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Industry 4.0 technology:

Smart bakeries

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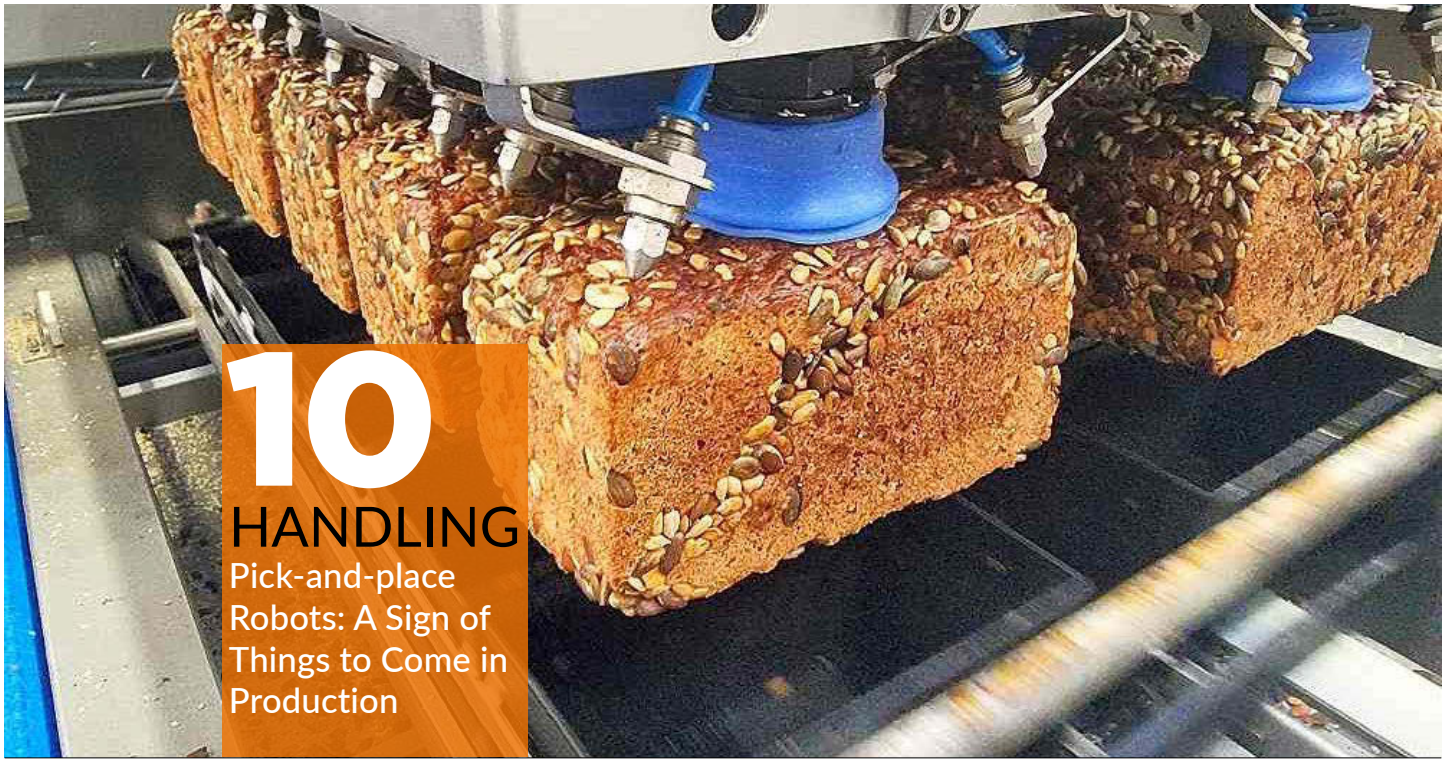
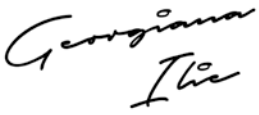


The Practice of Sustainability Can Begin with Technology

Jo Ilie, Senior Editor



More than 70% of Gen Zs and Millennials think their generations are more concerned with the environmental impact of their food choices than older generations. And, overall, across all generations, almost 40% say they are influenced in their purchasing decisions by the environmental impact of the production chain, which is almost 15% more people than in 2019, according to a recent study by the International Food Information Council. Even with inflation and financial concerns in the post-pandemic/war in Europe reality, environmentally-based decisions remain one of the staples of convenience shopping. And they are here to stay.
Sustainability is a big word, an umbrella under which many good practices can find a place. Responsible sourcing of ingredients is one, mitigating the environmental impact with compensating measures - reforestation, for example - is another, creating safe workplaces is also important.

> Consumers want to see more sustainable practices in how their bread, biscuits and snacks are made. One way to meet this concern is to employ smart technology that is developed with sustainability in mind.

Two recent world developments - the realization that the Western world wastes innate amounts of food and the energy crisis made acute by the war in Ukraine - brought forward two other ways companies can exercise sustainability. One is to focus on production processes that minimize food waste, and the other is to move to technology with a smaller carbon footprint, with hybrid or full-electric heating.
Thankfully, the equipment producers have been seeing these changes coming many years ago and the technology they offer now is ready for the new standards in the market. •

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Oven Technology's Nimble **Response to Market Demand**

As consumers request more product diversity, that caters to every free-from diet, and less environmental impact in the production process, bakers have to look for solutions in the latest oven technology. Multiple heating, steaming, and cooling functions, modular design, adjustable dimensions, easy cleaning, and component replacement, all contribute to better output.

