diagram

#189 / November 2024

the Bühler magazine

ROOTED IN INNOVATION

NURTURING GROWTH AT THE CORE

WE INNOVATE FROM OUR ROOTS UP FOR YOUR SUCCESS

MILLING, YOUR WAY: FROM VISION TO REALITY

TAILORING SOLUTIONS FOR EVERY GRAIN, MILL, AND CHALLENGE

THRIVING IN FAST-PACED MARKETS

HOW ADVANCED MATERIALS STAYS AHEAD OF THE CURVE

EDITORIAL

STEFAN SCHEIBER
CEO BÜHLER GROUP

DEAR READERS,

Business lives on innovation. You know this as well as we do – if we can develop new products or services that meet changing needs, it will not only benefit our own business but also have a positive effect throughout your value chains.

At Bühler, this idea has always driven and inspired us. Our purpose is innovations for a better world. Our efforts are not just focused on the newest sectors like cutting-edge biotechnology for alternative proteins or nanometer coating solutions for the most powerful chips, but of course especially on milling – where our company has been rooted for over 164 years.

This is what you can see in our new Grain Innovation Center (GIC), opened this year in Uzwil, Switzerland. It offers the most advanced grain processing infrastructure we have ever built, founded on our decades of milling expertise and everything we have learned through our close collaboration with you, our customers. The GIC is an integral piece of our application and training center network, which together offers farm-to-fork coverage – unique to the market. This latest investment in grain processing research marks a milestone in our history and turns our claim "milling, your way" into reality for our customers and partners.

Whichever market you are in – be it food and feed or advanced materials – things are changing fast and new opportunities and challenges constantly emerge. To play a leading role in fast-paced markets, it is essential to recognize trends at an early stage and to be clear about the role we can play in adding value. This is what happens in our Advanced Materials business. Whether you, our customers, need to produce coatings in the nano range or megacast ultra-large structural parts, we seek to understand how our technology makes a difference to you and across the whole process chain.

While milling has always played a crucial role in the development of civilizations, providing the key ingredients with which humans nourish themselves, advanced materials are now fundamental to our modern lifestyle – essential to mobility, communications, and the built environment. What connects these sectors is the change that new technologies can spark. By improving the production of the products and services that meet our daily needs, we can ensure a sustainable future.

The world may be changing faster and the future becoming less predictable, but there are opportunities to be seized, and new technologies and solutions enable this. Innovation is essential to all of our prosperity and that of future generations.

We hope you enjoy this issue of Diagram, and we thank you very much for your collaboration.

Sincerely yours,
Stefan

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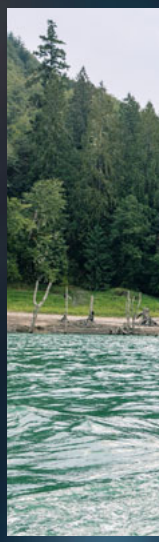
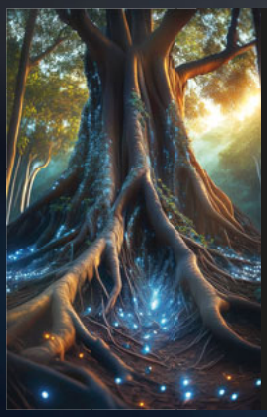
FROM THE ROOTS UP





ON THE COVER

Like a tree, our innovations have grown from the roots through the trunk of our company to every branch. A strong tree is resilient, and so is our innovation strategy. The markets are the air that our innovations need to breathe. We see where we can generate added value for our customers and remain true to our goal of creating innovations for a better world. And we have been doing so for 164 years.

DRIVING CHANGE

PURSUING EXCELLENCE

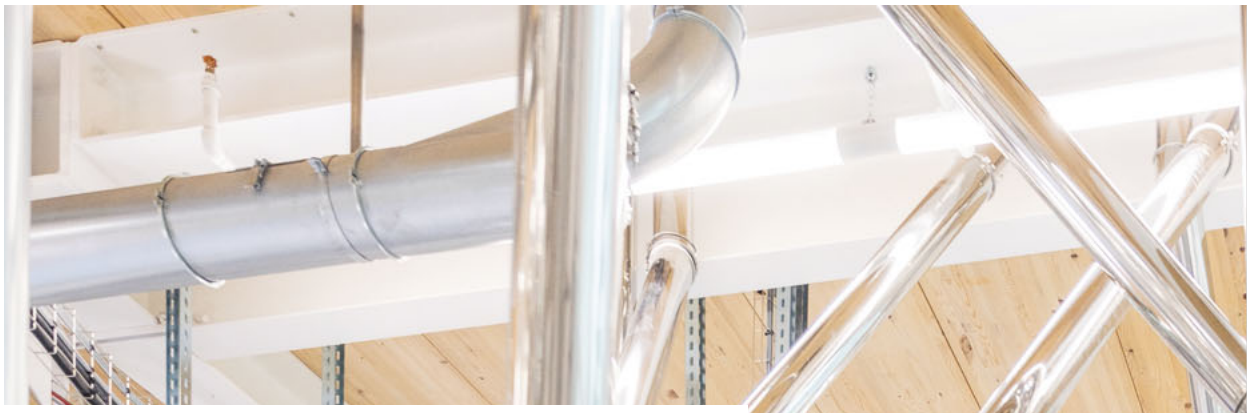
INNOVATIVE FROM THE ROOTS UP

Bühler is rooted in innovation. From our earliest years, we have strived to create the best technologies to make our customers more successful and more productive in their very dynamic market environments. We are dedicated to developing and improving processes, guided by the needs of customers. Our innovations are founded on our deep expertise in processing and on our experience with installed plants that must meet practical demands. Innovation is embedded in our DNA.

Like a tree, our innovation has grown from the roots through the core of our business to every branch. A strong tree is resilient, and so too is our innovation strategy. We maintain clarity on where to capture value for our customers and stay true to our purpose of creating innovations for a better world.

Like organic matter, innovation needs certain conditions and nutrients to thrive. Markets are like the air in which our innovations must survive, and they can move fast, which means recognizing emerging trends and being ready for them when they happen. To stay at the top of our game we keep a constant watch on our markets and those of our customers, we collaborate closely with both our customers and partners, and we keep our innovation tree healthy by spending nearly 5 percent of our turnover on research and development every year.

Throughout our 164-year history, we have continuously launched new solutions on the market. The new products and services we bring to the market today are only the most visible aspects of our innovation – like the leaves on a tree. Look beyond them and you will see that they are supported by a strong trunk and fed from the spirit of innovation deep in our roots.

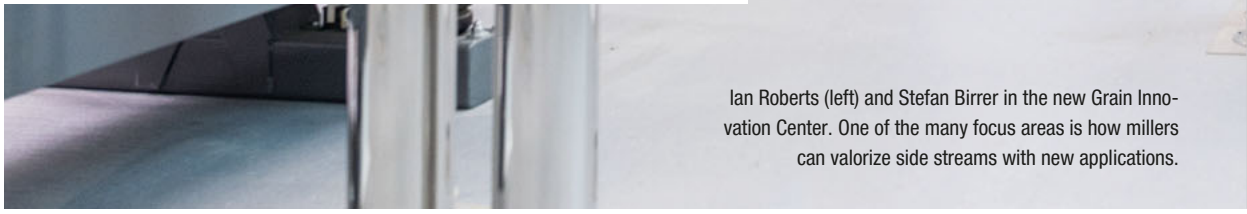


INNOVATION:

FROM MILLERS FOR MILLERS

TEXT: LUKAS HOFSTETTER
PHOTOS: JEKATERINA GLUZMAN

The milling industry faces a challenging yet opportunity-rich environment for growth and expansion. New technologies combined with digital solutions offer tangible benefits to increase yield, profitability, and food safety. Chief Technology Officer Ian Roberts met with Managing Director Milling Solutions Stefan Birrer in Bühler's new Grain Innovation Center to gain insights from the trained head miller on how this state-of-the-art innovation hot spot will support food and animal nutrition industries to tap into new markets.



Ian Roberts (left) and Stefan Birrer in the new Grain Innovation Center. One of the many focus areas is how millers can valorize side streams with new applications.

"AS A MILLER, I'M VERY EXCITED. THIS IS THE MOST ADVANCED GRAIN PROCESSING INFRASTRUCTURE WE HAVE BUILT. THIS IS THE PLACE WHERE WE WILL SEE INNOVATIONS FOR THE COMING DECADES IN THE MILLING INDUSTRY."

STEFAN BIRRER
Managing Director Milling Solutions at Bühler

IAN ROBERTS: At the Networking Days 2022, we announced that we will build a new Grain Innovation Center (GIC) to reflect the importance of the milling industry in global food systems. Stefan, as a head miller with decades of experience at Bühler, what does this opening mean to you personally, and to our customers?

STEFAN BIRRER: As a miller, I'm very excited about the GIC. It's the most advanced grain processing infrastructure we have ever built and is based on decades of milling expertise. The completely new facility is the successor to the Grain Technology Center, which had served the milling industry since 1951. We've spent decades working with our customers to bring highly efficient milling solutions to the market, and this essential and ongoing collaboration is the basis of the modern milling technology we see today around the world. The GIC is the place where all this comes together. It's where we will see milling industry innovations grow for decades – for wheat, maize, oats, and many other valuable grains and seeds.

I love that 3 years after our announcement, we have this incredible facility. Looking at it, I must admit, I can imagine retraining as a miller. What's going to happen here at the GIC in the coming months?

BIRRER: This facility is open for customers to address the challenges they face in the market. Together we will look at how we can further improve their processes and develop new solutions. Because we understand the art of milling in every aspect, we know exactly which technologies will make a miller's life easier while helping our customers become even more efficient.

The modernization of training facilities also includes our Milling Academy and the Swiss Institute of Feed Technology (SFT), both of which are strategically located next to the GIC to create even more synergies. A lot of grain processing know-how will be concentrated in Uzwil, and we will be able to innovate along the entire value chain in connection with our other Application & Training Centers here.

Why is the Milling Academy important?

BIRRER: The Milling Academy is very important for our customers. Every year, we train more than 500 customers at the Academy, and we see great value in training our own people here as well. Having well-trained operators is not just a benefit for our customers. We want to ensure that our milling experts who look after our customers are excelling in their field and up to date on the latest developments in milling.

Clearly this is not just about today – it is about preparing for the future in terms of skills and education. Coming back to what you said earlier – the concept of innovating together with our customers is not new to Bühler. How does this innovation model work in milling?

BIRRER: Bühler has always been known for high quality technology. But even the best machine does not give you the result you need if it is not embedded in

> *"WE INVEST A LOT INTO OUR CORE SIFTING AND GRINDING TECHNOLOGIES AND OUR SMARTMILL CONCEPT. THE GOAL IS CLEAR: TO CREATE AN INTELLIGENT SUPPORT SYSTEM FOR MILLERS THAT TAKES THEIR PROCESSES TO UNPRECEDENTED LEVELS OF EFFICIENCY."*
>
> **STEFAN BIRRER**
> Managing Director Milling Solutions at Bühler

a well-designed, customized process and controlled by highly efficient automation systems. If we want to go further, the next level is how we can make these plants smart. That is a journey we've embarked on for some time, and we've come quite far in terms of how to enable processes to adjust themselves and operate at the optimal level.

If you look at the full process, milling is a vital part, but it's still only one part of a long value chain before consumers can enjoy tasty bread, delicious pasta, and healthy breakfast cereals. The GIC offers the complete environment to integrate these process steps and find out where inefficiencies lie. That's the golden nugget that our customers can uncover to increase yield, reduce costs, and improve food safety.

Is this solely for wheat or can we process different grains?

BIRRER: Historically, wheat has been at the core of many processes. However, as a global player, we continuously develop processes for different grains that are the staple food in different regions. That's why we have a variety of processes for maize, for oats, and for pulses, which play a key role in sustainably closing the protein gap. We're also developing solutions for processing ancient grains such as sorghum, millet, and teff, which are of incredible importance in ensuring food security in Africa, for example.

Does this mean the GIC provides a full value chain platform to explore new raw materials and expand their business portfolio?

BIRRER: Absolutely. Millers are the undisputed experts in handling and processing grains, which makes them crucial to feeding a growing population. Traditionally, many millers have processed one type of grain in their facilities.

Today, with increasingly dynamic markets asking for more variety, we see many millers expanding their portfolios. The challenge for them is to determine how they can not only extract flour at the highest efficiency levels; in addition, they need to explore how they can get the most out of valuable side streams as well.

In the past, the goal was to extract the highest quality flour. The bran, as a side product, was fed to livestock. Today, the industry appreciates the fact that there are many highly valuable ingredients in these side streams, such as protein or dietary fiber. With this facility, we want to empower millers to valorize these side streams in new applications within their milling processes.

By combining forces with our other application and training centers, how can customers turbocharge value creation?

BIRRER: This is what makes our new facility so unique and exciting. The combination of the GIC with our other facilities, such as the Protein Application Center, the Extrusion Application Center, and the Flavor Creation Center to name a few, unlocks fantastic opportunities in fields we have not yet fully explored.

The possibilities are truly exciting in terms of collaborative innovation, upcycling of side streams, and opening new business fields for our milling customers. With your background, what can you reveal "from miller to miller" about our innovation pipeline?

BIRRER: Innovation has always been at the core of our activities, and it has never happened in a closed room. Innovation only happens when we consider customer and market demands combined with future trends. Being close to our customers is vital when developing new core technologies, equipment, and processes. Currently, we invest a lot of resources into further developing our core sifting and grinding technologies as well as our SmartMill concept. The goal is clear, we want to create an intelligent support system for millers that takes their processes to an unprecedented level of efficiency.

We have many tangible examples of modern mills running on a high level that suddenly experience a step up in efficiency and in profitability by embedding these digital layers on top of world-class technology. Why is that?

BIRRER: These technologies allow grain processors to anticipate inefficiencies in the process and act before out-of-specification products occur. We're also in touch with our customers' customers – the food producers.

A manager of one of the largest bakeries recently told us that, if he could, he would only take flour that comes from a mill that runs with the SmartMill concept. The reason is simple, his operations run so much more smoothly and efficiently with this kind of flour that he has experienced the same increase in efficiency and profitability as the miller using SmartMill. I couldn't have asked for a more convincing statement that we're on the right track, and it clearly shows the impact that smart solutions have on the entire value chain. These solutions are more important than ever, because every grain and every ounce of flour counts, especially considering today's challenges.

What's your final message to all the millers producing safe and high-quality flour for billions of people every day?

BIRRER: We talk a lot about purpose, and the milling industry has a real, tangible purpose: feeding the world. I'm proud that our company can offer the Grain Innovation Center and other application centers to them. By collaborating with our customers and combining our expertise, we can make significant strides in using our planet's resources more effectively to fulfill this crucial purpose.

INFO

Milling, your way!

With over 160 years of milling experience driven by innovation and excellence, Bühler is connected worldwide to help customers explore new business opportunities. From designing, building, and starting up milling plants to training customers at its schools, Bühler turns its motto of "milling, your way" into reality for millers around the world. This includes strengthening our training offering. In Uzwil, Switzerland, the Milling Academy and the Swiss Institute of Feed Technology (SFT) are currently being modernized to provide synergies with the Grain Innovation Center. Meanwhile, our African Milling School in Nairobi, Kenya provides hands-on practical and theoretical training to millers across Africa and the Middle East.

THE NEW HUB FOR GRAIN EXCELLENCE

TEXT: DALEN JACOMINO
PHOTOS: SAGAR SHIRISKAR

The five-story facility features state-of-the-art infrastructure along with over 70 pieces of cutting-edge equipment from Bühler and its partners.

Bühler marked another milestone on October 28, 2024, with the opening of its state-of-the-art Grain Innovation Center in Uzwil, Switzerland. The event brought together 200 customers and partners to celebrate the inauguration of the trailblazing facility. It was carefully designed to empower our customers from the food and animal nutrition industries to innovate and improve their processes, ensuring they stay ahead of the latest trends in milling.

MILLING IS A DEEPLY ROOTED and significant part of human civilization, with its origins going back thousands of years to ancient agrarian societies. This age-old practice, which involves grinding grains into flour or meal for food, is an essential process that has sustained communities and driven technological innovation. As part of its milling journey, Bühler, with a history dating back to 1860, has continuously honored the tradition while looking to the future. It has advanced and refined the processes to meet the evolving needs of the industry. The opening of the Grain Innovation Center (GIC) is the new playground for customers to explore potential.

The GIC is the successor to Bühler's Grain Technology Center, which has served the milling industry since 1951. The five-story facility spans 2,000 square meters and features state-of-the-art infrastructure along with over 70 pieces of cutting-edge equipment from Bühler and its partners. The GIC works as a leading-edge arena for customers to experiment, innovate, and find concrete solutions to meet their specific needs.

At the opening, customers and partners experienced firsthand the company's new powerhouse. After the official ribbon-cutting ceremony, guests embarked on a guided tour through the high-tech facility. "We are delighted to inaugurate this new center, which exemplifies Bühler's commitment to innovation. The GIC is our latest initiative to enable our customers to thrive in challenging times," says Johannes Wick, CEO of Grains & Food at Bühler.

A commitment to innovation

The milling industry has been navigating a dynamic environment, driven by evolving global grain supply chains, nutritional requirements, sourcing transparency, and pricing dynamics.

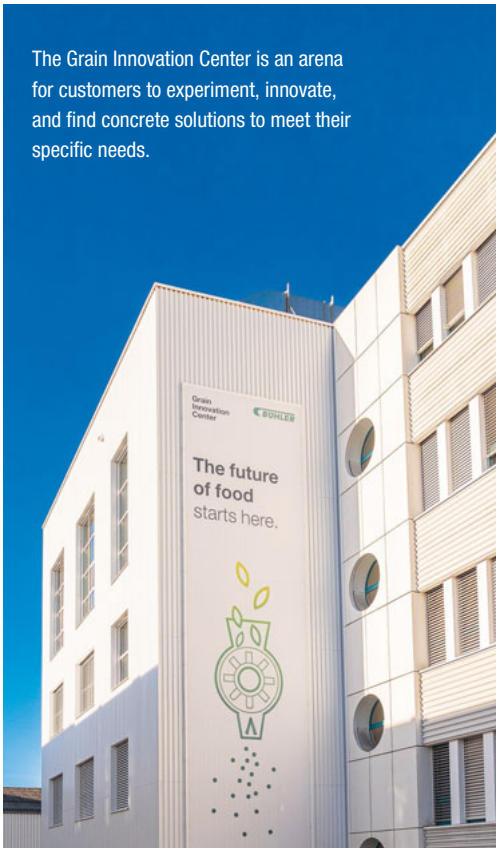
These challenges include maintaining flour quality, improving production and energy efficiency, managing safety, and retaining skilled professionals. Adopting technologies such as automation, Internet of Things, and data analytics, along with addressing environmental concerns, increases complexity. Meanwhile, consumer demand for healthier, sustainable products accelerates innovation.

"I saw many new technologies at the new Grain Innovation Center that I didn't know about, which could be very important for the company I work for in Brazil," says Ricardo Motta, Industrial Director at Viterra, who attended the opening event. "If we want to succeed in a competitive environment, we need to continuously think about innovation, train our personnel, and improve processes. Having an innovation center like the GIC helps us to understand these aspects and bring solutions to where we work – that is, our mills."

Supporting millers where it counts

At the facility, customers can conduct tests on food and animal feed and develop new processes and solutions in various areas, including cleaning, optical sorting, grinding, sifting, mixing, and protein shifting. Additionally, they can work on hygienization and pelleting, as well as dehulling, peeling, and pearling of grains and pulses. Instead of investing in a completely new, large plant, customers can run their tests and develop new processes or products at the GIC, making it a highly cost-effective option.

The Grain Innovation Center is an arena for customers to experiment, innovate, and find concrete solutions to meet their specific needs.



VIDEO

Watch the video about the opening of the Grain Innovation Center.

Around 200 guests from the milling industry came to Uzwil, Switzerland to celebrate the opening of the GIC.

"The center offers an unparalleled environment where customers can develop tailored processes and witness the extensive capabilities of Bühler's diverse portfolio," explains Stefan Birrer, Managing Director Milling Solutions at Bühler. "The GIC is not just a facility, it's a symbol of our commitment to helping customers succeed in an industry that is continuously evolving."

Food trials encompass a variety of raw materials, including cereals, herbs, spices, and pulses. The GIC provides the technology and expertise to conduct trials on local and ancient grains – raw materials that play a vital role in improving food security in many countries. Leveraging Bühler's extensive know-how in processing, the GIC also offers testing for various other commodities, including coffee, nuts, and insects. Additionally, the Application & Training Center caters to non-food bulk solids, such as plastics and absorbers.

Feed trials can be performed with production capacities of up to 5 tonnes per hour, covering the entire production line or individual process steps. "One of the main advantages of the GIC is its ability to provide not only detailed data that enable continuous and precise monitoring of the process but also the physical and chemical properties of the product at every stage of production and under different process conditions," says Lothar Driller, Department Manager, Feed Application Center and Training at Bühler.

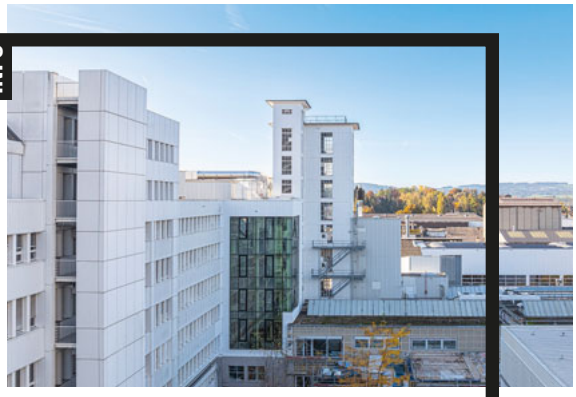
The side streams generated by the GIC, such as wheat bran and rice husks, corn husks, pea hulls, and screenings from cleaning, will feed Bühler's Energy Recovery Center, which provides heating for the company's offices in Uzwil. Customers can also use this center to explore the potential of utilizing side streams through energy recovery, which can lead to the reduction of their carbon footprint, waste, and energy costs.

A playground along entire value chains

The GIC is part of Bühler's Application & Training Center hub, which encompasses the recently launched Flavor Creation Center, Food Creation Center, Protein Application Center, and Energy Recovery Center – and other centers that have been in operation for several years, including the Extrusion Application Center and Pasta Application Center. With this innovation hub, Bühler can provide full, farm-to-fork coverage, encompassing entire protein value chains. Such an environment is unique in the market.

The modernization project also includes Bühler's Milling Academy and the Swiss Institute of Feed Technology (SFT), both of which will be housed in a new structure strategically located next to the GIC to increase synergies. The new Milling Academy and the SFT facility will enable Bühler's teams and customers to adapt and develop the skills needed to keep pace with a rapidly changing and increasingly challenging work environment. It will have classrooms, open learning areas, meeting rooms, a customer service corner, new laboratories, a workshop area, and a larger changing room for customers.

About 1,000 customers and 150 employees were trained in more than 120 training courses offered by the Milling Academy and the Swiss Institute of Feed Technology in 2023. The new training facility is scheduled to be operational by January 2025.



