

KORSCH: MAGAZINE

The KORSCH AG Customer Magazine

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by Being Highly Efficient

TOP TOPIC

High-Volume Tablet Production

Challenges and trends



Shaping the Future Together

Dear Readers,

In the recent past, experts have focused particularly on important future pharmaceutical manufacturing topics: personalized dosage forms and the associated challenges for modern manufacturing technologies, continuous processes, and contained production of small and mid-sized batches.

In this issue, on the other hand, we want to address the conventional processes for producing maximum batch sizes. For example, large-volume tablet production is not only an in-demand method for manufacturing pharmaceutical blockbusters, but also products such as dietary supplements.

Every company seeking to modernize its manufacturing technology and be competitive in the future face similar questions. Where are attractive locations in terms of international competitiveness? What influence do issues such as digitalization, supply chains and sustainability have on maximum output and quality of solid tablet forms? How do manufacturing companies deal with regulatory requirements? How are they responding to the challenges posed by cost pressures and a shortage of skilled workers?

In the current issue of this magazine, decision-makers from the pharmaceutical industry and other sectors report on their experiences and provide honest insights into practical realities.

This open communication with our customers and long-standing partners is of existential importance to KORSCH as a specialist, because this is the only way we can provide innovative technologies and clearly differentiate ourselves from the generalists. It is this in-depth dialog that ultimately enables all market players to remain competitive in a constantly changing environment and to help shape the future.

In this magazine, we present our new X 5 rotary press in more detail for the first time. It offers maximum performance on a minimal footprint and enables flexible, automated tablet production.

Why not take a few moments in this complex and fast-paced environment and be inspired.

I wish you an interesting read.

Yours sincerely
Stephan Mies
CEO of KORSCH AG



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High-Volume Tablet Production

An overview of developments, trends and future prospects



Over the past two decades, large-scale production of pharmaceuticals has increasingly shifted to Asia. Countries such as India, with low manufacturing costs and highly developed pharmaceutical knowledge, have focused on high-volume production of generic drugs. Has the market changed in the light of the Corona pandemic? In what ways are digitalization, automation and trends such as sustainability impacting high-volume manufacturing? Fred Murray, CEO of KORSCH America Inc, Jochen Sommer, Global Sales Director of KORSCH AG, and Sameer Rane, Executive Director of KORSCH India, pin down current global developments, provide insights into the company, and assess future prospects.

Global relocation of large-scale production

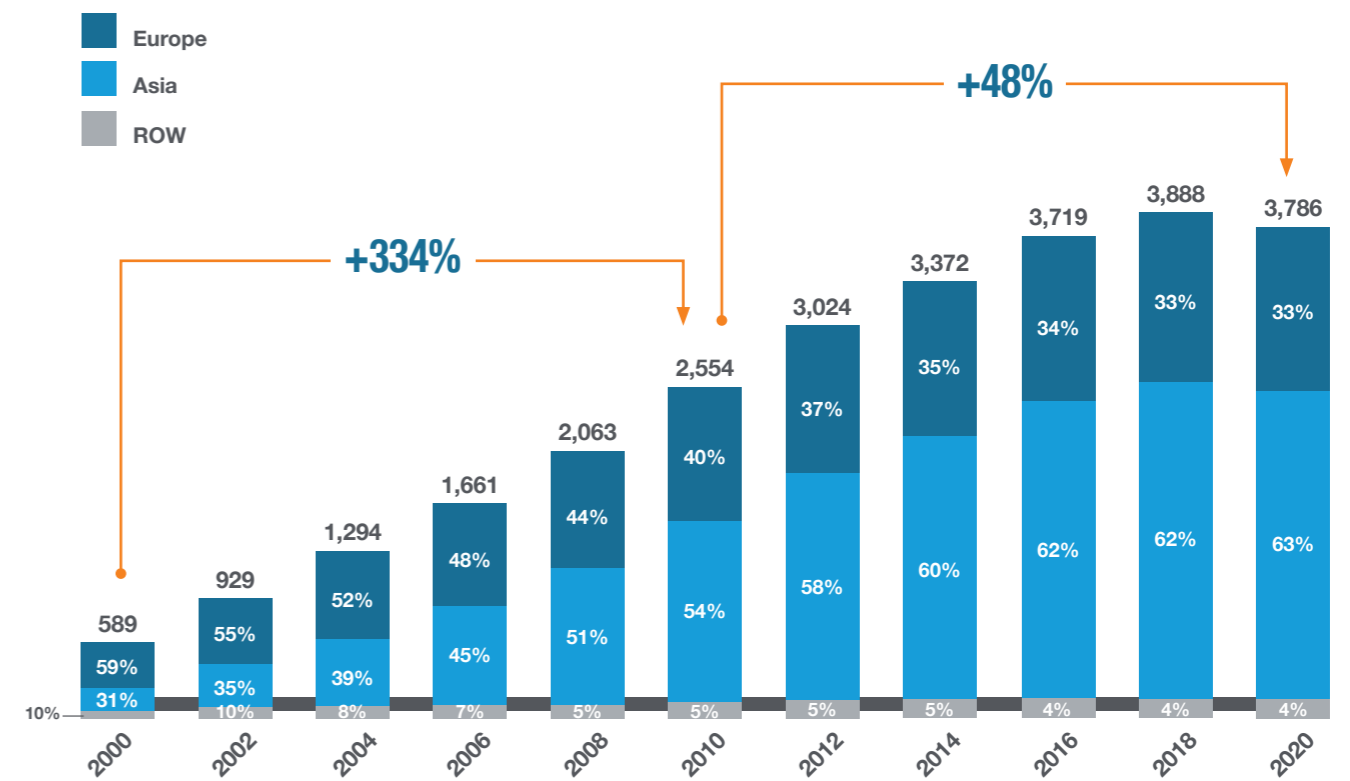
The 2020 Progenerics API study shows how much the market has changed in recent decades. Two-thirds of the active pharmaceutical ingredients (APIs) needed in Europe are now produced in Asia. India and China hold more than 80 percent of all active pharmaceutical ingredient approvals (CEP Certificates of Suitability) in Asia. India is one of the fastest growing markets. The local pharmaceutical industry is currently growing by 12 percent annually and is estimated to generate sales of \$10 trillion by 2030. Government fiscal

