



# MIWE impulse

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Despite how much our company has grown in recent times – we now have 700 employees and over 110 million euros in annual revenue – MIWE remains one thing: an owner-operated, medium-sized family-run German business. Like many other family-operated companies, we have adopted a strategy that is focused primarily on ensuring our company's long-term viability for the future rather than maximising shareholder value in the short term.

This forward-thinking approach is one reason why we have always focused so intensively on trends and innovations at an early stage because we know they will have an impact on

the future of our customers and our markets. Consequently, for decades we have enjoyed a reputation for being the first to introduce countless innovations in baking and to pioneer their development to the point of excellence.

One example is the rack oven, which we were the first to introduce in western Europe. With the new MIWE roll-in, we have taken this technology to a virtually unparalleled level of development. In-store baking is another example. What began with the basic concept of "sight and smell baking" evolved into one of our most ground-breaking innovations. Now enhanced with trendsetting



snack functions, it remains an unprecedented global success story brought to you by MIWE. When we unveiled MIWE energy, we were the first to deliver comprehensive solutions and company-wide system networks that help bakehouses save energy and money long-term.

And finally, MIWE connectivity, one of our latest innovations, gives you a convenient set of tools for entering the emerging world of networked baking. This issue of MIWE impulse illustrates many more examples of how we are already helping you to meet the challenges of the future.

Securing our future and your future is also why we have a major new

construction project planned for this year. Right next to the Arnstein campus, we're building the MIWE Live Baking Centre, an industry meeting place for experts and anyone who wants to become one.

So you see: When it comes to shaping the future together, you're in the best of hands with MIWE, for so many reasons.

Sabine Michaela Wenz



# Keeping a firm eye on energy costs

Energy is what keeps processes going in a bakehouse. But whether it comes in the form of electricity, gas or oil, energy is a very expensive resource. MIWE energy therefore offers solutions that help cost-conscious bakeries save substantial amounts of energy throughout the bakehouse. In conjunction with MIWE eco:control, the needed transparency is delivered: Where's all that expensive energy actually being consumed?

MIWE gives bakeries the tools they need to achieve excellent baking results with minimal use of energy by providing efficient systems technology, tailored energy recovery systems for bakeries, intelligent system networks and engineering expertise.

MIWE eco:control, the energy monitoring system for energy-efficient bakehouses, is the central reporting component that flawlessly keeps track of everything. It can transparently reveal all energy flows in the bakehouse and deliver comprehensive information about any aspect of energy consumption.

Of course you could simply read the utility company's meters at regular intervals. But that would only tell you what is already clearly documented on the utility bill, namely, how much energy was consumed.

Makeshift monitoring, that is, simply reading the meters does not tell you anything about what the energy was used for, why consumption drastically increased or decreased recently, what caused peak loads (and how they can be avoided), whether oven X used more energy than oven Y (and if so, how much more) and whether the heat recovery system you installed is actually helping you to save money.

Bakeries that want to lower energy costs across the board and hire the energy specialists at MIWE to develop an energy efficiency package for their bakehouse need precisely this information. They may require daily and annual data to furnish clearly documented results when they have their energy management system certified, for instance. How much primary energy am I saving with my heat recovery system? What does my hot water consumption look like over time? How do my various oven

systems differ in terms of energy consumption? What are the causes of unexplained losses or inconsistencies?

The MIWE eco:control provides comprehensive answers to these questions and many more.

It also monitors all energy processes and flows in the production environment via a central monitoring unit.

Depending on the desired range of the system, it can also monitor all baking oven and refrigeration technology, recovery systems, the water systems of the thermal network and connected loads (basket washing unit, rack washing unit, hot water supply, meeting rooms) as well as heating or room ventilation systems. Water consumption and overall primary energy consumption can also be continually recorded, preferably subdivided into logical process groups (heating, baking, ventilation, refrigeration, etc.).

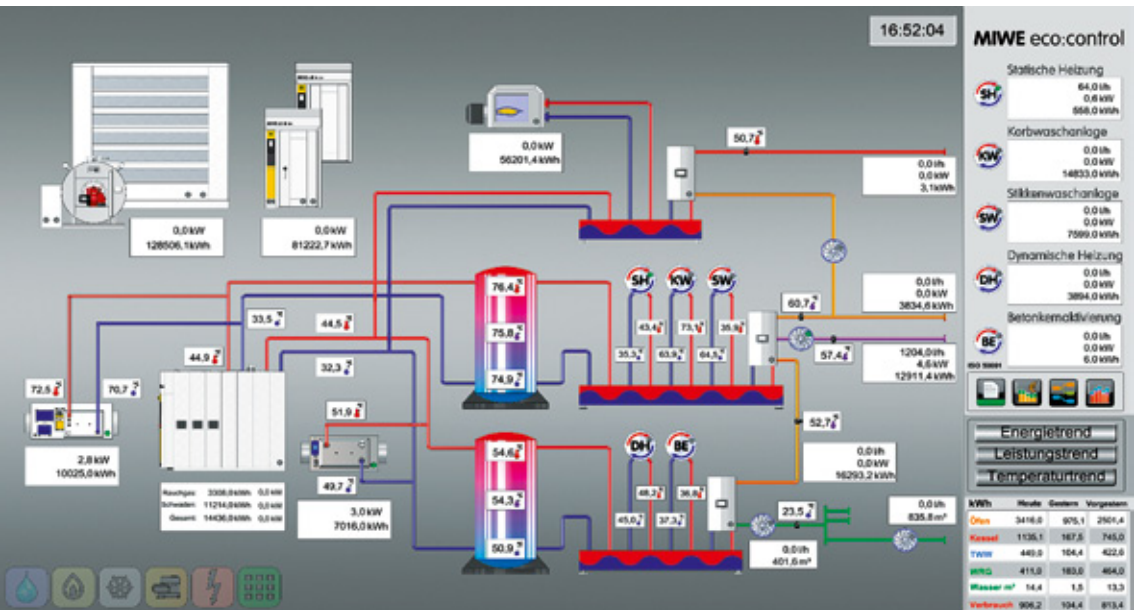
A clear schematic process control diagram shows all the systems involved and the complete energy balance of the bakehouse.

All components and all parameters (temperatures, loads, etc.) necessary for calculating their capacity and energy use are displayed in real-time. ▷

*Detect weak spots in energy efficiency. Optimise costs. The MIWE eco:control is the ideal tool for this rewarding task.*

**Always the centre of attention at trade shows: MIWE eco:control, the "energy detective"**





Clear process control diagrams with all the necessary parameters and metrics are the foundation of the system. They can be displayed for all energy networks such as water (top), bakehouse or bakery refrigeration system (bottom), and much more.

Important metrics such as the efficiency of the overall system are also continuously calculated and displayed.