INFO

Grain Innovation Center (GIC)

Uzwil, Switzerland

- The GIC was inaugurated on October 28, 2024.
- The GIC is a multi-purpose application center where customers can conduct tests on food and animal feed, innovate, and improve their processes, to ensure they stay ahead of the latest trends in milling.
- The GIC serves food and animal feed milling customers worldwide.
- The five-story facility spans 2,000 square meters and features state-of-the-art infrastructure along with over 70 pieces of cutting-edge equipment from Bühler and its partners.

The SmartMill journey began less than a decade ago and is today a driver of innovation that is improving yield, product quality, cost efficiencies, and environmental impact for the milling industry. How far are we on this journey and how easy is it to jump aboard?

WEB Find out all about Bühler's SmartMill and download the white paper here.

OVER THE PAST DECADE Industry 4.0 has gone from an obscure term that first appeared at the 2011 Hanover Fair describing the then high-tech strategy of the German government, to shorthand for a digital revolution impacting practically every industrial sector. The milling industry is no exception.

The arrival of sophisticated and affordable sensor technology over 10 years ago, along with vastly improved data storage, faster processing power, and lightening interconnectivity have, in recent years, released a flood of digital innovations across a range of industries. It was around this time that Bühler embarked on the journey toward the SmartMill, a fully autonomous digitalized mill that is both self-optimizing and self-learning. The digital data, algorithms, and cloud processing technology behind the evolution of the SmartMill are today driving the many innovations needed to improve yield, product quality, cost efficiencies, traceability, and sustainability across the milling industry.

Recent examples of these innovations include the Energy Management System, Quality Management System, Machine Condition Monitoring, and Temperature and Vibration Management, offering real-time analysis of roller temperatures during the milling process, which in turn enables automated process stability to maximize efficiency.

Each of these digital innovations make up part of the SmartMill, which is not an end product, but more of a concept made up of hundreds of complementary innovations designed through close collaboration with the industry. The SmartMill is a voyage of discovery for both Bühler and its customers. Designing an autonomous mill requires a granular understanding of the milling process. This is something that can only be achieved if Bühler and its customers share detailed knowledge and experience about every aspect of the milling process.

Fabien Varagnac, an independent milling consultant with over 20 years of experience in the sector, has been watching the industry adapt to digitalization. He is seeing the industry make incremental improvements rather than undergo a massive technological leap. But he is in little doubt of the transformative potential that digitalization and artificial intelligence (AI) offer. "Early adopters of comprehensive digitalization and AI integration will gain a significant competitive advantage. These forward-thinking millers will be able to improve and manage their efficiency but also foster innovation, responding more quickly to market demands, whether in terms of product or in terms of regulation," explains Varagnac. "These innovations mark an essential step towards improving the industry's efficiency and sustainability. Given the low-margin, high-volume nature of milling, every fraction of a percentage in yield, every kilowatt-hour, and every cent matters."

The first step on the SmartMill journey was to install sensors at specific stages of the milling process and use the collected data to understand milling variables in every tiny detail. Once collected, the data could then be structured and visually presented on a dashboard using a laptop, tablet, or smartphone,

SMARTMILL

A TRANSFORMATIVE JOURNEY

TEXT: STUART SPEAR

The SmartMill is a fully autonomous mill that is both self-optimizing and self-learning. Automation and digitalization are the joint enablers that make this possible.

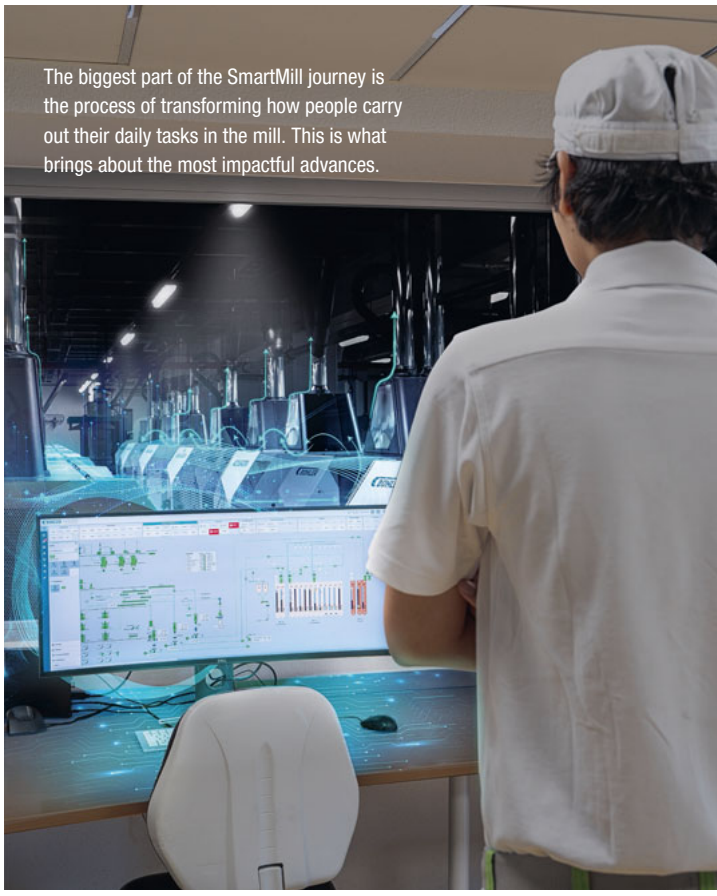
regardless of where the plant operator or manager was located. Algorithms were then used to compare quality and yield relative to production variables and to compare performance over both time and between plants. By providing this comparative data the skilled plant operator could now make informed decisions that improve efficiency.

The competitive advantage of digitalization

Silvan Trunz, Business Development Manager for Automation and Digital at Bühler explains how digitalization has super-charged the research and development process at the company.

"In the past we had to do a lot of research to understand the performance of our machines and how to develop them further. This was very time consuming as we had to collect and work through the figures. Today, we partner with our customers to do this – with their permission, the data is streamed into our algorithms and, by monitoring in real time, we can either instantly adjust a process or advise customers how to improve performance," says Trunz.

As the team collected ever-increasing volumes of data from across the industry, it became possible to predict production outcomes depending on variables like flour moisture content and quality. By understanding outcomes, it was possible to make real-time automated adjustments to production parameters based on the data feeds. Bühler now has a number of prototype solutions on the market capable of making autonomous production decisions that optimize parameters like the grinding gap and flour moisture content. It is not until autonomous processes have been developed for the whole milling process from intake to packing that the holy grail of the SmartMill will have been reached.



The biggest part of the SmartMill journey is the process of transforming how people carry out their daily tasks in the mill. This is what brings about the most impactful advances.

A useful analogy when describing the concept of the SmartMill is the development of the driverless car. Sixty years ago, the car industry introduced cruise control, the first driver-assisted function to make driving easier and safer. Next came semi-automated functions like lane assistance, capable of analyzing driver behavior. Auto-pilot functions were next developed for controlled environments like highways. Each innovation took the car industry a step closer to the fully automated car.

Similarly, the SmartMill has evolved from the data transparency of the digitally connected mill to providing the miller with actionable insights to improve quality and yield. Today, the SmartMill is able to self-regulate some processes without human intervention. The ambition is to create a fully autonomous, self-learning, and self-optimizing mill. Similar to a passenger sitting in a driverless car inputting their desired destination, the miller will set the product characteristics required by their customer and the mill will automatically make adjustments to achieve the desired quality.

But that is still in the future. While a number of the larger mills are embracing the digital revolution, many millers feel no need to change practices that have served them well for generations.

Adopting a more holistic approach

"Despite advances in integrating data management into milling processes our industry still lags behind in fully embracing digitalization. Traditional empirical methods dominate, particularly in generating deeper insights into the quality of wheat, gristing, and flour," explains Varagnac. "For millers to achieve optimal efficiency and sustainability it is crucial to adopt a more holistic approach, leveraging the power of artificial intelligence to connect all aspects of the milling process."

Trunz believes that one of the main obstacles for the industry in its transition is not so much the technology but a satisfaction with the status quo.

"It's a very human reaction: Millers feel that the way they currently do things works. The biggest part of the SmartMill journey is not the development of the technology itself but the process of changing the way that people do their daily jobs," says Trunz. "The challenge for millers is that the development of the SmartMill is not just about doing the things you have done before more efficiently. This might reduce your costs, but the real game changer is the ability to do things differently. This is where the biggest impact is achieved."

One example of how digitalization is transforming milling practices is in machine maintenance. Traditionally, this involves a maintenance schedule and skilled workers listening to and inspecting a machine. Using digitalization, algorithms can now analyze machine performance trends and make recommendations on energy usage, maintenance scheduling, and how best to optimize machine performance. Bühler's Error and Downtime Analysis is a service that interprets and records machine incidents that cause production losses and recognizes patterns and trends. The Bühler Energy Management System

BENEFITS

One of the latest innovations in the SmartMill, Bühler's Temperature and Vibration Management System:

+ optimizes your grinding processes by providing advanced insights;
+ ensures consistent product quality through operational stability;
+ provides automated temperature imbalance detection.

Find out more about Bühler's Temperature and Vibration Management System.

"SMARTMILL IS NOT JUST ABOUT DOING THE THINGS YOU HAVE DONE BEFORE MORE EFFICIENTLY. THE REAL GAME CHANGER IS THE ABILITY TO DO THINGS DIFFERENTLY. THIS IS WHERE THE GREATEST VALUE IS ACHIEVED."

SILVAN TRUNZ
Business Development Manager Automation and Digital, and Head of Sustainability at Bühler Milling Solutions

keeps a close watch on energy consumption with every part of the process monitored and inefficiencies flagged as data is sent to the cloud to interpret a problem and provide a solution.

To better understand why so much energy is going into the development of the SmartMill it is useful to first look at why it is being developed. The primary reason is efficiency. Milling is a highly competitive industry with tight margins that require optimum efficiency. Every plant operator knows they are in control of a highly interdependent process requiring constant adjustments. The advantage of the autonomous mill is that it reacts faster than a human and is informed by a more precise and complete data set that relates to the whole production process rather than just one aspect. It is the speed and accuracy of these adjustments where optimization is best achieved.

The second reason is an industry-wide shortage of skilled millers. As with other manufacturing sectors, young people are less attracted to working in the often-challenging environment of the traditional mill, leaving a skills shortfall. The SmartMill is bridging that skills gap and is providing a more attractive workplace for our next generation of millers.

Finally, the SmartMill is helping to tackle issues related to climate change. The more waste that can be cut from the production process and the fewer resources we use, the lower the cost base and the smaller the industry's environmental footprint. "This is where energy efficiency plays such a big part in the story," explains Trunz. "It means our customers not only reduce their environmental footprint, but also reduce their energy bills. It's all about optimizing resources, whether it's your raw material, manpower, or energy usage."

Joining the SmartMill journey

One advantage of the SmartMill being an incremental journey rather than a revolutionary moment is that customers can join the journey at the point that best benefits their business. While the speed and direction of the journey is up to each company, everyone needs to start from the same point. "Anyone thinking of being part of the journey in the near future should be thinking now about installing sensor technology and the connectivity that offers the necessary production transparency that informs decision making, because this is the foundation of the whole SmartMill process," explains Trunz. But after that it is up to the customer which digital solutions are most appropriate and how fast to adopt the new technologies.

"It's possible to start small," says Trunz. "We start by understanding our customer's situation and how they operate, and who needs what information in the mill. If we see hundreds of pieces of paper lying around, we can find out who is creating the paperwork, who needs it, and start to look at quality assurance and documentation management systems. This is a helpful first step, rather than thinking about the full concept of the SmartMill straight away."

Varagnac believes that digitalization is set to transform the industry. However it will require training for users to adapt to the new technologies. "The future mill will likely be a highly connected ecosystem utilizing weather forecasts and other external data to optimize production and resource use," Varagnac says. "This connectivity will reduce waste, lower costs, and make flour more affordable on a larger scale, reinforcing the miller's role in the global food supply."

The Grain Processing Innovation Center in Kano, Nigeria, is the hub for customers, researchers, and partners to collaborate and innovate. The goal is to harness the full potential of local grains.

UNLEASHING THE POWER OF LOCAL GRAINS

TEXT: BURKHARD BÖNDEL
PHOTOS: SHITTU MUHAMMAD

In a historic move, Bühler, in collaboration with Flour Mills of Nigeria and partners, have inaugurated their state-of-the-art Grain Processing Innovation Center in Kano, Nigeria. The goal of this research and development center is to unleash the potential of local crops on an industrial scale – not only in Nigeria, but across Africa and beyond – and, in so doing, make an important contribution to food security.

ACCORDING TO the Food and Agriculture Organization of the United Nations, around 868 million people in Africa were moderately or severely food insecure in 2022. By tapping into the potential of local grains such as sorghum and millet, Bühler's application center is poised to play a critical role in reversing this trend. The core objective of the Grain Processing Innovation Center (GPIC) is to elevate the industrial processing of local grains to new heights, thereby contributing to affordable and nutritious food supplies. "Sustainable food value chains utilizing local grains are the number one priority to develop Africa," says Johannes Wick, CEO of Bühler's Grains & Food business.

The importance of this endeavor cannot be overstated for a continent that is significantly dependent on imported grains like wheat and rice, which makes it vulnerable to trade disruptions and foreign exchange rate fluctuations.

John Coumantaros, Chairman of the Board of Flour Mills of Nigeria, envisions a future where local grains and pulses are processed to foster food self-sufficiency. "The application center is well positioned to sustainably develop local grains, create business opportunities, and provide viable alternatives to some imported raw materials used in production," Coumantaros explains.

Harnessing the potential of local grains

Local grains, including sorghum, millet, maize, and soybeans, offer immense advantages, making them ideal candidates for large-scale processing in Africa. These grains are not only rich in nutrients, vitamins, minerals, and proteins, but are also climate-resilient, capable of withstanding high temperatures and arid conditions. They require less fertilizer and pesticide compared to other grains, making them a sustainable choice in the face of accelerating climate change.

"With these characteristics, local grains are ideal plants to be cultivated in Africa," explains Thomas Ogundiran, Country Manager of Bühler Nigeria.

However, harnessing the potential of these local grains comes with challenges. Factors such as low farming volumes, short shelf life, and a lack of process knowledge and industrial equipment have historically hindered their integration into large-scale food processing. The last of these is exactly what the GPIC is set up to address.

A hub for innovation and collaboration

The GPIC is a vast three-floor facility which spans 480 square meters, equipped with pilot-scale production facilities, research and development labs, and classrooms. The heart of the plant is Bühler's high-compression AlPesa grinding system, which is designed to process a variety of local crops, including beans, nuts, and seeds. This center provides a collaborative environment where customers, researchers, and partners can explore cost-efficient food processing solutions for local grains.

In collaboration with Bühler's African Milling School in Nairobi, Kenya, the GPIC also offers a range of training and education courses focused on local grains and their specific requirements in cultivation and processing. Bühler's network of Application & Training Centers in 26 locations worldwide ensures that best practices and cutting-edge technologies are shared and implemented around the globe.

The center is designed not just to innovate but to scale these innovations to make a tangible impact on food security. Initial trials with customers have already been agreed upon, showcasing the immediate applicability and relevance of the center's work.

Addressing a multifaceted challenge

The opening of the GPIC comes at a critical time. Many regions in Africa are strong importers of grains, leaving them susceptible to external shocks. "Local grains offer many opportunities, not only to increase food security but also to generate new jobs in agriculture and adjacent markets, as well as enabling countries to become more independent from imports," says Ogundiran.

The ambition is to help create a more sustainable food system that not only meets current demands but is resilient in the face of future challenges. Transforming the food supply chain in Africa is no small challenge. "This requires concerted efforts across numerous sectors, including agriculture, processing, recipe development, end-product innovation, and consumer engagement," says Coumantaros.

The GPIC aims to be a catalyst for this systemic change, ensuring more Africans have access to affordable and healthy food, thereby reducing hunger and malnutrition. "Together with our partners, we at Bühler are happy to now contribute to this system change," says Wick.

Bühler's commitment extends beyond the immediate context of Nigeria or even Africa. The lessons learned and technologies developed at the GPIC have the potential to transform global efforts to improve food security. With its presence in 140 countries, Bühler is uniquely positioned to scale innovations and adapt them to different regional contexts.

Dr. Komla Bissi, a senior adviser on agriculture, trade, and value chains to the Secretariat of the African Continental Free Trade Area, encapsulates the broader vision. "We must enhance our domestic production so that we can feed ourselves. The current import bill for food into Africa is many billions of US dollars a year – money we have to borrow," he says. The efforts at the GPIC align perfectly with this vision, enhancing not just food production but processing and value addition within Africa.

Engaging the private sector, as Dr. Bissi points out, is crucial for catalyzing development along the food value chain. The GPIC exemplifies how public-private partnerships can yield significant benefits, both economically and socially.

"The world should be able to feed itself, but we need to work together. There is hope and there are opportunities," Dr. Bissi says.

Abubakar Kyari, the Honorary Minister of Agriculture and Food Security of Nigeria, cuts the ribbon during the opening ceremony. On his left is John Coumantaros, Chairman of the Board of Flour Mills of Nigeria. On his right is Johannes Wick, CEO Grains & Food at Bühler.

"THE WORLD SHOULD BE ABLE TO FEED ITSELF, BUT WE NEED TO WORK TOGETHER. THERE IS HOPE AND THERE ARE OPPORTUNITIES."

DR. KOMLA BISSI
Senior adviser on agriculture, trade, and value chains to the Secretariat of the African Continental Free Trade Area

The GPIC will take the industrial processing of local grains and crops to the next level, contributing to affordable and nutritious food supplies.

The lessons learned and technologies developed at the GPIC have the potential to transform global efforts to improve food security.

THE INVISIBLE BACKBONE

TEXT: ELPINIKI MOUZA

In industrial food and feed processing, the role of advanced weighing and dosing systems is of profound importance. Precise and accurate weighing and dosing of raw materials and products throughout the processing chain enable maximum yield and enhance the efficiency of machinery. From intake to final packing of goods, Bühler's solutions for weighing and dosing offer critical transparency and quality at every stage, tangibly impacting customers' financial and sustainability targets.

GRAIN PROCESSORS and food and feed producers around the world are bound by the same challenges. Variations in raw material characteristics affect the bulk density and flow properties of grains, posing a significant challenge to processing. This can ultimately lead to inconsistencies in the finished product if these challenges are not actively addressed, and any deviation will directly impact yield and affect the bottom line. Advanced weighing and dosing systems are the key in turning these challenges into business opportunities. By continuously optimizing processes and adjusting to variations of the raw material characteristics, these state-of-the-art solutions enhance product uniformity, reduce waste, and improve overall productivity, not least by harnessing the power of digitalization and artificial intelligence.

"Our portfolio of weighing and dosing solutions is unmatched when it comes to precision and accuracy along the entire process chain. The batch scale and loss-in-weight scale technologies with accuracies

With the Akrivis batch scale, customers can save thousands of kilowatt hours per year, leading to savings of several thousand Swiss francs per scale.

down to +/- 0.1% and +/- 0.2% respectively offer performance that no other provider has been able to replicate," says Raimo Weber, Product Manager Weighing & Dosing at Bühler. "Our dosing systems ensure the exact desired quantity travels into the next processing steps thanks to their uniquely high and repeatable accuracies of down to +/- 1%."

A prerequisite for safe food and feed

Adhering to the highest food and feed safety standards is crucial in food production. Manufacturers therefore place a particularly high priority on designing safe and hygienic machines that not only make operation safe, but also keep the product free from contamination. At Bühler, guaranteeing these design principles is essential at every stage of the process.

"We design our advanced weighing and dosing systems with materials certified for food contact and easy-to-clean structures. In the 146 years that we've been developing solutions for weighing and dosing, we've incorporated every learning in close collaboration with our customers to take our food and feed safety game to the next level," says Weber.

"We're constantly exchanging ideas and learnings with our colleagues working on solutions up and down the food processing value chain at Bühler – from intake to storage to sorting or milling, to name just a few. By applying hygienic design principles to our weighing and dosing systems, we not only prevent food contamination but also simplify the cleaning process – which in turn increases overall production efficiency," he adds.

Supply chain disruptions, conflicts, and inflation have dramatically driven up energy prices in many regions, once again putting energy efficiency in the spotlight. Thanks to its sustainability targets of having solutions ready to multiply by 2025 that reduce energy, waste, and water by 50 percent in its customers' value chains, Bühler is well-prepared to provide solutions that deliver on a key pain point for many customers these days. "We always put ourselves in our customers' shoes and proactively tackle their challenges head on. We're bound by our sustainability targets to constantly improve our solutions, and our weighing and dosing portfolio is testament to our innovation power," says Weber.

The batch scale Akrivis is a prime example of the direct impact an innovative technology can have on a producer's bottom line.

Many operations run 24/7 for most of the year. By installing the Akrivis batch scale from Bühler, customers can reduce their energy consumption by thousands of kilowatt hours per year. At today's energy prices, this quickly amounts to an annual saving of a few thousand Swiss francs – per scale. It has also been shown that up to 99 percent of energy costs can be saved thanks to the DriveX module.

The work towards more sustainable and efficient solutions does not stop here. "We set ourselves very ambitious sustainability targets and always look at the entire value chain for improvements. By reducing steel consumption in our portfolio through round shapes, a stiffer structure, and the ability to use thinner sheet metal, we will be able to save almost 200 tonnes of CO_2e per year," explains Weber. If you add to this the savings that we achieve in operation thanks to electric drives – which amount to approximately 250 tonnes of CO_2e per year, we save the equivalent of 6,000 flights around the world."

Turning data into actionable insights

In today's competitive landscape, collecting and processing accurate, real-time data and translating it into actionable insights is key. Manufacturers sometimes struggle with collecting the right data from their processes, which can hinder their ability to optimize process operations effectively. This lack of transparency can result in inefficient resource utilization, ultimately affecting profitability.

For many years, Bühler's cloud-based solution Bühler Insights has been revolutionizing the way the company's customers gather, interpret, and put data into action. "Our entire portfolio for weighing and dosing is built around self-optimization. It collects and analyzes important processing data and continuously increases efficiency," says Gernot Stoerr, Head of Product Management at Bühler Milling Solutions. "These actions range from predictive maintenance to prevent future downtimes all the way to smart interpretations, for example of mass flow or inlet and outlet gate positions, to ensure a maximum yield on raw materials."

Fine margins make the difference

Bühler's range of solutions for weighing and dosing is the result of many years of innovation, partnering with customers, and anticipating the next megatrend before it becomes mainstream.

Today, customers benefit from a full value chain approach that extends far beyond the actual process of weighing and dosing. This includes getting the necessary certifications, full process transparency in case of an audit by food safety regulators, and last but not least, harnessing the power of digitalization and artificial intelligence (AI) to reduce waste, increase efficiency, and improve the bottom line.

"In essence, our weighing and dosing portfolio is a microcosm of what Bühler is all about. We never stand still, we innovate together with our customers, and we ensure they remain on top of their game by always being close to them and putting ourselves in their shoes," says Weber.

With its complete portfolio of weighing and dosing solutions Bühler meets all requirements from high-end to entry-level. When you add to this the drive of Weber and his colleagues to remain best-in-class through product innovation and harnessing the power of digitalization, you have a winning combination that enables customers to meet their needs today and the future.

"IN THE 146 YEARS THAT WE'VE BEEN DEVELOPING SOLUTIONS FOR WEIGHING AND DOSING, WE'VE INCORPORATED EVERY LEARNING IN CLOSE COLLABORATION WITH OUR CUSTOMERS TO TAKE FOOD AND FEED SAFETY TO THE NEXT LEVEL."

