

**L.B. Bohle  
Maschinen + Verfahren GmbH**

**Press Release  
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## **L.B. Bohle invests in production and research**

### **Three steps into the future: Technology Center, Bohle Uni Cone BUC<sup>®</sup> and new Plant 3**

- **Special machine builder sets further accents:**  
**Technology Center is the ideal platform for scientists and process optimizers**
- **Bohle Uni Cone BUC<sup>®</sup> process celebrates world premiere**
- **Start of process machine production in Plant 3**

**Ennigerloh/Düsseldorf, May 2014 – L. B. Bohle Maschinen + Verfahren GmbH has set three important milestones for the future at the Interpack 2014. The Bohle Uni Cone BUC<sup>®</sup> process celebrates world premiere in Düsseldorf. The new building of the Technology Center at the Ennigerloh headquarters will be opened in the middle of the year. In the new Plant 3, the process machine production has started. The special machine builder for the pharmaceutical industry is setting its sights on expansion. “With investments into the future, we ended a very successful 2013 financial year“, reported CEO Lorenz Bohle.**

“With the Bohle Uni Cone BUC<sup>®</sup> process, we have developed an alternative to the conventional Wurster process which even coats small particles more precisely and evenly”, commented the managing director and owner Lorenz Bohle on the advantages of the new system. “We have developed two major changes that solve both problems of the Wurster process”, says Lorenz Bohle. A sloping floor and a conical tip in the centre ensure homogenous swirl of the product. Simultaneously, the

coating substance is sprayed through lateral nozzles. We thus achieve an unrivalled coating uniformity. With this process, customers can also apply active substances on the products with highest precision. “Even in very complex processes, the losses are below one percent”, said Bohle.

### **Dry granulator BRC 25**

In addition to the well-known handling and coating machines as well as granulation solutions, L.B. Bohle will present another product innovation at the Interpack: the Bohle dry granulator BRC 25. The smaller version of the BRC 100 compactor celebrated its world premiere at the “ACHEMA 2012”. The machine extends and optimizes the product portfolio of the machine builder in the granulation segment. The Ennigerloh-based technology leader thus provides the largest offer of granulation solutions of all manufactures. As a further proof, Bohle will be presenting its granulation system Compact Unit, in which the individual components High Shear Granulator GMA, Bohle Fluid Bed System BFS and Bohle Uni Cone BUC<sup>®</sup>, Wet Sieve and Dry Sieve BTS as well as a cyclone separator are optimally integrated into one unit.

### **Lean Production creates the competitive edge**

Also in their own production L.B. Bohle counts on optimized processes: “The relocation to the new Plant 3 has been completed and Lean Production is gradually being introduced”, says Lorenz Bohle. “We closely involve our suppliers in this process”, said Bohle. The production in the new plant will be standardized and more and thus significantly more efficient. “Machines can be delivered in four to five months instead of

seven months”, explains Lorenz Bohle. In times of short-term investment decisions, this constitutes an essential competitive edge.

### **Knowledge transfer in Ennigerloh**

For Bohle knowledge transfer to the benefit of the customers is also decisive for investments in the Technology Center which is currently under construction at the Ennigerloh headquarters.

“Our customers are increasingly relying on continuous production processes”, explains Bohle. In the new test, development and presentation center we will promote this development in cooperation with the Universities of Düsseldorf and Graz as well as the measurement, control and process experts from Siemens”.

Two million euros will be invested in the glass-fronted building alone. “In the next two to three years we will invest 6 to 8 million € in the cooperation”, announced the managing director. The permanent measuring, monitoring and controlling of the production throughout the entire process is decisive for the customers. “We will visualize the entire production line in one plant and develop and perform optimized processes”, Lorenz Bohle stated, outlining the goals. As the investor, L. B. Bohle Maschinen + Verfahren GmbH will also manage the Technology Center. The necessary capacities will be made available for university scientists and Siemens experts. “We encourage experts to come to Ennigerloh and provide the machine know-how“, said Bohle.