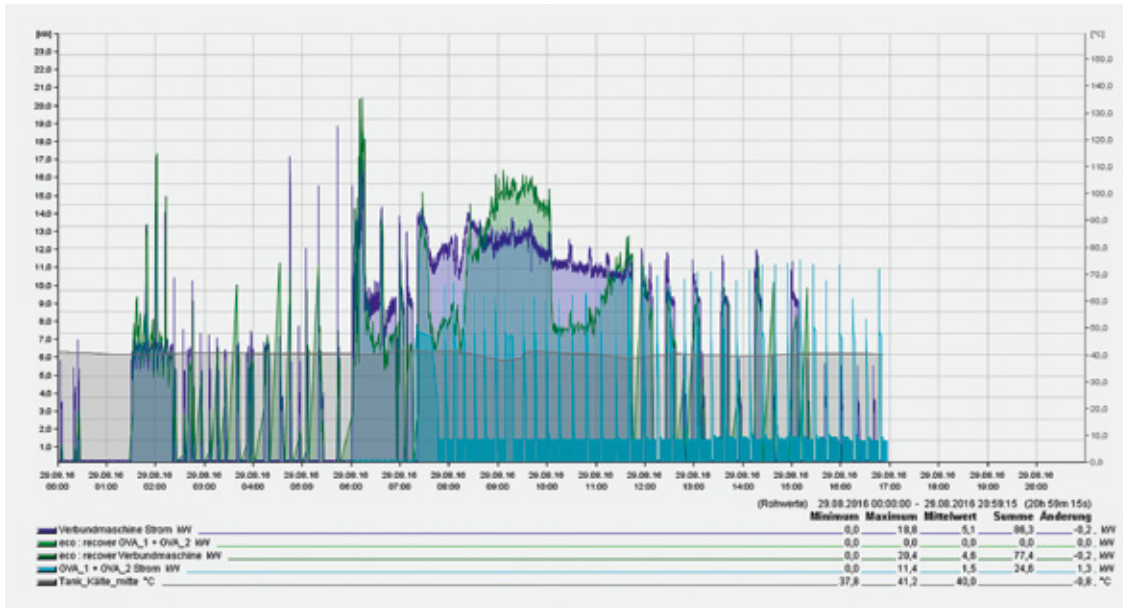
Furthermore, freely configurable detailed views show information such as consumption data for baking ovens and refrigeration systems (current data or data for defined periods). The consumption data of multiple baking ovens can also be compared over freely selected periods. In this way, modern energy-savers and true energy guzzlers can be identified. Values from different energy sources (such as gas and electricity) can be converted, allowing for real comparisons on a kWh basis.

A rate module can be integrated into the MIWE eco:control so that these and other consumption values can be expressed not only in kWh, but also in euro, a very practical feature. All visualised data can be displayed on the monitor of a central workstation or directly on a touchscreen display on the control unit. The current system status is visible at all times.

The MIWE eco:control also logs and saves all measured data so that changes and trends can be displayed over freely selected periods. In this way, variable values such as gas, water or heating oil consumption can also be displayed as trend curves. In short: With the MIWE eco:control, all energy flows and costs in the bakehouse can be displayed with their origins as well as reported in a profit and loss statement ("sources and sinks" is the technical term) and monitored.

The result is greater clarity about energy costs across the board, including proof that the MIWE eco:nova delivers the savings that we promised. Just a side note: So far, every MIWE energy system has delivered the energy savings that we initially promised. That means we're not afraid of transparency. Quite the opposite, actually.

But you can also see how the MIWE eco:nova keeps earning money and how much primary energy you are saving by using recovered energy.



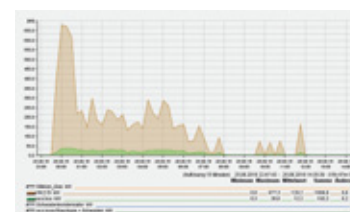
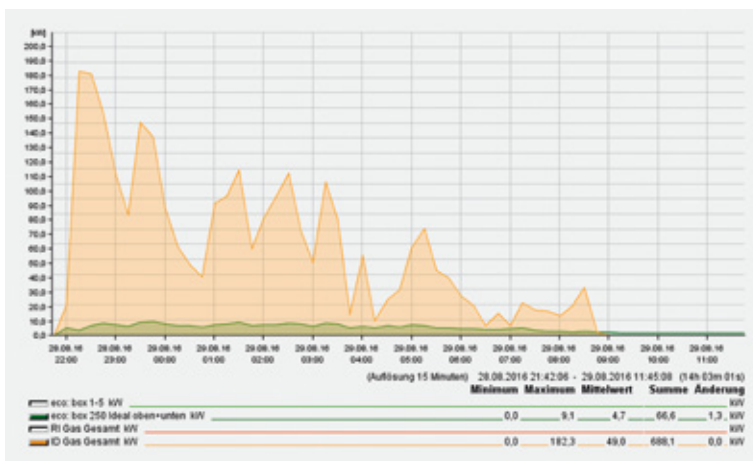
You can also see all the other energy consumers, including every baking oven and refrigeration system, your heating system, your ventilation and hot water/power supply system, all of it in both summarised and detailed form. The MIWE eco:control reveals whether the manufacturer's consumption specifications are correct.

If you happen to generate more recovered energy than you can use in your own bakehouse and would like

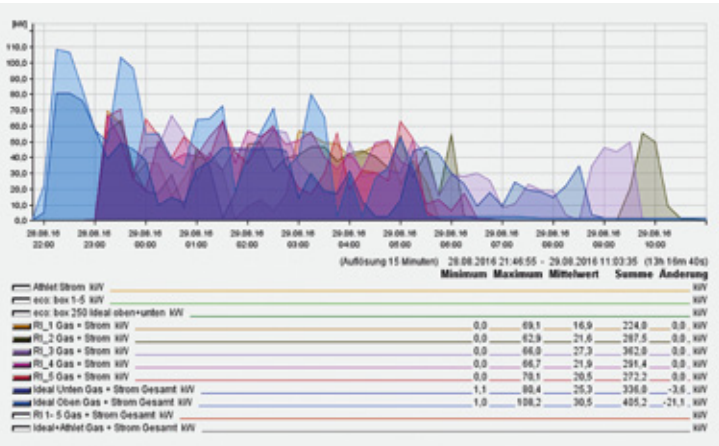
to sell your heat energy (to a neighbouring building, for example) – not an uncommon practice – you can very easily monitor this “energy flow” with the MIWE eco:control. You can also quickly determine where and when peak loads are driving up your energy costs and you can precisely identify the loads (or processes) responsible for these spikes.

Maybe you want to know if you can save more precious energy by using more up-to-date technology or organ-

**You can display any system component (even third-party products) or any system network in detail at the press of a button. In this example, the heat recovery function of the bakery refrigeration system shows its efficiency in real-time.**



“Smoothing” or filtering the selection delivers easily understandable graphics. Left, MIWE ideal consumption / MIWE eco:box heat recovery. Above, a central heating oil boiler with the MIWE eco:box. Easy to see: The MIWE ideal keeps resupplying recovered energy long after baking is finished.

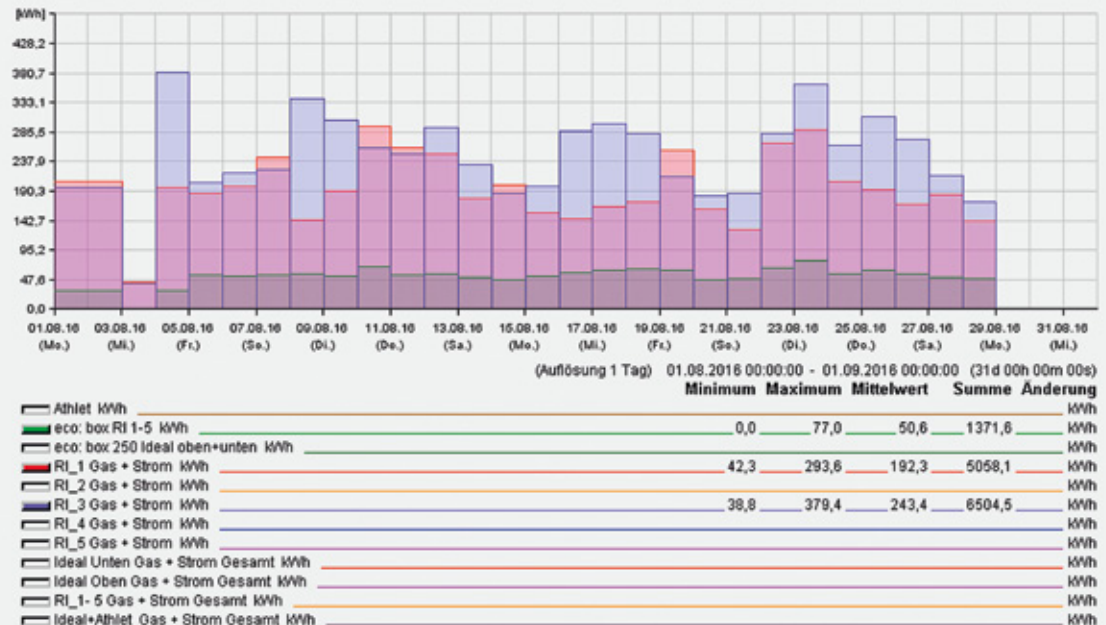


Smoothed consumption values (electricity/gas in kW) of the entire bakehouse for one day clearly show high and low points in consumption. The differences between deck and rack ovens are clearly visible.

using your processes differently? You can determine the reason for unexplained losses (leaks?) or inconsistencies and systematically eliminate them.