By Jo Ilie

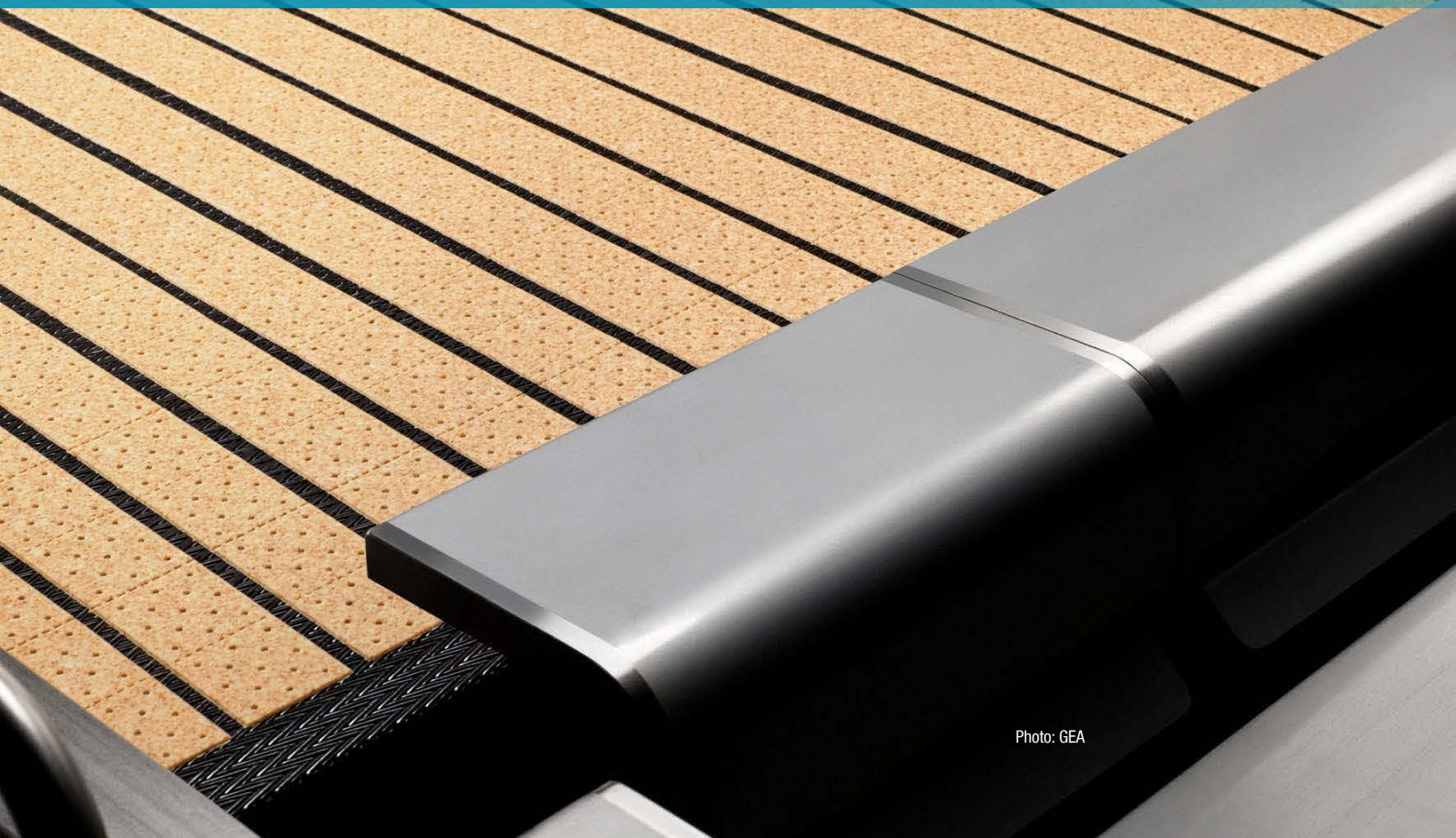

Photo: GEA

Ovens have evolved to answer to the ever changing demands of the market. Producers can now see highly modular equipment that allows them to create varied bakery products without having to invest in new and new lines.

MECATHERM'S MT-A OVEN, HIGHLY MODULAR DESIGN

Mecatherm's MT-A oven is one of the answers to the needs of the modern baker. In order to bring maximum flexibility, this oven has a modular design, composed of compact modules of 25m² maximum. Each module represents independent heating zones and for each independent module there are 6 combinations of heat transmission modes. The baker can select between top convection, top radiant heat or a combination of both. At the bottom, they can select between radiant heat or convection thanks to a patented "mobile hearth" system. The baker can also precisely adjust the heating intensity by selecting a temperature and air flow rates. The oven offers two ways of injecting steam: very close to the product in order to condense the steam on its surface or in the air circuit to deal with the humidity rate inside the baking chamber.
The M-TA oven has been designed to ensure the highest baking energy efficiency for each product, also in answer to the bakers' and consumers' preoccupation with sustainability. The oven housing has performant insulation and the oven relies on a heating principle combined with the use of convection. Convection is a very efficient mode of energy transfer that ensures shorter baking times for two main reasons. Firstly, the hot air circulates throughout the baking chamber and exchanges its energy with all surfaces of the product and its support in contact with the hot air - thus, the lateral or "hidden" zones absorb less energy. Secondly, convection also allows work at much lower air temperature than radiant heat. The temperature of the smoke is lower so the energy loss is reduced.
In addition to these energy-saving technologies, the M-TA oven is equipped with a new function of assistance to chimney opening control. This feature allows to control the balance of in and out air flows to avoid cold air from entering the oven and maintain the highest energy efficiency all along the production.


Photo: MECATHERM

JBT'S ELECTRIC TWINDRUM SPIRAL OVEN, FOR ENVIRONMENTAL GOALS

JBT produced a new, electric version of its successful Stein TwinDrum Spiral Oven, offering a range of features including simpler maintenance and connectivity to JBT's iOPS platform, as well as giving customers the opportunity to better meet their green commitments.
The TwinDrum spiral oven's design enables processors to increase their processing yield compared with existing ovens, while at the same time ensuring consistent cooking of food items by uniformly distributing the hot air flow across all tiers. JBT is offering customers a new way to heat by foregoing gas and oil-based heating systems, and plugging directly into the grid, according to Stefan Paulsson, JBT's Director of Value Stream & Global Product Line for Cooking & Linear Freezers. "Through the electric TwinDrum, we are offering a new way to heat," he says.
"We come in contact with a lot of new food producers in the world wanting to cook

Photo: JBT

and fry alternative proteins, but often, for these small scale start-up producers, investing in a thermal fluid system can be quite expensive. Having an electrically-heated fryer and oven is a good and more affordable alternative for this group."
With the electric TwinDrum, Paulsson says, customers are able to save twice: by having one single rather than two heat transformations, and by not having to invest in a separate boiler and piping.
"Instead of having to pay for a thermal heating system, you just have cables that go directly into the machine," he says. "The electric heater is fixed in the machine, so it can be easily accessed for cleaning and maintenance, while having fixed wiring means better reliability.
Electric heating also gives processors the ability to use renewable sources of energy that could help them to achieve their environmental goals or commitments."

GEA'S HYBRID BAKING TECHNOLOGY, FOR BETTER TEXTURE

GEA Bakery introduced the concept of Hybrid Baking Technology since the early 1980s, after the practical observation that different heat treatments are required to the dough pieces in different parts of their baking process. Since then, crackers are baked on Hybrid ovens constituted by DGF (Direct Gas Fired) and Indirect Convection; while Rotary Moulded & Wirecut/Deposited products are better baked on Radiated Heated and Indirect Convection.
The Hybrid baking technology offers an extremely flexible tool in the hands of the bakers, says Nicole Meierotto of GEA. "in cracker production, as an example, while the DGF section upfront offers ideal heating power technology for removing most of the moisture, the Convection at the end softly continues the extraction of the little amount of moisture still left inside the dough piece, allowing, at the same time, an optimum and fine-tune control on the final coloring of the top surface and final moisture level."
A Hybrid Oven requires in general less maintenance than a traditional single-heating system one. For example, in the case of a cracker oven, the Hybrid Configuration requires about 30% less ribbon burners if compared to an old fashion single-heating system oven, with consequent drop of maintenance time, maintenance cost and necessity of spares. Big improvements have been obtained by the adoption of big man-holes apertures on the non-control side of the baking chamber; this feature facilitates the accessibility to the baking chamber for cleaning or inspection purposes.
In a Hybrid oven, the heat transfer is optimized in respect of the possible need of the dough piece under baking; at the beginning, the product requires a lot of heat to rise its temperature and start the evaporation of the moisture; at the end of the baking process, this moisture removal is almost completed and gentle heating is required to fine tune the Maillard reaction which gives the golden color to the top surface of our cookies or cracker. •

Hybrid Configuration requires about 30% less ribbon burners if compared to an old fashion single-heating system oven, with consequent drop of maintenance time, maintenance cost and necessity of spares.