**Premiere at the Interpack 2014:**

**Bohle Uni Cone BUC<sup>®</sup> patent protected**

**New coating process coats particles more evenly and precisely**

**Ennigerloh/Düsseldorf, May 2014 – With the “Bohle Uni Cone BUC<sup>®</sup>” process, the Ennigerloh-based special machine builder L.B. Bohle Maschinen + Verfahren GmbH had a new development method for precise coating of particles protected as a utility model in 2013. “We have proven that our new method works much more precisely and evenly than the conventional Wurster process”, said the managing director Lorenz Bohle at the start of the Interpack.**

For over 50 years the Wurster process is being applied in the pharmaceutical industry for the coating of small particles, so called pellets.

Most coating systems, which are used today, were based on this method developed by the American pharmacist Dale E. Wurster in 1959. “The major weaknesses are hardly calculable setting parameters and the spray nozzles in the base plate”, explained Lorenz Bohle. The setting parameters must be re-tested in lengthy tests for each product. “This approach is based on experience rather than on verifiable data”, Bohle describes the scientific dilemma. This results in losses in production and major fluctuations in the coating uniformity. The spray nozzles at the bottom of the containers may cause interruption of the entire process in case of failure.

“We have developed two major modifications that solve both problems of the Wurster process”, says Lorenz Bohle. A sloping floor and a conical tip in the centre provide a uniform swirl of the product. Simultaneously, the coating substance is sprayed through lateral nozzles. “We thus achieve an unrivalled coating uniformity. With this process, the customers can also apply active substances on their products with highest precision”, says the CEO. Even in very complex processes, the losses are below one percent”.

The lateral nozzles also ensure a significantly enhanced handling. If a nozzle is blocked, it can be exchanged or cleaned in aqueous operation during the running process.

### **BUC<sup>®</sup> protected as European brand**

“Due to these tremendous benefits, we have obtained a utility patent protection for the process and have had the Bohle Uni Cone BUC<sup>®</sup> protected as European brand”, explained Lorenz Bohle.

(Utility patent protection: 20 2012 102 157.9 – Fluid Bed System with a conical fluid bottom; Brand: 011659067)

## **Bohle BRC 25**

### **Small dry granulator expands the range**

**Ennigerloh/Düsseldorf, May 2014 – With the dry granulator Bohle BRC 25, the smaller version of the BRC 100, which was presented at the “ACHEMA 2012“ in Frankfurt for the first time, celebrates its premiere at the 2014 Interpack. “We now round off our comprehensive offer of granulation solutions”, explained Lorenz Bohle. Easy handling, continuous production and a small footprint are the typical features with which Bohle now covers the comprehensive portfolio of wet and dry granulation.**

The principle of the BRC: In the roller compactor, powders are processed into free-flowing granules. The objective in the pharmaceutical industry is to achieve a granule with defined density or porosity for subsequent tableting. The powder is fed in via a dosing unit, compacted between two rollers with gaps ranging from 1 to 6 mm and discharged as flakes.

The forces on the rollers, as well as the gap width are monitored with sensors.

All data are integrated into a control circuit to continuously ensure optimum process parameters.

The chopper unit below the compact rollers processes flakes into granules. The unit is equipped with a conical sieve with exchangeable sieve units for achieving different particle sizes.



### **Well equipped for customers' requirements:**

Easy control, easy cleaning and fewer edges, screws and angles - these are the essential features of the BRC 100.

Especially the control of the pressing force via standard hydraulic systems constitutes a great problem, when the process is to comply with "hygienic design". The electro-mechanical batch can solve this problem.

With the Bohle BRC 25, frequent axis adjustment as with traditional roller compactors is a thing of the past. The axes are mechanically stable so that elastic deformation is prevented. This eliminates the need for complete axes control. Moreover, the BRC 25 is low maintenance. Even when cleaning is required, only four screws must be removed. Bohle engineers also reduced the footprint. Further advantages of the BRC series are the identical roller geometry and control in both machines allowing for easy scale-up.

Lorenz Bohle: "We are now able to offer our customers machines and processes for all stages of the granulation process with our new BRC 25 – continuously with the proven Bohle quality".