policy in India creates a favorable environment for manufacturing there. For example, manufacturing for export is taxed much lower than for the domestic market. Many of India's manufacturers already produce for export in line with U.S. Federal Drug Administration (FDA) standards and design their production processes and equipment to meet these strict requirements and regulations. "India is home to the highest number of FDA-approved plants outside the U.S.," Sameer Rane explains.

"Based on the demand for KORSCH equipment in India and from large, international contract manufacturers, I cannot see a fundamental trend reversal at the moment," is his assessment. Fred Murray explains: "if the pandemic had not occurred, the trend would have continued unabated. However, supply problems during this time, especially in the U.S., led to at least some production being moved back to reduce dependence on Asia." In the U.S., Fred Murray is observing a diversification of production sites, with major pharmaceutical companies expanding their production capacity, at least in contract manufacturing terms, at various global locations. Therefore, he says, there is the political will to relocate production of strategic APIs and products back to the West, but industrial and environmental difficulties still pose a significant obstacle.

Diversification rather than trend reversal

This reliance of the Western world on drugs produced in Asia became particularly apparent as a result of the supply chain disruptions during the Corona pandemic. Are we now seeing a trend reversal where production is shifted to other locations? No, says Jochen Sommer.



Growth in the number of valid certificates of active ingredient quality (CEPs) from 2000 to 2020 in Europe, Asia, and the rest of the world (ROW)

Source: Certificate Database, European Directorate for the Quality of Medicine & HealthCare, as of April 30, 2020

In contrast to production, companies' R&D activities are hardly affected by the shift from west to east. Molecule development for new drugs is currently located mainly in Europe and the USA, and there is no indication that this will change in the foreseeable future.

Machines are getting smarter and smarter

KORSCH maintains a consistent focus on automation and digitalization when designing its machines to ensure the highest quality in manufacturing processes. KORSCH's open and flexible software can be enhanced to match the working philosophy of each individual customer. This enables adaptation to different operator qualification levels in different markets. In some regions, the operator's freedom of action is severely restricted. The IT departments in these regions have increasingly played a key role in the integration and storage of process data. They evaluate data from increasingly digitalized machines and adapt their systems accordingly.

But even if operators are highly specialized, they increasingly need support from the software to operate multiple machines simultaneously and/or an entire process. "In pharmaceutical production facilities, machines are getting smarter and smarter. An exciting challenge for KORSCH here is the balancing act between the increasingly complex functionalities of the control system and

the design of the user interface, which must be as simple and intuitive as possible," says Jochen Sommer.

Digitalization – Pharma 4.0 versus data security

With the collection and analysis of almost all process data, digitalization offers a wide range of options for optimizing process control, as well as production and quality monitoring. However, when it comes to services such as remote support or predictive maintenance, tablet manufacturers in the pharmaceutical sector are very reluctant to open up their networks due to strict regulations. "Technically, a feature like remote support during production is easily feasible on KORSCH machines. But the process data must be one hundred percent traceable. As a result, manufacturers steer clear of Internet interfaces in order to avoid audit problems, for example", says Jochen Sommer. KORSCH is already working on edge computing solutions to process the production data locally. The PharmaView app, a holographic operating aid for the operator at the tablet press, is also being continuously upgraded and enhanced for multimedia content such as videos or 3D renderings.

