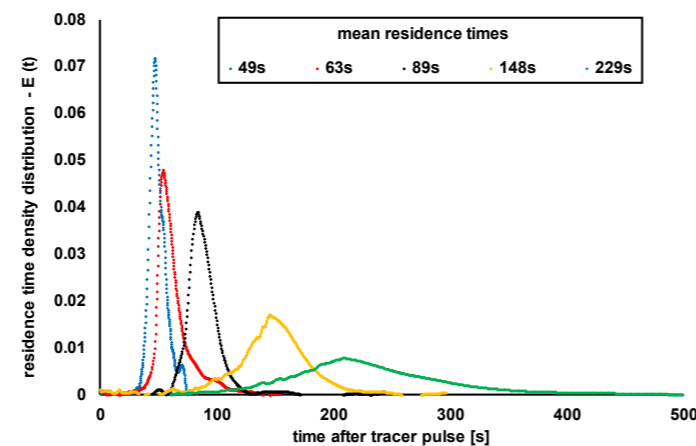
With QbCon® 1, the moist granules leave the twin-screw granulator and are conveyed directly to the distributor bottom of the continuous dryer where they are dried with hot air >



Efficient drying

With regard to the moisture content of the dried granules, QbCon® 1 achieves a constant and reproducible result, which is particularly important for a continuous process. The drying is so effective and efficient that some of the granules showed moisture content which was below that of the raw material. This is particularly relevant for moisture-sensitive products. If the residual moisture is considered too low, it is possible to adapt the process to shorter drying times (= residence times), lower temperatures and air flow rates in order to achieve higher residual moisture contents.

In addition to residual moisture, a consistent granule size distribution is important for further processing of the granules. The continuous granulation and drying process in QbCon® 1 leads to constant granule sizes, which are not changed by the gentle drying process. The residence time of the granules in the dryer is the time during which the moist granules are exposed to the drying air flow. A constant residence time distribution is therefore decisive for consistent drying results. All results reveal an ideal, very narrow residence time distribution of the measured distributions for a continuous dryer. All granules are conveyed through the dryer at the same speed in order to achieve uniform drying. Back-mixing of the granules in the dryer is also low.



and conveyed towards the outlet by mechanical excitation. During this conveying process, the granule particles no longer mix, as they remain very close together.

The conveying of the granules and the air flow are independently adjustable. Drying of the granules can therefore be controlled via the supply air temperature, the supply air volume and the conveying speed.

QbCon® 1 with technical edge

A new principle of filter cleaning keeps the filter surface for the exhaust air permanently clear. For the first time ever, continuous drying can be carried out permanently and without interrupting the process.

In all tests conducted, QbCon® 1 works without process interruption or disturbance. All critical process parameters of dosing, granulation and drying are always constant throughout the entire test period. A noteworthy benefit is the small amount of granules in the exhaust air filters. This is due to the extremely low fluidisation of the granules in the dryer. During cleaning, the filters are completely free of product residue.

Your advantages with QbCon® 1:

- The truly continuous use of QbCon® 1 increases efficiency by up to 30 percent with 24/7 production thanks to continuous filter cleaning.
- Product quality can be improved by up to 20 percent, since the product flow is monitored inline by means of spectroscopic methods (e.g. NIR); and
- the risk of contamination through the operator is eliminated as it is not necessary to dismantle dry filters covered with fine dust.
- Close process monitoring via PAT leads to high-quality products, high patient safety, lower costs, a better process understanding and control.
- The integrated product temperature measurement at the outlet prevents decomposition of the API or other structural changes and drying can already be controlled indirectly.
- The NIR measurement at the dryer outlet ensures that the quality variable of "residual moisture" can be monitored and controlled in real time.
- On customer request, this method can also be integrated into the control system, which further increases the degree of automation. Last but not least, the twin-screw granulator, which is connected upstream of the dryer, also offers the option of using variable probes for real-time monitoring thanks to its flexibly designed ports.

»QbCon® 1 enables drying granules with unprecedented efficiency«

Dr. Meier, why is QbCon® 1 a new stage for continuous processes in pharmaceutical production?

Dr. Robin Meier: When we talk about QbCon® 1, we are no longer just talking about the potential of new solutions for truly continuous processes. Rather, our results show that L.B. Bohle masters these processes. The consistently-produced high quality of wet granulation is guaranteed and uniform. Reproducible drying can also be ensured for different granule sizes.



How does this work? What is so special about the QbCon® 1?

The new drying process using a fluidised bed system is essentially based on very short residence times and narrow residence time distributions. Drying is so effective and efficient that residual moisture below the initial moisture content can be achieved, if requested. An NIR probe and other sensors provide data such as moisture, active ingredient content or product temperature during granulation. In the event of deviations, counter measures can therefore be taken immediately.

Which potential does the new system offer?

In our view, QbCon® 1 will finally help continuous processes to break through in the pharmaceutical industry because it closes a significant gap in the process. Moreover, there is no comparable system or process that combines this consistent product quality with high patient safety and low costs.

A new platform for all PLCs by L.B. Bohle

“b.sure®” allows machine operators to monitor their process data at all times on their mobile device



In order to detect deviations from process parameters or error messages at an early stage, the system operators must have access to the operating panels at all times. Today, system error and warning signals are often displayed merely through status light indicators. “However, if the machine operator cannot see the status light, the system may stop in the event of a fault or continue to run with the wrong parameters,” explains Executive Director Thorsten Wesselmann.