Energy monitoring is also a basic prerequisite for an energy audit or certification of your energy management system. These audits became mandatory for all companies that are not small and medium-sized enterprises (SMEs) when the Energy

Monthly overview: Consumption data and heat recovery from two selected rack ovens with MIWE eco:box.

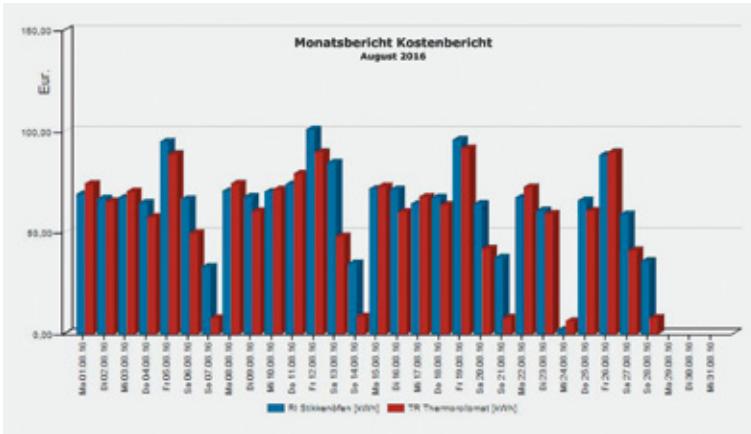


Services Act (EDL-G) was enacted on 22/4/2015. By the EU's definition, small and medium-sized enterprises are those „that employ fewer than 250 persons and which have an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro“.

Alternatively, companies can implement an ISO 50001-certified energy management system (EnMS) or an EMAS-certified environmental management system. MIWE eco:control automatically meets DIN 16247-1 requirements when you use it to monitor all primary energy flows. The MIWE eco:control can also calculate annual values for all data, an especially useful feature for energy audits, which usually require these values.

If improvements in energy efficiency must be demonstrated in order to receive a certification or a subsidy, the log book of the MIWE eco:nova





How did the energy costs of your rack ovens compare to those of your thermal oil tunnel ovens last month?

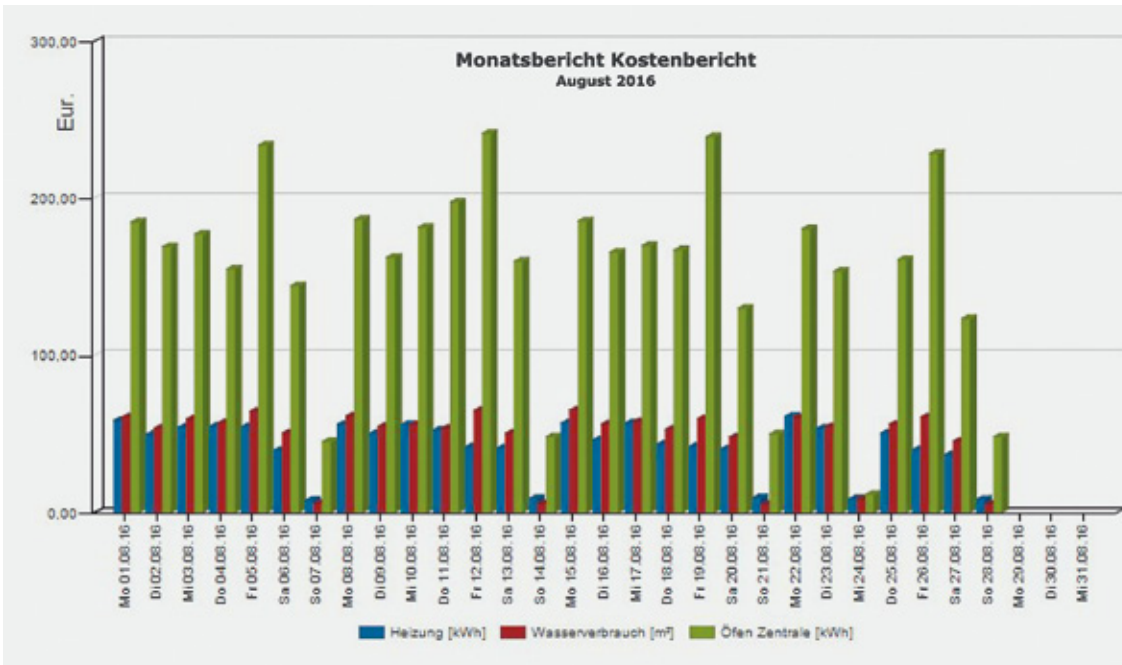
MIWE eco:control gives you the answer at the press of a button, either in table format or as an overview diagram.

provides significantly more transparency and details than readings from conventional meters. And while we're on the subject of subsidies: You can also apply for subsidies if you want to implement an ISO 50001-certified energy management system in combination with the MIWE eco:control, without having to hire an external energy consultant.

As you can see, your savings will begin to add up with the MIWE energy

and the MIWE eco:control. In most cases, these savings will amount to a handsome sum each year, giving you completely new freedom. Not only that, you'll also have the good conscience of an energy-saver. ■

**What are you spending daily on primary energy – for heating, ovens and water? From this monthly summary, you can immediately see load spikes on Fridays and load dips on Mondays, and that you're spending more on water than you had previously assumed.**





# Thinking quality a

*Innovative packaging solutions for more security during transit*

**We deliver high-quality products, and we want you to receive them in high-quality condition.**

**That's why we also put a lot of thought into our packaging and shipping methods.**

When it comes to high-grade materials and high-quality workmanship, MIWE products are the gold standard in the industry. And not without reason: We place the highest priority on both aspects (in addition to our no-frills, clear design). We want your experience with MIWE products to be a pure joy. Our products create a high-quality environment right

from the start. And they deliver years of hygienic, technologically superior, long-lasting and reliable service.

To make sure that's always the case, it's not enough for us to think about quality merely up to the point of shipping and then leave everything else to chance (or the nearest shipping company), as if to say, "Well, it's all out of our hands now". Our standards are higher than that: We want to ensure that our carefully crafted, top-notch products reach you in top-notch condition, whether they travel a few dozen or a few thousand miles. As a result, we have made reliable

# ll the way through

transport packaging our mission. At the same time we want to simplify the job of installers and avoid unnecessary packaging waste.

Large, heavy production baking ovens obviously require different packaging solutions than our baking stations. With this in mind, two teams focused on how we can reach our quality goals using modern shipping containers. One team is based in Arnstein, where MIWE technology for production facilities is designed and the other one at the Meiningen plant, where all MIWE baking stations are produced. ▷

Braking simulators with heavy ovens at the European load safety competence centre



When it comes to quality, we focus on everything: from seamless order processing to CNC equipment from the best manufacturers; from continual quality assurance, software and electronics testing to products that gleam with spotlessly hygienic quality. And it doesn't stop there ...



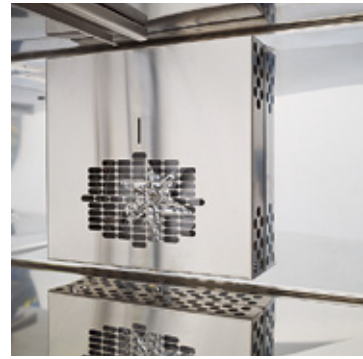
For heavy production systems, pallets are essential, and individual modules must be solidly encased in wooden containers. Modular packaging is necessary because it enables better planning for product installation and integration at the destination.