Flexible systems from KORSCH

Flexibility is also enormously important in high-volume production. "KORSCH has a unique range of machines for the production of a wide variety of tablet formats, in-



Fred Murray,
CEO KORSCH America Inc.



Sameer Rane,
Executive Director of KORSCH India



Jochen Sommer,
Global Sales Director of KORSCH AG

cluding single-layer and multi-layer, and for batch and continuous production applications", says Fred Murray.

Be it in the pharmaceutical industry or in the FC&TC sector (Food, Confectionary & Technical, Chemical) – flexible machine systems from KORSCH enable users to react to changes in the markets even at short notice. The company is in constant contact with customers and universities, to understand and react to emerging requirements and current trends, and therefore KORSCH is continuously developing its systems in terms of flexibility and efficiency.

Sustainability – start-up support from the KORSCH INNOVATION CENTER

The trend towards sustainability has long since manifested itself at KORSCH – in the truest sense of the word, especially in the cleaning and cosmetic products segment, which includes household cleaners or shower gel and shampoo in tablet form. "We were approached by start-ups that wanted to bring truly innovative, sustainable products to market, but didn't have the machines to produce the appropriate quantities. This

generated the idea of using the available production capacities of the machines in the KORSCH INNOVATION CENTER for this purpose. That's how we started to get actively involved as a service provider in product development: in optimizing product formulations, producing

small sample batches, enhancing production processes, all the way to contract manufacturing products in small quantities – a win-win situation," says Jochen Sommer.

FC&TC sector: efficiency and continuous manufacturing

What matters most in the food, confectionery, and detergent industries, as well as in the chemical and technical industries (FC&TC) is mono-production and therefore efficiency. This means minimum downtimes for maintenance and repairs. Here, KORSCH scores points with an ergonomic, fast-change design, superior component accessibility, tools with particularly low-wear high-load profiles, precision cam tracks, and robust precompression, main compression, and ejection stations for highest production speeds.

”**KORSCH has a unique range of machines for the production of a wide variety of tablet formats.**”

Fred Murray,
CEO KORSCH America Inc.

In the FC&TC sector, especially in the food industry, continuous manufacturing is in widespread large-scale production use. This harbors massive potential for the pharmaceutical industry. Technically speaking, it has long been possible to ensure that stringent quality assurance requirements are also met in continuous production. Particularly with the huge volumes resulting from tender transactions in which, for example, health insurance companies or wholesalers combine their orders. This is an interesting option for many pharmaceutical manufacturers.



KORSCH's expertise in tableting technology



Serial Blockbusters

KORSCH presses produce over one million tablets per hour

Blockbusters – this is not only the name given to particularly popular movies, but also to drugs with a high level of market potential. They are used to treat common ailments, such as diabetes or high blood pressure, and are therefore sold particularly frequently. Specifically, blockbuster drugs generate annual sales of one billion U.S. dollars or more for the pharmaceutical companies that manufacture them.

Blockbusters generate most of their sales in the first few years after they are launched on the market – mainly because these drugs still have patent protection against imitations, so-called generics, during this period. Nevertheless, a few years of the patent protection period have already passed by then. This is because a lot of time usually elapses

from patent application to launch due to research, clinical studies, and approval procedures. High efficiency is therefore particularly important in the first years of production, and while the product is still patented. Therefore, production of blockbusters is usually not outsourced, but remains in Western countries to avoid problems and loss of time when transferring the product. Continuous production may be an answer to the specifics of high-volume blockbuster mono-production, but so far this concept is still in its infancy.

Blockbusters are usually mono-produced on dedicated machines. This generally means that the production process is resilient and robust. Well-trained operators have got this precision-enhanced process down to a

fine art, and they are often supported by KORSCH service technicians at key points during the process.

Fully automated, digitalized high-volume production delivers major efficiency gains

Supreme production reliability is crucial: “Our customers in the pharmaceutical industry use the powerful KORSCH XL 400 and X 5 high-performance rotary presses or the XT 600 and XL 800 double rotary presses for this purpose. This allows very large batches to be produced in a short time. The XT 600, for example, achieves over one million tablets per hour, given its fully automatic high-volume production capability,” Thorsten Engler, KORSCH AG Service Engineer, explains. Automation has become an important factor in this area: automated production,

for example, enables one production worker to operate and monitor several machines at the same time. Full production traceability is also a given.

KORSCH supports its customers by equipping the tablet presses to record all the necessary data and transmit it to a customer-specific, higher-level data processing system. A differentiated analysis of the key performance indicators can then help to identify immediate optimization potential, increase machine availability and performance, reduce energy consumption, and coordinate and enhance maintenance intervals.