## **Bohle Film Coater BFC and Bohle Tablet Coater BTC**

### **Bestsellers set benchmark for substance coating through precision**

**Ennigerloh/Düsseldorf, May 2014 – The pharmaceutical industry increasingly relies on tablet coating as carrier for active substances. This trend was initiated by special machine builders like L. B. Bohle Maschinen + Verfahren GmbH which developed and implemented the substance coating with highest precision at an early stage and permanently developed it further. At the Interpack, the focus will be on the two bestsellers Bohle Film Coater BFC and Bohle Tablet Coater BTC. “The coaters are a vital element of our growth in sales”, said CEO Lorenz Bohle.**

The significance of coating technologies has continued to increase in recent years. L.B. Bohle Maschinen + Verfahren GmbH from Ennigerloh in Westphalia is recognized as technology leader on the market thanks to constant development of its film coaters. Tablets are mainly coated to achieve a modification of substance release, protect the substance against light and moisture or cover the bitter flavour of the tablet formula.

Especially the active pharmaceutical ingredient- i.e. the processing of active substances in the coat - is becoming increasingly important. Modern formula batches often consist of several coating types which results in long process times. In order to successfully produce these, uniform tablet coating is a crucial factor. This precise coating uniformity marks the advantage of Bohle technology over conventional coaters. “With

a standard deviation of less than two percent, we achieve an absolute top value with this technology”, explained Lorenz Bohle.

Bohle coaters combine excellent product processing with exceptionally high profitability. The flat tablet bed in a long drum geometry, as well as continuous adjustment of the inclination angle ensure optimal movement of the cores. The systematic compulsory guide in the drum enables continuous product movement, which prevents tablet twinning. Another competitive criterion is the reduction of coating losses to less than five percent.

### **BTC shortens process times by up to 35 percent**

The Bohle Tablet Coater BTC stands for economic coating. A flat tablet bed, patented air system and high spray volume ensure high quality and shorten process times by up to 35 percent. Three basic operations are vital for successful coating processes: spraying, drying and mixing. Each individual step must be planned carefully and optimized coordinately. The BTC is the economic “allrounder” with a working volume of up to 980 litres. Major advantages of the tablet coater series include easy “through the wall installation”, the integrated switch cabinet and a simple and functional housing. Additionally, all nozzles of the BTC are supplied with suspension via a pump head. The machine can easily be controlled and monitored as the multipanel visualization with touch panel operator unit is attached to the coater.

## **BFC as high-end version**

The Bohle Film Coater BFC is the high-end version of the Bohle coater. In addition to the aforementioned benefits, there are further process-relevant features: Air-tight housing (inflatable seals of the inspection doors on the side) makes the coater perfectly suitable for “high containment” applications. This effect is supported by automatic nozzle adjustment (recipe-controlled), which is optionally available. Moreover, the inclination of the coater housing can be adjusted. Each nozzle has a pump head for optional pressure measurement of the suspension on each individual nozzle – blockage of nozzles can be immediately detected. Another advantage is the high pressure cleaning of the pan inside. Additionally, this top product features computer-supported “InTouch” visualization with extensive batch management tools and a broad range of tools for creating recipes.

**Innovations as driving force for worldwide expansion  
With investments, Lorenz Bohle sends a clear  
message: “Our production site will remain in  
Germany”**

**Ennigerloh/Düsseldorf, May 2014 – Product innovations such as the Bohle Uni Cone BUC® process, the BRC 25 or the Bohle coater are the driving force for worldwide expansion: L. B. Bohle Maschinen + Verfahren GmbH now generates 80 percent of its sales through exports. At the same, managing director Lorenz Bohle makes significant investments in production and development capacities in Ennigerloh and Sassenberg. We will stay in Germany and will stay independent”, said Lorenz Bohle on occasion of the Interpack 2014 in Düsseldorf.**

The investment speed remains high: Official inauguration of the Sassenberg handling plant expansion was in autumn 2011. The transfer of Plant 3 followed in September 2013 in Ennigerloh where full-speed production is envisaged for autumn 2014. Already in spring 2013, the construction of the new Technology Center at the headquarters in Ennigerloh started and should be completed by mid 2014. “We undertake all efforts to keep and expand our leading position in terms of technology and quality”, summarized Lorenz Bohle his ambitious objectives.