The new app, b.sure®, avoids downtime or faulty production

These failures can be avoided because all systems with programmable logic controllers (PLC) already collect a wide range of process and operating data which is immediately available on the machines. “With b.sure®, we have developed an application whereby the operating data and parts of the process data are sent to and processed by a communications server. This means that the customer can keep track of the processes from authorized end devices or from the PC workstation. We take the individual customer’s pharmaceutical environment into account and retain the data on the customer’s network.”

Keeping track of maintenance intervals with b.sure®

“In addition, the app contains a maintenance mode with notification function that will transmit information about upcoming maintenance and calibration,” says Thorsten Wesselmann.

“The system operator not only receives a message in the event of a system fault, but also if the parameters deviate from the setpoints.” The operator can also monitor several plants in parallel and respond quickly. Wesselmann: “The operator gains valuable time to take measures that safeguard the quality of the product.”

Authorized operators follow the process

b.sure® is web-based and can be opened either on the respective device or via a link in an email. To prevent unauthorized access, an administrator must authorize specific individuals beforehand on the communications server. Operators cannot change the processes themselves via b.sure®.



b.sure® can be used on all machines with a PLC, such as this BFC 50 TriPan, and offers many advantages for the operator.

»Data and process reliability are given highest priority«

Technical Director Thorsten Wesselmann about the application of b.sure®



Mr. Wesselmann, what gave rise to the development of b.sure®?

Thorsten Wesselmann: We know from discussions with customers that due to a higher degree of automation in production, a small number of employees are often responsible for monitoring complete production lines. Constantly moving between the system's individual operating and control panels can be a physical challenge in and of itself. At the same time, our PLC machines collect a wide range of data and process information. It was therefore necessary to link this sensitive information in a smart way and at the same time transmit it securely to the authorized user group.

What does the solution of L.B. Bohle look like in concrete terms?

First, we analysed the available parameters and developed a communications server that can be easily integrated

into the company's existing IT infrastructure. The data is then processed on this internal platform so that it can be further processed via app or email. The pharmaceutical industry works with highly sensitive information which is why an external cloud solution was out of the question for us.

How is ease-of-operation being ensured?

With each customer, it can be individually determined which information from which plant is recorded and in which form it is to be assessed. The second step defines which signals or warnings are forwarded to whom and with what content. b.sure® gives highest priority to data and process security.

ISO certification successfully renewed

Environmental management will be certified by year end

L.B. Bohle Maschinen + Verfahren GmbH offers quality at the highest level. The result of the certification carried out at the beginning of the year underlines this claim to quality.

As part of the certification process, the auditors examined the transition from ISO 9001:2008 to the new ISO 9001:2015 and found that the requirements of the standard for QM systems DIN EN ISO 9001:2015 were met.

The scope of the certification applies to all German



sites and the following areas: development, production, sales and service of machines and plants for the food and pharmaceutical industry.

L.B. Bohle thus fulfils customer needs and other requirements for product and service quality with distinction. In order to continue to offer customers premium quality, L.B. Bohle will also undergo environmental management certification in accordance with ISO 14001: 2015 at the end of this year.

Continuous manufacturing in the pharmaceutical industry

Workshop in September 2018

From September 18–20, the Technology Center at Bohle headquarters was the venue of a seminar on the continuous manufacturing of pharmaceutical solids for the second time. In the user-oriented workshop with many practical elements and demonstrations, the process steps of direct compression, dry granulation and wet granulation for continuous manufacturing from powder to tablet were demonstrated.

For further information about the workshop and comprehensive reports, please visit:

www.continuous-production.com and www.lbbohle.com



L.B. Bohle at "Mach Mit"

Apprenticeship as industrial mechanic and electronics technician

For the second time, L.B. Bohle Maschinen & Verfahren GmbH took part in the vocational training fair "Mach Mit" in Oelde. At the two-day information event on all aspects of vocational education and training, students were informed about the current training occupations.

Klaus Emmerlich, head of industrial-technical training, and Bernd Pelke, master electrician at the Sassenberg site, were available on both days to

answer the numerous questions of the young people and their parents. L.B. Bohle trains industrial mechanics and electronics technicians in the field of industrial engineering.

To sum up the event, Klaus Emmerlich said, "On both days, many interested students visited our stand and learned about our training offers. L.B. Bohle is renowned as a reliable training company and a modern and safe employer."



Klaus Emmerlich (bottom left) and Bernd Pelke were available to potential applicants for two days.



Customer presence with even more power

L.B. Bohle joins Propack® as new sales partner



Looking forward to a good cooperation: For the start of the sales partnership, the new sales partner Propack® presented L.B. Bohle with a cleanroom tool trolley for the Technology Center. In the picture from left to right: Thilo Achenbach, Burkhard Lutterbeck (both Managing Directors Propack®), Michael Walz (Technical Sales Müller GmbH), Tim Remmert, Thorsten Wesselmann (both Executive Directors L.B. Bohle), Burkhard Schmidt (Sales Manager L.B. Bohle).

At ACHEMA, Propack® GmbH Prozess & Verpackungstechnik based in Karlsruhe and who recently celebrated their 50th anniversary, was introduced to customers as a new additional sales partner for Bohle. With this new partnership, the team of ten strengthens the German sales team and its proven salesforce.

"With Propack®, we have gained a new, powerful and long-es-

tablished sales partner for machines and process technology in Germany with a great network in the market. Another advantage is that Propack® also works successfully with Korsch AG. Depending on customer requirements, the pharmaceutical industry can now be supplied with machines for the entire production from a single source," reports Executive Director Tim Remmert.