KORSCH’s vast experience is key when providing on-site support

KORSCH’s extensive experience and know-how are important for the tablet manufacturers. “The production of drugs is subject to strict regulations, and the smallest divergences can have major consequences. Our on-site support is therefore particularly in demand for new serial production facilities. Basically, our service does not end with the commissioning of a press, that is when it really starts; especially in terms of validation activities and the initial creation of a product formulation, but later as well in the context of maintenance contracts,” says Engler.

Are blockbusters still a model for the future?

In addition to blockbusters and generics, personalized medicine is currently an emerging trend. The principle is that, in contrast to the use of blockbusters, the genetic, molecular, or cellular characteristics of the patient are also factored into the actual diagnosis. Doctors use these to derive the appropri-



“The XT 600, for example, achieves over one million tablets per hour, given its fully automatic high-volume production capability.”

Thorsten Engler,
Service Engineer, KORSCH Germany

ate treatment. However, because most patients respond to standard drugs, the blockbusters, “there is currently no evidence that personalized medicine is having an impact on blockbuster production. Instead, the two segments exist in parallel,” Ben McGandy, Service and Spare Parts Manager, KORSCH America Inc., explains.

Generics also only provide competition in the market for prescription medicines, due to cost pressures

exerted by health insurers. In the OTC (over the counter) business, i.e., drugs that can be purchased without a prescription in pharmacies, the situation is different. “Here, our customers report that demand for well-known branded products continues unabated,” says McGandy, estimating the relevance of blockbusters to remain high in the future. In order to meet demand, high-performance tablet presses, such as those from KORSCH, are indispensable. ■

XT 600 – HIGH-SPEED DOUBLE-SIDED ROTARY PRESS

- Production of single- and bi-layer tablets
- Highly efficient dust extraction
- Maintenance-free machine base
- Compression dwell bar
- Innovative feeder concept
- Minimal noise and vibration
- Intuitive operation using Smart-Touch HMI
- Compression force control
- On-board help function

Find out more about the XT 600:



Competitive Market, Low Margins



This is why high-performance processing systems are so important for generic drug production.

Generics are imitations of drugs whose patent protection has expired. Generic versions of brand-name drugs range from widely used medicines such as Ibuprofen or Paracetamol to antibiotics and specialized drugs for the treatment of cancer or viral diseases. The production of generic drugs is a billion-dollar business. That is why competition among manufacturers is fierce and price pressure immense.

One of India's leading generic manufacturers and the world's largest producer of antiretroviral drugs is Hyderabad-based Hetero Drugs Ltd. Founded in 1993, the company now employs around 22,000 people. In addition to generic versions of antiviral drugs used to treat various influenza and HIV viruses and COVID-19, among others, the company's businesses include active pharmaceutical ingredients (APIs), biosimilars, pharmaceutical services and other branded generics. Hetero Drugs Ltd. is also involved in research and development, manufacturing, and marketing of pharmaceuticals in various

fields. For tablet production purposes, the company uses 21 KORSCH machines, including 17 high-performance XT 600 double rotary presses.

KORSCH:MAGAZINE spoke with Bhaskar Reddy Pabbati Reddy, Director of the company, about the special requirements of generic drug production and the importance of state-of-the-art, specialized processing systems and high-performance equipment for the competitiveness of generic drug manufacturers.

KORSCH:MAGAZINE: Mr. Reddy, what parameters impact on large-scale production of generics?

B.R.P. Reddy: In a regulated market like the USA, patent protection is very strong. As long as it exists,

brand-name drug manufacturers can earn high margins for their products.

When that patent protection ends, generic manufacturers are given the opportunity to bring the generic version of the branded drug to market. Stiff competition for market share generates huge price pressure. As a result, generic manufacturers compete for market share at low prices. This means they must significantly reduce operating costs, increase operational efficiency and minimize in-process product losses in order to produce cost-effectively.

To ensure their own profitability when working within the constraints of discount agreements with pharmaceutical distributors in the USA, one strategy of generic manufacturers is to outsource smaller volumes to contract manufacturers and to concentrate on high-volume production at high levels of productivity. To enhance their processes to achieve this, they rely on high-quality equipment and the expertise and experience of the suppliers.

KORSCH:MAGAZINE: What else characterizes high-volume generics production?

B.R.P. Reddy: Production parameters such as throughput times, production yields and analysis costs play a major role in high-volume production. At the same time, large batches carry the risk of extremely high losses if disruptions occur during the process. On the one hand, generic manufacturers are forced to produce at market-driven prices while ensuring sufficient profitability. On the other hand, they have to comply with the respective rules and regulations of the exporting countries. This means that they rely on mass production and are dependent on high-quality processing equipment, because only machine

systems of optimum design can increase productivity and yields and reduce the process times and quality control costs involved in mass production. Even the smallest enhancements have a positive effect on performance, yield maximization, plant availability and product quality. This is where KORSCH's double rotary tablet presses in particular exhibit their strengths.