At the same time, we wanted to ensure that the shipping containers could also withstand the usual stress

and strain of road and rail transport. We therefore contracted 3G, the European load safety competence centre to test our containers for us. The test was officially entitled "Load restraint test of wooden structures containing oven components for road and rail transport".

During the tests, the packed and ready-to-ship modules were subjected to forces of 1.35 g on braking





simulators (in other words, 1.35 times the acceleration of gravity). The results were positive: We now have a certificate to confirm that our "shipping containers fully meet the requirements for withstanding the forces encountered during road and rail transport".

Previously, we also packed our baking stations in wooden cases for shipping. They were bulky and left

behind a lot of cumbersome waste at the destination. And even more frustrating for us: Systems were often damaged when they reached the customer. And of course it wasn't the customer's fault.

Those days are behind us now. The team of specialists in Meiningen has developed a brand-new packaging solution for our baking stations that meets all our requirements. >

Part of a production line  
at our subsidiary in Meiningen





... our understanding of quality goes up to extremely reliable and ultra-secure shipping

Every baking station is now packed in a combination of stretch wrap and bubble wrap on a winding machine that we customised ourselves. The individual cells of this bubble wrap, which we manufacture to our own specifications, are designed to withstand up to 100 kg.

On top of it all is a true highlight: A ShockWatch® sensor that records and immediately displays all shocks and improper handling – a shipping company's worst nightmare, since now there's a way of proving whether the shipment was handled carefully or not. But it doesn't stop there: Our experts actually thought the process all the way through to the last step in the delivery process: Underneath the packaging, a piece of coloured cut-resistant cardboard marks the spot where the outside packaging can be cut into with a conventional box cutter without damaging the baking station.

Finally, we developed a simple tool for installers so that they can remove the air from the bubble wrap all at once. All that's left is a tiny ball of plastic wrap that does not require special disposal because the types of wrap we use in the packaging are non-toxic and 100% recyclable. Before approving the new packaging solution, we also had it tested by third parties: IG Bau, Transport Thüringen and our air freight partner. All of them are confident that it meets requirements.

Planning continual improvements to processes and thinking quality all the way through – that's MIWE's fundamental approach. Our new packaging solutions are merely two very tangible and practical examples of this approach. ■

**All the accessories are securely packed inside the oven in special cardboard boxes before everything is packed in a combination of extremely tough stretch and bubble wrap. Then comes the icing on the cake: the ShockWatch® sensor, which clearly documents any improper handling during transit.**



**Perfect packaging – confirmed in writing on this certificate from the European load safety competence centre**







# Flexible, efficient, self-sufficient

**Baking with thermal oil is both simple and flexible. The MIWE thermo-static integro wagon oven for two or three trolleys comes with its own central heating boiler. The boiler rides piggyback. It requires no extra space for a separate central heating boiler and needs no external piping. And on top of that it's extremely economical. This opens entirely new perspectives for baking with thermal oil ...**

There are many good reasons for baking with thermal oil: gentle heat, high baking capacity, extended freshness, perfect crust, outstanding crumb structure. Bakers often hesitate to purchase a thermal oil baking oven to complement their other baking systems because of the additional cost, work and space needed for the separate central heating boiler.

In such cases, the MIWE thermo-static integro is the perfect solution. It offers all the advantages of thermal oil baking without cumbersome additional requirements such as auxiliary units and external piping. Instead, it features a built-in central heating boiler that is positioned at the rear end firmly attached to the oven.

This "piggyback" central heating boiler has a variety of benefits besides its financial advantages and the fact that no extra space is needed for piping. In contrast to boilers installed

in a separate location, there is obviously less distance between the burner and the baking chamber and less thermal oil has to be heated. As a result, the baking oven heats up quickly and every temperature adjustment is immediately effective because the heat does not have to travel long distances to reach the oven. This configuration is perfect for batch-after-batch baking and uses minimal energy. There is also no need for a separate exhaust flue in an adjacent room. It is usually easier and more cost-effective to connect the MIWE thermo-static directly to an existing flue system in the production facility.

Furthermore, this self-reliant thermal oil wagon oven is a good choice for situations where multiple wagon ovens are operated using thermal oil. It can improve energy efficiency and bring more flexibility to the bakehouse, for example. If multiple baking ovens are to be operated with one central heating boiler, the boiler must be configured so that it can supply enough energy to all baking ovens whenever necessary. Burner outputs of 1,000 kW and more are not uncommon in such configurations. But what happens if another batch of rolls has to be baked in the afternoon? Of course a large central heating boiler with distribution functions can supply individual ovens with hot thermal oil, but even then,

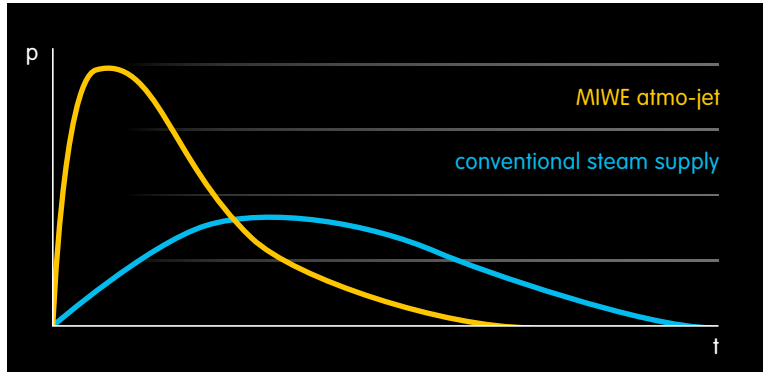
*Baking with thermal oil – now possible without a separate central heating boiler*

**The finest in thermal oven technology. The result: Perfect crust, perfect sheen.**



The amount of steam during the first few seconds is crucial; so that, as much steam as possible can condense before it overheats.

As the graph shows, the MIWE atmo-jet produces steam much faster, with approximately 2.5 times the pressure.



the high-output central heating boiler always has to be started up and more thermal oil also has to be heated. This would be similar to starting up a 12-cylinder diesel ship engine every time you needed to drive your compact car out of the garage. Complete overkill and a total waste of money.

A self-sufficient system like the MIWE thermo-static integro always delivers only the burner output needed for the current load. As an example of one energy-efficient and cost-effective combination, you could bake the majority of your products in multiple baking ovens connected to one large central heating boiler, while ensuring sufficient back-up capacity with a self-sufficient system. Or, in another common scenario, your baking ovens for bread and rolls could be supplied by one central heating boiler.

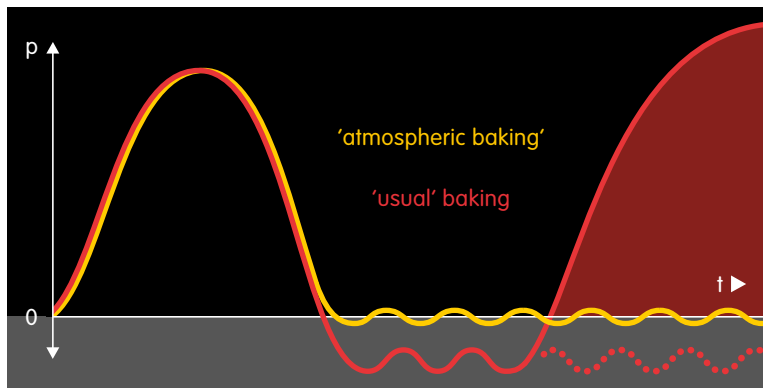
However, in the fine baked goods area next door, you could have (multiple) self-sufficient units that can be switched on and off individually as needed and also operated at different temperatures. We should also mention that independent systems are more reliable overall compared to baking ovens supplied by one source.

As you can see, the MIWE thermo-static integro brings incredible freedom to your production environment. Especially since this self-sufficient system also comes in two versions, for either one (solo) wagon or two wagons (duo). In both models, a built-in central heating boiler delivers thermal oil at the perfect temperature for maximum energy efficiency. Since the MIWE thermo-static integro is a MIWE product, both versions come equipped with MIWE's special



After the first injection of steam, the pressure drops in an environment-dependent manner to the "uncontrolled range" (grey zone). It remains there until baking has ended (dotted in red), or it shoots up again (red line) after the slide valves are completely opened. Energy loss (dark-red zone) is the consequence.