RAIMO WEBER
Product Manager Weighing & Dosing at Bühler

King Milling has never been afraid of stepping out and adapting new milling technologies to improve their operations. Their latest "D" mill is a testament to a generations-old philosophy that has guided them for over 100 years. Packed with the latest technologies from Bühler, King's new mill is a clear investment in their own growth and sustainability, as well as that of their customers.

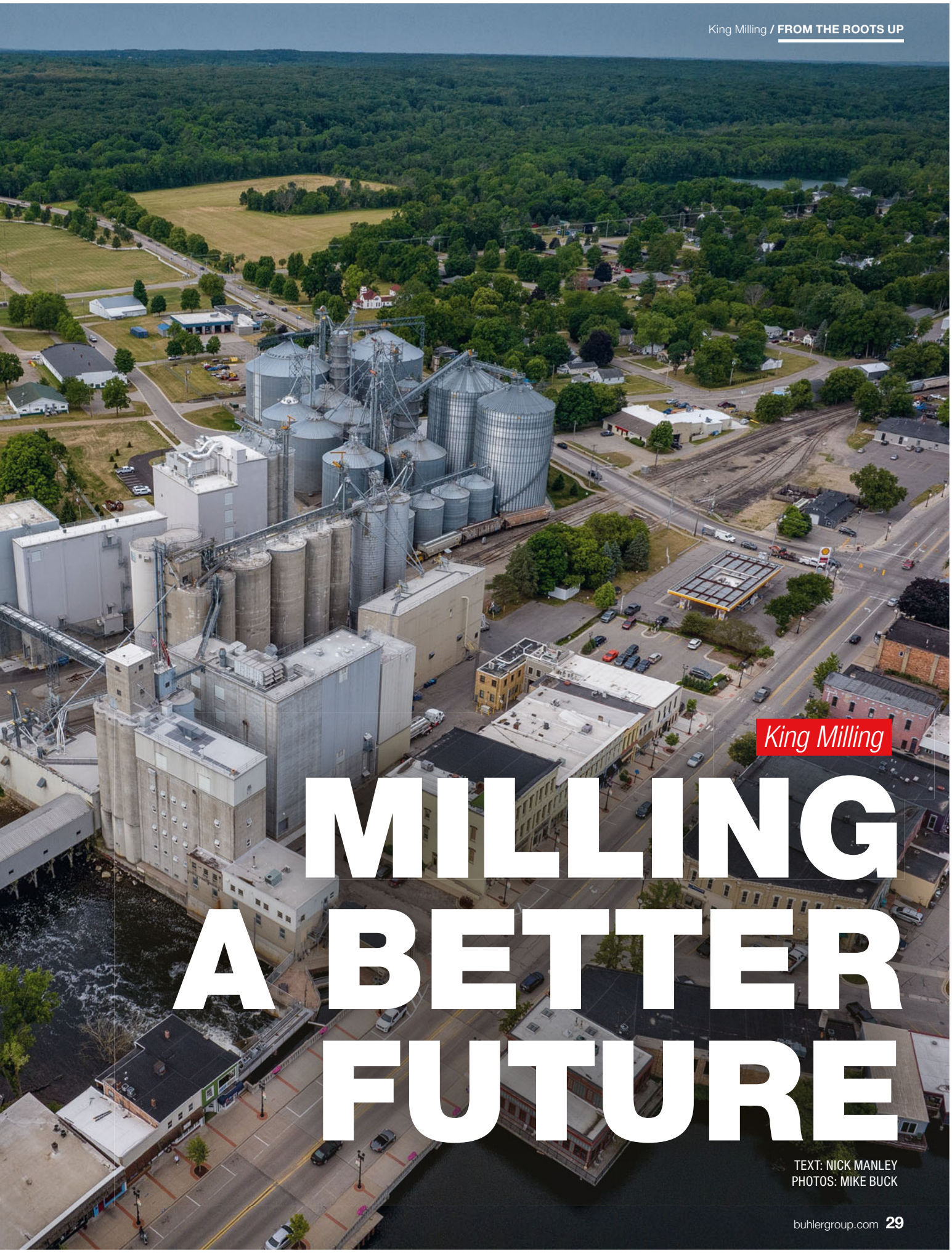
IF YOU CLOSED YOUR EYES and imagined the quintessential small, midwestern US town, chances are very good that what you would see in your mind's eye is almost exactly what you would see when you enter Lowell, Michigan: A main street lined with historic late 19th century buildings, small businesses bustling with townspeople, all nestled into the vast expanses of surrounding farmlands.

In this quaint setting at the confluence of the Flat and Grand Rivers and in the middle of this picturesque town, King Milling Company rises as a beacon of both tradition and modernity. With a history spanning over 134 years and five generations of the Doyle family ownership, this business has kept its roots firmly planted while propelling itself into the future with pioneering technologies and a steadfast commitment to sustainability. This duality of honoring the past and embracing the future is something that defines King Milling.

A rich history

King Milling's journey began over a century ago, marking its inception in a period when the milling industry was largely manual and driven by water-power – a technology that still powers portions of its "A" mill. Throughout its history, the company has witnessed and adapted to the seismic shifts in milling technology. "King Milling Company has a long history of employing the latest milling technologies. We were one of the first mills to use pneumatics back in the late 1950s. Then in the 1980s, we were again one of the first to be fully automated, using PLCs (programmable logic controllers) to control the mill," Jim Doyle, Executive Vice Chairman of King Milling Company says. "We were also one of the first, if not the first, to use color sorters in the milling process. Here in our new mill, we are using the absolute latest technologies from Bühler for cleaning, optical sorting, and weighing and dosing among others."

King Milling stands tall as a symbol of innovation and heritage at the center of Lowell, Michigan.



King Milling

MILLING A BETTER FUTURE

TEXT: NICK MANLEY
PHOTOS: MIKE BUCK

Indeed, a particularly defining characteristic of King Milling is their ability to blend this rich history with cutting-edge innovation. The company's dedication to quality and technological advancement has positioned it as a key player in a highly competitive industry.

Gearing up for growth

King Milling processes several different wheat classes. The site produces products from soft white, soft red, hard red winter, and hard red spring wheats for a wide variety of customers, ranging from flours for cereal producers and bakers to grains for brewers and distillers. However, even running 24 hours a day, seven days a week King Milling still found themselves having to say "no" to existing customers who wanted more of their high-quality products, and new customers that were now knocking on their door. "We simply needed more capacity to produce flour," says Jim Doyle.

King Milling and Bühler have enjoyed a long and productive relationship, dating back to the 1960s, around the time that Bühler first established a North American presence. What started with a few machines back then developed into a trusted partnership that gave the Doyles the confidence that Bühler could help them to meet their growing need for greater capacity. Having built King Milling's "B" mill, Bühler, led by Sales Account Manager for Wheat and Rye Hendrik Weichelt got the task of building the company's latest "D" mill. Weichelt is always up for an exciting challenge, and this new mill presented plenty.

"King Milling has a unique location," Weichelt explains. "They are located in the center of town, and it's important to them to be good neighbors to the community. We also had the existing mill structures to deal with. So, the footprint we had to work within was the biggest challenge."

Collaboration between the two teams was the key to overcoming this. From the very start, King Milling was heavily involved in the planning of the new mill. With a bit of creativity, they were able to squeeze the new mill into the existing location with room for future expansion. The addition of the new mill increased King Milling's capacity by 406 tonnes to a total of 1,270 tonnes per day.

Consistency and reliability

Quality is a deliverable for King Milling. Over the lifespan of the company, they've built a reputation for providing a high-quality, nutritious product. This doesn't necessarily make them unique in the milling industry, but if one of your calling cards is being able to consistently and reliably deliver on that

"QUALITY HAS TO BE INGRAINED IN OUR MINDSET. THE EFFICIENT OPERATIONS OF OUR FACILITY GIVE OUR ENTIRE TEAM THE TIME THAT THEY NEED TO DEDICATE TO THE QUALITY OF OUR PRODUCT."

REGAN DOYLE
Vice President of Operations at King Milling

Patrick Doyle, President at King Milling and Hendrik Weichelt, Sales Account Manager for Wheat & Rye at Bühler.

promise of high quality, then it needs to be a central tenet of your operations. And with King Milling it certainly is. Regan Doyle, King Milling's Vice President of Operations, ties quality directly to efficiency. "Quality has to be ingrained in our mindset through everything we do here. And the efficient operations of our facility give our entire team the time that they need to dedicate to the quality of our product," Doyle says.

A commitment to sustainability

To help reach that level of efficiency, King Milling installed the latest portfolio of weighing and dosing scales and flow balancers. This new line is making its mark in the industry for precision, quality, and – key for King Milling – energy efficiency. For example, the Akrivis batch scale employed at King Milling can deliver accuracy to ±0.1 percent while reducing power usage up to 99 percent with its DriveX modules and integrated power management systems – an important benefit for a mill that is laser-focused on sustainability.

Sustainability is woven into the fabric of the company's operations. Even before sustainability became a global imperative, the company was pioneering green practices. "Our philosophy as a company is to try to always do things the right way. We've been trying to do things the right way from the beginning. We always like to say that we were green before green was popular," says Patrick Doyle, President at King Milling. In fact, they still use water power from the Flat River to run portions of their "A" mill.

The new mill contains some thoughtful design features that help the company make progress on their sustainability journey. For starters, the mill is fully insulated, helping to regulate the temperature inside. Additionally, they worked with Bühler engineers to design and install an Air Make-up Unit (AMU) that takes warmed process air from inside the mill to help heat the incoming fresh air, significantly lowering their energy usage in the colder months. "The AMU is a big improvement in energy efficiency over what we have in the other mills," Patrick Doyle says.

King Milling's approach to sustainability is multifaceted, encompassing everything from energy efficiency to community stewardship. Over the past 3 years, they have collaborated with Bühler's Environmental Impact Service (EIS) to quantify and mitigate their carbon footprint. Each year the company met with the EIS team to work on gathering and quantifying data around King Milling's sustainability initiatives. This work resulted in a plan on how King Milling can move forward with their plans and set new Scope 1 and 2 emissions targets for

The new "D" mill employs Bühler's latest weighing and dosing technologies, including the precise and energy-efficient Akrivis batch scale.

coming years. As defined by the Greenhouse Gas Protocol, Scope 1 emissions are direct emissions from sources owned or controlled by a company, and Scope 2 emissions are indirect emissions from purchased electricity, steam, heat, and cooling.

And as it turns out, King Milling has been making all the right moves. "Working with the EIS team, we found that there were no substantial areas for improvement," says Tiffani Hauck, Director of Regulatory Compliance and Sustainability at King Milling. "Having the data really confirms that what we're doing here is the right thing."

For Hauck, using the EIS has given King Milling direction on where they can focus next and look at options and opportunities for improvement. For instance, when it comes to energy use, King Milling is now partnering with Lowell Light and Power, the local energy supplier, to see what options there are for them to use more green energy. "It's really about understanding the possibilities," explains Hauck. "The results of this collaboration act as a guide to help identify where we emit more carbon and how we might address the issues."

"Sustainability is a key topic in business performance," says Jay O'Nien, Environmental Impact Services Lead at Bühler. "Companies are finding they must quantify and understand their environmental footprint to guide investment decisions, support customer requests, and report key figures to their stakeholders. The milling industry plays a key role in reducing the environmental footprint of products we consume every day, and King Milling has been very proactive and effective in their approach."

Inspiring confidence for the future

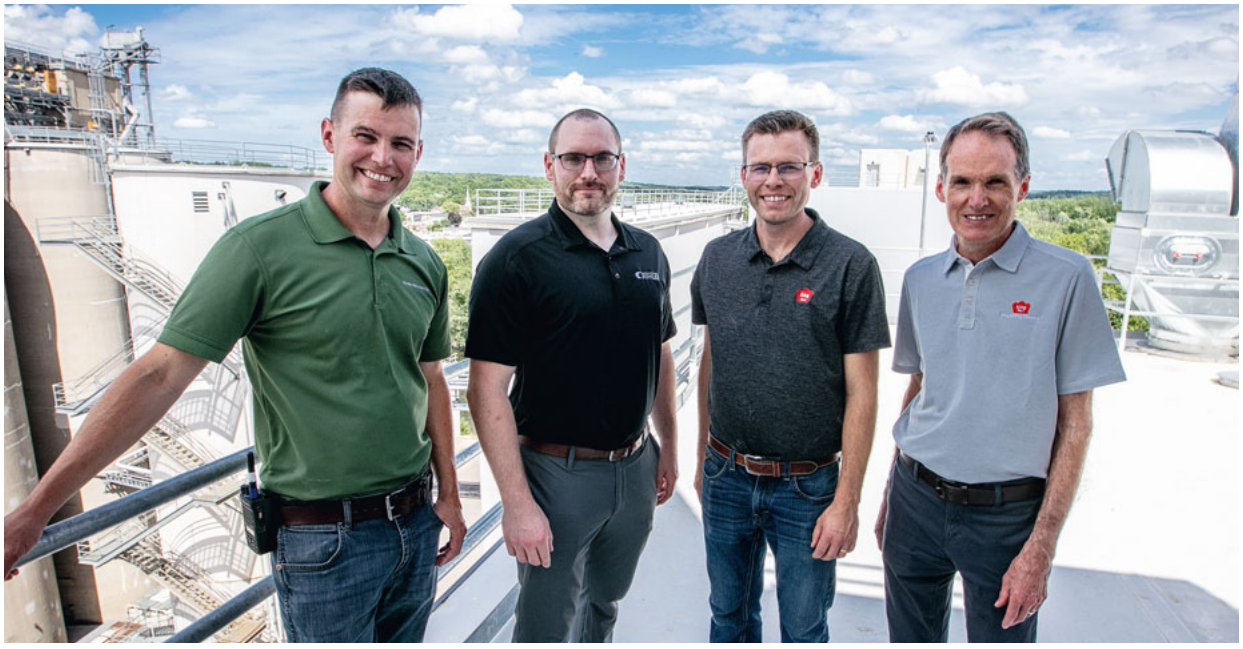
The company's sustainability programs extend beyond technology to human capital and community outreach. They maintain a stormwater program to protect the adjacent river, reflecting their commitment to environmental stewardship. "It's important that even though I'm the sustainability director here, the whole staff is very much aware of the part that they play when it comes to sustainability and making sure that we're keeping such things as the river clean, our drains clean, and being conscious of the waste we do produce and that it's dealt with properly," says Hauck.

The idea of doing the right thing is one that is repeated frequently when talking to the King Milling team. Whether it's the company, their customers, their community, or the environment, doing the right thing has, and will continue to drive King Milling's success. With this commitment and an unyielding focus on quality, innovation, and sustainability, they are poised for a bright future.

VIDEO

Watch this video to learn more about how Bühler supports King Milling.

The King Milling and Bühler team takes in the view from the top of the "D" mill silos. Left to right: Patrick Doyle, Hendrik Weichelt, Regan Doyle, and Jim Doyle.



"OUR PHILOSOPHY AS A COMPANY IS TO TRY TO ALWAYS DO THINGS THE RIGHT WAY. WE ALWAYS LIKE TO SAY THAT WE WERE GREEN BEFORE GREEN WAS POPULAR."

PATRICK DOYLE
President at King Milling

Patrick Doyle and Hendrik Weichelt discuss the performance of the new mill's SORTEX H optical sorter, which plays a key role in the grain cleaning process.

INFO

king flour
KING MILLING COMPANY

King Milling Company

Lowell, Michigan, US

Founded in 1890.

King Milling produces products from soft white, soft red, hard red winter, and hard red spring wheats.

The company supplies flour to a wide range of food producers, as well as whole grains to brewers and distillers.

King Milling has multiple mills equipped with Bühler wheat milling solutions. In their newest mill, they are employing the latest cleaning and weighing and dosing technologies available.

Szatmári Milling Company

ON THE PULSE *WITH MAIZE*

TEXT: PETERJON CRESSWELL
PHOTOS: JEKATERINA GLUZMAN

The most advanced maize mill in Central Europe stands in Karcag, a county town on the western edge of the Great Hungarian Plain. This rural community has long been home to milling. Today, its owner Szatmári Milling Company is looking to the future thanks to state-of-the-art Bühler solutions. Recently installed equipment helps the business meet the growing demand for maize grits and flour while addressing processing challenges caused in part by climate change.

The Karcag maize mill in eastern Hungary is one of six mills owned by Szatmári Group, all of which operate with Bühler equipment.

ON THE FIRST FLOOR of the five-story maize mill in Karcag in eastern Hungary, Maize Mill Manager József Svec and Miller Imre Szabó are looking at screens in the control room and exchanging satisfied nods of approval. Locally sourced maize is being processed to the exact specifications required for another new customer that the company has acquired. Like many of these, this new customer is also attracted by the gluten-free properties of maize flour.

Thirty years ago, as teenagers, Svec and Szabó both started out in this same building. Like generations before them, they rose through the ranks. Today, they stand at the top of their profession and at the cutting edge of Hungary's milling industry.

Reducing energy, increasing flexibility

The Karcag mill is one of six mills owned by the multifaceted, nationwide Szatmári Group, all of which operate with Bühler equipment. In this long-established relationship, the target is always a moving one. The latest addition to the Karcag complex, the maize mill was first fitted out with Bühler machinery in 2019. Then in March 2023, two Pulsroll hullers – the first of their kind operating in this part of Europe – were installed.

They not only degerminate maize more smoothly and precisely, they also use up to 40 percent less energy compared to traditional degerminators. With 120 tonnes of maize to process every 24 hours, and with energy prices affected by the situation in neighboring Ukraine, these margins matter.

But energy is only one aspect in the decision to upgrade the technology. The machinery enables Svec to optimize the grinding process according to the quality of the raw maize, hard or soft, and to the exact fat content required by the customer.

"In Hungary, we prefer hard maize kernels, but typically we receive the softer variety. The benefit of the new machines is that the processing is much gentler," says Svec, a graduate of food engineering at Budapest's prestigious Corvinus University.

This is the first time the Pulsroll huller has been used in Europe for maize. Using a solution developed for hulling pulses to degerminate maize may be new to Europe, however it is a well-established approach in Africa, where producers also confront the problem that maize is getting softer.

"With maize kernels getting softer, debranning and degerminating is becoming more challenging. Our Pulsroll huller allows you to gently remove the outer layer and gently remove the germ in pieces or whole," explains Tino Boehm, Head of Market Segment Maize at Bühler. "This enables our customers to achieve the same or similar product specifications while increasing yield. At the Szatmári mill we have proven that this approach works."

The process is not only gentle but flexible. As the maize kernels travel through the Pulsroll, the friction of the kernels on each other, on the sieve basket, and on the stones debrans and degerminates them. The granulation of the stones as well as the size of the openings of the sieve can be changed according to the result being targeted. The Pulsroll is unique in

"THERE HAS BEEN VERY CLOSE COLLABORATION WITH THE SZATMÁRI GROUP FOR DECADES. THEY TRUST US TO DELIVER THE MACHINERY THEY NEED AND PROVIDE EXPERT TECHNICAL SUPPORT AFTERWARDS."

ANTJE GERMAN
Area Sales Manager at Bühler Budapest

Miller Imre Szabó checks the Pulsroll hullers. They degerminate the maize more smoothly and precisely.

VIDEO

Watch this video to learn more about the collaboration between Szatmári Group and Bühler.

Maize is processed to the exact specifications required by the Szatmári Group's customers.

"WHAT WE HAVE HERE IN KARCAG IS THE MOST STATE-OF-THE-ART MILL IN CENTRAL EUROPE. WITH THIS TECHNICAL SUPERIORITY, WE ARE READY FOR THE FUTURE."

ISTVÁN KÖKÉNY
Managing Director, Szatmári Group

that the back pressure on the outlet gate can be controlled to prolong or shorten retention time of the grain in the machine. The clearance between the sieve basket and the stones can also be adjusted, as well as the brake bars.

"We have extensive expertise in processing maize. We also have a deep understanding of the unique market requirements of our customers. We know that these can differ even within countries," says Boehm. "In order to select the right solution for each customer, we have a lengthy exchange with them about the quality of the maize they are processing and their target markets. Then we tailor the right solution for them to maximize quality and extraction."

Steeped in tradition

The investment in maize processing builds on a long tradition in milling in the region – one that began with wheat. In the Habsburg era, 125 years ago, Hungary was the world's largest exporter of wheat flour after the United States. Thanks to an extensive rail network across the vast Austro-Hungarian Empire, the flour made in sophisticated roller mills in Hungary's capital, Budapest, could be dispatched across Europe by train, and beyond by ship.

A track still runs by the Karcag complex today. Walk around the factory courtyard and birdsong will be broken by the familiar jingle played at Hungarian train stations before every announcement. The many local millers who ground by stone – as evidenced by a 160-year-old windmill still standing in Karcag – could also transport their goods easily.

These days, a fleet of trucks in the signature yellow and blue livery of the Szatmári Group dispatches the maize flour and maize meal from Karcag across the country and over borders. In the loading bay, where a large sign proclaims "Folyamatos fejlődés és minőség" (continual development and quality), sacks piled high carry labels outlining the nuances of difference in the maize flour within them. As well as being an important ingredient for animal feed, demand for maize for human consumption has been growing, partly driven by the fact that it is a naturally gluten-free grain. Karcag's move into maize in 2019 was motivated partly by this and also by a desire for further diversification.

"Wheat was traditionally the main profile of our company," says István Kökény, Managing Director of Kunság region milling under the broad Szatmári umbrella and an expert in agrarian economics. "We're the market leader in the milling industry in Hungary. We have always and will continue to diversify. Maize is important from two points of view. There is increasing demand for gluten-free products for public health, and maize is Hungary's biggest crop produced by area. If I multiply the area by crop average, that comes to 7-8 million tonnes a year, of which only about 4.5 million tonnes are needed for internal use. This definitely gives us a great opportunity."

Two hours' drive west of Karcag, Budapest is a buzzing metropolis of 2 million people. As Hungary's capital springs back from the pandemic, demands of restaurateurs, bakers, and confectioners are constantly rising, and the majority of their businesses carry gluten-free dishes or products.

While agriculture accounted for only around 3.2 percent of Hungary's GDP in 2022, half of its territory is given over to arable land. Hungary is self-sufficient and, as Kökény correctly posits, yields almost twice as much maize as locals consume. The service industry may now dominate the national economic landscape, and many of Karcag's smaller mills can now only be seen in sepia photographs in

Karcag's Museum of Mill History, but milling is still a main source of income in the region. The Szatmári Group's milling operation was largely developed by Kökény's predecessor, Attila Tóth-Kása, who was Managing Director and Technical Director of the milling operation for many years. "Our colleague Attila Tóth-Kása developed the relationship with Bühler," says Kökény. "From around 2005 on, pretty much every 2 years a new mill was built. Most of what is currently working elsewhere around Hungary is otherwise the product of an earlier generation, 20-30 years old."

As Szatmári acquired more mills, Tóth-Kása, keen on keeping ahead of the now leaner competition, had the firm install Bühler equipment. The first was the flour mill at Törökszentmiklós, under Kunság Mills, in 1997. After Kunság became part of the Szatmári Group, flour mills fitted out with Bühler machinery were established in Jászberény, Veszprém, and Szeged.

