



INNOVATIV

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Total revenue increases to € 50 million
Containment in process technology
Workshop crowned with success

Dear readers,



As managing directors of L.B. Bohle Maschinen + Verfahren GmbH we, Dipl.-Ing. Tim Rimmert and Dipl.-Ing. Thorsten Wesselmann, look back at a successful first year full of intensive work and new insights.

After many years as Department Managers at the company, we had to establish ourselves in our new positions, and we would like to take this opportunity to thank the Chairman of the Advisory Board, Lorenz Bohle, for his continued support. We would also like to thank our employees who helped make this transition as smooth as possible and worked as responsibly as always since L.B. Bohle was founded.

Last but not least, we would also like to thank you, dear readers, for accompanying us as customers and partners in 2017 and for continuing our shared journey.

We concluded 2017 with yet another sales record. This increase in sales tells us that our machines and plants, technologies and concepts are being successfully implemented in the market and contribute to our customers' success.

As an independent family-owned company, we assert our position among competitors and promise that we will continue to leverage our innovations, reactions, reliability and service quality for you. To showcase our company, in the fall of 2017, we organized a workshop on continuous manufacturing at our Technology Center in Ennigerloh.

Prominent speakers from science and industry inspired more than 30 participants from all over the globe with their presentations, as did our QbCon® 25 production plant. Regarding the worldwide unique modular plant, the experts were impressed by its functionality and overall concept which guarantees continuous manufacturing from powder to the coated tablet.

As a comprehensive system provider for batch and continuous processes in pharmaceutical solid production, we are, of course, constantly seeking communication and feedback from our customers. It is only in this way that we can implement successful projects together, as we present them in this magazine.

2018 will be as eventful for us as the previous year. Topics such as the expansion of the service and sales structure and continuous manufacturing are on the agenda together with numerous trade fair highlights in the exhibition year. At Interphex in New York, we are going to present the latest news and trends surrounding our machine portfolio for batch and continuous manufacturing.

ACHEMA in Frankfurt/Main is on the agenda in June. There, we will again have a joint appearance with our cooperation partner Korsch AG. At ACHEMA, we will also present a new patent-pending product for continuous manufacturing. Please save this date in your calendar and get a first-hand look at this global first. We look forward to your visit at booth A71 in hall 3.

Dear readers, we look forward to an interesting and successful year with you and hope that our facilities and machines will continue to contribute to your success.

Kind regards,
Tim Rimmert und Thorsten Wesselmann

Total Revenue Increases to More than € 50 Million in 2017

L.B. Bohle focuses on QbCon®, increased efficiency and comprehensive service in 2018

The new management duo of Tim Rimmert and Thorsten Wesselmann concluded their first year with record sales of more than € 50 million. "Following this solid growth, we will mainly focus on three aspects in 2018," states Managing Director Tim Rimmert. "With our QbCon® pilot plant, we want to establish continuous processes as a standard in the pharmaceutical industry. Secondly, in light of increasing costs, we are working on higher efficiency. And our third goal is to set up a comprehensive range of services." In the year of ACHEMA, the key objective is a sustainable increase in turnover.

"We had a good year, but our earnings did not keep up with the sales increase," reports Managing Director Tim Rimmert. Increased costs as well as high up-front payments for research and development had a strong impact. At the same time, the market development of the continuous processes turned out to be a lengthy process. However, this topic gained new momentum with the international workshop this past fall. We have definite plans to repeat the expert forum. "In addition, the topic will be further promoted at the upcoming trade fairs in 2018 with ACHEMA as a highlight", explains the Technical Director, Thorsten Wesselmann.

In the 2017 financial year, L.B. Bohle has increased total revenue to more than € 50 million. This was achieved due to a higher export ratio after an above-average number of projects were completed in Germany in the previous year. Large-scale projects could be concluded in 2017 in Russia and Algeria, among others. "The positive development in Europe and South America continued," states Tim Rimmert. Even business in Brazil was established – albeit at a comparatively low level. The development in the US still harbours potential, even though the benefits from the tax reform should not be overestimated in the new financial year according to Tim Rimmert. "The US market still holds great potential, which is why we will expand our sales team yet again," states Tim Rimmert. The containment solutions, in which highly-active substances are securely processed in contained systems, also offer a lot of potential on the international market.