In contrast, with 'atmospheric baking', the pressure - completely independent of the ambient conditions - oscillates within the controlled and most energy-efficient range of  $\pm 2$  Pa (yellow line).



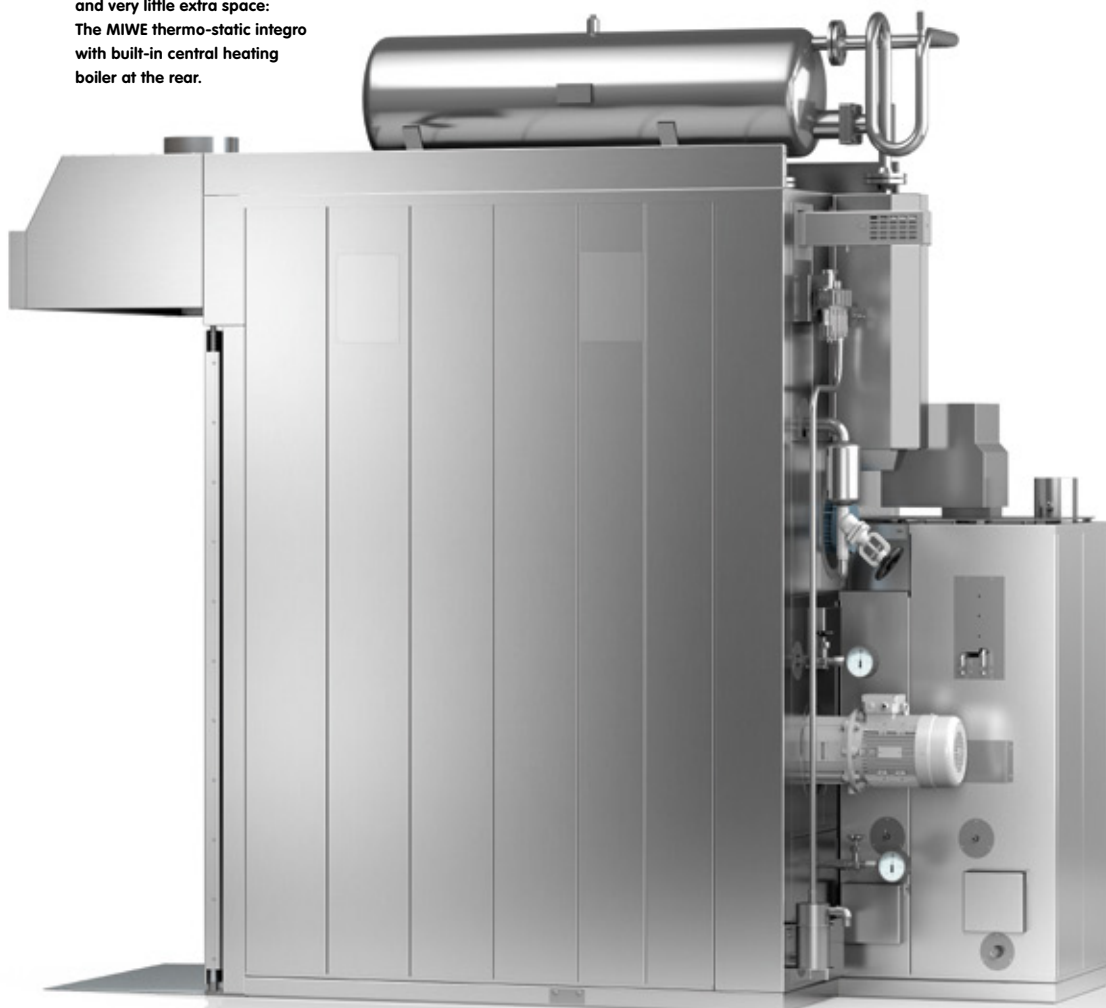
baking technology innovations: MIWE's own 'atmospheric baking' feature, which ensures consistent results despite weather-related fluctuations in pressure; the new MIWE atmo-jet steam technology, which delivers saturated steam to the baking chamber and gives your products better sheen; the MIWE TC Touch Control system, which features a clear and intuitive user interface; and the baking stone system, which allows you to produce genuine brick-oven bread.

And because it's independent, the MIWE thermo-static integro is also easy to install and set up. This allows us to offer interested customers the option of trying out the advantages of this system in their own production environment.

After all, your own experience is what counts most.

We'll be happy to give you the opportunity to see what makes MIWE the best provider of thermal oil technology on the market. ■

**It requires no additional piping and very little extra space: The MIWE thermo-static integro with built-in central heating boiler at the rear.**



# Just how far is your refrigerator



*The EU's "F-gas regulation": What does it mean for bakeries?*

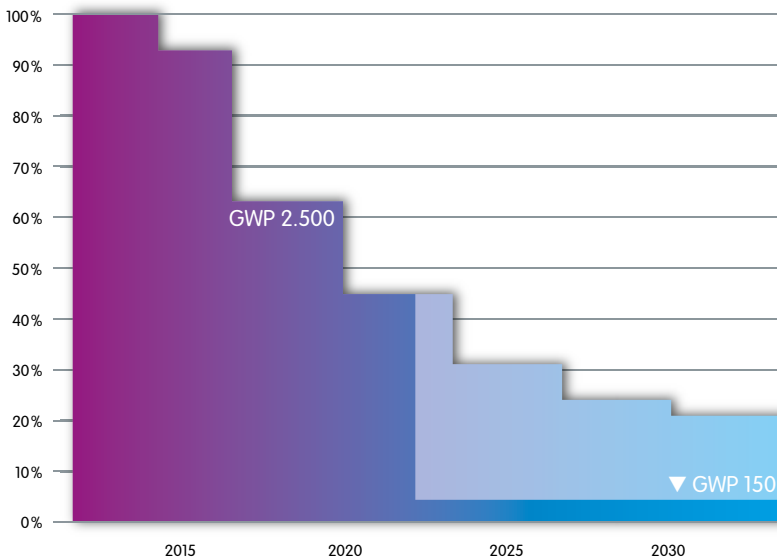
**The EU is picking up the pace and taking one refrigerant after the other off the market. Does this affect you? We will shed light on this subject and show how modern refrigeration technology by MIWE can eliminate any worries you might have about the future and even save you money.**

Many bakeries are quite indifferent to the refrigerant they use in their refrigeration system. This is not surprising, since bakers are usually more worried about whether their flash freezer is powerful enough, whether their cool/frozen storage

areas are big enough or whether their dough preservation unit is delivering reliable service around the clock. In other words, they're more concerned about whether their refrigeration technology and their overall refrigeration system (and layout) is a good fit for their products and processes.

Bakeries wouldn't really care about what kind of coolant is used for their flash freezer if it weren't for the EU, which has placed extremely tight restrictions on refrigerants as part of its ambitious goal to drastically reduce greenhouse gases. These new regu-

# Climate-proof refrigeration system?



Starting in 2022, operators of refrigeration systems with a connected load of more than 40 kW may only use refrigerants with a maximum GWP of 150. For smaller systems, a more gradual phase-out is planned, as shown by the lighter stages in this graphic.



### GWP: the threshold for refrigerants

GWP stands for global warming potential and is a metric that defines a refrigerant's potential to create greenhouse gases and warm the earth. Carbon dioxide, which has a GWP of 1, is always used as the reference for calculating GWP. CO<sub>2</sub>e, or carbon dioxide equivalent, is the standard unit of measurement. The higher the GWP value, the greater the likelihood of creating chemical bonds that contribute to the greenhouse effect.

lations are forcing bakers to deal with this problem themselves or hire refrigeration specialists like MIWE who are experts in the field.