"There has been very close collaboration with the Szatmári Group for decades," says Antje German, Area Sales Manager at Bühler. She worked closely with Tóth-Kása during this time, seeing the Szatmári brand expand, taking more companies under its wing. "They trust us to deliver the kind of machinery they need and then provide expert technical support afterwards," she says.

The Karcag mill was acquired in 2018. The reopening of the plant in 2019 as a maize mill warranted a visit from the then Hungarian Minister for Agriculture and former mayor of Karcag, Sándor Fazekas, who was delighted to announce the creation of 25 new jobs. With the decision made to focus on maize, Tóth-Kása turned to Bühler for its key equipment, including the separator machine, roller mill, automatic flow balancer, and automatic hopper scale. These were fitted by the Szatmári engineers under the supervision of the Bühler specialists working with them on site for several months.

Dealing with the changing climate

Even in the relatively short time since former mayor Fazekas was meeting and greeting in Karcag, a new challenge has come to the fore. "Climate change now has a significant impact on maize in the region," Svec explains.

Warmer temperatures see a rise in mycotoxins. These are naturally occurring by-products of the metabolism of molds on grain and pose a serious health hazard. As mold thrives in warm, humid conditions, mycotoxins are becoming a greater challenge. "When the incoming delivery is still in the vehicle, we take a sample and test everything rigorously," says Svec. This is taken care of by his colleague Gréta Kerekes, who carries out the controls in the laboratory on the same floor. "Quality control and precision checks are vital. There can be no room for cross-contamination," Svec explains.

Kerekes also tests for moisture, another factor in a changing climate. By contrast, the autumn of 2023 was wet, with fears in Budapest of the Danube flooding its banks. "This increased the amount of moisture in the maize we received. With energy prices increasing, farmers have been looking to harvest maize without having to dry it first," says Svec.

"The precision of the Pulsroll machines gives us a leading edge," says Kökény. "With Bühler equipment we can handle both hard and soft raw material and get good yields. What we have in Karcag is the most state-of-the-art mill in Central Europe. With this technical superiority, we are ready for the future."

INFO

Szatmári Group

Karcag, Hungary

- Szatmári Group's Karcag Mill has been in operation since 2018.
- The Karcag Mill processes 120 tonnes of maize every 24 hours.
- The company supplies customers in Hungary and abroad.
- Szatmári Group's maize mill in Karcag uses Bühler technology including the Destoner MTSD, Huller Pulsroll® DRHG, Roller Mill Diorit MDDY, Purifier Puromat MQRF, Gravit separator MTLC, Plansifter Arenit MPAW-6, Batch Scale MSDM, and WinCos plant control system.

Attila Tóth-Kása
*1964 – †2024

We are very sorry to learn of the passing of Attila Tóth-Kása. He has been a great friend over many decades. He will be much missed.

SPOTLIGHT ON
GRAINS & FOOD

Our expertise in food and feed processing is based on over 160 years of experience combined with close collaboration with customers around the world. Discover how our drive for innovation and our customer proximity enable us to stay ahead of the curve and deliver best-in-class solutions and services.

Santiago, Philippines

BUILDING A FEED MILL IN RECORD TIME

The successful installation of a feed mill for San Miguel in the Philippines is an impressive example of outstanding teamwork under extreme conditions. With a capacity of 60 tonnes per hour, the expansion of the existing plant is designed to meet the increasing demand for high quality animal feed in the country. The diverse team consisting of seasoned Bühler experts and local partners overcame many challenges to make sure the installation was completed on time. The difficult weather conditions, characterized by high temperatures, extreme humidity, and heavy thunderstorms, necessitated careful planning and execution of the installation process. During the project, at the customer's request, the schedule was compressed so that production of the feed pellets could begin earlier. Without compromising on safety and quality, the teams worked tirelessly and benefited from the many years of experience that the Bühler experts have acquired in projects around the world. As a result, San Miguel was able to start operating the feed mill on time and in so doing, put in place another piece of the puzzle to provide a variety of safe and healthy feed and food to the Philippines.

The installation team overcame numerous challenges to complete the feed mill on time.

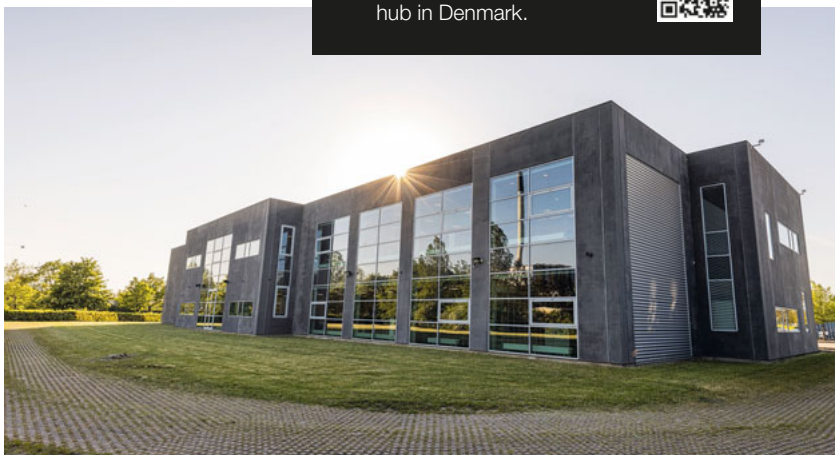
Copenhagen, Denmark

A PLACE FOR SWEET INVENTIONS AND SUPERIOR SERVICE

Bühler has relocated its Biscuit Business Unit and Nordics Services & Sales organization to Copenhagen. This strategic move marks an impressive milestone in the company's journey, creating a powerhouse in the Nordics and laying the foundation for advancing its biscuit business globally. "The full integration of the biscuit business into Bühler Group's portfolio enhances customer access to a broader range of solutions," says Morten Riisager, Managing Director of Bühler Denmark and Head of Business Unit Biscuit. For Bühler's Nordic customers, this move translates into a simpler, more powerful local organization. The Biscuit Application & Training Center, strategically positioned opposite the new office, offers customers an exceptional venue to innovate and refine processes and products.

VIDEO

Watch the video to learn more about the new hub in Denmark.



Customers will soon be able to run trials in the modernized Biscuit Application & Training Center located near the main office.

Jaipur, India

RAPID EXPANSION INTO NEW MARKETS

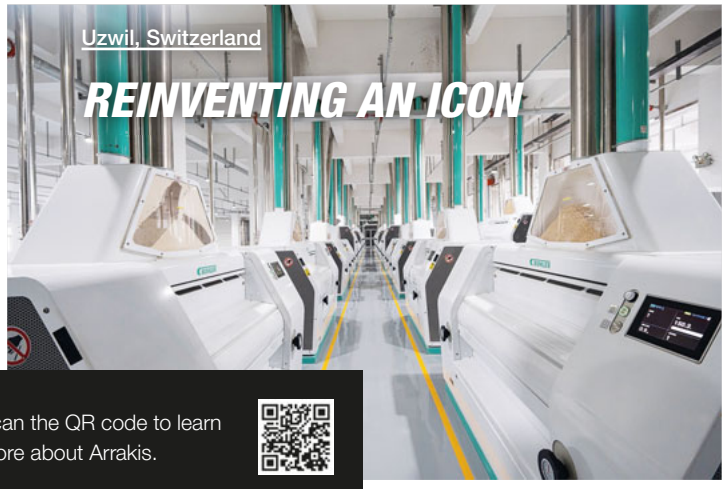
Bühler's partnership with the Kanha Group has revolutionized the Indian company's entire value chain. The Kanha Group was established in 2008 to provide healthy and safe food for the people of Jaipur in India. Today, they operate nine retail outlets, selling bakery products, namkeen (salty snacks), and other snacks. To enter the B2B and B2C markets and meet their in-house needs, the company sought a partner who can offer solutions along the entire value chain – from wheat intake to flour milling and cookie production lines. They opted for Bühler's flour milling solutions to provide flour for making breads, rusks, and cookies, as well as a besan plant that produces chickpea flour for the variety of namkeens and sweets they make. Recently, the Kanha Group ventured into the bakery industry and added biscuits to their portfolio – an exciting journey that is set to continue.

VIDEO

Watch this video to learn how Kanha Group is expanding its portfolio.

Uzwil, Switzerland

REINVENTING AN ICON

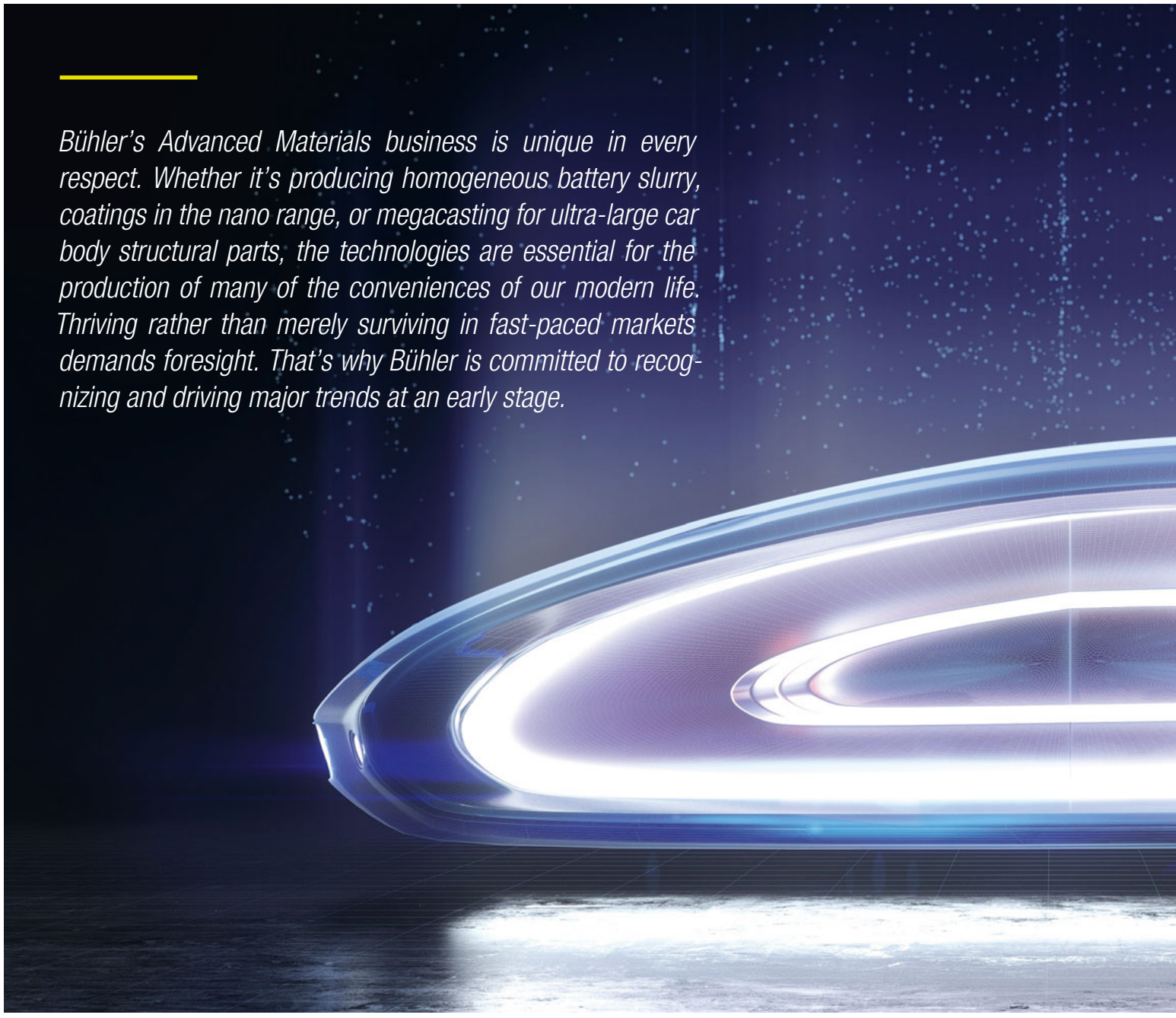


WEB

Scan the QR code to learn more about Arrakis.

Bühler's Milling Solutions business has launched the new roller mill Arrakis, the successor of the Airtronic, considered an icon in the history of milling for its durability and ease of operation. Arrakis takes these qualities to the next level with increased efficiency, reliability, and simplicity of operation. Connecting the fixed-speed feeding roll to the main roll's drive guarantees a more streamlined system that is easy to install and maintain. Urs Schwendener, Product Manager in Milling Solutions at Bühler, says: "We thought of new customers as well as customers who want to upgrade their systems. Conversions of existing installations are usually very complex, and the available space is often limited. With Arrakis, they can replace Airtronic and other roller mills quickly, thereby saving valuable production time."

Bühler's Advanced Materials business is unique in every respect. Whether it's producing homogeneous battery slurry, coatings in the nano range, or megacasting for ultra-large car body structural parts, the technologies are essential for the production of many of the conveniences of our modern life. Thriving rather than merely surviving in fast-paced markets demands foresight. That's why Bühler is committed to recognizing and driving major trends at an early stage.



WHAT IS THE DRIVING FACTOR behind Bühler's Advanced Materials business? Sometimes it is quite literal – for example, the fields of die casting, coating, and mixing technologies are driven by the automotive industry; sometimes it is more metaphorical, such as in the fields of applications for smartphones and printing ink. Wherever you look in Bühler's Advanced Materials business, it is teeming with high-tech applications that support our customers' vital process steps.

All of these technologies are finely tuned to the specific and diverse needs of the individual markets they serve. "We offer key technologies in our customers' process chains, and at these interfaces we understand exactly how our technology must function within the bigger picture," explains Marcel Natterer, who has been CEO Advanced Materials at Bühler since the beginning of 2023. "We have to know every detail of the process chains. This comprehensive understanding helps us to identify and correctly assess market trends. Keeping all of this in mind while excelling at each individual step – that's what gives our Advanced Materials business its edge."

A classic example of this is die casting. One in four vehicles worldwide contains parts that were manufactured using Bühler die casting technology. In other words, one billion people travel in vehicles whose parts were produced using Bühler technologies. Anyone who can achieve such a market share must be more than a traditional supplier, they must constantly be preparing for the road ahead.

"Our experts recognized many years ago that the automotive industry was facing its biggest transformation since the invention of the combustion engine: electromobility. In the midst of a bear market in the

Advanced Materials

AHEAD OF THE CURVE

TEXT: LUKAS HOFSTETTER
FOTOS: JEKATERINA GLUZMAN

late 2010s, we took decisive action. We rolled up our sleeves and invested heavily in research and development. With the megacasting technologies of our Carat die casting machine series, we found the answer to how cars can be manufactured most efficiently, in collaboration with our stakeholders," says Samuel Schär, who was CEO Advanced Materials at Bühler from 2013 to 2022 and is now Chief Services and Sales Officer for the company.

Today, Carat technologies are indispensable. With clamping forces of up to 92,000 kilonewtons, ultra-large car body structural parts can be produced in a single shot, saving dozens of work steps. With megacasting solutions, the die casting business has not only designed the nail itself, it also has hit it on the head with precision. Now, the team is researching the next step in aluminum die casting – rheocasting.

"In die casting, liquid aluminum is forced into a die in a relatively short time. The aluminum cools quickly. With parts getting bigger and bigger, we are aiming for a mixture that flows for as long as possible. In addition, this melt should be as dense as possible to reduce porosity to an absolute minimum," says Schär. "This is what we want to achieve with rheocasting technology, which involves producing a mixture of liquid aluminum and individual solid components. Put simply, the melt achieves the consistency of ice cream, which means it can be spread into the mold, perfectly filling every crack and preventing a 'skin' from forming during cooling."

This next quantum leap in die casting is already showing promising results in the laboratory and now Bühler's experts are testing the technology on an industrial scale to get it off the ground.

> ***"KEEPING THE ENTIRE CHAIN IN VIEW, BUT MAXIMIZING THE STRENGTH OF EACH INDIVIDUAL STEP IS WHAT MAKES ADVANCED MATERIALS SO EXCITING."***
>
> **MARCEL NATTERER**
> CEO Advanced Materials at Bühler

In the high-tech sector, it is often the invisible technologies that make our modern life easier in terms of networking, efficiency, and overall convenience. While die casting solutions shoot molten aluminum into a die under high pressure and compress it with a weight equivalent to the Eiffel Tower, the systems from Bühler Leybold Optics work in the range of tenths of nanometers. A nanometer is a billionth of a meter, and a tenth of that is called an angstrom – a unit that is beyond the grasp of the human mind because it is on the scale of individual atoms, where the building blocks of matter exist.

Pushing the AI wave

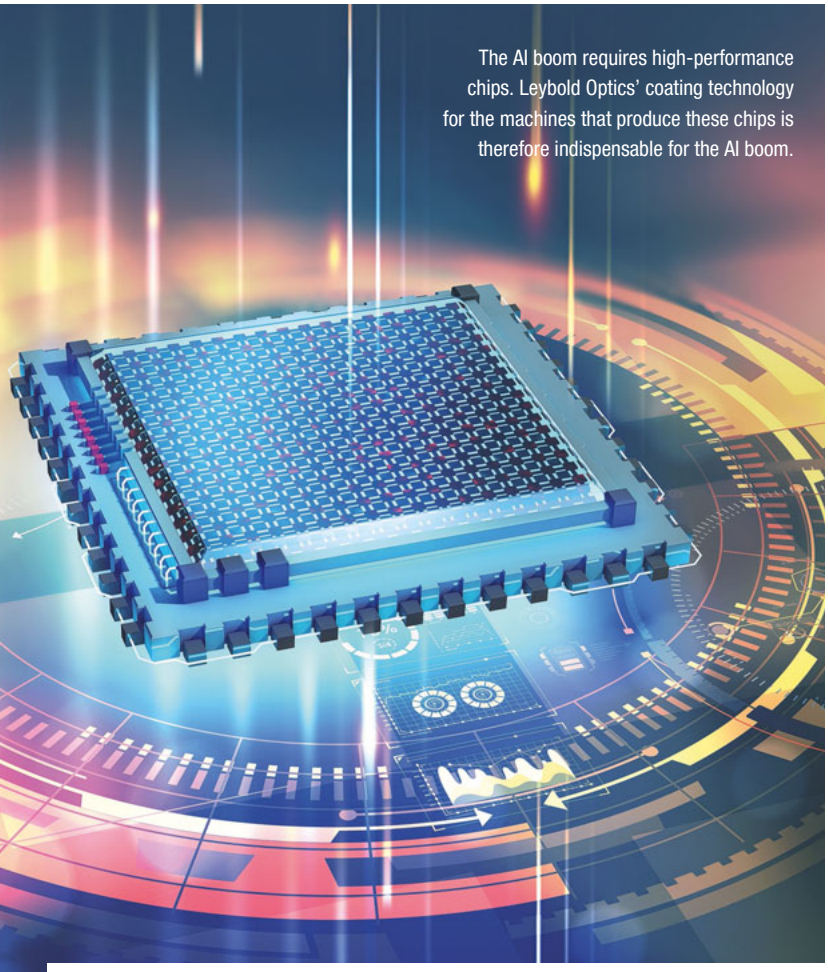
"In the age of artificial intelligence (AI), our technologies are in high demand for coating the machines on which contract manufacturers produce the most powerful chips for the world's leading software companies," says Natterer.

Leybold Optics in Alzenau, Germany, offers an extensive selection of advanced technologies. "In precision optics, we deliver a diverse range of solutions and applications. For example, lithography in the ultraviolet and extreme ultraviolet range is fundamental to the semiconductor industry. As designs become more sophisticated, we must develop our technologies accordingly, to meet the demands of more complex structures and geometries. We are also researching atomic layer deposition technology, which represents the next level in thin film coating," explains Natterer.

Even if AI chips dominate the headlines, the semiconductor field is extremely broad-based. In the precision optics business area, Leybold Optics also offers solutions for 3D antennas in the field of radar systems, WiFi and Bluetooth, as well as augmented reality and virtual reality. These are all exciting developments with incredible potential. How-ever, they are also business areas in which only those who are always one step ahead and actively develop technologies get a piece of the pie.

"It is important to always look at the market as a whole and not to be influenced by regional or market-specific developments. Take LiDAR (light detection and ranging) technology, for example. It is related to radar, but works with light beams instead of radio waves, and is crucial for self-driving cars. We are at the forefront here with our Helios technology. Even though self-driving cars are only slowly starting to appear on the roads in Europe, for example, they are already part of the cityscape in places like San Francisco," explains Schär. Figures from the provider Waymo confirm this. According to Reuters, the subsidiary of the Alphabet Group, which also includes Google and YouTube, the number of trips has doubled to 100,000 per week in just three months.

The third business area, Grinding & Dispersing, also benefits from growth in e-mobility. Even if the boom has slowed somewhat in regions such as Europe and North America, steady growth continues. "China is setting the pace, with an electric car share of around 40 percent, and the trend is rising



The AI boom requires high-performance chips. Leybold Optics' coating technology for the machines that produce these chips is therefore indispensable for the AI boom.

sharply. Our Grinding & Dispersing business area has been able to establish a strong position here for several years with our continuous mixing technology for battery slurry," Natterer explains. "Today, 70 percent of batteries for electric cars are manufactured in China. Accordingly, western car manufacturers and suppliers are now moving and building up this expertise in house. We are happy to support them in this endeavor with our experience and – again – our capabilities to test new applications in the lab and scale them up to industrial levels."

A possible game changer

A new technology that could give electric cars in Europe and North America an even greater boost is the solid-state battery. "In a solid-state battery, a solid electrolyte is used instead of a liquid one, which is responsible for transporting the ions between the anode and the cathode. If this is solid, manufacturers can make the batteries more compact and with no flammable components, which significantly increases safety. In addition, much higher energy densities can be achieved, which reduces charging times and increases range – we are talking about a range of up to 1,000 kilometers after a few minutes of charging," says Natterer. This could be a real game-changer in the automotive industry and further proof that innovation and collaboration are the keys to a more

"IT IS IMPORTANT TO ALWAYS LOOK AT THE MARKET AS A WHOLE AND NOT TO BE INFLUENCED BY REGIONAL OR MARKET-SPECIFIC DEVELOPMENTS."

SAMUEL SCHÄR
Chief Services and Sales Officer at Bühler

Batteries play a crucial role in electromobility. However, they are also coming into focus as a storage medium for sustainable forms of energy.

sustainable future. “We are carrying out intensive research with our network in this area and can contribute our in-depth know-how – whether in our own application centers, in exchange with university research centers, or in direct collaboration with our customers,” says Natterer.

Pulling in the same direction

In all these highly complex applications, the top priority for Bühler’s Advanced Materials business is always to reconcile sustainability and cost effectiveness. “Every innovation must reduce the footprint in production. In die casting, megacasting enables manufacturers to replace 100 to 200 individual parts, resulting in massive savings in material and downstream steps such as transport or welding. The continuous mixing process used in the production of battery slurry saves up to 80 percent of the energy used in the conventional batch process and greatly reduces operating costs. And in the coatings segment, intelligent glass coatings reduce energy consumption for heating and cooling by up to 35 percent,” says Schär.

These examples illustrate why the innovative force of advanced materials is fundamental to our modern lifestyle, but also to the sustainable change that new technologies can spark. “With our highly qualified employees, our global network of Application & Training Centers, and our partnerships with customers, we have incredible leverage for positive change,” says Natterer. “We all want to make the world a better place through science and technology. That is the essence of our Advanced Materials business. It makes us very confident about the future.”