Extensive service in demand

The two managing directors see room for further growth in the comprehensive service area. "Detailed service requirements are often defined in today's manufacturing environment, especially for large orders and international business," reports Thorsten Wesselmann. "We therefore established a service company for our customers in Switzerland as a first step." This year an overall concept with modules like a service hotline, maintenance, repair and spare parts services will be developed. Tim Rimmert is convinced that "these services are becoming increasingly important when it comes to winning new orders". There are machine manufacturers who are already generating substantial revenue with their after-sales services.



The compact granulation plant, consisting of a fluid bed and a GMA was an international bestseller in 2017. Major projects were successfully implemented in Russia and Algeria, among others.

Containment in Process Technology

L.B. Bohle produces BRC 100 and BFC 100 Containment



The BRC 100 Containment was designed according to customer specifications in the shortest possible time and guarantees convenient handling.

In the pharmaceutical industry, one term is becoming increasingly important: containment. It describes the process of containing a substance within a defined space, a method that is suitable for protecting operators and the environment in case of high toxicity and product reactivity. At the same time, containment prevents dust, gases or vapours from being released into the environment and contaminating the product.

More than 60 percent of pharmaceutical products are produced as tablets, capsules, lozenges or similar solids. Especially in new products the active pharmaceutical ingredients (APIs) are becoming increasingly more potent. In some markets, the segment for high potency active pharmaceutical ingredients (HPAIs) is growing in the double-digit range, especially driven by oncology medication.

In addition to requirements set by manufacturing guidelines, it is essential that the product is safe for the machine operator and, of course, for the patient. As a result, machine manufacturers such as L.B. Bohle are faced with new challenges in all toxicity classes in which customers want to use plants and processes.

In 2017, numerous customers with special specifications turned to the independent medium-sized family-owned company requesting, among other things, containment solutions for film coating applications and a dry granulation process.

Two projects are examples of this:

The Bohle Film Coaters BFC have been a cutting-edge technology on the market for years and have guaranteed top-quality product processing and high profitability. The BFC Film Coater and its scaled-down version, the BTC, have achieved excellent market penetration.

According to customer specifications, the developers of L.B. Bohle designed a BFC 100 that meets the latest containment requirements.

The containment version of the BFC 100 enables operation in closed driving mode thanks to:

- automatic nozzle adjustment (stroke and angle)
- infra-red product temperature measurement
- charging via a container flap
- the connection for cleaning the container flap and the charging pipe (also available for discharge)
- the connection for drying the container flap and the charging tube
- the sampling lance
- side doors with inflatable gasket (also standard for BFC)
- the demountable nozzle holder. This results in great advantages when it comes to cleaning.

A second successful project is the design of a dry granulator from the BRC series. Already at the product launch in 2012, the BRC 25 and 100 were in high demand among customers. The dry granulators of the BRC series are already popular in the market due to their flexible set-up or integration into the production process.

Continuous dry granulation has been an established process in the pharmaceutical industry for decades and is used not only for products sensitive to moisture or temperature, but also for classic wet granulation because no energy-intensive drying processes are required. This saves high investments in systems and production rooms, resulting in lower costs per batch. ➤



The containment port below the sieving unit of the BRC ensures convenient removal of granules.



The BFC 100 offers its user various benefits when it comes to handling, process technology and cleaning.



The sampling lance of the BFC 100 ensures that the product can be inspected during operation.

Dry granulation is often the process of choice in particular for high-volume or moisture-sensitive products.

The BRC 100 Containment is proven through the typical BRC attributes. Just like the standard version, the Containment BRC features a state-of-the-art electro-mechanical drive, completely eliminating the need for hydraulics.

In addition, the special version is equipped with the latest and fastest control which enables fully-automated operation.

The BRC is very user-friendly and low-maintenance, with very short set-up times.

Following a short project phase, L. B. Bohle supplied its customers with a BRC 100 according to the latest containment requirements.

The highlights of the BRC Containment at a glance:

- equipped for the containment level OEB 5
- integrated insulator unit in the compacting unit with corresponding vacuum monitoring
- glovebox with security prompt for the removal of scabs
- containment port for the collection of scab samples
- containment port underneath the sieve unit for the

removal of granules

- convenient access, since no complete insulator unit is installed around the entire compactor
- residue-free removal of product by integrated WIP equipment (WIP is also integrated in the standard version).