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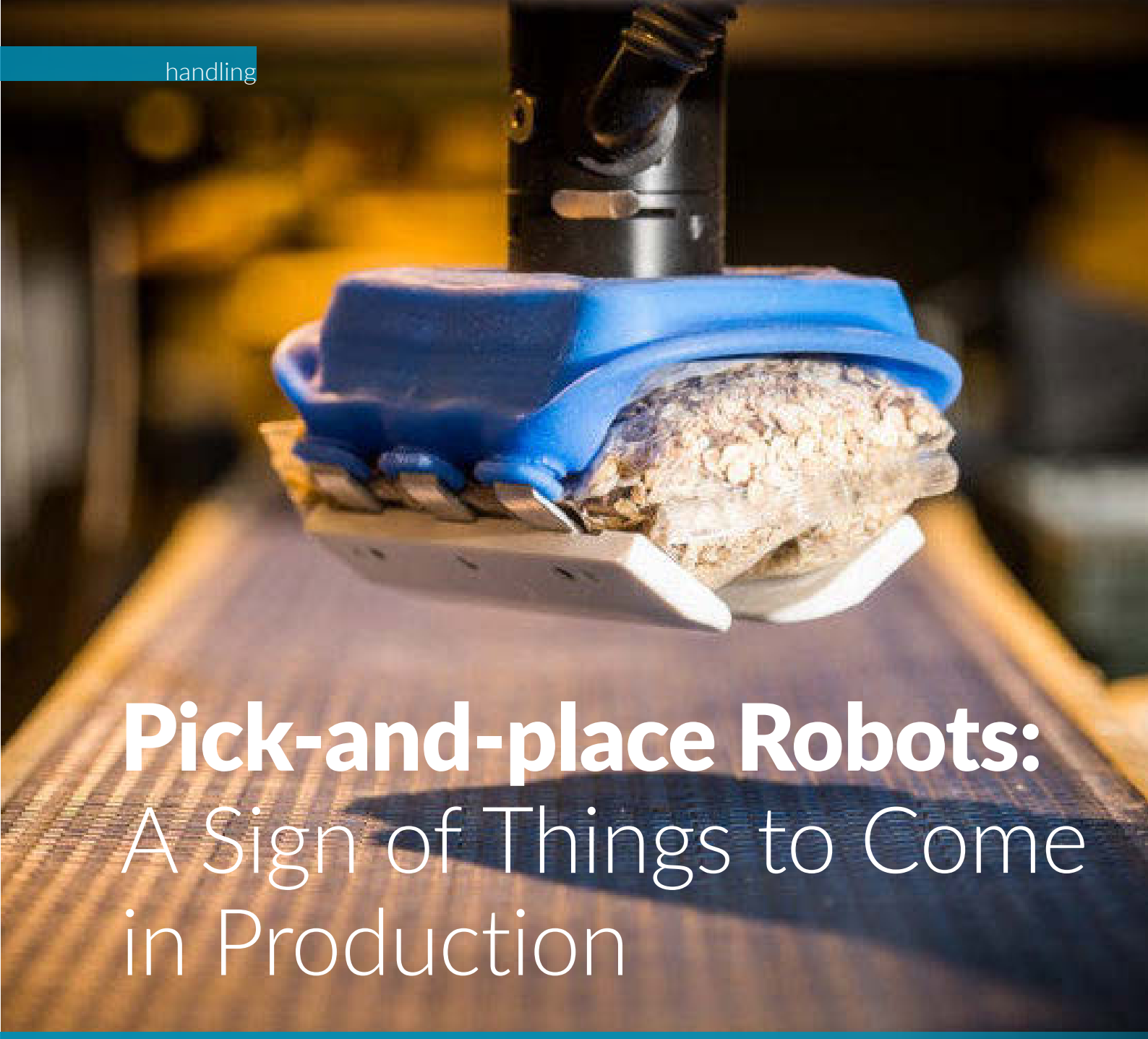

Pick-and-place Robots: A Sign of Things to Come in Production

Pick-and-place robots and cobots have evolved in recent years to handle even the most delicate pastry and confectionery items without damaging the product, but their applicability is even more relevant today, when the industry is facing personnel shortage, supply chain interruptions, and increased demand. Their high adaptability and throughput allows businesses to keep up with the new market challenges.

By Jo Ilie

With the gentlest grip, a pick-and-place robot arm moves cookies from a conveyor belt into a plastic recipient. It doesn't drop them, it doesn't smash them one bit, and it knows where to place them so they don't stack up in the box. Later on, a similar robotic arm with suction cup end effector picks up the plastic box from a different conveyor belt and places it on a transportation rack. It knows where to put the boxes so they don't fall from the rack. It even knows to slow down when a human worker approaches.

These scenes appear in a presentation video by Baker Bot producer Apex Motion Control, but they are common now in bakeries around the world. Increasingly, pick-and-place robots take over repetitive work from humans and help produce a better, bigger yield in a shorter time.

The history of these robots is fairly recent. They are based on the Delta robot designed in the early 1980s by a research team at Swiss Federal Institute of Technology in Lausanne, Switzerland, and they started to be mass produced in 1987 by Swiss company Demaurex, who bought the license from the Institute. In 1999, a revolutionary robot called FlexPicker was launched by ABB Flexible Automation. Today, the pick-and-place robots have developed to have applications in all industries that require higher speed repetitive tasks and precision: computer, car, packaging, and, of course, the food industry.

Today, pick-and-place technology typically uses delta robots (also called parallel robots), 6-axis articulated arms, or collaborative robots (or cobots, the robots that interact with human workers and adapt speed and gestures to protect them from harm). The throughput can reach up to 200 products per minute, vastly superior to what human workers can achieve while maintaining quality. Their vision modules can identify 100 or more products on the moving conveyor per second and they have a high picking accuracy and tool compensation that can bring placement error down to 0 mm.

A pick-and-place robot can cost anywhere between several thousands USD to USD250,000 - a good measure of worthiness is if it reaches net ROI on a 12–18-month timeline.

A pick-and-place robot is always part of a more complex, modular system that can include conveyor belts, ovens, and other bakery equipment. While the initial cost can be steep - depending on the complexity and add-on features, a pick-and-place robot can cost anywhere between several thousands USD to USD250,000 - a good measure of worthiness is if it reaches net ROI on a 12–18-month timeline. After, the investment is fully paid off and the equipment only has maintenance costs, so it can bring profit for a long time.

THE RISE OF THE ROBOT IN THE PANDEMIC

The COVID-19 pandemic has fueled the automation megatrend. Automation was an answer to both concerns for safe handling of food and for production interruptions because of COVID outbreaks. Robots can't catch viruses, at least not the ones that cause human pandemics.

Now, manufacturers of different products, especially food, increasingly rely on robotic solutions to automate critical process steps or to fully automate entire systems. Syntegon Technology, for example, recently debuted a newly developed RPP platform that includes quality assurance, user-friendliness and efficient production processes, "an automated turnkey solution from a single source," as Dr. Silke Blumer, Vice President Strategy and Product Management for the business unit Food at Syntegon, calls it.

The Syntegon RPP platform automates process steps such as handling, feeding and loading. The new robotics platform is designed as a modular system that allows individual configuration of the robotic

cells because “each customer’s project is different,” explains Andreas Schildknecht, Product Manager Robotics at Syntegon. “Together with our customers, we can automate single process steps consecutively and in line with their needs or budgets, following the principle ‘build as you grow’.”