KORSCH:MAGAZINE: Why is it important to have highly flexible equipment when mass producing generics?

B.R.P. Reddy: Flexible machine systems are essential for designing production processes for the different products that a generic manufacturer includes in its portfolio – depending on which patents expire and what is stipulated in the manufacturing contracts.

The equipment must be flexible and easy to adapt or change over, even on a production line for a specific product, for example, when different dosages of active ingredients are required or when modified raw materials or additives are added due to supplier changes.

KORSCH:MAGAZINE: What advantages do high-quality processing systems offer?

B.R.P. Reddy: Sophisticated, automated equipment plays a crucial role in large-scale production, because it enables the best possible control of



Bhaskar Reddy Pabbati Reddy,
CEO of Hetero Drugs. Ltd.

process parameters to achieve the highest product quality. With high-end processing equipment, all parameters can be monitored throughout the process to continuously control possible divergences and avoid subsequent divergence investigations.

KORSCH:MAGAZINE: How important are process design and optimization in this context?

B.R.P. Reddy: The key is to develop a robust process with low complexity. The process must be enhanced to achieve shorter throughput times with higher productivity and better yields. High-end equipment that operates reliably, even at high speeds, is the key to competitiveness in generic drug production.

KORSCH:MAGAZINE: Is continuous manufacturing the answer to the requirements in large-scale production?

B.R.P. Reddy: Yes, the future lies in continuous or at least semi-continuous manufacturing. It achieves higher output with lower quality control costs, reduces "out-of-specification" (OOS) tablet scrap, lowers overall production costs, and therefore allows manufacturers to price competitively.

KORSCH:MAGAZINE: Thank you for the informative interview! ■



High-Speed Nutraceutical Production

The Sanotact Group opts to use KORSCH machinery for volume production purposes and is a launch customer for the new X5 high-speed single-sided rotary press.

The Sanotact Group is a manufacturer of high-quality dietary supplements and functional confectionery, such as dextrose and mints, that operates globally. Its production facilities are located at the company's headquarters in Münster. This is where around 1,000 different products are pressed into tablet form around the clock – approximately 5 billion tablets a year. Natural products

are often used as raw materials to manufacture dietary supplements, and their properties may vary from batch to batch. A great deal of handling expertise is required to ensure consistent end-product quality. For this reason, the company is reliant on the experience and expertise of its approximately 220 employees and attaches great importance to basic and advanced training.

KORSCH presses at Sanotact: "simple solutions to complicated problems"

The shortage of skilled workers in Germany has not passed Sanotact by. However, the company has had positive experiences in recent years with new employees, who came to Germany as migrants and would otherwise not have had a chance in the official integration system. "If we see potential there, we train these new colleagues ourselves. KORSCH presses with their intuitive and user-friendly user interfaces are a real help, especially when new operators initially lack the requisite language skills. They visualize machine data superbly and are fully accepted by the team," says Yossi Sarafraz, Production Manager at Sanotact. "In general, our experi-

ence with KORSCH presses is that many of them feature uncomplicated designs and provide simple solutions to complicated problems," he applauds.

Machine reliability lays the foundation for uninterrupted production

Sanotact has already been using KORSCH's XT 600 high-speed double rotary press for four years, and another one is currently being installed. The XT 600 features KORSCH's hallmark flexibility, good accessibility and cleanability, as well as simple changeover options thanks to its rapid-change design. It is ideally suited for direct compression, an increasingly common process in tablet production. Particularly important is its high level of reliability, which goes hand in hand with long maintenance and cleaning intervals. "Our machines operate in three shifts, six days a week. During this time, the equipment does not stand still, even for five minutes." Sarafraz continues, adding, "when you consider that the XT 600 has been operating almost continuously since it was purchased four years ago, only taking short breaks for minor maintenance, that's quite remarkable. The need for repairs has been virtually non-existent during this period. This is the ideal foundation for high-performance, cost-effective manufacturing."

Quality standards that even meet ultra-stringent GMP requirements

The high levels of precision and reliability delivered by the machines are also of particular importance for Sanotact products that are exported – Sanotact now sells in 60 countries. Unlike in Germany, dietary supplements in Asia and the Middle East are considered to be medical products and must therefore comply with GMP regulations for pharmaceuticals. The strict guidelines on "Good Manufacturing Practice" stipulate the quality standards that apply to pharmaceutical production – even minimal divergences are then no longer permitted. Sanotact is set to acquire the necessary GMP certification this year. This means that Sanotact is also well prepared for future pharmaceutical production – an area in which the company would like to strengthen its positioning in the future.