The end is fast approaching for old refrigeration systems and conventional refrigerants – and for refrigeration system planners who fail to keep up with the times. This transition is being driven by Brussels with the goal of better protecting our atmosphere. Dubbed the “F-gas regulation”, EU Directive 517/2014 from the 16th of April 2014 on fluorinated greenhouse gases prescribes a multi-stage plan for phasing out specific refrigerants by certain dates. The governing factor in the plan is the refrigerant's GWP (global warming potential), which is its global warming impact expressed in CO<sub>2</sub> units. The higher the GWP, the greater the impact on the environment.

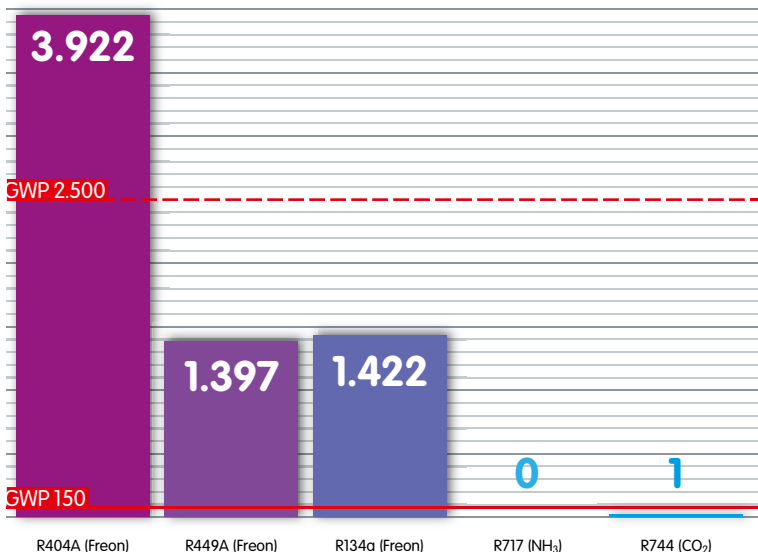
The EU's road map is clear: Refrigerants with a high GWP will be gradually phased out. An ambitious schedule has been set: As of 1 January 2020 refrigerants with a GWP greater than 2,500 may no longer be used. R404a refrigerant, which was once

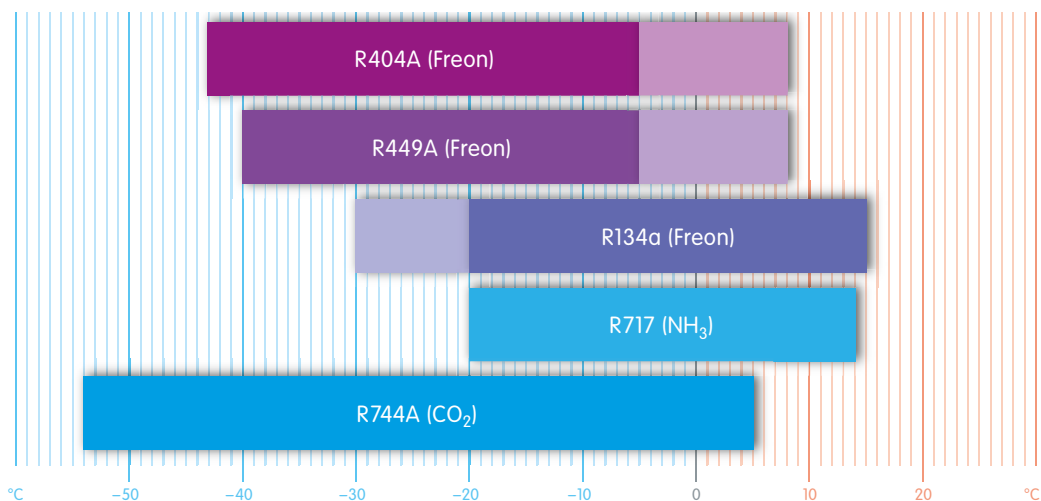
widely used, has a GWP of 3,922, meaning it will be completely banned on that date (although this won't prevent some refrigeration specialists from continuing to rely on it until then).

Regulations are even stricter for refrigeration systems with a connected load of more than 40 kW (medium-sized and large bakeries easily reach this level): Starting in 2022, refrigerants with a GWP above 150 (!) will no longer be permitted for these systems.

As a result, bakeries that would like to invest in a future-proof system without getting a degree in refrigeration technology should seek advice and assistance from a partner when designing and configuring their bakery refrigeration system. That partner should be well versed in the new regulations and offer solutions that will meet EU standards for years to come. Ideally, the partner should also know something about refrigeration systems for bakeries. That's because no matter what type of refrigerant is used, the technology of a bakery refrigeration system also has to work perfectly.

Overview of GWP values of common bakery refrigerants and their possible substitutes. The environmental advantages of the replacement refrigerants are dramatic and very clear.





When designing a refrigeration solution, our refrigeration specialists, like all engineering teams at MIWE, always focus on your products and processes and space requirements. The climate you live in is also important because designing a refrigeration system in Spain requires very different considerations than a system designed for a colder climate like Iceland. Once output volumes and process sequences have been determined, we usually propose two solutions for your specific application:

One solution based on a synthetic Freon (usually R449A, which usually has similar thermodynamic properties to the standard R404a, which will be phased out, but has a low GWP of 1,380, meaning it can be used beyond 2020).

And another solution that uses natural refrigerant, that is, carbon dioxide (CO<sub>2</sub>), which has a GWP of 1.

For the sake of completeness, we should mention that we also consider other alternatives based on your specific situation, such as a cascading system that uses a CO<sub>2</sub> stage in combination with an NH<sub>3</sub> stage.

However, in many cases, ammonia is neither desirable nor necessary because CO<sub>2</sub> is a viable alternative. Generally speaking, CO<sub>2</sub> refrigeration systems are more expensive than those that use Freon, but they're usually more energy-efficient and more future-proof (GWP 1!). In some cases, they are also eligible for significant subsidies that can often significantly offset the extra initial cost.

Ultimately, each individual situation will dictate which approach is most cost-effective. The natural refrigerant CO<sub>2</sub> is more effective if more power is generally required for deep-freezing and flash-freezing as compared to normal refrigeration. It is also the better choice for refrigeration systems that serve multiple refrigeration points. In short, Freon is the refrigerant of choice for smaller applications

**Today's standard R404A refrigerant can be replaced by a combination of R134a and R744 (CO<sub>2</sub>). Even more ecological and future-proof would be a combination of R744 (CO<sub>2</sub>) and R717 (NH<sub>3</sub>). However, significantly higher hardware investments are required because of the corrosive properties of NH<sub>3</sub>, so that we basically do everything we can to cover the entire temperature range exclusively with R744 (CO<sub>2</sub>).**





**An impressive combined refrigeration system operated exclusively with CO<sub>2</sub> – this bakery in Dreieich is already thinking about the future (and the environment).**

requiring less than 40 kW of power, whereas CO<sub>2</sub> is best for much larger applications with a large amount of deep-freezing. However, as mentioned before, it always comes down to specific requirements.

We don't want to bore you with too many technical details about CO<sub>2</sub> refrigerant systems. But it's important to know this: In order for CO<sub>2</sub> to cover the entire temperature range required for refrigeration applications, it has to be used in what refrigeration experts call a transcritical cycle. In this process, heat is removed isobarically (at constant pressure on the high pressure side) and not isothermally (at constant temperature). Pressure is optimally adjusted to operating conditions in a modulating fashion by an intelligent controller. Transcritical processes have long been commonplace in the refrigeration systems of large supermarkets. However, to our knowledge, MIWE was the first to successfully bring this process to bakehouses.

Here's a real-life example: The Weller bakery in Dreieich has about two

dozen branch outlets, plus a delivery service, and is a successfully growing business. As a result, the bakery's owners, Hartmut and Matthias Weller, planned to expand into a new building which would house the dough preparation space, the pastry-making area and the entire bakery refrigeration system: A MIWE SF flash freezer for three three-rack trolleys, a MIWE TLK dough preservation unit for about 130 trolleys, MIWE NK normal cooling system for ingredients, a MIWE SK cream cold storage unit for the pastry shop as well as another MIWE TK deep-freeze storage unit and a MIWE NK normal refrigeration unit in the delivery area.