END EFFECTORS MAKE THE DIFFERENCE

Beyond the robotic parts, one essential component of the pick-and-place robot is the end effector - the piece at the end of the robot arm that manipulates the object. In bakery applications, it can be a suction cup, various grippers, extruders, or other types. For pick-and-place purposes, grippers and suction cups do the job: they can move products, packaged or not, gently onto their next destination.
Piab, a major producer of end effectors


Photo: Syntegon

for various industries, says that, in the development of gripping devices for food, they specifically looked at how to avoid breakage. This led to a range of e.g. different suction cups, able to handle everything from brittle lasagna sheets and very thin slices of cracker bread to pralines, bread and muffins. The suction cups used for lasagna sheet handling, for example, are designed with an extra-long and thin lip enabling it to handle fragile pasta sheets with special care - and they are approved for direct food picking.
Piab is also developing advanced gripping solutions for certain industry segments, among them piSOFTGRIP, a vacuum activated finger gripper. This gripper can handle delicate objects from ripe tomatoes and strawberries to empty chocolate eggs. When reaching the desired destination, these delicate products are never dropped, but placed carefully in their new spot, to avoid damage. Other grippers don’t use vacuum, because the product’s texture won’t allow for a sealed contact area. With the help of Piab’s Kenos foam, an FDA approved foam for direct food handling, these grippers work like very gentle and precise human fingers, picking the products from the sides.
Robots are gentle, but they are also incredibly strong and can lift things human workers can’t. The gripping system from GRIPWIQ for automatic de-panning of fresh loaves of rye bread is proof of what pick-and-place robots can do to make things easier and faster. Without this machine, a fifteen-kilogram bread pan had to be lifted and turned over on a conveyor belt by hand, which required several workers to empty and align the products on the running conveyor. With GRIPWIQ, it can be done by one person, who brings the rack with pans to the machine and assists when some minor technical errors happen.

WHAT’S NEXT?

Automation is the future, says Dr. Blumer from Syntegon. “The growing need for more flexibility and efficiency will be increasingly realized by integrated robotics solutions.”
Flexibility must be met with flexibility, add experts from Piab: “The key part in future design of handling solutions will be flexibility to allow easy use with different product types either in series or simultaneously.”
With powerful forces shaping the baking industry - personnel shortages, increased demand for more free-from bakery, which means constant tweaking of recipes and more fragile end-products, supply chain interruptions - pick-and-place robots can give businesses leverage to mitigate change. •

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Mixing Technology Can Solve **New Baking Challenges**

Demand for bakery and pastry products keeps growing, and trends are evolving quickly. Taste and quality are currently top criteria for consumers, but they are also increasingly mindful of the composition and nutritional quality of their food as well as its environmental impact. At the same time, other external factors are impacting the market such as supply chain or skilled labor issues.

By VMI

In their search for smart solutions to keep up with today's consumers and challenges, bakery manufacturers can rely on processes and technologies to help them rethink product formulation while maintaining consistency and quality. As one of the most critical and important steps in the production of baked goods, mixing is a significant contributor when addressing these new challenges, whether manufacturers seek to increase efficiency, diversify their production, integrate environmentally friendly or sustainable practices, or improve traceability, cleanability, and quality management.

CONSISTENCY AND ACCURACY – TOP PRODUCTION CRITERIA FOR MANUFACTURERS

Repeatability is crucial, especially for large commercial bakeries, as they need to meet the growing demand while ensuring the consistency of their end products. This sounds simple in theory, but the dough and the mixture are living elements that must be understood and controlled. It is a difficult challenge if you add external biases such as the ambient temperature, the whole manufacturing process, and the environment. External factors, such as a high turnover, can also impact the consistency of the production as it usually comes with a loss of knowledge and skills and increases the risk of mistakes. Innovative and efficient mixing technology can help.

Automation appears to be the perfect solution as it plays a big part in improving the control and repeatability of mixing processes. Continuous and automated mixing systems are now equipped with a powerful HMI which can manage recipe formulation, dosing, programming, monitoring of instructions, and traceability. Not only does automation ensure a higher standard of food safety, as fewer hands are required to handle the product, but it would also allow bakers to establish organized process control.

ENSURING CONSISTENCY DESPITE STRUCTURAL CHANGES

Generally speaking, tracking process parameters helps provide greater consistency and is a good way to adjust to changes such as new ingredients or suppliers. For instance, continuous metering and weighing devices for all the recipe ingredients, including liquids, are essential to ensure the repeatability of the produced doughs. Other parameters can be monitored to ensure consistency, such as temperature or energy provided to the dough to monitor the gluten network's viscosity and formation.

If we focus on continuous mixers, they are a great combination of consistency and high productivity levels. Recipe formulation, dosing, programming, monitoring of instructions, and traceability are all managed by a user-friendly, high-performance HMI. Our Verymix continuous mixer also benefits from a precise yet flexible dosing system; fat in blocks or liquid, scrap dough, special flours, eggs, dried fruits, or chocolate chips can be incorporated at any time during the mixing stage. The ingredients (powders, liquids) are weighed by 3 stainless steel load cells. These load cells can be fed automatically by intermediate hoppers, manual loading hoppers, or big bags. Water, egg, milk, liquid yeast, flavors, liquid sugar, and brine are dosed in a very accurate manner. Dosing pumps and electromagnetic or mass flowmeters weigh the liquids. You can also dose the quantity of scrap to integrate. Scrap quantity should not be neglected: for bread they can reach 25% of the weight of the flour and for some puff pastry, up to 50% or more! With automation and controlled dosing, the tasks performed are accurate and repeatable, ensuring that all batches are produced with the same specifications and will have the same quality.


Photo: VMI

VERSATILE SOLUTIONS TO ADAPT TO SIMPLE OR COMPLEX PRODUCTION PROCESSES

Continuous mixers are great for keeping a constant flow for raw-frozen, par-baked, and frozen doughs, but they might not be suited for more complex or varied production processes. For instance, adding yeast and preferments increases the preparation phase of the dough and makes the mixing process undeniably more complex. Careful management of the mixing process is essential to successfully develop a good flavor and texture, as well as a lasting shelf life. So, if you want to produce sourdough bread or sprouted bread, which are back on the center stage for their nutritional value, you will want to look at batch mixing systems.
Automated mixing systems integrate several mixers or planetary mixers and automate the progression of batches from one station to another. It becomes possible for larger bakeries to manage the gentle, slow mixing and long resting times in an automated way and on a very large scale. Automated systems can integrate several mixers (fork mixers, spiral or others) as well as dough rest stations. To carry out these processes in a repeatable way, automation and process programming is key to the success of a fermentation-based recipe. Whether fermentation, sprout, degassing, introduction of yeast or sourdough: nothing is left to empiricism and each recipe is made accurately.
The bowls can be easily transferred for resting, fermentation or other steps in the mixing process. The use of buffer tanks for these fermentation steps, automatically managed by a monitoring system, makes it possible to implement batch technology to enable flexible and scalable processes. The batch technology allows a complex and long process of mixing and fermentation while keeping a high productivity, from 15 to 16 bowls per hour.

TRACEABILITY AND FOOD SAFETY: A HUGE PRIORITY FOR MANUFACTURERS

Traceability is a factor that can't be ignored nowadays as food safety and health remains top-of-mind. You never know when a recall or data collection for an audit will be required. Automated systems facilitate the monitoring of operations. You can follow on screen the history of informative events, and faults, but also manage different recipes. For instance, bowls with allergens are clearly identified. They also offer optimized cleanability to limit the risk of contamination, and production does not start if the bowl has not been cleaned. Clean, allergen-free bowls are prioritized during recipe sequencing.