For many years, L.B. Bohle has been known as a supplier of all-in-one solutions and successfully demonstrated this once again in this BRC project. The fully-integrated solution also contains a lifting column and containment flaps for feed-in of the product as well as an integrated containment flap for transferring the granules into the receiving container. Thus, customers have

been relieved of some tasks involving the clarification and implementation of interfaces between the system components.

As these two case studies show, L.B. Bohle does not only ensure premium technology in standard machines, but also develops complex individual solutions which instantly create added value in daily operation.

“Customers seeking help with solving a special challenge or problem can contact us any time,” says Thorsten Wesselmann, Technical Director. Thanks to the experts’ comprehensive know-how, the product teams always seem to find the best solution.

Ennigerloh Ahead of the Global Game

Continuous Pharmaceutical Manufacturing: more than 30 experts from Asia, Europe, South and North America at the technical symposium.



L.B. Bohle's concentrated pharmaceutical know-how: The Chairman of the Advisory Board Lorenz B. Bohle, Martin Hack (Vice President L.B. Bohle LLC) and Andreas Altmeyer (Head of Service Center), from left to right, are following the results of the test runs with satisfaction.



The international participants listened closely to the explanations of Dr. Robin Meyer (to the right). The twin-screw granulator BCG, which has been presented as recently as in 2017 (to the left), was also met with great interest.



For two days in the fall of 2017, Ennigerloh was the place to be for experts and users in the pharmaceutical industry doing research in the area of continuous manufacturing: They accepted the invitation of L.B. Bohle Maschinen + Verfahren GmbH to the "Continuous Pharmaceutical Manufacturing Symposium" to discuss the processes of the future. "We are in constant exchange with scientists from all over the globe and are at the technological forefront when it comes to continuous processes for the pharmaceutical industry," reports Tim Rimmert, Managing Director.

"For pharmaceutical manufacturers, continuous manufacturing means shorter time to market, more flexible production even of small batches and

highest precision and quality due to comprehensive process monitoring and control," added Thorsten Wesselmann, Technical Director. "This saves time and costs for our customers in the pharmaceutical industry." More than 30 guests from Asia, South America, North America and, last but not least, Europe exchanged views on the current state of developments and discussed future steps at the symposium. At the globally unique Technology Center the participants had the chance to get a first-hand impression of the sensor technology measurement, analysis and control technology in practical application. The QbCon® pilot plant, which was developed in close cooperation with science and project partners from the industry, sets standards according to Prof. Peter Kleinebudde of

Heinrich Heine University Düsseldorf. "The strength of the L.B. Bohle plant clearly is its modular design which enables both dry granulation and wet granulation."

The "point of no return" has already been passed.

Tim Rimmert is convinced of that as well: "There is a huge interest in continuous processes." Experts all over the world no longer wonder whether, but when the breakthrough will come. "We like to compare the situation with e-mobility. But everybody in the industry knows: The "point of no return" has already been passed". At the same time, all parties involved must be aware that perseverance is required due

to the long-term planning of new production plants. L.B. Bohle has now combined all activities surrounding continuous processes under the umbrella name QbCon® as a brand to strengthen Bohle's position "QbCon® stands for Quality by Continuous Manufacturing", explains Dr. Robin Meier, Scientific Director, to the participants.

Continuous manufacturing – the basis for success

The central venue for the three-day expert symposium was the Technology Center. In the new building, L.B. Bohle has been offering an open platform for the development of innovative processes of continuous manufacturing since March 2015. Customers, scientists and cooperation partners >

from all over the world make use of the unique system for experimental and testing purposes. "Permanent and process-overlapping measurement, monitoring and production control are the key to success in continuous manufacturing in the pharmaceutical industry," explains Thorsten Wesselmann. In addition to the innovative processes, Dr. Robin Meier and Thorsten Wesselmann demonstrated the interaction of different process machines. "We see ourselves as solution partners for the entire process." L.B. Bohle makes use of the close cooperation and expertise of the partners Korsch AG (tablet press) and Gericke AG (blender) to offer its customers an optimum all-in-one solution. "This cooperation creates added value because the combined effort benefits all partners," explained Dr. Ralf Weinekötter, Managing Director of Gericke AG. At the

end of the symposium, the Bohle Management team was left with such a positive impression that they are planning to continue this exchange. "From 18–20 September, we are going to organize the next workshop on continuous manufacturing to give the scientific and practical dialogue some regularity," said Tim Remmert.