So the framework for the baking technology was already established. But the next question was: Which technology, that is, which refrigerant would be best for the system? Matthias Weller's goals were clear. The technology would have to be future-proof and remain viable beyond 2030.

As always, the experts at MIWE developed two solutions, one with

**This machinery room is really no different from that of a conventional refrigeration system – compact and organised, exactly what one would expect from MIWE.**





a conventional Freon refrigerant (R449a) and another one with a natural CO<sub>2</sub> refrigerant. While calculating the expected energy consumption at Weller's bakehouse for the two different solutions, it quickly became apparent that the natural CO<sub>2</sub> solution would use much less energy per year than the Freon-based alternative. This conservative estimate also didn't take into account the fact that the Weller bakehouse could also use the CO<sub>2</sub> solution to generate all of its hot water (for heating and general use) more cost-effectively. Because CO<sub>2</sub> has higher pressure outlet temperatures, a higher temperature level would also be available for heat recovery with this solution, allowing for water temperatures of up to 65°C.

The system would be configured like a conventional Freon system. CO<sub>2</sub> is in safety class A1 (no flame spread, minimal toxicity, components last longer thanks to modulating rather than on/off power control). As a baker, Matthias Weller also liked the fact that CO<sub>2</sub>, which can reach much lower temperatures, allows for much

faster freezing for flash-freezing applications, a feature that ultimately improves product quality. And as a businessman, Weller also realised that he could officially advertise his products as carbon neutral if he implemented this refrigeration solution.

Given all these selling points, Matthias Weller didn't hesitate very long. Even though the CO<sub>2</sub> system would initially cost more than the conventional system, the long-term savings and the certainty of purchasing a future-proof solution were enough to win him over. He opted for the forward-thinking solution: a transcritical CO<sub>2</sub> system. After a few weeks with the system, he had nothing but praise for MIWE's execution of the project and the good results he was seeing: "I'm 100% satisfied. The system is all set up and working. That's just the way it should be."

There's only one conclusion we can come to at the end of this brief article: If you're looking for future-proof bakery refrigeration technology, MIWE is your best choice. ■



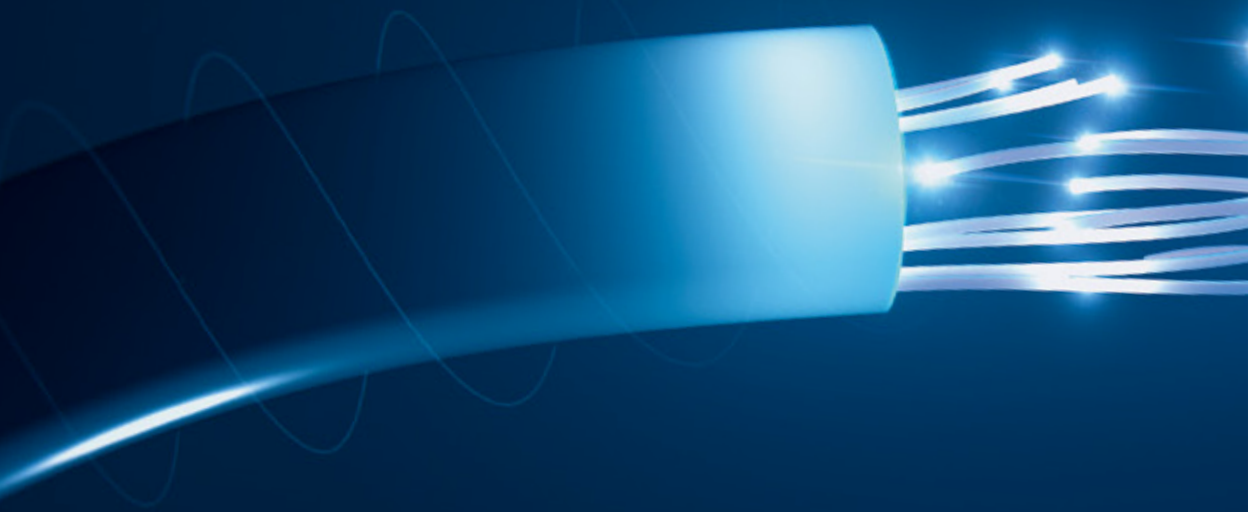
**Matthias Weller can rest assured. He doesn't have to worry about his refrigeration system until well past 2030.**



After reading this short article, if you'd like to learn more about our latest innovations in bakery refrigeration or find out how future-proof your refrigeration system really is, take us up on this offer. No strings attached, of course. And totally free of charge. Benefit from all the expertise of our MIWE bakery refrigeration specialists.

Request our survey on future-proof bakery refrigeration. Simply answer a few questions and send it right back to us. We'll look at your response and give you a rough assessment of whether you're all set for the future. Or whether you need to take action.

It's best to know where you stand. Take advantage of this offer.



# Industry 4.0

## We call it MIWE

*The future  
of networked baking*

**If you ask three different experts what Industry 4.0 means, you'll get four different answers.**

**Actually, Industry 4.0 is nothing more than a broader framework in which individual industries, manufacturers and users have to decide for themselves which approaches and solutions will create real added value for them.**

We have been focusing intensively on this trend for many years and have been gradually enhancing our range of digital products and services in collaboration with our customers. Our concept: MIWE connectivity. Today, it's already easy to see how this concept can be your gateway to a successful future in "networked baking".



# Industry 4.0?

## E connectivity

We decided to focus so intensively on networked baking early on for one very simple reason: We are confident that with MIWE connectivity, you will be better equipped to meet the current and future challenges of your market (increasing pressure to lower costs, need for quality assurance and shortage of skilled personnel) on a long-term

basis. We are also in an ideal position to drive developments in networked baking because we understand the opportunities and risks of Industry 4.0 from different vantage points: We are systems engineers, and connectivity will present new opportunities in our own production environment. But even more importantly, we are a systems partner

**Our goal:**

**Take networked baking to a new level so that our customers can do even better business with even better products.**



MIWE connectivity is now reality in bakehouses, branch outlets and shops around the world ...



to the bakehouses, branch outlets and shops around the world that prepare baked goods and snacks. Tasks and solutions in these three sectors vary greatly in their details, but they are closely related and interwoven as stages of a continuous process sequence.

The underlying goals are also the same everywhere. Generally speaking, the objective is to:

... know exactly what happens when, where and why, and use this information to ...

... identify and implement potential process improvements, either manually or better yet, automatically, and ultimately ...

... standardise all processes, boost quality levels, significantly lower process costs and accelerate lead times.

In our industry, specific goals might include:

- ▶ A comprehensive overview with full transparency of business processes: What happens when and where?
- ▶ Ensuring consistently high product quality and freshness
- ▶ Optimising product availability (includes striking a balance between amount of products on display and the cost of unsold goods) while maximising system utilisation
- ▶ Increasing flexibility with regard to products and batches, in other words, learning to manage complex processes
- ▶ High process stability (consistent processes, identifying and avoiding process errors, self-regulating and self-optimising processes)
- ▶ Resource efficiency (lowering

costs of raw materials, energy and personnel)

▶ Better monitoring and increased availability of systems (predictive maintenance, faster response times for service calls)

▶ Ensuring that bake-off systems at the point of sale or production systems in bakehouses are as easy to manage as possible

All of these goals are ultimately part of MIWE's larger mission: To help you make better baked products and do better business.

The system requirements for a successful digital future can be summarised in five stages that build on each other:

Systems require sensors so that data such as information about the system status or product progress can be recorded. If possible, the products themselves must have dedicated data storage media as well and there have to be control systems that can retrieve, log and save specific data and output it in a structured format for external analysis.

Secondly, technology is required for linking the system to an external network so that data can also be retrieved from the system.

Thirdly, there must be a defined network infrastructure to ensure encrypted and secure transmission of the data.