Photo: VMI

OPTIMIZATION IS KEY

Finally, apart from the process and product quality, these new technologies also provide significant benefits to the manufacturers. The automation of mixing systems maximizes the availability of the installations and guarantees a considerable increase in the efficiency of the production, compared to a manual process. Optimizing cycle times allows machines to run longer and faster, thus increasing production rates and greater flexibility for varied recipes. Production costs are also reduced, and the return on investment is often faster. Automated systems often allow better use of space within a production line and thus make them more efficient. The precision of the robots enables the reduction of dough waste, ingredients are saved, as well as the costs of waste treatment.
All these elements make smart mixing solutions perfectly suited to be integrated into broader production lines. Choosing smart bakery solutions will help you streamline your production and minimize expenses without overlooking quality. •

Rademaker

Specialists in food processing equipment

Experts in dough technology

In-depth knowledge of dough technology is a key ingredient required for the production of high-quality bakery products. With over 40 years of experience in the bakery industry, Rademaker is expert in this field. This know-how, combined with specific sheeting process expertise, overall production process insights and cost of ownership calculations, are used to develop the very best bakery equipment solutions that will work for you.

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Radini Dough Processing Equipment: Where Artisanal and Automated Production Meet

Today, the bakery sector requires more and more flexible, automated production solutions at different production capacities. Rademaker's Radini is the answer to these requests. It is a production system for bakeries that want to increase their production capacity or extend their product range, or industrial bakeries that want a smaller, flexible production line that respects their industrial values.

by Rademaker

Rademaker is well known for high end and high-volume bakery production equipment. Its latest production line, Radini, offers outstanding solutions with regards to flexible and high-quality dough processing equipment, where ease of operating is key. The production lines are capable of processing 400 up to 1,000 kg per hour. It is designed and built for bakeries that want to expand or maintain their production range or capacity at a compact footprint. Rademaker's proven techniques and technologies are the basis of a large variety of predefined Radini production line configurations.
Radini is developed after intense testing. A process in which Rademaker specialists and technologists closely worked with customers, in the Rademaker Technology Centre in The Netherlands, but also at the customer's production site. The result is an efficient, compact, and flexible production line which contains industrial values but is suitable for processing up to 1,000 kg dough per hour.
From single layer to laminated dough sheets, yeast to puff doughs the possibilities of processing various doughs are extensive. It is even possible to process different dough types on the same production line.
For shaping the dough, different tooling is offered. By simply adding a tool, a baker

can easily expand their product range. Radini offers bakeries the possibility to automate the production process fully or partially, in one go or step by step. Automated process functions can be combined with manual process steps, e.g., fat application, offline resting and cooling, (rework) dough feeding, as well as partial or full forming of products. This allows bakers to be flexible and make a mark on their products.

KEY CHARACTERISTICS

Modular Design
Ranging from a straight sheeting line to a three-section laminator and pastry production line, Radini offers suitable solutions for a variety of production methods and end products. A broad selection of predefined modules and easy to add-on tooling provides bakeries with numerous possibilities.

Smart and Automatic Process Control
All sheeting lines and laminators are executed with automatic process control features. For example, product related settings like automatic gap adjustment. And in- and outfeed control to synchronize the production line speed to create an optimal dough sheet.

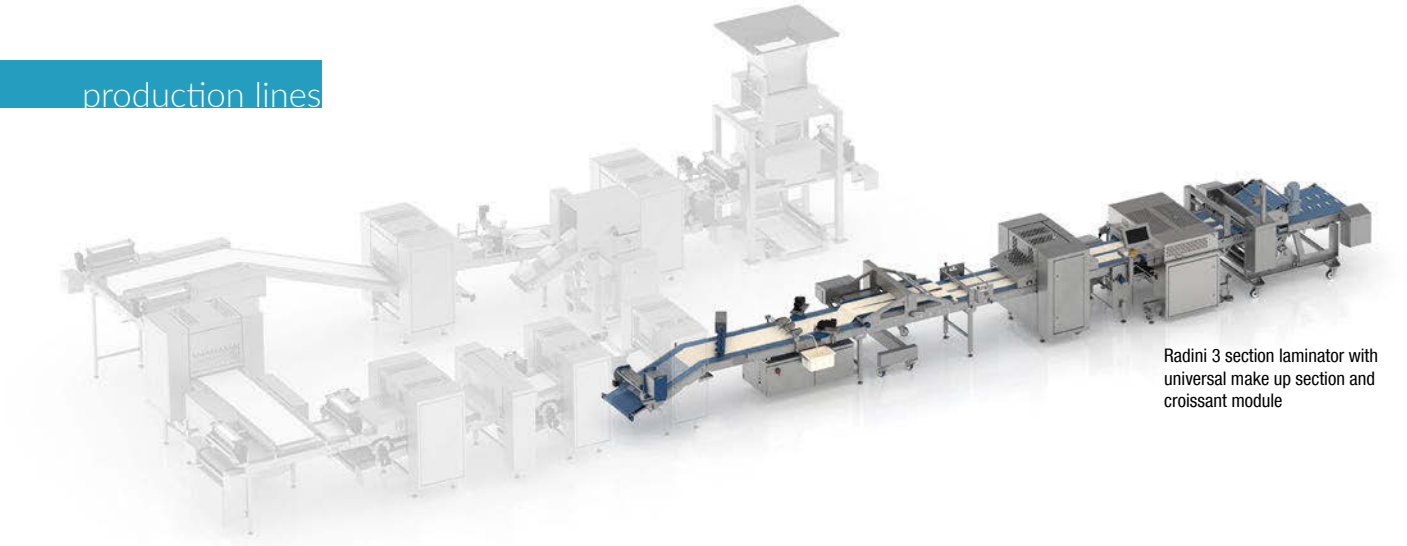
Intuitive Control Interface and User Friendliness
Radini's operator interface (HMI) and control system are optimized to help the baker run their production line as efficiently as possible. A large (15") touch panel provides a user-friendly interface. A combination of a PLC control system and a PC oriented controls interface creates an optimal combination of system intelligence and ease of operation. Extensive recipe management which can also include your own notes are integrated in every line. As well as performance insights to assist in running your production as efficiently as possible. Additionally, an open cover design creates the best possible visibility on the production processes. Removable units and scrapers are ergonomically designed and easy to handle.

Based on Proven Rademaker Technologies
Radini has been completely designed to satisfy the requirements of today's market. The production lines have been equipped with Rademaker's technical and technological high standards.

SHEETING OF (NON)LAMINATED DOUGH

The Radini dough sheeting line produces a consistent stress-free dough sheet. With advanced sheeting features bakeries are able to create consistent and high-quality products. Radini solutions range from a straight sheeting line, producing a consistent dough sheet or cut dough slaps, to a three-section laminator, producing a laminated dough sheet or laminated dough blocks. The equipment can be used for both block making and block processing. Also, an endless dough sheet feeding a downstream system can be produced, for example, the Radini Universal make-up line. During this process, combinations of both manual and fully automatic processes are possible. The production lines are available with a working width of 600mm or 800mm. Sections can be extended to make sure the equipment fits an existing infrastructure.

Radini yeast dough sheeting line



Radini 3 section laminator with universal make up section and croissant module

UNIVERSAL MAKE UP LINE

A production system as versatile as the baker's product portfolio. Radini offers a wide range of tools enabling endless possibilities to shape beautiful and tasty dough products. We developed various tooling for carrying out dough shaping, one tool can be used to produce multiple products. It is also possible to do manual shaping. This allows bakers to give their products a personal twist and surprise their customers with new, innovative products.