Save the Date
 Workshop on Continuous Pharmaceutical Manufacturing
 18.–20. September 2018

More information at:
www.continuous-production.com



Dipl.-Ing. Andreas Altmeyer explains the advantages of the semi-continuous coater KOCO® 25 to the workshop participants.

New General Sales Manager

Burkhard Schmidt assumes top position



When Tim Remmert and Thorsten Wesselmann assumed management of the company in early 2017, the fields of responsibility in sales of L.B. Bohle Maschinen + Verfahren were also reorganized. Dipl.-Ing. (FH) Burkhard Schmidt, the long-standing Area Sales Manager for Mexico, Spain, France and the Maghreb states, who has been with the company since 2011, took over general sales management from Tim Remmert.

The main tasks of the new Sales Manager include the further expansion of the sales and service structures as well as the general organization. "I would like to thank the management and the Chairman of the Advisory Board, Lorenz Bohle, for their trust. I would like to contribute my expertise to ensure that L.B. Bohle is not only acknowledged in the area of batch production but also as an expert for continuous processes," states Burkhard Schmidt after having assumed his new position.

Closer to the Customer

Service subsidiary for Switzerland

The Swiss pharmaceutical industry is not only of great importance for the gross value added and as an employer on a national scale, but as an exporter and key innovator as well. Due to the many renowned pharmaceutical groups, the pharmaceutical industry location occupies a prominent position globally as well as for the sales and service structure of L.B. Bohle Maschinen + Verfahren GmbH.

Over the years, the number of process machines installed in Switzerland by Bohle has steadily increased. In order to be close to the customer, be flexible and eliminate bureaucratic obstacles, L.B. Bohle established its own service subsidiary in the fall of 2017 in Reiden in the Canton of Lucerne. The German management selected Reiden as a location due to its central geographic position and proximity to Swiss pharmaceutical centers. In the regions of Basel, Espace Lémanique and Zurich-Zug-Lucerne, three quarters of the gross value added of the Swiss pharmaceutical industry have been generated recently. Consequently, a large number of Bohle customers is also located in this region.

With the service subsidiary, L.B. Bohle can ensure short response times for maintenance and additional services.

L.B. Bohle Switzerland AG

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Slotted Coating Drum

Solution for tablet coating

For L.B. Bohle, direct customer contact has been one of the decisive criteria for joint success since it was founded. The close tie with users ensures that developers from technology and research regularly learn about new requirements placed on machines and processes.

"The demand for technology for coating miniature tablets has recently been on the rise. As early as in 2009, we were able to develop a slotted coater drum as part of a customer project. At that time, a customer needed a coater to film miniature tablets and pellets with a diameter of less than three millimetres - a requirement that conventional systems with standard perforation had not been able to meet," Tim Rimmert outlines the task at that time.

that is required in the fluid bed system, they can rub off and break easily. This is why in 2009 L.B. Bohle conceived its first slotted coater drum which treats small cores more gently. This drum comes with an appropriate perforation in which not only normal sized cores but also extremely small cores with a diameter of 1.5 millimetres can be coated. As a result, the system offers maximum flexibility and can be used for processing different particles. "In contrast to our competitors who want to sell this technology as a novelty, we have already built numerous systems with perforated coater drums on a laboratory and process scale and successfully installed them in the production shops of international manufacturers," Tim Rimmert points out with a view to Bohle's competitive edge.

Cores with a diameter of only 1.5 millimetres

Miniature tablets have already been established as a dosage form for several years and offer the advantage that several tablets can be administered together if necessary to achieve the required individual dose. They are especially suited for multi-particle dosage forms as they can be individually and flexibly dosed. As a result, they can either be filled into capsules or sachets or applied with miniature tablet dispensers. Often the small cores are coated to provide sufficient stability.

Besides functionality, swallowing as well as taste and odor are improved by the film coverings.

Unfortunately, miniature tablets are often very fragile. Due to the strong fluidization



600 m² More Space for Construction

Completion of construction and re-location to the new Plant 2 in Sassenberg

Construction of the new wing for engineers, technicians and documentation at the Sassenberg site went according to plan and is now completed. "Thanks to the mild winter, we were able to keep to our tight schedule and complete the building extension without any problems," said Lorenz Bohle, Chairman of the Advisory Board. He himself had been in charge of site management for the project. With the total investment of one million euros, we have constructed and equipped the building, the offices and meeting rooms according to the latest standards," Lorenz Bohle continues.