ABOUT SANOTACT

International specialty supplier of nutritional supplements, medical products, and functional confectionery

- Headquarters: Münster, Germany
- Branch: Hong Kong
- 220 employees
- 5 brands incorporating over 1,000 different products
- Annual production of 5 billion tablets in different formats
- Sales in 60 countries around the world



NACH MÖGLICHKEIT
IN EINER BESSEREN
QUALITÄT ANFRAGEN



One of the machines to be used for this purpose is a KORSCH XM 12, which has also been in operation at Sanotact for some time. It is used for product-development, scale-up and small-batch production of single- and bi-layer tablets.

Up to 25 percent higher production output with the X 5

In mid-November 2023, Sanotact will commission its first KORSCH X 5. This new product is a high-speed single-sided rotary press for pharmaceutical applications delivering significantly increased production output- At the same time it retains KORSCH's hallmark flexibility and rapid-change system. The machine is easily accessible, ergonomically

designed and has a compact design with integrated control cabinet. Even with a conventional turret, the X 5 delivers 20 percent higher production output than most single-sided presses on the market without significantly increasing its footprint. The optional turret with segmented die table even enables production output to be increased by a further 25 percent.

The machine is optionally available in SFP or MFP versions for single- or multi-layer production. The modern operator interface can be intuitively controlled via a smart-touch HMI. A standardized programming language makes the machine Industry 4.0-capable and ensures integration

into upstream and downstream process systems. "Purchasing the X 5 means we can once again increase our productivity and meet the high global demand for our products," Sarafraz explains.

Application-related enhancement in partnership with Sanotact

Proof of the profound trust between the two companies is the fact that Sanotact is the launch customer for the X 5. For KORSCH, this involves long-term observation of the press in a real production environment over a period of several months, Jochen Sommer, Global Sales Director at KORSCH, explains. "We are always in close touch with our contacts at Sanotact. Their input is particularly

important to us, because we always create solutions through a process of dialog, enabling us to generate application-related innovations." Each side benefits from the other's knowledge during the process – a real win-win situation. "This helps us in particular with fine-tuning: how does the tablet press perform when it has been operating for four to five months, what works well, and where can we make further enhancements if necessary?" Sommer continues.

More than your classic customer-service provider relationship

The key factor in this trust-based working relationship is also the mentality of the companies, which fit very well together, Sarafraz explains. "Although KORSCH has continued to grow in recent years, the special character of a family business has not been lost. You get a sense of that in our working relationship." He highlights the major importance of after-sales service: "From our point of view, the support provided is outstanding, even by international comparisons. We know that if there's a problem, there's someone there who knows what to do, is solutions-focused, and is keen on supporting



Jochen Sommer, Global Sales Director at KORSCH, in conversation with Yossi Sarafraz, Production Manager at Sanotact

us." He emphasizes that KORSCH's service technicians also take time during routine maintenance work to clarify any other unaddressed problems and questions. "This has really enabled us to forge close ties with each other. We felt a great sense of security right from the start."

Jochen Sommer also views the working relationship with Sanotact as being special. "In product devel-

opment projects, for example, we look very closely at which partners would be a good fit, even if a solution is not yet 100 percent validated. The interpersonal aspect plays a major role here. We value Sanotact's hands-on approach. Therefore, it was clear to us relatively quickly that Sanotact is the appropriate partner for this project." Both sides agree that this will continue to be the case in the years to come. ■



” **“Purchasing the X5 means we can once again increase our productivity and meet the high global demand for our products.”**

Yossi Sarafraz,
Production Manager
at Sanotact

X5 – THE NEW PHARMACEUTICAL HIGH-SPEED SINGLE-SIDED ROTARY PRESS

- Maximum production output for a single-sided rotary press
- Optional segmented die table to increase production further
- SFP version: dedicated single-layer production
- MFP version: single-, bi- and tri-layer production
- Intuitive operation using Smart-Touch HMI
- Realtime energy consumption display for as sustainable operation as possible
- DryCon® version (OEB 3/4)

More information on the X 5 is available here:



Remaining Competitive by Being Highly Efficient

Chemical industry: Varta produces ring-shaped tablets for household batteries using KORSCH presses

Price pressure from abroad, supply bottlenecks and the energy crisis – these are the challenges that many companies in the chemical industry have been facing for months. Like Varta, one of Germany’s most successful manufacturers of household batteries. The long-established company shows how important a high level of efficiency is in order to survive in a tough environment. Rotary presses from KORSCH play a key role in this respect.