INFO

On the cutting edge

The essence of Bühler’s Advanced Materials business is recognizing technology cycles and applying core technological expertise to an ever-growing range of new applications. Exciting overlaps with technologies from the Grains & Food business unit are constantly emerging. For example, the twin-screw extruder technology used to produce the electrode masses for lithium-ion batteries is the same as that used to process breakfast cereals, vegetable proteins, and fish food.

Fully continuous **electrode slurry production.**

Bühler's fully continuous mixing process achieves:

- shorter mixing time and consistent product quality;
- high productivity of up to 3,000 l/h per line and scalable processes;
- significantly less waste and higher energy efficiency;
- lower operation costs thanks to a high level of automation.

Do you have questions? Let's talk.
Scan the QR code to learn more from our website or write us:
grinding.dispersing@buhlergroup.com

Innovations for a **better world.**

BÜHLER

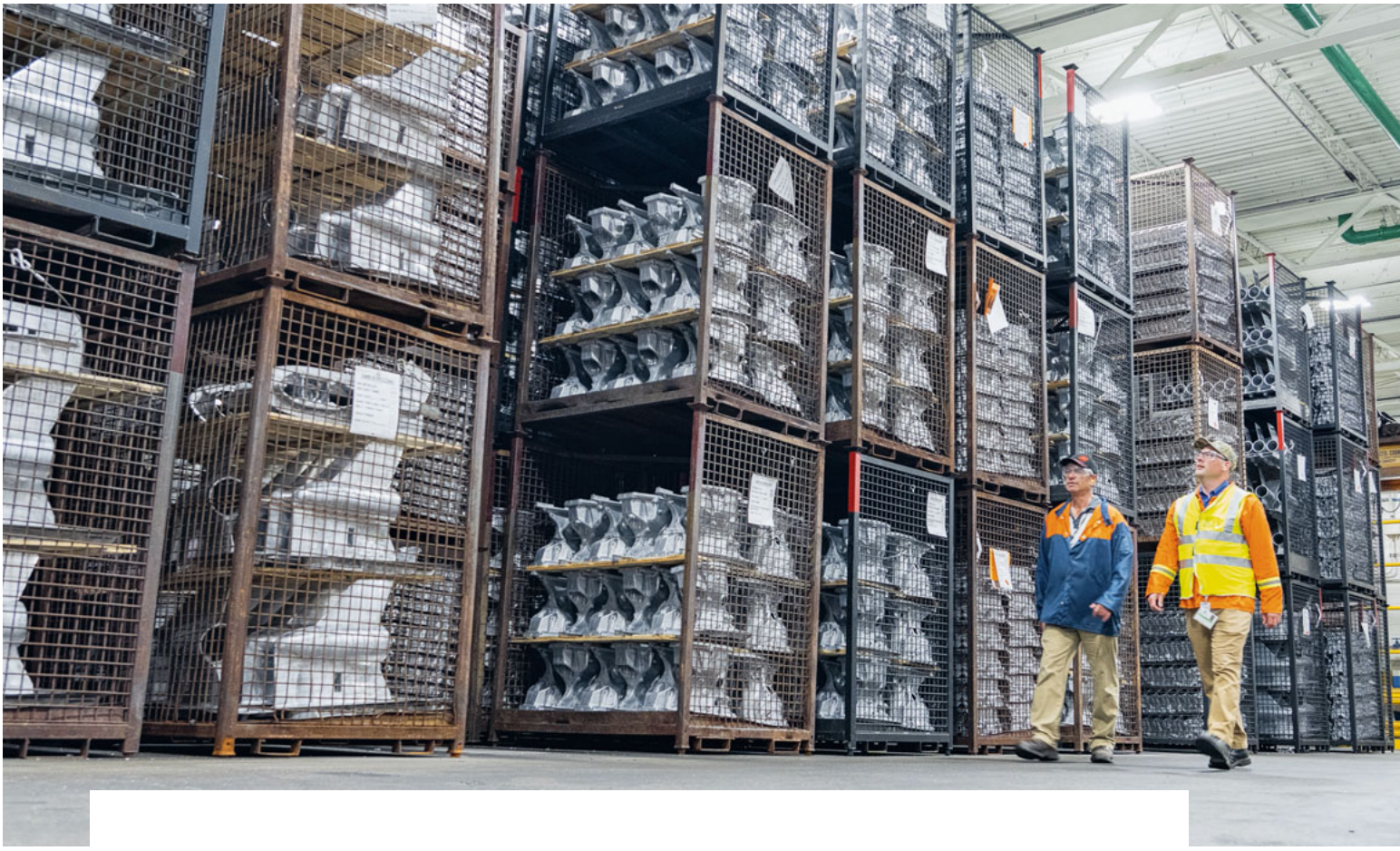
Mercury Marine

FUN, FAST, *AND* RELIABLE

TEXT: JANET ANDERSON
PHOTOS: MERCURY MARINE, IMAGE STUDIOS

There is nothing like the freedom of speeding across water toward a distant horizon, the boat's wake behind, and the wide open sky above. That's what Mercury Marine is all about. The US-based company builds high-performance marine propulsion systems for boat lovers worldwide. Die casting plays a key role in producing the parts to withstand fresh and saltwater environments. The company depends on Bühler die-casting technology to produce engines that are fun, fast, and reliable.

Mercury Marine is an industry leader in marine propulsion. It relies on its many decades of experience in high-pressure die casting to produce high-performance solutions for its customers.



WHEREVER YOU GO in Wisconsin, you are never far from water. The state is speckled with more than 15,000 lakes – and the locals know how to make best use of them. A favorite pastime during the glorious summer months is boating, whether for fun, fishing, or just to go fast. Everywhere you look you see boat dealerships, boats on trailers, and boats in the water, often with several outboard engines hanging off the transom. These are people with a true passion for water.

It's a passion shared by Mercury Marine, a leading manufacturer of marine propulsion systems. Its headquarters are in Fond du Lac, a small town on the southern tip of Wisconsin's largest lake, Lake Winnebago. The company prides itself on the performance, reliability, and efficiency of its products. And they know all about fun – no wonder their engines sound so impressive when they start up.

Mercury Marine is one of three major players globally and the only remaining outboard manufacturer in the US. Its market strength is built on strong design and manufacturing practices as well as continual process optimization. Reliability is a big selling factor – after all, it is not just the initial purchase price that matters to customers, but the total cost of ownership. The engines are tough and dependable, and that is, to a large extent, thanks to the way that key parts are cast.

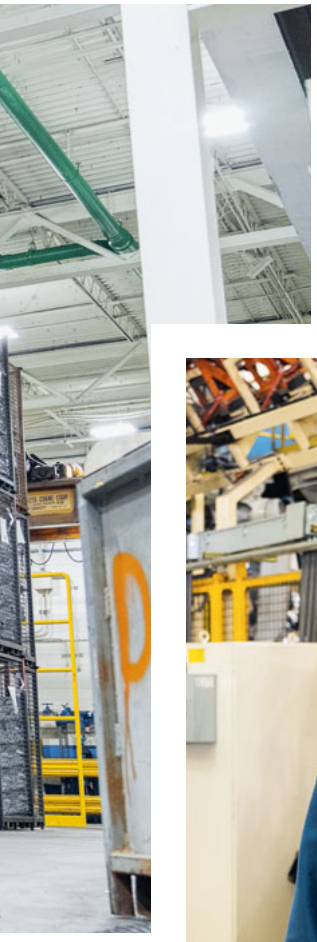
Casting takes place at Plant 17 of the Fond du Lac site. This is the home of Mercury Castings, the company's business unit dedicated to die-casting technology. Inside are rows of automated die-casting cells producing complex aluminum castings. A robot ladles molten aluminum into the die-casting chamber. The temperature inside is 1,260 degrees Fahrenheit (682 degrees Celsius). Among the heat and steam lie massive dies and racks of completed parts, quality checked and ready for the next operation.

Experience and experimentation

With over 60 years of experience in high-pressure die casting, it is a hub of innovation. The Mercury Castings experts are continually experimenting and have developed special aluminum alloys that are tougher, more corrosion-resistant, and have a higher proportion of recycled material to minimize environmental impact and cost.

As well as the alloy, the machines on which the castings are made also play an important role. "Three things matter in die casting: alloy chemistry, die innovation, and the machine," says Scott Hansmann, Project and Program Manager at Mercury Castings. The company has put its faith in Bühler die-casting machines since 1968, provided by Bühler's plant across Lake Michigan in Holland, Michigan.

The first machines purchased by Mercury Marine were smaller toggle machines. In the 2010s, the company was looking at casting bigger parts and in 2017 made an investment in the biggest die-casting machine at the time in North America – Bühler's 4,500 US-ton machine with 40,000 kilonewtons (kN) of locking force. Then in 2019, they decided to go to the next level of technology as they needed highly



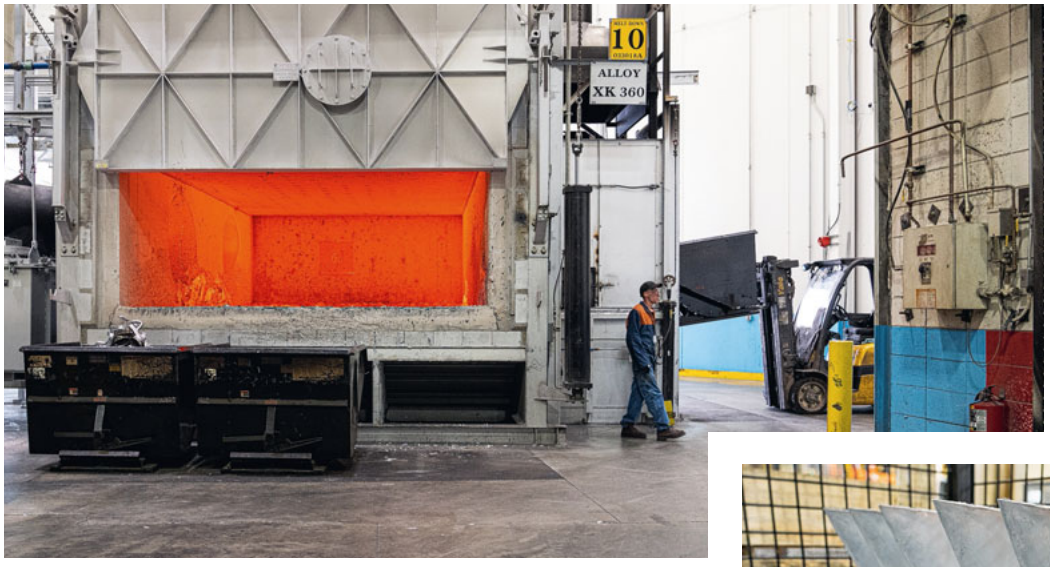
From the inventory area the die-cast parts are sent for trimming, finishing, and, finally, shipping to customers. Each part is marked with a QR code for quality control.

"WHICHEVER DIRECTION WE GO IN, WE LOOK TO PARTNER WITH PEOPLE LIKE BÜHLER TO CONTINUE TO INNOVATE AND DO WHAT WE CAN TO SUCCEED IN THE FUTURE."

SCOTT HANSMANN
Project and Program Manager at Mercury Castings

The foundry is located at the Mercury Marine headquarters. This is the hub of the company's die-casting expertise.

In order to deliver a range of premium products, Nathan Peplinski, Process Engineering Lead at Mercury Castings, says that the company needs the flexibility to cast several different products within one cell.



The reverberatory furnace is where the special alloys are produced. The pre-melted and pre-mixed metals and alloys are melted together here.

The gear casing is the biggest part that Mercury Marine die casts.

The way in which the parts are die cast is key to ensuring that they withstand the rigors of the marine environment.

controlled process steps. Working closely with the team from Bühler, they made the move to the two-platen Carat. "Today we have 25 die-casting cells ranging from 900 tons with 8,000 kN of locking force, to 4,500 tons with 40,000 kilonewtons (kN) of locking force," says Hansmann. "The move to the Carat series has been a major boost. It has fewer moving parts, which means less maintenance and improved uptime."

Mercury Castings sees itself as a high-production job shop. "We cast a large portfolio of parts ranging in size from 5 pounds [2.3 kilograms] to 165 pounds [75 kilograms], including bearing housings, bedplates, the propeller, and engine blocks," says Nathan Peplinski, Process Engineering Lead at Mercury Castings. Many of the castings are similar in shape but different sizes and weights. Bühler's Carat series provides the flexibility Mercury Castings needs to make these parts.

"WE CAST THE ENGINE BLOCKS ON OUR LARGEST MACHINE WITH 40,000 KN OF LOCKING FORCE. THE V12, OUR BIGGEST ENGINE, IS A 165-POUND SHOT – THAT'S A LOT OF MATERIAL TO MANIPULATE THROUGH ONE CELL."

NATHAN PEPLINSKI
Process Engineering Lead at Mercury Castings

"The Bühler Carats allow us the ability and flexibility to cast several different products within one cell. The Carat's flexibility has enabled us to utilize the best thermal management techniques to successfully balance our various tools to ensure the best possible casting," says Peplinski.

The V block portfolio for Mercury's large outboards presents some unique challenges. "We cast the engine blocks on our largest die cast machine with 40,000 kN of locking force. The V12, our biggest engine, is a 165-pound [75 kilogram] shot – that's a lot of material to manipulate through one cell," Peplinski explains.

The goal is to fill the massive die as efficiently as possible. Shot control and monitoring makes all the difference to repeatedly cast quality parts. "Minor process deviations can have devastating effects on casting quality. Bühler machines provide the visibility to such deviations to our process and allow us the control to quickly overcome any process variation," says Peplinski. "We are always striving to be better. The level of control provided by the Bühler die casting machines drives our ability to compete as a world-class die caster."

A major step toward improved processes began just over 20 years ago, when the company started introducing automation in the die-casting cells. Several of the machines are now served by five robots each. The robots pour the molten aluminum, extract the casting, maneuver it through the next process steps, and clean the die ready for the next cycle.

"We used a lot of the features that Bühler provides to develop our processes. They worked very closely with us on this," says Hansmann.

The resulting choreography is impressive. Once the casting is made, one robot extracts it from the press and hands it to a second, which removes the runners and overflows before placing the part in a case where it is laser-marked with a QR code for later identification and traceability. The first robot then picks up the part and places it on a conveyor belt to present to the human operator.

Safety is paramount every step of the way. Next, the part is taken to quality control. This is another fully automated process to check that the dimensions in key areas meet the product specifications. It then goes to machining, paint, and final assembly.

No limitations on pushing the envelope

"Innovation is at the forefront of everything that we're driving for at Mercury," says Clay Rasmussen, Technical Specialist at Mercury Castings. "We are always trying to push the envelope on new technology or abilities."

Over the past few years, Mercury Marine has launched a new engine nearly every year. Each new design has between five and 10 different castings in it. The castings have evolved from chunky blocks of aluminum to thin-walled, sporty, lightweight castings.

"A new technology that we are pushing into is electrification. We recently launched a lower horsepower fully electric outboard," Rasmussen explains. "We drew on our expertise from higher horsepower combustion outboards to make the leap into this new and exciting market."

"WE FEEL THAT WE'RE A GOOD MATCH BECAUSE WE HAVE A SIMILAR ATTITUDE TO INNOVATION AND QUALITY. IT'S THE ABILITY TO DO SOMETHING THAT OTHERS THOUGHT WAS NEVER GOING TO BE POSSIBLE."

STEVE JACOBSON
President & CEO of Bühler West Michigan

Rasmussen works with the product development group to ensure that new designs can be cast. To do this, he uses simulation technology to envision possible defects before the tools are made.

For new designs it is also necessary to think through the process on the machine. Again, Bühler machines provide flexibility and reliability. "There is never a second thought about whether we're able to make even very intricate, large castings in the machine. There are zero issues with integration," Rasmussen says. "It means there are no limitations to the design we come up with. We have full rein."

Bühler also provides the services needed to support the introduction of innovative designs. One recent challenge involved integrating the ability to insert liners into the engine blocks. Cast iron liners make the cylinder more stable when the pistons ride up and down. The Bühler team assisted with retrofitting one of the newer die-casting machines to do this. "When we made the V10, we decided to save machining time by putting the liners into the die. We had to develop that whole process," explains Grant Wollersheim, Controls Engineer at Mercury.

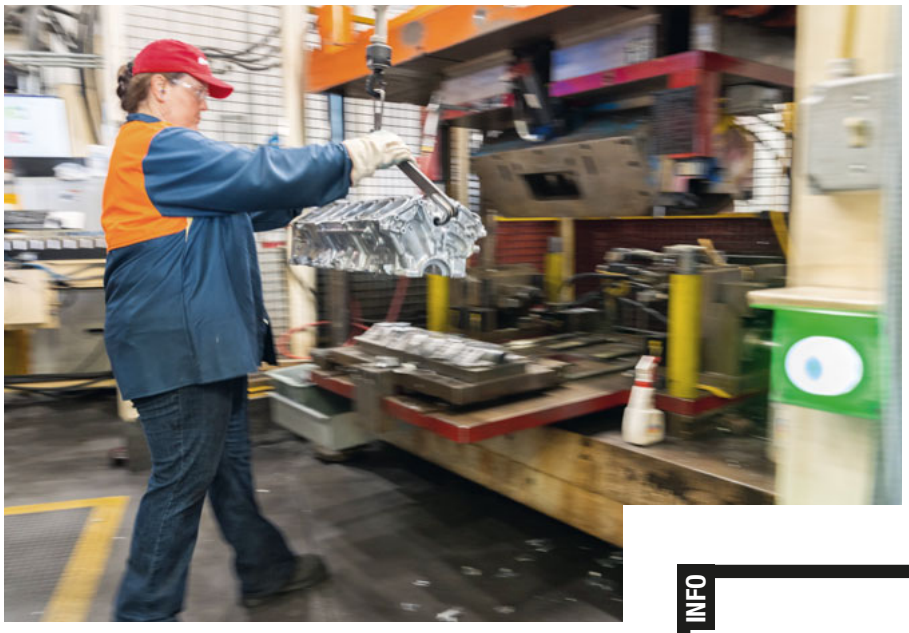
The robot places the liners in the die before the shot is made. When the machine opens after the shot, the liners are in the cast part. "One challenge was to design the robot gripper because we had to get it into a tight area and make sure it was pushing straight. My counterparts at Bühler knew their side very well. Their support was a great benefit," Wollersheim explains.

Mercury Marine is recognized in the die-casting community in North America for their innovation and for being a technology leader. At the North American Die Casting Association (NADCA) they sit on the R&D committees and have a significant technical impact on the industry. Bühler also sits on these committees and works with Mercury Marine to continually develop new ways of optimizing the die-casting process. "Our partnership works well because we share a passion for innovating in the die-casting market," explains Kristopher Hoffman, Project Manager at Bühler. "We have great respect for their expertise. They were able to engineer and introduce a V12 engine into an outboard engine, which just a few years ago was unthinkable."

Shared spirit and passion

For Steve Jacobson, President & CEO of Bühler West Michigan, it is a collaboration on innovation. "We feel that we're a good match because we have a similar attitude to innovation and quality. It's the ability to do something that others thought was never going to be possible or impossible at a certain price. And with Mercury Marine's engines, the end result is cool and exciting – 600 horsepower hanging off the back of a boat is something you gravitate toward."

There is no resting on their laurels, though. In every project, the Mercury Castings team always looks for lessons to learn and further improvements. "Bühler is very participative in that respect, because there are things we can do better and Bühler can do better. That close collaboration is what has got us where we are today," says Hansmann. "Whichever direction we go in – whether it is developing bigger marine propulsion systems to go faster or electric engines for clean, quiet power – we look to partner with people like Bühler to continue to innovate and do what we can to succeed in the future."



Rose Guelig operates the 4,500-ton die-casting machine. It is used to make bigger parts like the V12 cylinder blocks.

Mercury Marine is continually innovating. The Avator is its fully electric range, offering clean, quiet power and drawing on its expertise in combustion outboards.

INFO

Mercury Marine

Fond du Lac, Wisconsin, US

Founded in 1939.

Mercury Marine manufactures 75 through 600 horsepower production engines designed for the marine environment.

The company supplies customers in the US and across the world.

Mercury Castings has 25 die-casting cells ranging from 9,000 to 45,000 kN locking force, including the Carat 180L and 280L. It uses the Bühler machines to cast all sizes of components, from the propellers and gear casing to the V blocks for its powerful Verado series.

VIDEO

Watch this video to learn more about the collaboration between Mercury Marine and Bühler.

HEATING UP

NEW WAYS TO OPTIMIZE ENERGY USE

TEXT: STUART SPEAR

The food industry has traditionally used gas in its thermal processing and yet electricity is versatile and can increasingly be generated sustainably. Energy optimization technologies are changing this over-dependency on gas as innovative new ways of turning electricity into heat at competitive prices while cutting greenhouse gas emissions are being discovered.

The food industry has traditionally been dependent on gas for thermal processing. Today, with innovative technologies, electricity can be used instead, lowering the carbon footprint.

SUCCESSFUL BUSINESSES have always optimized resources. For food businesses, this means sourcing raw materials and the energy to process them at the best prices. That often involves a thermal process. Before reaching the point of sale, our food has typically undergone heating, whether drying, roasting, steaming, conditioning, baking, kilning, or cooking.

This is why Bühler is currently focusing on thermal technologies as part of its energy optimization program. Put simply, energy optimization is about reducing how much energy is used to produce each tonne of end product to the desired quality.

Depending on where you are located, gas has traditionally been the fuel of choice for heating processes in food manufacturing. But the climate change crisis and advances in energy optimization technologies are changing this energy profile. Electricity is becoming a more attractive alternative in terms of cost and the environmental benefits from wind, solar, and hydroelectricity.

Climate change strategy

As part of its environmental commitment, Bühler has set a target to have solutions ready to multiply by 2025 that reduce energy, waste, and water by 50 percent in customer value chains. Bühler estimates that across its portfolio of solutions sold over a 10-year cycle, thermal technologies account for between 30 percent to 50 percent of total emissions. James Maari, Bühler Lead Project Manager Resource Efficiency, has been tasked with optimizing energy used for these thermal processes to help reach that 50 percent energy reduction target.

"My focus at the moment is specifically what we do with thermal processing because that's where right now we are burning the most fossil fuel to generate thermal energy," says Maari. "As green electricity becomes more available, this means not always burning gas but finding better alternatives, examining energy systems around machines, and ensuring these solutions work well with our processes, cut costs, and reduce emissions."

The International Energy Agency (IEA) strongly warns that achieving our global sustainability targets will require a trebling of renewable energy sources to power our industrial processes by 2030 compared to 2022. In its World Energy Outlook report for 2023, the IEA estimates that global renewable power capacity needs to rise from the 2022 figure of 3,629 GW per annum to a substantial 11,008 GW per annum by 2030.

The same IEA report also warns that industrial processes need to become more efficient. The agency estimates that by 2030 improvements in the energy efficiency of technologies need to achieve a 4 percent annual decrease in energy intensity compared to the 2 percent annual drop

reached in 2022. Most of these efficiency savings in technological advances will need to come from renewably sourced electricity.

Bühler is reframing its approach to its thermal technologies to enable its customers to take advantage of these global trends. The sustainability argument is compelling. A recent environmental audit shows that heat treatments involved in food processing can account for as much as 75 percent of the greenhouse gas emissions of customers' Scopes 1 and 2 emissions. "Switching thermal technologies from gas to renewable electricity could potentially cut up to 10 million tonnes of these CO_2e emissions over a 10-year period," says Maari.