On the world market, he currently sees growth opportunities in Russia and South America. “For South America, we were able to win over a sales expert who knows the market very well”, reported Bohle. In Russia, too, a positive development can be expected “with several major orders” in 2014. The most important market will remain the USA with about 30 percent of

sales. The excellent features of the blending and coating machines will be promoted in a sales offensive for further market penetration. However, the managing director takes a rather critical view on the situation in China and the emerging pharmaceutical market in India. The general market conditions and the legal protection of own technologies urge Bohle to be cautious.

In the previous financial year, L.B. Bohle Maschinen + Verfahren GmbH generated sales of around 42 million euros. With Plant 3 and the gradual introduction of Lean Production L.B. Bohle has laid the foundation for further growth. “Now we have to give our customers a stronger sense of the variety of our products portfolio which ranges from simple handling machines to complex solutions – including software” explained Bohle.

### **Equity ratio is over 50 percent**

The financial situation of L. B. Bohle Maschinen + Verfahren GmbH is very sound. Investments are financed from ongoing business activities. Lorenz Bohle: “Our equity ratio is over 50 percent.” With 44 patents and further innovations, the managing director sees the further positive development and the future as secured.

## Facts and figures

### L. B. Bohle at a glance

<b>Company:</b>	L.B. Bohle Maschinen + Verfahren GmbH
<b>Locations:</b>	Ennigerloh Plant 1 (production, administration) and Plant 3 (final-assembly) Plant 2 Sassenberg (handling machines and blenders), Warminster (USA; sales and services), sales offices in Singapore and Goa (India)
<b>Premises:</b>	Currently approx. 20,000 m <sup>2</sup> of production area at the Ennigerloh headquarters; 2,900 m <sup>2</sup> in Sassenberg, further 3,700 m <sup>2</sup> of production area at the Ennigerloh Plant 3
<b>Employees:</b>	Approx. 205 in Ennigerloh, 25 in Sassenberg, 15 in the USA (sales and services), 10 company sales representatives worldwide, further 35 sales partners
<b>Product range:</b>	Special machines and handling systems for the pharmaceutical industry: Coaters, granulators, compact units, compactors, weighing systems, grinding and sieving machines, blending systems, containment systems
<b>Turnover in 2013:</b>	Approx. € 42 million
<b>Customers:</b>	Pharmaceutical companies and their subcontractors worldwide
<b>Export rate:</b>	Approx. 80 per cent in total
<b>Markets:</b>	In addition to the German domestic market (approx. 20 percent), predominantly USA (30 percent),

Europe (25 per cent), South America  
and Asia

**Owner:** The Bohle Family (100 percent)

**CEO:** Lorenz Bohle



## **L.B. Bohle – partner for the pharmaceutical industry for over 30 years**

### **Technology leader by tradition**

- 1981** After many years as the head of engineering for special machines for a pharmaceutical company, Lorenz Bohle founded his own company in Ennigerloh/Westkirchen. He first developed the tablet checker KA. Today's COO, Robert Stauvermann has been with the company right from the outset.
- 1983** Start of own production of L.B. Bohle Maschinen + Verfahren GmbH. Lifting columns and containers supplemented the supply range.
- 1986** Relocation of the company to Ennigerloh, the present headquarters. Decisive for the company's growth is the system for dust-free penicillin production.
- 1987** First container blender sold, paving the way for the company's continued growth. Since then, more than 2,000 PM container blenders ranging in sizes between 2 and 12,000 litres have been built and supplied to clients. Thus, Bohle is the global leader in this segment.
- 1990** Foundation of L.B. Bohle Inc. (USA)
- 1991** L.B. Bohle lays the foundation for entry into process technology with the first single pot granulator (VMA). The first VMA already features microwave drying.
- 1998** With the first 70-kg-coater, L.B. Bohle extends its product range with the coating technology. The first coaters are still equipped with a drum replacement.
- 2000** Bohle launches the first 200-kg-coater with CIP equipment and a long cylindrical drum.
- 2000** Construction of the Sassenberg location
- 2003** With the tangential fluid bed process, Bohle lays the foundation for new, more compact systems.
- 2007** The company launches the Bohle Tablet Coater BTC which provides unparalleled tablet consistency and

efficiencies, resulting in high speed, problem-free coating. Bohle's airflow design within the coating pan reduces the likelihood of spray drying. This is only possible due to the patented coils for axial conveying in both directions