CROISSANT MODULE

The croissant module is an addition to the universal make up line and consists of a small number of additional units, based on movable frames. Different specialized moulders are available. This way croissants in various shapes and sizes can be added to the baker's product range.

RADEMAKER SERVICE AND TECHNOLOGICAL EXCELLENCE

Radini production lines are serviced through Rademaker's 24/7 service department. As can be expected of a Rademaker brand, the service does not stop after delivery. Troubleshooting Radini systems therefore is also supported by the service department. Great care is given to the quality of the baker's product. This means that technological know-how is an important matter. A team of bakers from the Rademaker Technology Centre assists in finding the optimal combination of artisanal and industrial excellence. •

Photo: Rademaker

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What can you expect from the largest trade event for the grain-based foods industry in the Western Hemisphere? Everything you need to take your ingenuity to new heights. With the latest innovations, new ingredient formulations, game-changing insights and an unbeatable sense of community, it's a one-stop shop for all baking professionals. Join the global industry in Las Vegas, where you'll find the power to keep your business soaring.

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From the Field: Automation Solutions for Baked Goods

Once the oven is running, baked goods need to be packaged quickly after cooling without slowing down the flow of the production line. With this in mind, manual packaging processes can quickly reach their limits. With the help of its versatile and highly advanced pick & place technology, packaging machine manufacturer Schubert can provide custom-fit automation solutions to large bakery operations as well as small and medium-sized enterprises. The robot-assisted packaging machines are a future-proof investment thanks to their flexibility in terms of product and packaging formats, which includes the possibility to use more environmentally friendly packaging materials.

By Schubert

With automated packaging systems, baked goods manufacturers have to be certain that the sensitive products are not only packed quickly, but also very carefully. Thanks to the use of robotics, new standards in terms of production reliability and quality can be achieved in the packaging process. Ultimately, improved efficiency, speed and flexibility are also reflected in higher profitability. Baked goods manufacturers can now produce more cost-effectively, expand their production and product range flexibly, while asserting their position in the market.

Schubert's state-of-the-art pick & place robots are well known for performing this demanding task reliably and efficiently. The image recognition system developed by the Crailsheim-based family business

ensures a precisely targeted grip, while the robot tools specifically engineered for each product ensure that neither soft croissants nor fragile pieces of cake are damaged. The highly advanced pick & place technology, in conjunction with Schubert image processing, also ensures that only flawless products make it into the packaging and to the customers.
The modular system makes Schubert packaging machines extremely easy to expand. This approach brings more flexibility to the machine configuration and to the entire packaging process. This applies not only to automation with pick & place, but also to Schubert's flow-wrapping machines. With the Flowpacker, the packaging machine manufacturer offers an integrated machine solution that enables an exceptionally high degree of flexibility. This technology fully integrates packaging in flowpacks into the packaging line and also enables the use of recyclable flowpack films through the various sealing processes. Feeding to the Flowmodul unit is also solved with pick & place robots. And this is why the compact flow-wrapping machine is especially interesting for companies with limited space.

AUTOMATION WITH A SMALL FOOTPRINT

An Alsatian manufacturer with a century-old tradition also exploits these advantages. The company benefits not only from the Flowpacker's flexibility in handling different formats, but also from the ability to form and seal different films. This is especially important with regard to more sustainable plastic films made from monomaterials or paper-based films. Because the baked goods sector is also increasingly adapting to the demands of consumers, retailers and politicians to package their products in a more environmentally compatible manner. This is how even small and medium-sized enterprises can position themselves for the future and master current and upcoming challenges with the help of automation.
This is impressively demonstrated by the Alsatian producer. Due to the company's wide range of products, a true multi-talent was required that could handle different types of packaging through to sustainable solutions. Specifically, the bakery wanted to be able to process both plastic and paper-based films, trays made of cardboard and plastic as well as U-boards made of cardboard. Also called for was the gentle packaging of a wide variety of biscuit shapes, directly after the production process, via quality control and packaging into flowpacks with and without trays, all the way through to sealing. Since its installation in June 2020, the flow-wrapping machine has taken over all steps of the packaging process in a small space.

LINZER SQUARES AND SIMILAR PRODUCTS GENTLY PACKAGED

Reliable quality control combined with gentle handling is very well received by baked goods manufacturers. In addition to taste, the presentation of sweet works of art, such as those from

Photo: Schubert

Guschlbauer, is also important. For the safe and efficient packaging of its Linzer Schnittten, Linzer Kipferl, Punschwürfel and many other Austrian baked goods, Guschlbauer has long relied on packaging machines from Schubert. In 2019, the company commissioned another system from the specialist from Crailsheim adding a robot-assisted picker line to its existing equipment. It safely packs the assortment of numerous biscuit varieties in extremely lightweight plastic trays.
To make the packaging not only machine-compatible but also more sustainable, Schubert and Guschlbauer, together with their partner esbe plastic, entirely revised the packaging formats. To this end, resource-saving and very thin plastic trays were developed which are perfectly adapted to the sensitive baked goods and the line technology used. Pick & place robots with customized gripping or suction tools for the different product formats then fill the plastic trays. A reflected-light scanner checks each piece of pastry during feeding. And only those products that meet all the defined quality criteria in terms of shape and color are packaged.

CUSTOM-FIT PACKAGING SOLUTIONS FOR BAKED GOODS MANUFACTURERS

As a holistic partner for packaging solutions, Schubert advises customers on the best packaging materials and designs – setting the course for a flawless end-result at an early stage in the new packaging machine's planning phase. By combining the key technologies of robotics, image processing and tool development, the experts are able to devise suitable solutions to meet even the most challenging product characteristics and packing requirements, and to implement them reliably in the production environment.
With the mission to always offer customers the most suitable overall solution for their applications, Schubert has also been able to further optimize the packaging processes at the long-established Italian Asolo Dolce company. The company has long relied on flowpacks to package its Cantuccini and Amaretti. Until now, however, these were packed into pre-glued boxes – an expensive and labor-intensive process that Asolo Dolce wanted to optimize due to increasing demand. The previous pre-glued packaging was therefore replaced with a more cost-effective and machine-compatible version as a flat blank by the Schubert consultants.
Schubert makes use of the top-loading method for this. With the Schubert solution, the cartons are filled robotically from above via the largest possible opening. This increases the flexibility and reliability of the line, enabling the robots responsible for the filling process to operate independently of the height of the cartons. The changeover to other bag or pouch formats is straightforward: The filling tool automatically adjusts to new bag formats via a spreading motion. Schubert's robot technology masters the special challenges associated with all types of baked goods during packaging with high-level efficiency. Thanks to the modular design, the possibility to increase the number of pick & place robots per line section and quick tool changes, manufacturers can immediately respond to new market and trade requirements. •

> The baked goods sector is also increasingly adapting to the demands of consumers, retailers and politicians to package their products in a more environmentally compatible manner.


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Mixers: A New Generation for **Faster, Better Yield**

When developing proprietary recipes, bakers face a lot of challenges in search of consistency across different production equipment. A new generation of mixers allows for better, more adaptable programming that helps bakers get consistent results.