"THE HEAT PUMP IS ONE OF THE BIGGEST LEVERS WE CAN PULL WHEN IT COMES TO OPTIMIZATION. YOU ARE BASICALLY ACHIEVING YOUR ENERGY SAVINGS BY LEVERAGING WASTED ENERGY."

JAMES MAARI
Lead Project Manager Resource Efficiency at Bühler

The financial benefits for customers are also starting to look attractive. In recent years, new energy optimization technologies have evolved for use by industry. For thermal processes, these include heat pumps, thermal batteries, induction techniques, and electric batteries. These advances are making electrical solutions much more cost-effective.

Leveraging technology

Maari uses the example of heat pumps to explain how these new technologies are changing the energy landscape. "The heat pump is one of the biggest levers we can pull when it comes to optimization. If you have an 80°C heat stream emitting from your dryer and you need 120°C for your process, the heat pump uses electricity to boost the temperature from 80 to 120°C," explains Maari.

The beauty of the heat pump is that the electrical power input to raise the temperature is less than the thermal power made available for recovery in the exhaust stream. "You are basically achieving your energy savings by leveraging the wasted energy that was being emitted from your dryer to drive a new process," Maari says. "It means that you achieve a net gain, you use one unit of electricity, and you pull out of the environment two or maybe three units of heat."

Another way of creating energy savings is by using battery and thermal storage technologies that enable a business to store power when it is cheap or when there may be an intermittent wind or solar supply. Different methods of thermal battery storage are appearing on the market as ways to leverage electricity prices or store energy from different manufacturing processes within a plant for later use.

It is when this approach to energy optimization is applied to a business's whole manufacturing process that significant cost cuts are achievable.

"You can't just consider a machine in isolation, you have to look at all the energy streams within a plant and consider them as potential sources of energy recovery," explains Maari. "If you have hot water coming out of one process, instead of chucking it out it can be used elsewhere; you can even

expand beyond your plant. If you are operating near a town with a district heating system, for example, you could consider selling your excess energy. It is important to take a systemic approach when it comes to energy optimization."

Auditing energy systems

To find out whether these optimization technologies are right for your business, the process starts with Maari and his team carrying out an energy system assessment. This shows how much energy can be potentially reclaimed and whether it is sufficient to be used to drive other processes. The "pinch analysis" methodology used for the audit originated in the 1970s, when the energy-intensive chemical industry realized it could save money by not wasting energy by heating some compounds and cooling others.

The audit starts with a performance assessment workshop to establish if each food manufacturing process is operating at maximum efficiency. Next comes an energy audit of the whole food process, looking at temperatures, mass throughput, humidity levels, and mechanical heat generation, and establishing how much energy can be potentially recovered. A Coefficient of Performance (COP) is then calculated for heat pumps. This shows how much electricity is needed to leverage the excess heat being dissipated from factory processes and how much energy can be recovered. This figure is then compared to the current cost to the customer of continuing to use gas as the energy source.

"Once we have all this information, we get a clear picture. For example, if the payback time for the investment is 5 years, it makes sense, or it may be that the benefits just don't stack up," explains Maari. "We might also start to strategize, looking at the potential volatility of existing fuel prices or whether thermal storage might make it cost-effective."

Next comes the pre-engineering phase. Specialists look at the plant to see how the technology can be best engineered into the existing manufacturing process, what piping is needed, where heat exchangers can be installed, the positioning of heat pumps, and the insulation required. The rule of thumb is the greater the spare space available within the plant, the easier the installation.

Not a silver bullet

However, heat pumps may not always be the most appropriate solution as they do come with their technological constraints. The first is temperature. For now, the heat pump is the right way to go if you are using a thermal process up to 130°C, which includes drying and kilning processes. "We are looking at the next generation of technologies which might provide benefits up to 160°C or 180°C, but they are not market-ready yet," says Maari. "There will eventually be a temperature ceiling for heat pump optimization that will be difficult to break through, such as in the field of die casting."

The other constraint is the comparative cost of gas and electricity. In some regions it is so great that it will never be a competitive proposition to switch to a renewable electricity supply, regardless of how many energy optimization technologies are used. In other regions including Scandinavia and much of Europe, the price difference makes converting to electricity much more attractive.

"If we are going to keep global warming below 2°C, we have to make sure our customers can transition to more sustainable energy sources that are cost beneficial. The use of energy optimization technologies – that will only become more efficient in the future – is making that transition from gas to electricity much more attractive for a growing number of businesses," says Maari.

The use of renewable electricity sources combined with the installation of these energy saving technologies is not a silver bullet. But as these technologies advance and renewable electricity sources become cheaper and more available, the number of businesses that find transitioning financially attractive while also cutting their environmental footprint will rise.

BENEFITS

With an energy system assessment, you can:

+ understand the current energy use in your plant;
+ determine the potential for energy recovery and key technologies to integrate to achieve energy reduction;
+ evaluate the financial and CO_2e impact of the implementation of the various available solutions.

Would you like to learn more about an energy system assessment and whether it is a suitable solution for your plant? Let's talk!

RPET FLAKE

TURNING TRASH INTO TREASURE

TEXT: CHRIS WARD
PHOTOS: SAGAR SHIRISKAR

Driven by a focus on both environmental responsibility and profitability, Spanish recycler RPET FLAKE is transforming how the industry manages plastic reject. With an optical sorting solution from Bühler, the company is turning the waste pile back into profitable, sustainable material. It's a win-win for the environment and RPET's bottom line.

THERE IS A CHALLENGE that plastic recycling faces, beyond the well-documented area of single-use plastic. This new challenge is a complex balance of sustainable and economic factors. The issue is profitability and the low margins in plastic recycling. Without profit, recyclers are not incentivized to operate. However, Spanish recycling plant RPET FLAKE has found a solution to achieving more profit, while simultaneously reducing waste.

An hour south of Madrid, in the heat and natural beauty of central Spain, lies the municipality of Tarancón, Cuenca. Against an expansive backdrop of fields, a thriving plastic recycling plant, RPET FLAKE, recycles plastic bottles back into the economy – a mission that has an impact far beyond the province of Cuenca to the whole of Spain and across Europe.

The company recycles PET plastic, or polyethylene terephthalate, a polymer commonly used for bottles, food containers, and textiles. By putting it through a recycling process, PET can be transformed into new products. This reduces the reliance on using virgin plastics manufactured from previously unused materials and minimizes waste.

With 500,000 bottles processed per hour, RPET FLAKE is one of Spain's leading recyclers of bottle-to-flake PET plastic.

To address the economic realities of the plastic industry, Chairman and General Manager Antonio Martínez Mocholí focuses on processing PET, a plastic which has a longer life cycle and lower carbon footprint than other plastics, while also aiming to improve profitability. "There is waste all over the world. We wanted to make a change. Here in Spain, we process high quality recycling with the mission of giving packaging a new life. It makes us proud to keep the environment clean and contribute to a positive change in the world," explains Mocholí.

A bottle's journey back into the market

Before diving into RPET's solution to profitability and waste, it is important to understand the process a plastic bottle undergoes once it is dropped in a recycling bin.

After bottles are deposited into a recycling container, they are collected and compressed into rectangular bales and then transported to a plastic

RPET FLAKE's mission is to give PET plastic bottles a new lease on life through recycling – not just the clear uncolored bottles, but also blue, green, and multi-colored PET.

recycling facility, such as RPET FLAKE in Spain. The bales are then broken open and undergo a pre-wash to remove excess dirt and debris. Once washed, the bottles are sorted on bottle sorters, where foreign material, color, and polymer defects are removed, before being shredded, washed again, dried, sieved, and then passed through color and polymer flake sorters. Finally, the flakes go through a decontamination, extrusion, and thermo-forming process, which reshapes them back into bottle form.

For many, this is where the journey ends. RPET FLAKE recognized an opportunity at one critical stage of the process. After the first bottle sorting, a step that sorts for clear uncolored bottles and discards the rest, the company introduced a system to also sort blue, green, and multi-colored PET plastic. This step involves separating the colored "reject" that would normally be down-cycled or sold for lower-value applications.

"By retrieving these extra flakes, we have opened new market opportunities while reducing overall waste," says Mocholí.

To achieve this goal, he reached out to Bühler and Pellenc ST, a partnership that offers the complete bottle-to-flake sorting line. Like RPET FLAKE, Bühler and Pellenc ST share the mission of sustainable processing as well as an awareness of the challenges. These include the shortage of feedstock, which makes it more important than ever to have a system that gives maximum yield. After consulting a variety of solution providers, it was ultimately the combined expertise and technology of this partnership that sealed the deal.

Recovering more to increase yield

As anyone can imagine, plastic waste is full of unwanted materials. These include colored plastics, other unwanted polymers, and metals. However, there is still good PET mixed in the batch.

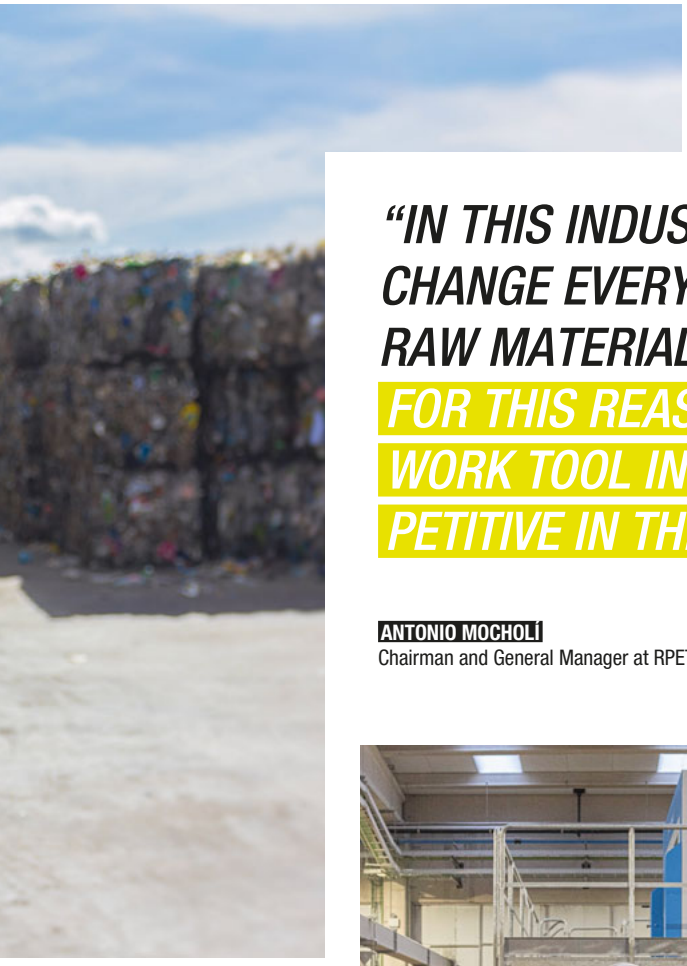
Bühler's recovery solutions can identify the good PET, retrieve more good plastic from the reject stream, and significantly increase the overall yield of high-quality recycled PET. "The sources of the bottles are continually changing, so you need a technology that enables you to achieve the quality you require whatever the source that you are using," explains Mocholí.

The Bühler solution uses a combination of optical sorting and artificial intelligence, meticulously scanning and separating the good plastic flakes from the contaminants in the reject stream.

Once the bottle sorting is completed via Pellenc ST's optical sorting line, RPET FLAKE redirects the rejected and shredded mixed color plastic into the SORTEX N PolyVision. This is a specialist polymer sorter that effortlessly removes non-PET polymers from the good PET before sending it to the SORTEX B MultiVision to finalize the sort with separate blue, green, and mixed color outputs. Simply put, instead of only taking pure transparent flakes to market, RPET FLAKE can now add value to their business by effectively creating a new market for purified green and blue PET flakes.

"RPET FLAKE recognized the need for a system that can retrieve good color flakes alongside the traditional clear flakes. To achieve this, they need to have greater insight into what's happening in the process so that they can better manage it and become more efficient," explains Lawrence Kuhn, Market Lead for Plastics at Bühler SORTEX. "Using the SORTEX monitoring system, they are able to monitor in real time what's happening in the line, the fluctuations in the input streams, and make changes to the programs on the machines remotely from the control room."

By separating colored plastics, RPET FLAKE is embracing new market opportunities and putting its mission to make plastic as environmentally friendly as possible in action. According to a report from Waste Managed, the UK's leading waste management company, 8 million tonnes of plastic end up in our oceans worldwide every year. That's the equivalent weight of 4 million mid-size sedan cars. With numbers like this, it becomes apparent how important RPET FLAKE's mission is.

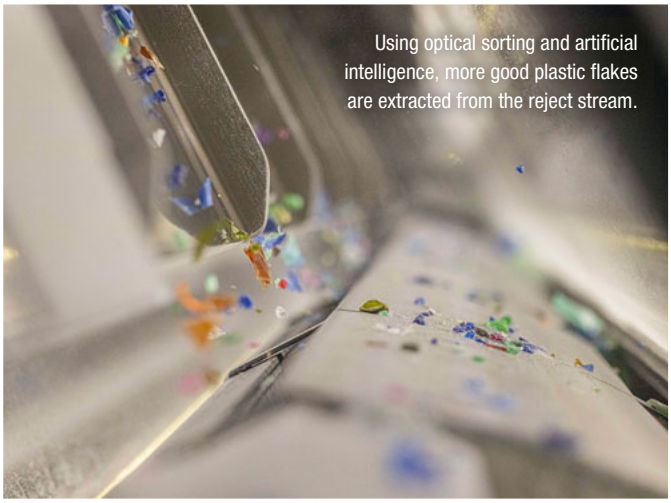


"IN THIS INDUSTRY, THE CHALLENGES CHANGE EVERY DAY, AND LIKEWISE, THE RAW MATERIAL IS ALWAYS CHANGING. FOR THIS REASON, SORTEX IS A CRITICAL WORK TOOL IN OUR PLANT TO BE COMPETITIVE IN THE MARKETPLACE."

ANTONIO MOCHOLÍ
Chairman and General Manager at RPET FLAKE

Pellenc ST's optical sorting line sorts out PET bottles from waste. Antonio Mocholí, Chairman and General Manager of RPET FLAKE, and Raúl Hernández, Sales Manager at Pellenc ST, observe the sorting process.

The SORTEX N PolyVision removes non-PET polymers from the good PET flakes.



Using optical sorting and artificial intelligence, more good plastic flakes are extracted from the reject stream.

With Bühler and Pellenc ST solutions, RPET FLAKE is able to increase its yield of high-quality recycled PET.

Luckily, PET plastic adapts well to recycling. With a processing plant powered by the technology of Bühler and Pellenc ST, RPET FLAKE is determined to realize its vision of a circular and sustainable future while making plastic recycling more profitable.

"In this industry, the challenges change every day, and likewise, the raw material is always changing. For this reason, SORTEX is a critical work tool in our plant. The machines help us to be competitive in the marketplace by increasing our yield, quality, and margins," says Mocholí.

Every flake matters

Despite processing millions of plastic bottles every day, for RPET FLAKE, every flake is important in terms of quality, waste reduction, and higher profits in a challenging market environment.

Tackling plastic waste can seem like an overwhelming task. But with waste recovery solutions that allow processors to keep waste to a minimum while generating more market opportunities, and ultimately, more profit, there is hope. Visionaries like Mocholí and RPET FLAKE are already fulfilling that hope and creating positive change. They offer a road map for future success and sustainability within plastic. "It is critical for our success to work with companies like Bühler and Pellenc ST, because they are not only suppliers, they are also partners. They help us to be competitive in the market and provide the best technology," says Mocholí. "This enables us to have a top-quality product with a high yield and gives us a margin high enough to sustain and grow the business."

VIDEO

Watch this video about RPET FLAKE's mission and see the facility in action.

INFO

RPET FLAKE

RPET FLAKE

Cuenca, Spain

- Founded in 2018.
- RPET FLAKE is one of Spain's leading PET-bottle-to-flake processing plants. It is on a mission to end plastic waste.
- The company serves customers in Spain and other European countries.
- RPET FLAKE uses Bühler's PET flake optical sorting technology and Pellenc ST's bottle sorter to ensure maximum PET quality and increase yield.

"RPET FLAKE RECOGNIZED THE NEED FOR A SYSTEM THAT CAN RETRIEVE GOOD COLOR FLAKES ALONGSIDE THE TRADITIONAL CLEAR FLAKES. USING THE SORTEX MONITORING SYSTEM, THEY ARE ABLE TO MONITOR IN REAL TIME."

LAWRENCE KUHN
Market Lead for Plastics at Bühler SORTEX

Embrace the future of optical sorting with SORTEX.

With us, you get more than technology. You get access to over 160 years of expertise, innovation, and partnership. With 25,000 color sorters installed worldwide and a presence in more than 140 countries, our global network, cutting-edge solutions, and passionate team are by your side. We are dedicated to supporting your success.

Visit our website to learn more:
www.buhlergroup.com/SORTEX

Don't just SORT it, SORTEX it.

Innovations for a **better world.**

BÜHLER

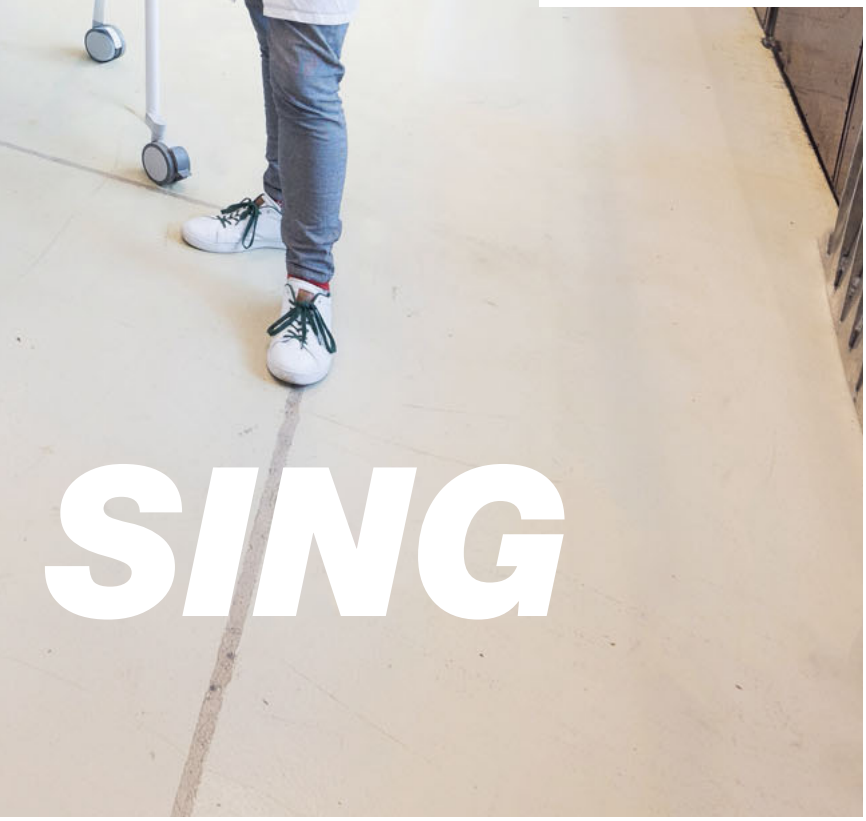
BREAKTHROUGH IN

INDUSTRIAL BIOPROCES

TEXT: BIANCA RICHLE
PHOTOS: JEKATERINA GLUZMAN

At the Bioprocess Technology Laboratory at Zurich University of Applied Sciences (ZHAW) customers from the bioprocessing industry can conduct trials and early-stage tech optimization.

For over 164 years, Bühler has been synonymous with innovation. But how do groundbreaking advancements come to life? Collaboration is key. A prime example is our revolutionary Stellar technology, developed in close collaboration with leading academic institutes to transform research into scalable industrial applications. Stellar significantly accelerates cell growth in various biological systems, enhancing the efficiency of food production processes. It offers commercial benefits to customers and contributes to sustainable nutrition.



SING

FOOD BIOTECHNOLOGY, a field of technology that implements biomolecular and cellular processes in the creation of food products, offers promising solutions to the urgent challenges of today's food production systems. However, traditional methods of cell growth and germination are often time-consuming and inefficient, leading to higher operational costs and increased contamination risks. By harnessing advanced techniques, such as Bühler's Stellar technology, the industry can push the boundaries of established operations, making processes faster, safer, and more efficient.

Stellar speeds up bioprocess efficiency in food production by providing an extra boost so that biological cells can thrive. "It's like drinking coffee in the morning. By stimulating the cells in a specific manner, Stellar makes the entire process more efficient, leading to faster results. This not only shortens the production time, but also reduces the risk of contamination, ensuring safer and more reliable outcomes," explains Dr. Leandro Buchmann, who has been Head of Bioprocessing at Bühler since 2022.

“WITH STELLAR, WE MANAGED TO SCALE THE AMOUNT OF MALT TREATED IN A MALTING PLANT FROM 500-GRAM BATCHES TO 150 TONNES PER HOUR.”

LEANDRO BUCHMANN
Head of Bioprocessing at Bühler

The seeds for the development of Stellar technology were sown 7 years ago, while Buchmann was studying food science at the Swiss Federal Institute of Technology (ETH) in Zurich. He was working on a project to make microalgae production more economically viable. The impetus for the project was a study by the Karlsruhe Institute of Technology (KIT) that showed that the growth of a leaf can be accelerated by electrical pulses. The project team, led by Alexander Mathys, Professor in Sustainable Food Processing at the Institute of Food, Nutrition and Health at ETH Zurich, wanted to make use of this knowledge. This led to opportunities for Buchmann. In his master’s thesis, he established a laboratory for nanosecond pulsed electric field processing, the underlying principle of Stellar. He was then offered a doctorate at ETH in Sustainable Food Processing to explore and broaden the application field.

“Influencing biological cells using an electric field is actually an old concept that has been used for decades to modify single cells or plants,” Buchmann says. “By shortening the pulse duration, we were able to specifically target the ion homeostasis in cells, which significantly enhances control over cellular functions and minimizes unintended effects.”

As part of his doctoral thesis, Buchmann built a prototype that made it possible to treat one liter of cells per hour; previously, only a few milliliters per hour had been achieved. “This enabled the technology to be integrated for the first time into industrially relevant operations in fully controlled twin bioreactor runs,” he explains.

Bühler experts, who worked closely with ETH, and regularly exchanged ideas with Buchmann. This connection led to Bühler offering him a position to elevate the technology to an industrial scale. Bühler’s strong reputation at ETH played a significant role in his decision to join the company, alongside a compelling words of an ETH professor: “Research is only finished when it is implemented industrially.”

From 500 grams to 150 tonnes

Buchmann presented his project to Bühler in February 2020, a few months before his start date in May. Shortly after his first day at work at the company, he was asked to implement the project in its malting division. A mere year and a half later, the first industrial installation of the Stellar system was operational in a malting plant. “We managed to scale the amount of malt treated in the plant from a 500-gram batch to 150 tonnes per hour in a single step. I felt almost prouder of that than I did of my doctoral thesis,” explains Buchmann.

The groundbreaking Stellar technology, using non-invasive electrical pulses, allows cells to grow significantly faster, which leads to increased biomass or, in biotechnology, to increased product yields. It can be applied to countless fields. For example, in malting, the technology makes grain germinate faster. In fermentation, Stellar can improve production for applications ranging from the brewing industry to recombinant protein production and cultured meat.