Rotary presses, more specifically the TRP 900 five-layer rotary press and the TRP 700 high-performance double rotary press, produce battery tablets at the Varta site in Dischingen in Baden-Württemberg – those small rings that are inserted into battery cases and enable batteries to keep remote controls, clock radios or other electrical appliances running for days. The tablets are pressed from a fine-grained granulate material composed of manganese dioxide, graphite, a plastic binder, and electrolyte.

KORSCH presses have been operating reliably around the clock for decades

Battery manufacturers now produce all over the world, especially in Asia, and usually at lower labor and energy costs than in Germany. This makes

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“High machine availability is the basis for our profitability. In this respect, the durability of our KORSCH presses is a big plus.”

Rainer Pösl,
 Product Development
 Department at Varta



The Varta facility in Dischingen produces around 1.75 billion batteries a year.

reliable production plants and machinery even more important, in order to stay ahead of the competition in efficiency terms. “They guarantee us production without major interruptions. High machine availability is the basis for our profitability. In this respect, the durability of our KORSCH presses is a big plus,” Rainer Pösl, formerly production manager and now working in the product development department at Varta, explains. Varta has a total of thirteen KORSCH rotary presses in operation – 24 hours a day, seven days a week, roughly a thousand shifts a year. The robust machines only come to a halt for a fifteen-minute cleaning session after each shift and for an eight-hour maintenance period after around 60 to 65 shifts. Downtime is virtually non-existent.

Low-wear, efficient and intuitive to operate

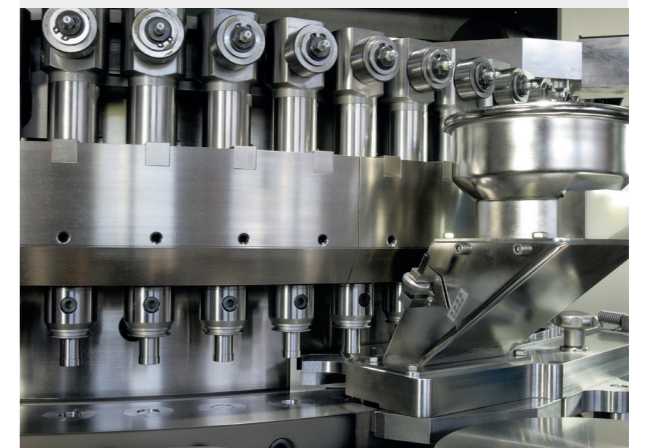
Given the longevity of the presses, employees have a great deal of machine expertise. Pösl himself has worked for the company for 35 years. The first KORSCH presses were already in operation back then. “We still manufacture today using the majority of those initial presses. We only upgrade the electronics at longer, regular intervals and replace wear parts, such as the die table or the gear unit. A gear unit, for example, breaks down after an average of seven years. So, we are talking about long periods here,” Pösl emphasizes. Varta stocks wear parts itself at its production site; only complex equipment such as pressure rollers or entire groups of individual parts are purchased from KORSCH in case of acute need – they are immediately available by express delivery, as was the case during the COVID 19 pandemic. Simple, intuitive operation of the KORSCH presses also aids high production efficiency. As a rule, one employee can operate two presses and is responsible for two downstream processes.

Process and peripherals optimization

Nevertheless, price pressures are high, particularly because not only wages but also energy prices in Asia are significantly lower than in Germany. That is why Varta is working on solutions to recover used energy. “We use a lot of compressed air for our packaging. For years,

KORSCH'S TRP TECHNOLOGY – TECHNICAL ROTARY PRESSES

- High-speed double-sided rotary press for high compression forces, large formats, and deep fill depths
- Punch shanks with guide rollers on both sides ensure smooth punch travel and no wear on punch heads or cams
- Roller-guided tool shanks featuring patented heavy-duty profile heads deliver maximum compression force at minimum wear
- Optimum material feeding for reliable processing
- Efficient dust extraction for long operating times
- Rapid, precision compression force control



we have been using the waste heat from the compressors to back up our heating system,” Christian Löffler, production manager at Varta, explains. The company is also continuously trying to increase the level of automation and is examining ways to further optimize production processes.

The Role of Continuous Manufacturing in Large-Batch Production



Dr. Robin Meier, Chief Scientific Officer at L.B. Bohle, a specialist in machinery and process integration for the pharmaceutical industry and partner company to KORSCH, provides some insight on this emerging technology.

New equipment is tested on the KORSCH R&D press

Close contact with KORSCH is an important factor here. In addition to the 13 production presses, there has been an R&D KORSCH press at the Dischingen site since 2020. It was acquired during relocation of the prototype plant from the US site back to Germany and enables Varta to optimize production further. "We have incorporated a few special features into the machine that serial production machines do not have. This allows us to test new equipment or small adjustments on it during trial runs at our own pace and then consider where the one or other feature might also make production sense," Löffler explains. If any change requests are made, KORSCH actions them tailored to the needs of the battery specialists. It is also possible to reduce the range of functions, if certain functions are not required.