By Koenig

Koenig's mixer program features a spiral mixer, a twin twist mixer and a bowl hoist for supplying the lines with the mixed dough, all of them in different capacities. We provide mixers in various sizes – for a dough capacity of 125 up to 240kg.

The interaction of tool speed, speed and direction of rotation of the mixing bowl can be precisely coordinated with all mixers and stored in the program in different languages. Thus, the Koenig mixers can be used universally. Mixing time, kneading time and, if necessary, kneading time with fruit can be set in the programs. In the same way, bakeries can also set when the mixing bowl should turn in the opposite direction. A temperature sensor provides information about the temperature of the dough.

Moreover, Koenig's "DW" twin twist mixer has two tools with different profiles that are at an ideal working angle to one another. In this way they increase the transmission of mechanical energy and shorten the mixing time.

Adaptability to Specific Bakery Needs
Customers often ask questions about the process itself. This is especially important for having several batches of one and the same product. When mixing several batches, the mixing times need to be coordinated with the floor resting times and the processing times. The floor resting time must be exactly the same for each bowl with dough. We recommend making the batches in a size to process each in approx. 15 minutes on the dough processing line (preferably on a dough sheeting line for bread doughs). This turned out to be a good referential number.
Koenig's guiding principle is that the recipe of the dough must not change when mixing, the equipment has to adapt to the recipe. Mixing times can vary, but the recipe of a product should never change as this is the unique characteristic of every bakery. Therefore, Koenig supports customers with advice in order to achieve optimal mixing results.
It has been observed that customers often fear mixing their doughs for too long, for example for ciabatta doughs with a high dough yield. However, if the dough is not mixed properly, it will not develop properly and will become too sticky. Koenig therefore recommends giving the dough enough time to mix and testing it properly.
Another question is how to make sure the mixing bowl can work with the subsequent dough processing lines. That is why Koenig provides the suitable bowl hoists for each mixing bowl. With a lifting force of up to 1,000 kg and an adjustable tipping height of stepwise 50 mm to a maximum of 3300 mm, the tipper can be used universally. The mixing bowls are securely locked in the holding device during the entire lifting and tilting process. The dough bowl is completely emptied due to the large tilting angle and an optional moving scraper device for soft dough.
It is a general decision which mixer is used for which kinds of doughs.

TWIN TWIST MIXER, FASTER WATER ABSORPTION

With the twin twist mixer, the water absorption tends to be faster at the beginning of the mixing process than with the spiral mixer and a slightly higher water absorption can be achieved and thus a higher dough yield. The input of mechanical energy is accelerated with a twin twist mixer and the mixing of a roll dough can be done faster with a twin twist mixer than with a spiral kneader.
Koenig's "DW" twin twist mixer has two tools with different profiles that are at an ideal working angle to one another. In this way they increase the transmission of mechanical energy and shorten the mixing time.
Another advantage is the increased air and oxygen input during the kneading process.
For this reason, the twin twist mixing machine is particularly suitable for wheat and pastry dough, as air is incorporated

Photo: Koenig

Photo: Koenig

into your dough and ensures better loosening and volume.
The mixer is also very suitable for rye and mixed rye bread doughs from a dough yield of 180.
Even with intensive mixing, processing is gentle, such as with dough with dried fruits.
However, if bakeries tend to have smaller batches, a spiral mixer might offer a lot of advantages as the bowl does not need to be filled to the same extent as with a twin twist mixer to have a good mixing result.
Generally, artisan doughs with higher dough yield need longer and slower mixing for optimal swelling of water.
For wet doughs, we recommend using twin twist mixers. Because of the two tools, more energy is transferred and therefore, the mixing time is decreased compared to spiral mixers. This can result in decreased mixing time of 30%.

WASH-DOWN MIXERS FOR BETTER HYGIENE MAINTENANCE

All Koenig mixers apply to the current international standards of food and machine safety.

Koenig's guiding principle is that the recipe of the dough must not change when mixing, the equipment has to adapt to the recipe.

Koenig

For even better hygiene and wet cleaning, Koenig offers the DW240 twin twist mixer in hygienic design.
Aside from program features, hygiene is highly demanded. This is why Koenig launched the established DW 240 Twin Twist Mixer also in the "H" hygienic design which meets highest international customer requirements for cleaning and maintenance. The entire mixer is wash-down, entirely washable with low-pressure water. The machine frame and the machine head are in a completely sealed welded construction. Generous claps allow easy and safe access to the machine. The cladding, switch cabinet and friction wheel mount are made of stainless steel to enable wet cleaning. Drainage holes in the base plates of the machine frame and machine head allow easy drainage of water. The friction wheel holder has a splash water drain and the mixing bowl cover is sealed. •

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Packaging Systems for Every Production Need

Thanks to over 50 years of experience in the bakery packaging sector, IMA Ilapak and IMA FLX companies gained a proven know-how that has enabled the company to develop and manufacture sustainable, flexible, reliable and innovative packaging solutions to meet nowadays and future market needs - from entry level flow wrapping and bagging applications to complete and automated packaging lines including feeding and distribution systems, primary, secondary and end of line packaging. In short, from the oven/ freezer exit to the pallets.

By IMA Ilapak

IMA Ilapak, together with IMA Delta Systems, IMA Eurosicma, IMA Record, IMA Tecmar and IMA Ciemme, is now part of IMA FLX, the new IMA hub where the production of all machines in the flexible packaging chain converges. All technologies were thus brought together in one facility, which allows the supplier to do extensive research in the fields of sustainability, innovation, and new eco-compatible materials.

OPENLAB IS THE PLACE TO SHARE

The FLX hub works closely with OpenLab, which is the IMA Group's network of technological laboratories and testing area, dedicated to the research on sustainable materials, technologies, and production optimization processes.
OpenLab analyzes most of the new sustainable and innovative materials as new compostable, biodegradable, based or ultra-thin film, before they are commercially available in order to run them on vertical and horizontal packaging lines. OpenLab has carried out in-depth analysis of the composition and performance of most flexible films available on the market. Drawing on this extensive library and on its own practical experience, IMA FLX HUB can help bakers enhance e□ciency by selecting the best film for their application. The experts work through any technical glitches

that are preventing a film and a specific packaging machine from interfacing seamlessly.
IMA FLX HUB can design a turn-key packaging solution to accommodate the sealing and running characteristics of any chosen film. In addition, the o er includes thorough testing of new materials, from laboratory analysis right through to trials on production lines that simulate real-life conditions – avoiding actual downtime and costly mistakes.

PACKAGING SOLUTIONS FOR THE BAKERY INDUSTRY

HFFS Modified Atmosphere Packaging (MAP) Solutions for Bakery Products

- High-speed hermetic sealing for MAP applications using sustainable barrier films
- Extended shelf life to support preservative and alcohol removal and granting product freshness
- Hygienic design throughout the packaging line, total expertise and reliability.

IMA FLX offers MAP solutions for pizza, tortillas, sandwiches, fresh dough, and bakery snacks. Featured by high-speed long dwell sealing jaws, this technology ensures to our flow wrapping machines a hermetic seal even with new eco-friendly wrapping materials such as paper, recyclable & compostable films.
The Delta range, conceived for the bakery sector, provides the top hygienic level available today besides offering superior performances for speed and sealing tightness.
FLX is active in applications where MAP O2 scavenger and VacMap technology replaces alcohol use, granting same performances through a simpler, safer, and cost-effective solution.
IMA Ilapak proven VacMap technology, which removes oxygen inside products and adds protective gas in the pack, is today available not only for pizza & tortillas, but also for single-serve baked goods at high speed, 300-400 ppm.
IMA Ilapak deployed a new bakery MAP twin line which offers footprint and product flow performance advantages and IMA Ciemme provides end of line solutions suitable to any product specification offering a wide choice, from low to high speed, of cartoning machines among continuous, intermittent and loader.