Buchmann's expertise, including his experience in fluid mechanics, electrical engineering, and other fields, was crucial for the rapid development of Stellar. Bühler's innovation network also played a significant role in the quick implementation.

"For hardware development, we utilized the rapid prototyping space at Bühler's CUBIC innovation center, which increased the speed of progress. This simulation expertise along with Bühler's engineers facilitated the swift optimization of the technology. The analytical laboratory provided a comprehensive portfolio for evaluating and further developing processes," says Buchmann.

In addition, Bühler leveraged its partnership with the Bioprocess Technology Laboratory at Zurich University of Applied Sciences (ZHAW). This collaboration, now entering its fifth year, focuses on analytical process technologies and automation solutions for Stellar. With access to advanced biotechnology infrastructure, spanning lab to pilot-scale operations, multiple customer trials and application developments have been successfully conducted across a wide range of biological culture systems.

Different system configurations, adapted to the treatment of batch, fed-batch, and continuous cultures, have been designed, implemented, and successfully validated jointly by Bühler engineers and the bioprocessing experts at ZHAW. Dedicated tools for process analytical technologies and cell biological assays, specifically tailored to Stellar, were developed with the aim of making application development as streamlined as possible.

A versatile platform is now available that enables customers from all segments of the bioprocessing industry to conduct proof-of-concept trials and early-stage tech optimization on their individual process, strain, and production design within a timeframe of only two to four weeks. And biotech customers are now able to purchase the Stellar Gemini system for lab- to pilot-scale and the Stellar Orion system for outputs of up to 50 cubic meters per hour.

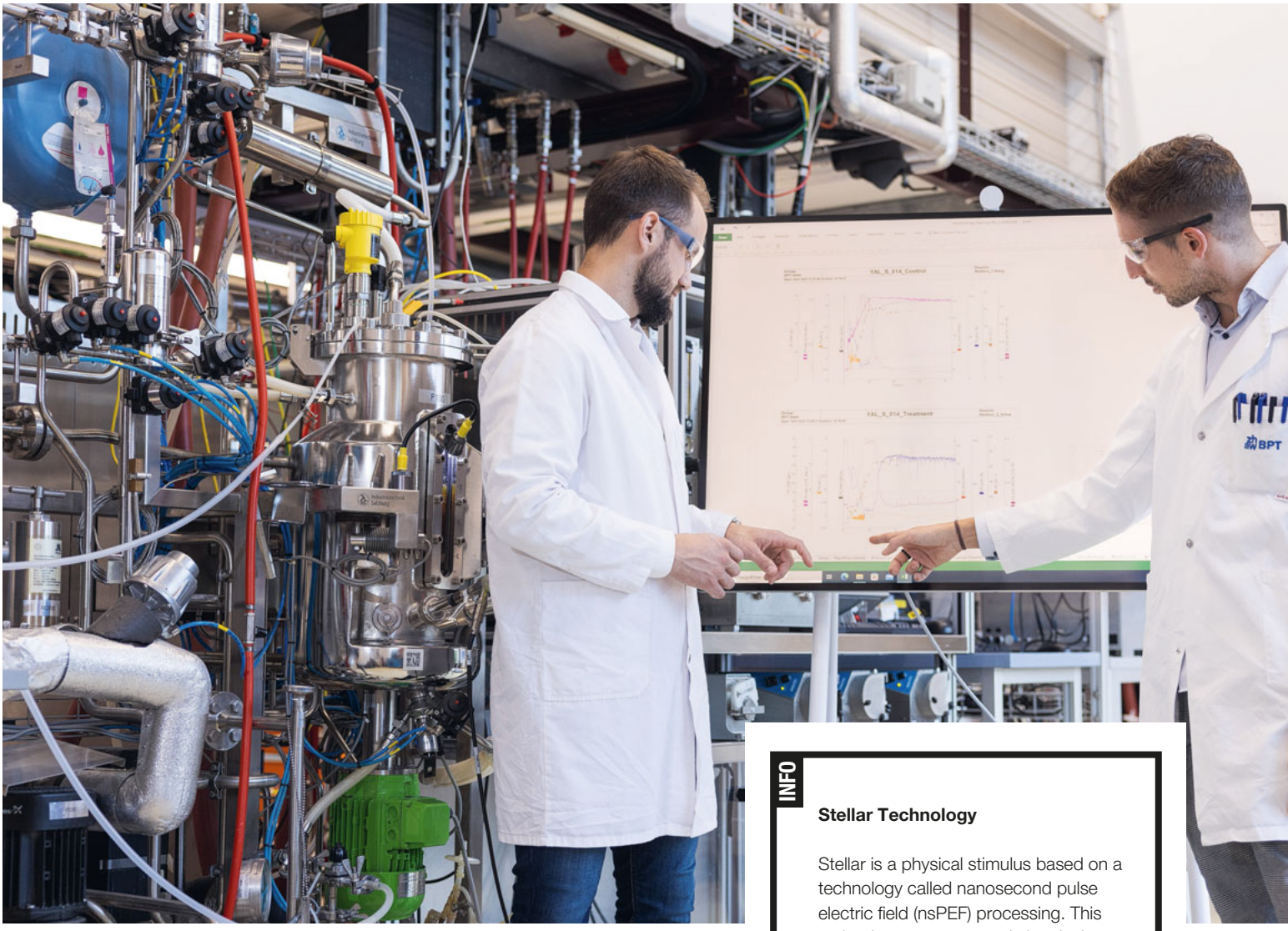
"We see Stellar as an enabling technology with disruptive potential in bioprocessing. Its flexible retrofit concept offers versatile implementation options, from cellular agriculture to high-value biopharma plants," says Prof. Dr. Lukas Neutsch, Head of Bioprocess Technology at ZHAW.

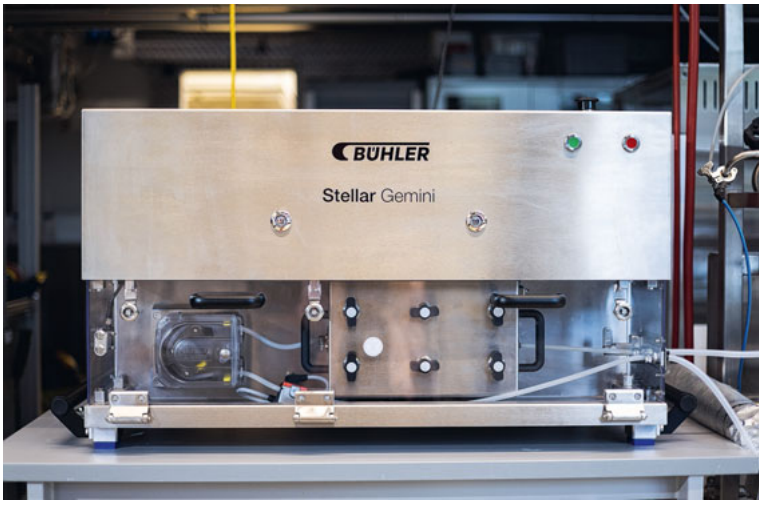
Prof. Dr. Lukas Neutsch, Head of Bioprocess Technology at ZHAW (left) in discussion with Leandro Buchmann, Head of Bioprocessing at Bühler.

"STELLAR IS AN ENABLING TECHNOLOGY WITH DISRUPTIVE POTENTIAL IN BIOPROCESSING. IT OFFERS VERSATILE IMPLEMENTATION OPTIONS, FROM CELLULAR AGRICULTURE TO HIGH-VALUE BIOPHARMA PLANTS."

PROF. DR. LUKAS NEUTSCH
Head of Bioprocess Technology at ZHAW

Leandro Buchmann, Head of Bioprocessing at Bühler (left) and Marco Fluri,
Deputy Head of Bioprocessing Technology at ZHAW analyze the latest data from the Stellar process.





The Stellar Gemini system is suitable for small-scale applications in malting and biotech, and can be quickly integrated as a pipe insert into the existing infrastructure.

INFO

Stellar Technology

Stellar is a physical stimulus based on a technology called nanosecond pulse electric field (nsPEF) processing. This technology uses targeted electrical pulses to facilitate the mass transfer of ions within biological systems. This makes it possible to accelerate biology in a non-invasive physical manner. The production efficiency of microorganisms such as yeasts, bacteria, microalgae, cyanobacteria, plant, or animal cells and of macro-organisms such as barley can be accelerated. This creates the potential to make various food production processes economically viable beyond their current perceived limits. Stellar systems are available in Bühler's application centers and its partner network for customer-specific process intensification trials.

For inquiries, please reach out to:
bioprocessing@buhlergroup.com

The solution developed for the malting industry speaks for itself. “Our Stellar technology makes the malting process faster and more efficient without extensive changes to existing processes,” Buchmann says. “The technology can be integrated into the existing infrastructure as a pipe insert and therefore has a relatively short installation time.”

The technology is flexible and scalable. To serve the needs of customers, Bühler has developed multiple solutions. The Stellar Gemini system is suitable for both small-scale applications in malting and biotech, while the Stellar Taurus system can process up to 300 tonnes of grains per hour.

“The Stellar technology provides a competitive advantage in an increasingly demanding market. The ability to optimize an existing process positions Stellar as an indispensable tool for modern malting plants,” explains Johannes Preiss, Head of Business Unit Malting & Brewing at Bühler. “Pilot tests with a customer are now in the final phase. By the end of 2024, malting customers will be able to purchase the Stellar Gemini system and the Stellar Taurus system from Bühler.”

In the future, Stellar technology could be used for all types of grain, including pulses, to speed up germination and sprouting. And Stellar technology could be applied throughout the biotechnology sector, because the targeted stress indication also works to obtain specific proteins from yeast and can therefore be used in the production of enzymes or biomass. “We are working on these topics with various customers, and are in the process of scaling up a wide range of applications,” says Buchmann. “Cultured plant cells, cultured meat, microalgae, and all sorts of yeast are just some examples of potential application developments in the laboratory.”

All these applications contribute to a more resilient and sustainable agriculture and food system and have the potential to unleash the full power of a growing sector.

“STELLAR TECHNOLOGY PROVIDES A COMPETITIVE ADVANTAGE IN AN INCREASINGLY DEMANDING MARKET. IT IS AN INDISPENSABLE TOOL FOR MODERN MALTING PLANTS.”

JOHANNES PREISS
Head of Business Unit Malting & Brewing at Bühler

AROUND THE WORLD

Find out how we are expanding our network to serve our customers even better and open up new business opportunities for them. Also discover why Bühler has been investing in training apprentices in various professions since 1915.

COMPLEMENTARY TALENTS DRIVE INNOVATION

WEB Read the press release to learn more about this exciting acquisition.

Uzwil, Switzerland The best innovations often emerge from teams with different skills and expertise. When Bühler was searching for a way to provide superior solutions for its customers in the brewery and sustainable protein areas, it found the perfect partner in Esau & Hueber. The German company specializes in hygienic process and fermentation technology for the beverage, food, pharmaceutical, and biotechnology sectors. By acquiring Esau & Hueber, Bühler has enhanced its malting, brewery, and sustainable protein businesses. For Esau & Hueber, its technology now extends across Bühler's global network. The acquisition fills technological gaps and strengthens Bühler's position as an industry innovator, aligning perfectly with its long-term strategic objectives. For the team at Esau & Hueber it is also a boost, opening up new dimensions and opportunities and offering customers in the brewery and sustainable protein areas new innovative solutions. "This step will also greatly benefit our customers and create new market potential," says Johannes Schulz, shareholder at Esau & Hueber.

VIDEO

Watch this video to learn more about WorldSkills 2024.

The three successful apprentices, Manuel Ulmann, Maurin Schickli, and Florentin Kaufmann (from left to right), exemplify dedication to their chosen profession.

BÜHLER APPRENTICES SHINE AT WORLDSKILLS 2024

Lyon, France In September 2024, Lyon, France, hosted the 47th WorldSkills Championship, a global showcase for the finest young talent in skilled trades. Representing Bühler Group were three accomplished apprentices: Florentin Kaufmann, Maurin Schickli, and Manuel Ulmann. Their rigorous year-long training culminated in success, with each earning recognition at the prestigious competition.

Florentin Kaufmann competed in the Mechatronics category, excelling in constructing automated systems with his teammate, Enrico Putzi. In the Industry 4.0 discipline, Maurin Schickli demonstrated advanced programming skills and secured a silver medal with his partner, Leon Bamert. Both Kaufmann and Schickli stood out as two of the youngest participants at just 18 years old. Meanwhile, Ulmann, a skilled welder and a 2022 graduate from Bühler's Appenzell plant, showcased exceptional craftsmanship in sheet metal work, earning a Medallion for Excellence. In total, 45 Swiss candidates participated in WorldSkills, making the achievements of the three Bühler candidates even more remarkable.

The apprentices' journey to WorldSkills was defined by intensive training, involving sessions both in Switzerland and abroad. They honed their technical capabilities and also enhanced their teamwork. Their performance highlighted the importance of comprehensive vocational training – a sentiment echoed by Swiss Federal Councillor Guy Parmelin, who underscored the value of dual vocational education in cultivating future industry leaders.

The four-day international competition brought together young professionals aged 18 to 23 from across the globe, who competed in various disciplines after either completing apprenticeships or intensive university training in their fields. Bühler CEO Stefan Scheiber emphasized the importance of their achievements: "With the top performances of these young professionals, we are strengthening the public image of industrial occupations. This is essential to attract motivated and capable young talent to the industry."

Bühler's commitment to nurturing talent dates back to 1915, when it established its apprenticeship program. Since then, 8,420 apprentices have been trained at Bühler in Switzerland alone. The opening of the Energy Center in June 2023 marked a milestone in Bühler's dedication to future-ready training, providing a state-of-the-art environment for apprentices to develop both technical and personal skills.

In 2024, Bühler trained 565 apprentices globally, 305 of whom were based in Switzerland. The company's apprenticeship programs span 26 locations across Europe, North and South America, the Middle East and Africa, and South Asia.

Motivated by their strong showing, Bühler's vocational training team is setting its sights on the 2026 WorldSkills in Shanghai to achieve even greater success in the future.

Divella produces about 1,100 tonnes of dry pasta a day, serving 11 percent of the Italian market.

Divella PASTA E PASSIONE!

FOR 130 YEARS

TEXT: DALEN JACOMINO
PHOTOS: SAGAR SHIRISKAR

If there is one word that gets taste buds dancing in every corner of the world, it is pasta – the culinary delight that needs no translation. Pasta is so well known and beloved worldwide that it transcends culture and language. With its centuries-old tradition, Italy has become the kingdom of the pasta world. That is precisely where pasta producer Divella has reigned for the last 130 years. From its production plant, the company provides this delicious staple food to consumers across the globe.

ADDRESSING THE SIGNIFICANCE and impact of pasta in Italy without resorting to clichés or the obvious can be challenging, as this staple and comfort food is so deeply embedded in the fabric of the Italian culture. In fact, pasta is part of the Italian DNA. Federico Fellini, the famous Italian film director and screenwriter, used to rightly say, "Life is a combination of magic and pasta." The statistics confirm that: On average, Italians consume about 23 kilograms of pasta per person per year (according to the association Unione Italiana Food, UIF), leading the global average consumption ranking.

Marino Niola, professor of cultural anthropology at the University of Naples and co-director of MedEatResearch, a center for social research on the Mediterranean diet, analyzes the role of pasta in Italian society: "Our bond with pasta is so strong that it unifies us, while still acknowledging all its multiple individualities."

The word pasta is singular, but for those who truly understand the subject, a closer look reveals a myriad of formats and differences. It ranges from Sardinian fregula to Piedmontese tajarin, from Neapolitan paccheri to Sicilian anellini, and from Valtellina pizzoccheri to Ligurian trofie. Each form tells the story of a community, a tradition, a landscape, and a distinct agriculture.

Its historical importance, forming the basis of Italy's culinary traditions, lies in it being an affordable, nutritious product. Throughout history, pasta has evolved from a simple, humble product – often borne out of necessity or limited resources – into something of exceptional quality and renown. It is no coincidence that pasta has increasingly become a multifaceted ingredient in home cooking, in taverns and trattorias, and in haute cuisine alike.

That is, very briefly, the scenario and cultural context in which Divella, the well-known pasta producer based in Apulia region in the southern part of Italy, was founded and successfully developed over the years. The historical significance of pasta and its vital role in the life of Italians is deeply embedded in Divella' spirit. In fact, it works as the guiding light for the company, influencing its decisions for more than 130 years.

"Since 1890, one thing has remained unchanged: the passion that all of us – the family, managers, and employees – put into creating a quality product every day. This dedication ensures our product meets the expectations of our consumers. It means consistently prioritizing quality, meticulously selecting raw materials, and paying close attention to every detail in the production process," explains Fabio Divella, Management Representative, Pasta Division at Divella, who is part of the fourth generation running the organization. In fact, Divella's journey is one of "pasta e passione" (pasta and passion).

The company, which is now among the top 10 producers of pasta in Italy by turnover, is based in Rutigliano, a small town in the Puglia region of southern Italy. Francesco Divella, a visionary entrepreneur, started his journey in 1890 by founding a small mill to grind durum wheat, a staple of the region renowned for its quality. His dedication to producing high-quality semolina laid the foundation for what would become a celebrated pasta brand.

Pasta picks up around the world

Francesco's passion for quality and innovation was passed down to his sons, who expanded the family business by venturing into pasta production in the early 20th century. Utilizing the high-quality semolina produced in their mill, they began crafting pasta that quickly gained a reputation for high quality across Italy. Like many other businesses, Divella faced significant challenges during the tumultuous years of World War II. The war disrupted supply chains and damaged infrastructure, posing a severe threat to the family's livelihood. However, with resilience and determination, the Divella family rebuilt and modernized their operations post-war, investing in new technologies while still adhering to traditional pasta-making methods.

In the late 20th century, demand for Italian pasta reached new heights worldwide. Italian immigrants brought their culinary traditions to countries such as the United States, Argentina, and others, making

Divella's headquarters in Rutigliano, Bari. The company was founded in 1890 by the visionary entrepreneur Francisco Divella.

An estimated 35 to 40 percent of Divella's production is for export to over 120 countries.

"TO UPHOLD OUR HIGH STANDARDS OF QUALITY WHILE EXPANDING PRODUCTION, WE CONTINUOUSLY INVEST IN NEW EQUIPMENT AND TECHNOLOGIES. WITHOUT THE RIGHT SETUP, WE WOULD NOT BE ABLE TO EXTEND OUR PRODUCT LINE."

FABIO DIVELLA
Management Representative, Pasta Division at Divella

pasta a staple food in these new regions. Early trade routes and the spread of European colonists brought Italian ingredients and cooking techniques to diverse parts of the world.

Pasta's affordability, easiness to cook, and ability to pair with a wide range of ingredients made it adaptable to various local cuisines. In the United States, for example, pasta merged with local tastes to create dishes like spaghetti with meatballs.

Under the leadership of the subsequent generations, Divella continued to innovate and grow. The family maintained their commitment to quality while quickly embracing new advancements in pasta production and markets. "To uphold our high standards of quality while expanding production, we continuously invest in new equipment and technologies," says Divella. "Without the right technological setup, we would not be able to extend our product line to include various pasta shapes and sizes and cater to a broader market."

The global pasta market size, according to Fortuna Insights Business, is valued at USD 68 billion (2023) and is projected to grow from USD 71 billion in 2024 to USD 100 billion by 2032, with a compound annual growth rate of nearly 6 percent during the forecast period of 2024-2032. In 2023, Europe dominated the pasta market with a share of nearly 30 percent.

Divella stands out in this context. The company, with its 320 employees and 14 dry pasta lines, produces about 1,100 tonnes of dry pasta a day, serving nearly 11 percent of the Italian market. An estimated 35-40 percent of production is for export to over 120 countries, bringing the taste of the Italian tradition to consumers around the globe. The company also produces fresh pasta and fresh egg pasta.

130 years of partnership

To keep up with market changes and new consumer demands, the management of Divella decided to invest in a new short pasta line. By 2022, the company already had two short pasta lines from Bühler, reflecting the long-standing and fruitful relationship between the companies.

The collaboration between the two companies spans generations. One concrete proof of this special bond lies in the Bühler machinery from 1890 that the Divella family has carefully preserved with great affection within the company's facility.

Giuseppe Stamilla, Service & Process Engineer at Bühler Italy, checks the new plant, which began operations in January 2024.

Mauro Ruta, Pasta Factory Coordinator at Divella and Giuseppe Stamilla, Service & Process Engineer at Bühler Italy. With Bühler's WinCos, the team has immediate and continuous management of all production processes.

"SINCE THE BEGINNING, BÜHLER HAS NEVER SHIED AWAY FROM ADDRESSING OUR REQUESTS AND THIS ATTITUDE HAS ONLY STRENGTHENED OUR COLLABORATION."

MAURO RUTA
Production Manager, Pasta Factory Coordinator at Divella

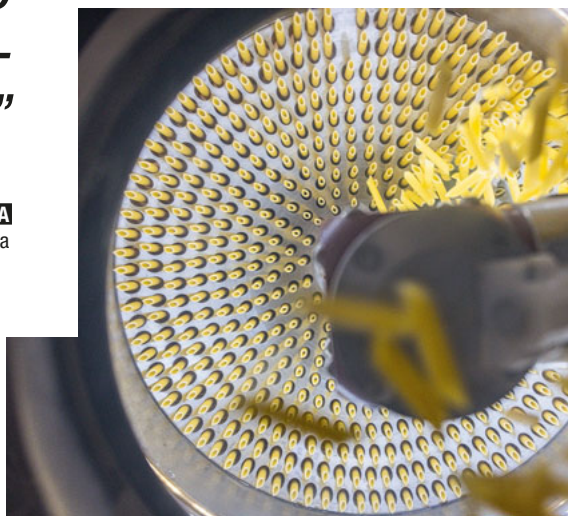
"The machines belong to the first generation of my great-grandfather when he started the business. We can now look back on more than 130 years of a collaboration that has intensified over time, becoming a true partnership," explains Fabio Divella.

A new pasta line "straight from the oven"

At the beginning of 2023, Divella, whose teams are in permanent contact with Bühler's experts, initiated discussions on the new short pasta line. One of the key challenges was the reduced space available for the new equipment.

"We had to install a 4,000 kilogram-per-hour (kg/h) line within the same space as an old line that had a capacity of about 2,500 kg/h. This required more calculations and customized adjustments," explains Giuseppe Stamilla, Service & Process Engineer at Bühler Italy. This and additional requests from the Divella team demanded more exchange at the beginning of the process. But it was worth investing time and energy in the preparation phase, so that the team was able to thoroughly address the specific requests of the customer and deliver accordingly.

The new short pasta line has a capacity of 4,300 kilograms per hour.



Ensuring correct flavor, texture, color, structure, and porosity is fundamental to maintaining the high quality standards of Divella's pasta.

The entire production process is managed by Divella, from quality control of the raw material to the different steps that involve the production of the pasta.

"ENERGY CONSUMPTION HAS BEEN MARKEDLY LOWERED WITH THIS NEW PLANT. FOR AN ENERGY-INTENSIVE COMPANY LIKE OURS, IT IS FUNDAMENTAL TO REDUCE CONSUMPTION, NOT ONLY FOR OUR ECONOMIC BENEFIT BUT ALSO FOR THE ENVIRONMENT."