- 2009** Bohle presents the Conti Granulator BCG at theACHEMA in Frankfurt.
- 2010** Development of the continuous KOCO<sup>®</sup> coater.
- 2011** Start of construction work for the extension of the Sassenberg location; investment in the amount of € 3.0 m.
- May 2011** At the Interpack, L.B. Bohle presents the new coater generation KOCO<sup>®</sup>, the Bohle Conti Granulator BCG and the new compact unit.
- October 2011** Official inauguration of the Sassenberg production location expansion. From now on, the entire handling production including construction is located at the Sassenberg plant.
- November 2011** L.B. Bohle acquires 20,000 m<sup>2</sup> of developed land in Ennigerloh in order to double production capacity at the headquarters.
- June 2012** At theACHEMA 2012, L. B. Bohle Maschinen + Verfahren GmbH presents the BRC 100 dry granulator to the public. The compactor closes a gap in the range of offers. Customers thus obtain technology for the entire production process – without tablet press – all from a single source.
- July 2013** First sod for the new Technology Center at the Ennigerloh headquarters
- August 2013** The Bohle Uni Cone BUC<sup>®</sup> process is protected as a utility model.
- September 2013** L.B. Bohle inaugurates Plant 3. The 20,000m<sup>2</sup> premises encompass a production area of 3,700 m<sup>2</sup>. The investment sum amounts to € 5 m.

**May 2014**

At the Interpack, the Bohle Uni Cone BUC® process and the BRC 25 is presented to industry professionals for the first time.

## Vita Lorenz Bohle

**Lorenz Bohle**, CEO and owner of L. B. Bohle Maschinen + Verfahren GmbH

After graduating from the Brilon secondary school, Lorenz Bohle (born 1939) completed an initial training as a machine fitter. Thereafter, he took up engineering studies in Kassel, at which time a “love of process engineering” developed in him - a relatively new science for improved production, which, at that time, was still in its infancy.

In 1972, Lorenz Bohle, now a qualified engineer, moved to Ennigerloh as technical manager of Rottendorf Pharma GmbH. There, he had a major impact on the establishment of clear process flows including the required documentation. Under his direction, the company received the GMP Good Manufacturing Practice Certificate for the quality assurance of its production processes relating to medications and active substances for both the existing and new facilities. The experiences he gathered then inspired him to found his own development and consultancy firm. In 1981, he took his first steps to self-employment.

In addition to his various professional activities, Lorenz Bohle is involved in numerous voluntary endeavours. He is a passionate hunter. Since 2007, he has been making his company’s training centre available for regional art exhibitions, and sponsors a range of sports programmes in Ennigerloh. He has been a member of a successful men’s choir for many years.

Lorenz Bohle also backs a number of school projects and, within the framework of a cooperative venture with the Ennigerloh Secondary School, has established a metal workshop there. The

company was honoured for its “Obstgarten mit Park (Orchard with Park)” on the company grounds. In addition to this, the enterprise is the recipient of the Münsterland Innovation Prize.

Since a few years Bohle is a passionate hunter.

Lorenz Bohle is married and has 2 children.

## Photos



**Figure 1 Lorenz B. Bohle**



**Figure 2 BRC Dry Granulator**



**Figure 3 Bohle Fluid Bed System BFS – Bohle Uni Cone BUC®**



**Figure 4 Bohle Film Coater BFC 600**



**Figure 5 Plant 3 in Ennigerloh**



**Figure 6 Animation of the Technology Center**