HFFS Complete Turn-key Solutions for the Bakery Industry

- One stop supplier able to provide a wide array of packaging solutions
- Know how gained in over 50 years of experience in the bakery sector
- Hygienic design throughout the whole packaging lines

Thanks to a “modular approach”, IMA can offer fully automated MAP lines featured by high hygienic design also able to handle new eco-friendly packaging materials. Solutions for snacks, bread, cakes and pizza are featured by flow wrapping platforms combined with last generation sorters and switches such as the fully integrated Intralox AIM.
The range of flow wrapping solutions for layer cakes, cupcakes, and swiss rolls includes handling and distribution systems for products arriving in rows or single lanes.
Specific technical knowledge in wafers handling, feeding, portioning and flow wrapping including dedicated extraction systems to collect books of wafers and distribute them into single and double

lane wrapping systems. This know-how allows the packing of wafers positioned both cross and lengthwise.
All the above applications can be completed with a wide range of secondary packaging solutions such as cartoning, top loader, case packers and palletizers.

Sandwiching & Packaging Solutions for Biscuits

- From stand-alone solutions to turnkey systems with direct link to upstream lines
- Top flexibility in pack configurations and high expertise in handling different kinds of biscuits
- Advanced technical know-how and hygienic design of the whole lines

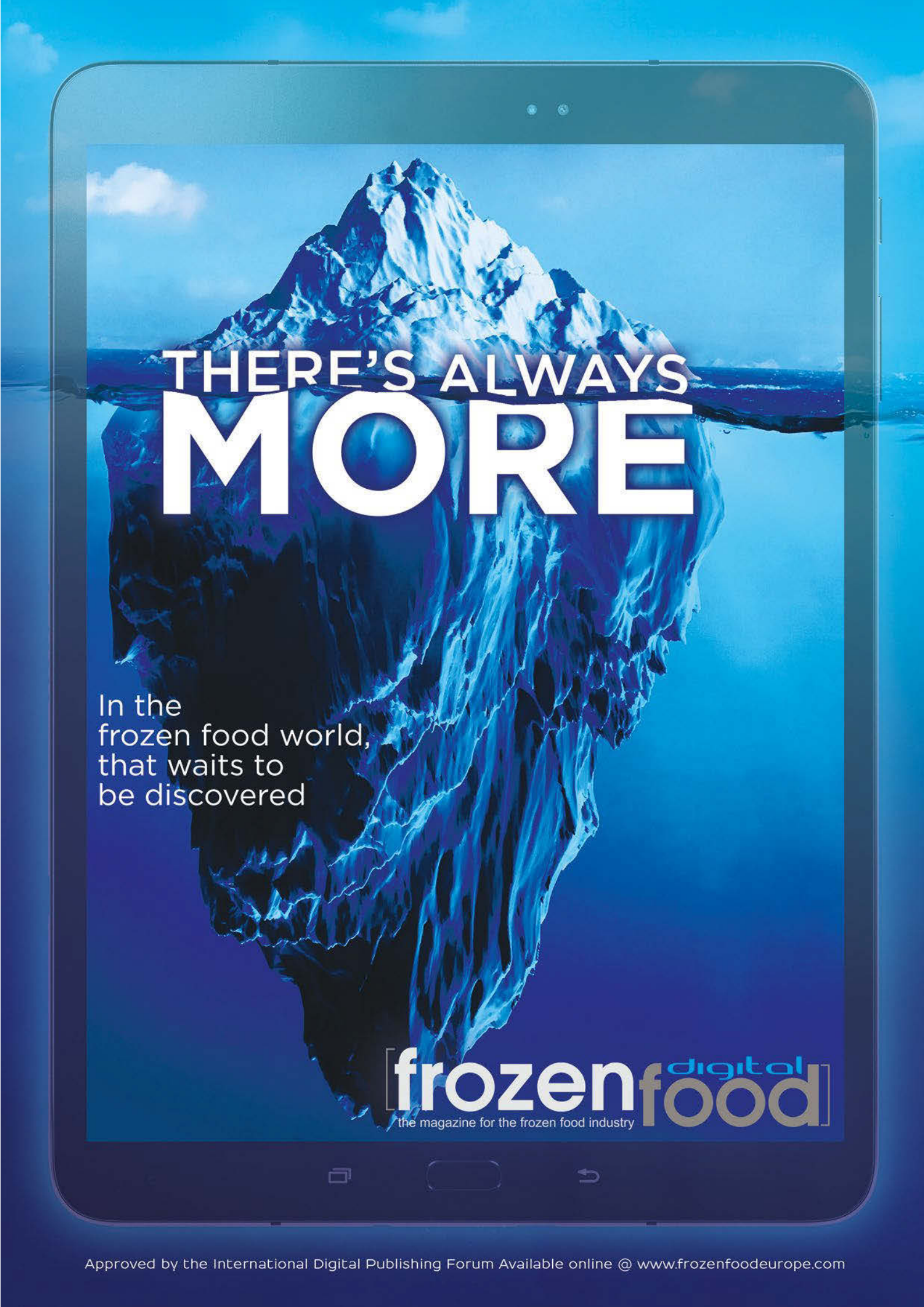
IMA Eurosicma offers advanced technical know-how in biscuits handling, feeding, wrapping, and sandwiching. Feeding and portioning systems for biscuits in stacks and on edge together with a variety of flow-wrapping machines are part of IMA FLX HUB portfolio and allow us to manage the most challenging biscuits packaging projects granting cost-effective solutions.
IMA FLX HUB is the ideal partner for any biscuit packaging solution thanks to “in line” overlapping units for products coming flat, stacking and buffering systems for products on edge, counting and volumetric slugs’ feeders as well as tray loaders.
Wire-cut sandwiching machines, in 2 and 4 lanes executions, can be integrated with medium and high-capacity flow wrappers. X-Fold packaging machines for products on edge complete the range of wrappers.
All the above applications can be completed with a wide range of secondary packaging solutions such as cartoning, top loader, case packers and palletizers.

Solutions for dosing & vertical packaging of fresh, dry or frozen bakery products

- Turn-key solution from process to secondary packaging
- Full range of dosing systems (counting, weighing, vision)
- Wide variety of VFFS machines

IMA Ilapak offers a variety of dosing systems, including high-efficiency vision counters for gentle product handling, multi-head weighers for loose products and counters for rolls and bagels.
The Vegatronic range of VFFS machines, from low-end to top-end, offer extreme sealing pressure for MAP applications, many pack styles and changeover features.
Vision system coupled with VFFS is ideal to protect baked goods such as bread, croissants and pastries with the flexibility to handle different shapes and counts.
Bagger can run traditional and stand-up reclosable pouches.
The weigher combined with top-end’s VFFS is the high-speed system for small bakery products - crackers, snacks and biscuits - in pillow, gusseted or stand-up bags up to 200ppm.
IMA Ciemme provides end of line solutions suitable to any product specification offering a wide choice, from low to high speed, of top loading units and case packers. •


Photo: IMA Ilapak



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