FABIO DIVELLA
Management Representative, Pasta Division at Divella

"Working hand in hand with Divella has been a wonderful journey. This close collaboration has allowed us to deeply appreciate their unique qualities and distinct needs, helping us to build the new project more effectively," says Stamilla.

Divella's management opted for the 4,300 kilogram-per-hour short pasta line, which included Bühler's Priomatik press and a belt dryer with a drying time of about 4 hours.

The Priomatik press is the perfect solution for those who value traditional technology in dough preparation. Long retention times in the trough allow for optimal hydration of coarse semolina granules, leading to the optimal development of the gluten network. The solution addresses Divella's commitment to maintaining the tradition of pasta making while ensuring the correct flavor, texture, color, structure, and porosity. The entire pasta production process is managed by Divella, from the quality control of the raw materials, which are processed in the company's own mills at the same location, to the different steps involved in the production of the pasta. Every nuance in pasta-making impacts the result and each generation of the Divella family has been taught these intricacies.

Another key aspect of this project was making sure that the operating team at Divella would have advanced tools to manage the line. They opted for the WinCos management system, Bühler's manufacturing execution system for reliable, high-quality production of pasta.

Digital eyes on every detail

With this tool, production can be planned and executed quickly and sustainably. The clear visualization makes effective monitoring of the plant easy. The system's comprehensive recipe management system always allows for consistent production. With this tool, Divella can immediately and continuously manage all production processes.

The new plant began operations in January 2024. Mauro Ruta, Pasta Factory Coordinator at Divella, participated in the process. Drawing upon his several years of experience and in-depth understanding of the details and challenges of running a pasta line, he assessed the journey: "Since the beginning, Bühler has never shied away from addressing our requests and this attitude only strengthened our collaboration. In addition, Bühler's experts made sure that our teams had all the support to start operating the new line and maximize its potential."

In fact, the short pasta line is up and running at full speed, 24 hours per day, 7 days a week. With that kind of solution, Divella's team is able to improve overall efficiency, increase process control, and reduce downtime. The new plant also contributes to the reduction of energy consumption of the whole pasta factory.

"Energy consumption has been markedly lowered with this new plant. For an energy-intensive company like ours, it is fundamental to reduce these numbers, not only for our economic benefit but also for the environment," says Divella. "Over the years, we have also embarked on a journey of promoting and collaborating for more sustainable practices in farming, reducing the company's footprint, and prioritizing more sustainable packaging solutions."

With that kind of mindset, Divella has become a pasta powerhouse. The company's journey underscores the profound impact of the family's entrepreneurial spirit and commitment to quality.

Their dedication to preserving their heritage while embracing innovation is inspiring and is reflected in each of the 2.5 million packages of pasta that are produced every day at their factory in Apulia. From the Mediterranean, Divella's passionate team nourishes and delights consumers around the globe.

Fabio Divella, Management Representative, Pasta Division at Divella and Mauro Ruta, Pasta Factory Coordinator at Divella. From the Mediterranean, the company team nourishes and delights consumers around the globe.

INFO

DIVELLA
Passione Mediterranea

Divella

Rutigliano, Bari, Italy

- Founded in 1890.
- Divella produces about 1,100 metric tons of dry pasta a day, serving nearly 11% of the Italian market.
- The company exports an estimated 35-40% of what it produces to 120 countries.
- Divella has three short pasta lines from Bühler in full operation.

VIDEO

Watch this video to learn more about Divella and Bühler's shared passion for pasta.

E.Wedel

JAPANESE PRECISION MEETS POLISH TRADITION

TEXT: BURKHARD BÖNDEL

After 173 years, the Polish heritage brand E.Wedel is reinventing itself, elevating both the quality of its chocolate and the efficiency of its production. With Bühler's help, it is working at particle sizes of just 12 micrometers and reaching world-class standards in taste and smoothness. The timing couldn't be more perfect.

Chocolate city in Wedel's new museum: a feast for the senses. Even if you want to, you are not allowed to taste it!

© E. Wedel

PREPARATIONS ARE IN FULL SWING. Drilling, hammering, painting, and testing are taking place. No wonder – after more than 170 years of a rich and varied history, Wedel the tradition-rich confectioner is opening a museum in the heart of Warsaw for visitors to discover chocolate with all their senses.

Located within the existing factory grounds, which were built in 1931 on the shores of Lake Kamionkowskie, the E.Wedel Chocolate Factory Museum spans three floors and 2,500 square meters, showcasing the entire world of this sweet delight and the E.Wedel brand universe. Visitors learn how chocolate has conquered the world, that Wedel's cocoa beans come exclusively from Ghana, and how the beans are crafted into a wide range of chocolate treats. Visitors can touch, taste, smell, and play – it is a place of joy and a sensory feast.

The purpose of the museum is to open up the world of Wedel. "E.Wedel is a very strong brand – one of the oldest in Poland," says Robert Zydel, Museum Director. "We want to share our history with our customers and show them the world of chocolate – its production, history, and packaging design. It will provide visitors with an in-depth experience of the whole chocolate phenomenon and our brand, including tours and workshops in the chocolate factory. We hope they will see Wedel in a new, fresh way."

Visitors learn how Karol Wedel, founder of the company, introduced chocolate to Poland around 1851 – originally inspired by his stays in Paris, where chocolate was enjoyed as a hot beverage. His successors, Emil (his son) and Jan Wedel (his grandchild), continually innovated, establishing E.Wedel as the leading chocolate brand in Poland. During the communist era, the company was nationalized, and in 1991, Pepsi Co. acquired it until it was finally taken over by the Japanese firm Lotte Co., Ltd. in 2010. These ownership changes did not diminish the brand's popularity.

When asked which manufacturer they associate with chocolate, more than 90 percent of Polish consumers answer E.Wedel, according to a recent brand tracking study for brands in the sweets category.

Describing this place merely as a museum would be misleading. It is, in fact, a unique experience center. Integrated into the factory, it serves as the new emotional focal point for the brand and its products, marking a new chapter in the company's long and varied history.

Setting new standards in milk chocolate

The new chapter is all about high ambitions. Just in time for the museum's opening, Wedel is introducing a new milk chocolate that sets a new quality standard in the region. Such high-quality chocolate has not been produced in Poland before. The reason for this move is that, until now, the company has not been among the top players in milk chocolate. While Wedel can claim about one-third of the market for dark chocolate, its share in the milk chocolate segment is only around 10 percent and milk chocolate represents a much larger market. "We aim to change this and become the top provider in Poland in the medium term," explains Tomokazu Kono, Director of Production at Wedel.

The new quality level comes with a specific figure: 12 micrometers. It's not just any old number – this is the metric that makes the hearts of chocolate experts beat faster because it represents the particle size of the ground chocolate mass. The rule is, the smaller the particles, the finer the chocolate tastes, the smoother it melts, and the more impressive the explosion of flavor in the mouth. The average for most chocolate ranges from 18 to 22 micrometers. "With this chocolate, we are reaching world-class standards," says Kono.

To venture into such a realm, two ingredients must harmonize perfectly, technology and knowledge – technology in process design and machinery, knowledge of recipes and process knowledge.

"Due to the complexity and high standards of our task, it was clear to us that we could only undertake the small-particle-size project with Bühler," says Kono. The impetus for the project came from Kono. Gradually, he managed to convince the traditionalists among his Polish colleagues of its benefits. "At first, I was met with skepticism, but in the end, we became a team and were excited about the mission," he says.

In 2020, the Wedel-Bühler engineering team got to work. At first, they were slowed down by the Covid-19 pandemic. An additional challenge was that the new line had to be installed in an existing building with ceiling heights of just 3 meters. Nevertheless, the team finally defined the process and equipment, bringing the solution to paper and into the engineering system with the ShearMix as the mixing system, the PreFiner S and Finer S as roll refiners, and the DÜC conches for bringing the flavor to life.

"I am really proud that I personally have had the chance to work with Wedel for over 30 years. Our collaborative relationship is built on mutual passion and commitment to delivering the best technological and technical solutions," says Jacek Kerber, Managing Director of Bühler Warsaw. Another key reason for the close relationship with Wedel is the in-depth technical know-how of Bühler's salespeople. Thanks to their high level of experience and knowledge, they were able to speak the same language as their customers from day one of a project. The core components of the process are the five-roll refiner and the conche. After the PreFiner S crushes the ingredients – sugar, cocoa mass, and milk powder – and transforms them into a paste, Bühler's Finer S five-roll refiner pulverizes the substance to the desired 12 micrometers.

"Only Bühler can deliver this reliability," says production expert Kono. The powder is then reconstituted and liquefied with cocoa butter in the conche. Additional flavor and content ingredients are added here, creating the unique taste of the chocolate depending on the recipe.

Efficient production

The conche also plays a crucial role in another aspect: efficiency of production. Grinding and conching take hours. The rule is, the finer the product needs to be, the longer the process takes, This affects the line's capacity. However, Bühler stands not just for quality but also productivity. With the new process design and Bühler's DÜC S conche, Wedel was able to reduce the process time by around 30 percent. "Especially in times of high raw material prices, this productivity helps us keep our costs under control," says Kono.

Since no one at Wedel had experience with the necessary recipes, processes, and equipment, Kono sent his colleagues to Bühler's Chocolate Application Center in Uzwil, Switzerland. This included the entire team, from research and development, to marketing, operations, and other key personnel. They visited multiple times and learned the entire process from bean to bar, beginning with raw materials, refining, conching, ball milling, and molding.

The last course in 2022 focused on the new conching process using the DÜC S. It offers short conching times by applying higher shear in a shorter period. "My idea was that colleagues in all functions involved in this new project should have a fundamental knowledge of chocolate manufacturing. New product creation starts by forging employees' abilities," Kono explains.

"It really opened our eyes," explains Katarzyna Kowlaczyk, Marketing Manager at Wedel. "I never thought that the process of making top-quality milk chocolate could be so complex and that we would have to consider so many parameters."

Wedel's new product reaches world class standards in taste and smoothness thanks to particle sizes of just 12 micrometers.

Bühler's DÜC conches bring flavors to life. With the new process design of the DÜC S conche, Wedel was able to reduce process time by around 30 percent.

"DUE TO THE COMPLEXITY AND HIGH STANDARDS OF OUR TASK, IT WAS CLEAR TO US THAT WE COULD ONLY UNDERTAKE THE 12-MICRON PARTICLE SIZE PROJECT WITH BÜHLER."

TOMOKAZU KONO
Director of Production at Wedel

The conching process, in particular, was completely redefined for Wedel at Bühler's Application Center. The conches that Wedel had been using were underpowered, which made the process unnecessarily long and also meant that the energy input into the mass could not be adequately controlled. "With the Bühler conche, which processes the mass with up to 160 kilowatts and speed-controlled motors, a whole new world of chocolate production opened up for us," says Magda Ewa Kołodziejczyk, R&D Manager at Wedel.

A symphony in chocolate

And now it has arrived: Wedel's first world-class milk chocolate. Every museum visitor receives a 50-gram bar at the end of the tour. They can also purchase 90-gram bars in the museum gift shop and Pijalnie Czekolady E.Wedel. In future, Wedel plans to introduce the product to the broader market. Step by step, the quality chocolate will be incorporated into other products as well.

All of Wedel's employees were briefed and trained in detail about the recipe development. When asked how they would characterize an ideal chocolate, among the answers included, "smooth melting in the mouth" and "harmony of duet, with the cocoa note gradually intensifying as it melts in the mouth". Or, as Kono says, "Our chocolate is like a Chopin nocturne with a crescendo effect." Thanks to technical innovation and a fresh interpretation, Polish tradition is experiencing a renaissance.

INFO

OD 1851 E.Wedel

Wedel

Warsaw, Poland

Founded in 1851.

Wedel makes chocolates, Ptasie Mleczko®, pralines, cookies, waffles, bars, and ice cream.

The company supplies customers in almost 60 countries.

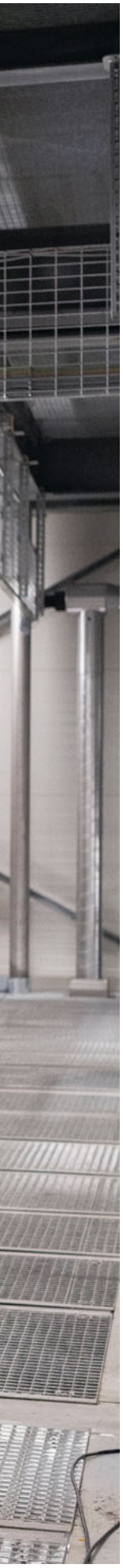
Wedel has the ShearMix mixing system, the PreFiner S and Finer S roll refiners, and the DÜC S conche. Its employees received training at Bühler's Chocolate Application Center in Uzwil, Switzerland.

SUCCESS AND SAFETY

GO HAND IN HAND

TEXT: JANET ANDERSON
PHOTOS: ANDREAS ZUBER

Safety is a priority for STAMAG. Dr. Achim Hanninger, Technical Director at STAMAG, and Volker Dworniczak, Bühler Site Manager, were in close contact throughout the project.



A major installation site is like a precisely choreographed dance. With planning and coordination, the individuals work together to deliver a successful outcome. Success is defined in quality, timing, and budget, but also – most importantly – safety. As a major installation at the malt producer STAMAG (Stadlauer Malzfabrik GesmbH) in Vienna, Austria, shows, success goes hand in hand with safety.

STAMAG'S MALTING PLANT in Vienna operates 24/7 to produce the highest quality products for its customers in Austria and across Europe. Malting is an energy-intensive business, so the company keeps its plant up to date to ensure efficiency. In 2022, the company embarked on a major update of the plant.

Two years later, the project was complete, on time and on budget, and most importantly without a single accident.

This is an impressive achievement considering its complexity, with Bühler and contractors from 15 companies working together for 2 years, during which the Bühler team alone contributed 75,000 working hours. There were over 100 fitters on site during the busiest period. By the end, the welders had completed 8.5 kilometers of welding seams.

Four cranes worked in parallel in a tight space and the work often had to be carried out at different heights. On top of that, the plant continued to operate throughout. Bühler was responsible for the overall project management and coordination from beginning to end.

As in any installation, planning is everything. Long before anyone arrived on site to start work, the project team had defined the material flows and assembly routes, walkways and driveways, then selected locations to position the trucks and cranes. This ensured that materials arrived at the assembly site without crossings or collisions.

"The project was completely planned out in advance, including every part and delivery, and the whole construction site," says Dr. Achim Hanninger, Technical Director at STAMAG. "All the workers knew what they had to do from the first day of installation. We had specific contact people at Bühler for planning and organizing the construction site. They were available to us whenever we had questions, requests, or suggestions."

Rules also had to be agreed. "We know that the building companies have more experience with their trades than we do, so we ask them to submit their safety rules to us and their rules apply alongside ours. If we think there might be safety gaps, we specify stricter rules," says Hanninger.

In addition, a local external safety expert was brought in by Bühler to assist in creating comprehensive risk analyses. Only when the site met the requirements of the "site readiness" protocol could work begin. This ensures that the conditions are in place for a safe start to work.

Once the work began, it took a high level of coordination to maintain the strict organizational division between traffic lanes and storage areas, and to ensure that waste and raw materials were stored correctly. "The key to success on the construction site is coordination so that the individual trades can carry out their work side by side without getting in each other's way or creating dangerous situations," says Joachim Mayer, Project Director, Project Execution at Bühler. "We have to ensure that all the workers – our own and those hired by the customer – are integrated into the system and coordinated."

This was the task of Bühler Site Manager Volker Dworniczak. Every day he coordinated with the other companies. "We held daily discussions to

“THE PROJECT WAS COMPLETELY PLANNED OUT IN ADVANCE, INCLUDING EVERY PART AND DELIVERY, AND THE WHOLE CONSTRUCTION SITE.”

DR. ACHIM HANNINGER
Technical Director at STAMAG

identify and eliminate risk points. We looked at the hot spots and agreed on possible solutions so that we could complete the day without any accidents. The entire site was inspected weekly,” he says.

For Hanninger, this process was managed very well. “We allocated each company their own areas or time slots where they could carry out their work. This was accepted and adhered to by everyone. Where there were conflicts, we found solutions quickly,” he says. “We had a very collegial way of dealing with each other.”

Eyes wide open, all the time

In addition to planning and coordination, another key element is safety awareness. This must be communicated and cultivated daily because the installation site is changing all the time. Keeping a high level of awareness for safety over a long project requires constant vigilance.

“As a site manager, you walk round the construction site several times a day keeping your eyes open,” says Dworniczak. “Any defect or violation of the regulations must be remedied immediately. This includes ensuring all workers have the correct personal protective equipment.”

Exchange with the customer is also key. “In large projects, it is important that the customer, the other companies, and their safety officers establish, cultivate, and control the culture of applied occupational safety,” says Dworniczak. “For STAMAG, this task was a priority from the start and remained the focus throughout the execution period.”

INFO

STAMAG

STAMAG

Vienna, Austria

Founded in 1884.

STAMAG produces top-quality brewing malt and baking ingredients.

The company supplies customers in Austria and abroad.

The STAMAG project involved the Installation of a new malting plant consisting of a steeping house with a washing screw, six cylindroconical steeps, and two towers each with three germination kiln units.

STAMAG's malting plant continued to operate 24/7 throughout the 2 years of work to update it.

VIDEO

Watch this video to learn more about the collaboration between STAMAG and Bühler.

"This is not the achievement of a single person but the result of good teamwork, starting with planning and then execution," says Mayer. Leadership and management are also critical factors. But it is the corporate culture that plays one of the biggest roles.

Teamwork – from plan to execution

"We can learn so much from each other. It is important to have a speak-up culture where everyone feels responsible for Environment, Health, and Safety (EHS), not just the experts," explains Sandie Lancashire-Arn, Global Head of EHS Management at Bühler. "The challenges at installation sites are often complex. The best solutions are generated together. That was the success in this project."

As well as keeping accidents to zero, the Bühler team were able to finish their part of the project earlier than planned, so that the new plant was completed almost on schedule. "Considering that the construction and planning period together took 3 years, we managed very well," says Hanninger. "We were very pleased with the collaboration."

"THE CHALLENGES AT INSTALLATION SITES ARE OFTEN COMPLEX. THE BEST SOLUTIONS ARE GENERATED TOGETHER. THAT WAS THE SUCCESS IN THIS PROJECT WITH STAMAG."

SANDIE LANCASHIRE-ARN
Global Head of EHS Management at Bühler

INDIA – A GROWING INNOVATION POWERHOUSE

Prashant Gokhale, President Region South at Bühler

INDIA, with its dynamic economic landscape, is on the cusp of becoming the third largest economy by 2030. This remarkable success story is underpinned by economic growth, its large and young population, infrastructure development, digitalization, and innovation. For 30 years, Bühler has been contributing to India's upturn with vital know-how, training, and a network of manufacturing and training facilities.

India's economy grew at an impressive rate of 7.8 percent in 2023 and is projected to maintain a robust growth rate of 6.8 percent in 2024, according to the International Monetary Fund (IMF). Connecting such a vast country is crucial to continue India's growth on an economic as well as a societal level. The country has built 75 new airports in the last decade, and another 70 are expected to be constructed in the next 5 to 7 years.

The government of India launched its "Digital India" initiative to improve online infrastructure and increase internet accessibility for citizens. Today, India's digital infrastructure is unparalleled, with the nation witnessing a staggering surge in digital transactions. In 2023 alone, more than 100 billion digital transactions took place.

The "Make in India" government initiative has propelled domestic production, encouraging local manufacturing and attracting global investment. India is the third largest player in automobile production and has become the second largest mobile phone producer. Additionally, India's distinction as the world's software capital underpins its stronghold in global offshoring, providing cost-effective and skilled IT services to multinational companies.

Innovation is also witnessing a steep rise. India is home to over 100 unicorns (start-ups valued at over USD 1 billion) and a start-up landscape boasting over 100,000 ventures, reflecting its status as a cradle for innovation and technological advancement.

Bühler India is contributing to this economic and innovation wave. Through high-end machinery and dedicated research and development facilities, Bühler supports the manufacturing sector with cutting-edge technology specializing in manufacturing equipment for processing rice, pulses, and other grains as well as color sorters and mid-market biscuit solutions. The creation of a network of Application & Training Centers (ATCs) exemplifies Bühler's commitment to collaborating with customers to trial new products, improve processes, and develop innovative solutions. The training programs ensure a well-equipped workforce capable of driving the industry forward.

Local innovation is another focal point for Bühler India, with tailored solutions designed to meet Indian customer's requirements such as the Pesa technology for whole wheat flour (atta) and processing solutions for spices, pulses, and other grains.

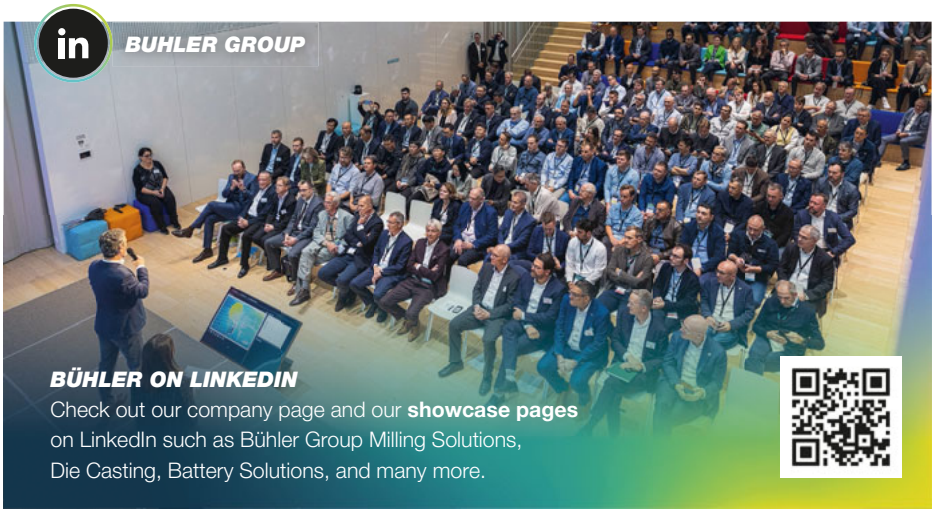
To address the growing demand for technologies in the food, feed, and mobility industries locally and internationally, Bühler India is expanding its expertise and capabilities into manufacturing color sorters, core milling technology such as plansifters and purifiers, as well as biscuit ovens. This expansion aims to cater to local customers while increasing exports, further contributing to India's economic growth.

India is self-sufficient in food grains, producing 330 million tonnes annually. Even during challenging times, India can not only meet its domestic needs but also continue to export. The food processing sector in India is set to experience significant growth due to changing food habits as disposable income rises and the effects of urbanization come into play.

With Bühler's solutions for food and feed processing and advanced materials production, coupled with our network of manufacturing sites and ATCs, we are well positioned to not just benefit from India's economic upturn and thriving innovation system, but to actively contribute to the success and wellbeing of the country's 1.4 billion people. With these strategic initiatives and a dynamic demographic profile, India's future is radiant, brimming with opportunities for growth and innovation.

LET'S GET SOCIAL!

Stay up-to-date with the latest trends, innovations, and customer success stories from the Bühler world by following us on our social media channels. You are also welcome to tag us in your posts about how you work with our solutions.



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YOUR OPINION MATTERS TO US

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