Recognizing changes, seizing opportunities

Varta is not only using the R&D press to test the extent to which new functions could make battery production even more efficient in the future – the experts at the long-established company are also examining new options in terms of the raw materials used. "Manganese dioxide, also known as manganese oxide, is the basis for the ring tablets that we make for battery production purposes. Prices for the raw material have risen in recent months due to the energy crisis, because manganese oxide is a very energy-intensive raw material. That is why we are looking around for alternative suppliers," Löffler explains. This fits with Varta's approach of seeing challenges as opportunities, as Rainer Pösl affirms. "When the winds of change blow, there are some who build walls to protect themselves. Others build windmills to harness the winds. At Varta, we see ourselves as windmill builders – changes offer opportunities to those who recognize them in time and are bold enough to take advantage of them."

The presses, on the other hand, will remain the same. The high level of reliability exhibited by KORSCH machinery enables Varta to continue producing batteries in large quantities in a standardized manner and to serve the global market from Dischingen – 1.75 billion batteries alone in 2022. ■

IMPRINT

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Breitenbachstraße 1
13509 Berlin
Germany

E-mail: berlin@korsch.de
Phone: +49 30 43576-0
Fax: +49 30 43576-350
CEO: Dipl.-Ing. Stephan Mies

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Editorial team:
KORSCH AG
C&G: Strategische Kommunikation GmbH

Design, layout, text and production:
C&G: Strategische Kommunikation GmbH
Hoffnungsthaler Straße 1, 51491 Overath
Germany
Phone: +49 2204 9756-0
E-mail: info@c-g-gmbh.de
www.wir-verstehen-technik.de

ABOUT VARTA

Comprehensive battery portfolio for household and industrial applications



- Headquarters: Ellwangen, Germany
- 5 production and manufacturing sites in Europe and Asia
- Sales centers in Asia, Europe, and USA
- Approx. 4,600 employees
- Annual production of more than 1.2 billion batteries
- Represented in over 75 countries worldwide

KORSCH:MAGAZINE: Is Continuous Manufacturing (CM) an answer to the requirements of large-batch production?

Robin Meier: First, let us clear up a common misunderstanding: continuous manufacturing does not mean uninterrupted production around the clock. In fact, it means continuous material inflow into or outflow from the production process. And yes: CM offers plenty of potential for high-volume production. However, the focus is more on quality enhancement than on throughput quantities.

KORSCH:MAGAZINE: What benefits does CM offer?

Robin Meier: Keyword quality. CM massively reduces the risk of segregation in the direct compression process, for example, because the material is constantly in motion within the system. This simplifies feeding and mixing, especially of drugs and excipients with poor flow properties. For example, errors resulting from minimal material deviations can also be detected much faster, and defective products can be rejected immediately. At the same time, upstream process-stage parameters can be

corrected to ensure a return to the design space. And last but not least, it can also save product development time and materials.

KORSCH:MAGAZINE: When does it make sense to switch from batch production to CM?

Robin Meier: That is always a strategic issue. In the case of existing, large-volume batch production involving small margins, decision-makers need to check whether reinvestment makes commercial sense. CM should definitely be considered in the event of quality problems or if investment in a new plant is planned - perhaps initially only for certain sections. Ultimately, it is a huge puzzle made up of many pieces. This is where KORSCH and L.B. Bohle can leverage their process engineering strengths and develop special solutions.

KORSCH:MAGAZINE: Is CM cheaper than batch production?

Robin Meier: CM offers high potential savings as far as operating and energy costs are concerned. For example, CM requires only 10 percent of the air volume for the wet granulation drying process that batch production

does. Here, too, various scenarios can be reviewed. Ultimately, you must look at each case individually.

KORSCH:MAGAZINE: Thank you very much for the interesting interview! ■



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KORSCH

KORSCH AG – Berlin

Breitenbachstraße 1
13509 Berlin
Germany
Phone: +49 30 43576-0
E-mail: berlin@korsch.de

KORSCH America Inc.

18 Bristol Drive
South Easton, MA 02375
USA
Phone: +1 508 238-9080
E-mail: sales@korschamerica.com

KORSCH Singapore Pte. Ltd.

1 Scotts Road, 21-10 Shaw Center
228208 Singapore
Singapore
Phone: +49 30 43576-300
E-mail: info@korschsingapore.com

KORSCH India Private Limited

Plot No: M24, TSIC, Medical Device Park
Adjacent to ORR Exit No.4, Industrial Area Bollaram,
Sultanpur, Hyderabad, 502319, Telangana State, India
Phone: +91 80 0899 7035
E-mail: info@korschindia.com