After EUR 2.5 million had already been invested in the expansion of the Sassenberg site in 2011, this latest project was the next step towards total development of the property.

For Lorenz Bohle, the completion of the wing in Sassenberg is an

important foundation for meeting the expected increase in demand. Our handling plant in Sassenberg is currently working at full capacity all year round, which is why another investment was necessary in order to increase capacity. Lorenz Bohle looks to the future with optimism: "The building addition in Sassenberg will help contribute to a continuous increase in sales over the next few years."

In plant 2, L.B. Bohle has pooled its production facilities for mixers and the extensive handling program since the foundation of the site. "With our handling equipment, we help our customers optimize their production processes, - whether with individual systems or all-in-one solutions. Recently, customers' demands for more complex systems has been growing, particularly in the containment sector," explains Technical Director Thorsten Wesselmann.



Excellent framework conditions: In the newly completed building, the handling machines are now being designed according to state of the art manufacturing.

Trade Fair Highlights

World's first presented at ACHEMA

2018 is characterized by numerous trade fair highlights and will therefore give ample opportunity for customers to obtain information on the latest developments and technologies of L.B. Bohle. The special machine builder for pharmaceutical solids production will again be represented worldwide at various industry trade fairs in order to showcase its extensive product portfolio.

Spring is heralded with the Interphex in New York – the most important trade fair in North America. The subsidiary L.B. Bohle LLC will offer extensive information about the current machines and trends surrounding batch and continuous processes at booth #3345.

In June 2018, ACHEMA, one of the world's leading trade fairs will open its gates to the expert audience in Frankfurt am Main. Just like at last year's Interpack, L.B. Bohle will have a joint appearance with the tablet press specialist Korsch AG at a booth with more than 400 m². At booth A 71 in hall 3, visitors can look forward to a world premiere by L.B. Bohle.

Two important regional trade shows will round out the 2018 international trade fairs Pharmtech in Russia and PMEC in India. A lot of interesting news and innovations are awaiting the trade fair audience: We look forward to your visit!



Visit us at the following trade fairs:

| | | | |
|------------------|--------------------------|------------|-------------|
| 17–19 April | Interphex | New York | USA |
| 17–20 April | KOREA PACK / COPHEX 2018 | Seoul | South Korea |
| 20–22 April | CIPM | Peking | China |
| 22–24 May | FCE Pharma | São Paulo | Brazil |
| 29 May – 01 June | IPACK-IMA | Milano | Italy |
| 11–15 June | ACHEMA | Frankfurt | Germany |
| 27–29 June | Interphex Japan | Tokyo | Japan |
| 25–27 September | Iran Pharma | Teheran | Iran |
| 25–27 September | PPMA NEC | Birmingham | England |
| 20–23 November | Pharmtech | Moscow | Russia |
| 26–29 November | All4Pack | Paris | France |
| 04–06 December | P-MEC | Mumbai | India |

Loyalty Pays Off

Twelve employees, 255 years of expertise



Happy faces at the jubilee ceremony. The company's top management was once again pleased with the large number of outstanding long-term employees.

12 employees with 255 years of cumulative experience: Those celebrating anniversaries in the year 2017 gladly accepted the invitation of Lorenz Bohle, Chairman of the Advisory Board, and the two Managing Directors Tim Remmert and Thorsten Wesselmann to celebrate their many years of service with the company. As in previous years, the long-standing employees of L.B. Bohle Maschinen + Verfahren GmbH were recognized for their loyalty. As a company with an exceptionally high level of employee loyalty, management was pleased to honor three employees for ten and nine employees for 25 years of service. For Lorenz Bohle, honouring the employees truly comes from the heart because "they all show their loyalty and dedication to the company day in, day out. As a family-owned company, we want to create the best working environment to ensure that our employees enjoy working for our company in the long term."

Both managing directors were also very pleased with the large number of anniversaries.

"Employees are the most valuable and most important asset for us. They are not only a community with great knowledge and experience,

but also pass this wealth of experience on to the younger colleagues," says Managing Director Tim Remmert, underlining the importance of the employees.

10 years with the company:

Guido Scheufens, Timo Schäfer, Marvin Westphal

25 years with the company:

Andreas Altmeyer, Alexander Bauer, Michael Bruland, Georg Häberle, José Luis Lucas, Jacob Rempel, Christoph Röwekamp, Melanie Schemann, Ralf Schulze-Dinkelborg, Ralf Koplin (jubilee in 2016)