Next, a suitable storage architecture is required so that data can be stored in an organised, secure fashion (if possible in real-time) in a central location where it can then be processed further and evaluated.

Finally, digital tools (apps, software, web-based portals, etc.) are re-

quired for organising controlled access to the data and selecting usable information from the pool of raw data (aka big data) for specific audiences. For example, these tools can generate performance reports and deliver analyses and could one day even identify potential areas of improvement and initiate the corresponding process changes or actually assume control of the processes.

MIWE products already offer many of these capabilities. More recent MIWE systems come with the most fundamental feature of all: an intelligent, network-capable control system.

The latest generation of the MIWE go! control system is an excellent example. It takes connectivity to a new performance level by also ensuring extremely smooth, effective interaction at the interface between the user and the machine.

For years, MIWE has successfully used a variety of network and storage architectures for different applications, from local WiFi connections to mobile phone networks and even high-security VPN tunnels via routers and ethernet.

The nicest thing about all this: Users usually don't have to worry about any of the technical details. For example, they can simply download a MIWE App from the App Store and use MIWE zoom\* (for remote control of baking ovens), MIWE messenger\* (for remote status monitoring and notifications) or MIWE flow\* (for simplification of the loading process) on their smart device.

MIWE winCAB, the condition monitoring tool for production bake-houses uses a VPN tunnel via ether-



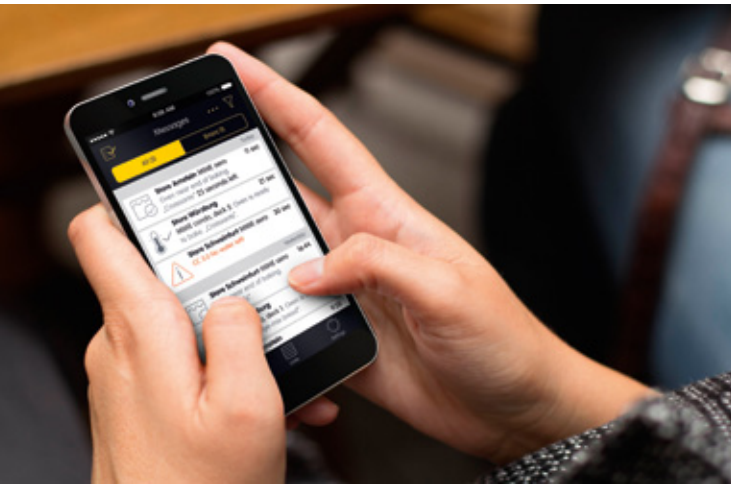
net to connect to a powerful central monitoring computer.

MIWE remote:net, the technical foundation for 24/7 remote condition monitoring, developed especially for bakery refrigeration systems, also features a secure, encrypted and fast connection. In addition to basic system monitoring, analytic and diagnostic services are also available, including active remote access by MIWE service specialists for troubleshooting activities.

... from control systems that take into account the user's knowledge level and allow for comprehensive networking ...

... to apps like MIWE zoom\*, which not only gives you a full overview, but also allows you to control each oven as if you were standing in front of it, no matter where you are ...





... to the MIWE messenger\*, which lets you control all baking stations and branch outlets/shops, even when your smartphone is in silent mode.

The latest tool, which we will unveil in the autumn of 2016, adds significant data analysis capabilities: the tool MIWE data analytics. Its job is to provide different audiences such as regional managers, branch outlet managers and baking technology coordinators or service technicians with tailored information and metrics for their specific critical performance areas.

The tool uses dashboards in a web-based application (and can therefore be accessed from any device with an internet connection).

The dashboards are cockpit or report pages that synthesise essential information and use graphics to illustrate current conditions, historical trends and/or key performance indicators, which provide a solid basis for evaluating workflows and processes and making further decisions.

MIWE develops standard reports in close collaboration with selected customers who have already made significant progress in becoming "smart shops". However, these standard reports can also be customised to meet a wide range of customer or user needs. Customising can be done by MIWE or the customer may assign the necessary customising rights to appropriately trained employees. Using a variety of selection and filter options, authorised users can then display weekly regional or standard reports or even daily reports on baking activities at a specific location. These are just a few examples of the tool's many capabilities. Tiny graphs, or sparklines (commonly used in the stock market world), chart the history of perfor-

MIWE data analytics not only shows you current conditions, it also logs processes and displays trend analyses. In this example, four shops of a region are being compared: Sales in Albany are at risk of declining and employees in Boston require retraining in customer expectations regarding product freshness. The Dover location could also use a refresher in process reliability. By contrast, the team in Concord is doing a good job, although it looks like sales are stagnating there.

Shop comparison		Week 46		
North area		Baking processes		Freshness
Shop	No.	10 week trend	No.	
Albany	87		12	
Boston	113		24	
Concord	98		6	
Dover	126		14	

■ static- no recognizable trend ■

Product comparison		Week 47							
Shop Essex	Baking processes		Freshness specification exceeded			Process errors		Processes with errors	
	Baking program	No.	10 week trend	No.	Error rate	10 week trend	No.	10 week trend	No.
Kaiser rolls	24		0			8		7	
Croissant	32		0			3		1	
Danish-style pastry	12		2			0		0	
Pretzel stick	7		3			1		1	
Baguette	9		6			4		3	

mance indicators over a selected period so that current numbers can always be evaluated in the context of a broader time period.

For example, the weekly report for a certain region might show all the baking processes at selected locations and provide a clear overview of any process errors that occurred. Process errors can also be determined from context using a threshold analysis: Was the temperature of the baking chamber more than 5°C above or below the desired temperature when products were loaded? Was the total baking time less than 95% or more than 110% of the desired baking time? Was the door of the baking chamber closed for more than 30 seconds after the end of the baking time?

Was the oven door opened during the baking program?

These and other questions can be individually configured and answered using the MIWE data analytics tool. For example, the trend line for the frequency of process errors in the last 10 weeks could provide information about whether retraining employees had any effect on improvements at the location.

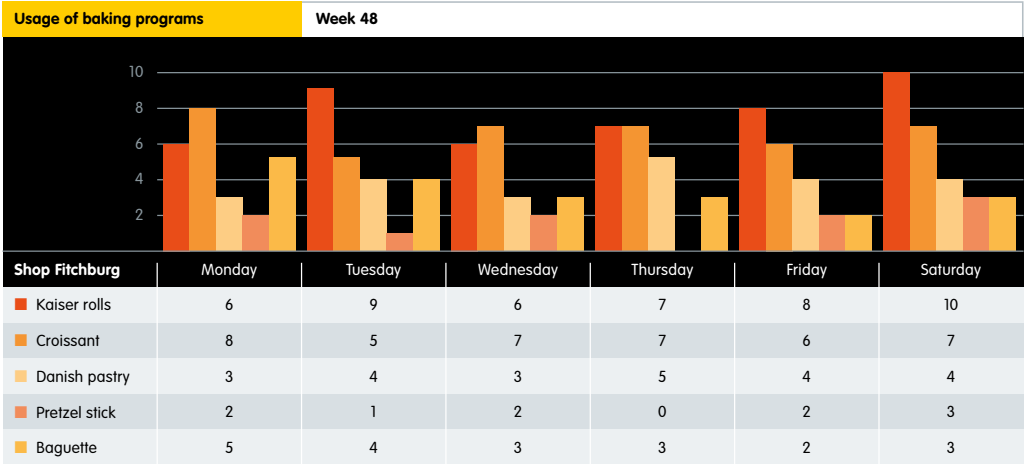
Using a weekly report for a specific location, a branch manager or other authorised user can determine how frequently certain baking programs were used on certain days of the week and which process errors occurred while using them.

A graphic subdivided into days of the week can also be used to

Individual products are analysed at the Essex branch. At a glance we can see that pretzel sticks and baguettes are very popular, although there's an urgent need for retraining in baguettes. Kaiser rolls, on the other hand, show a downward trend. Could that be because of so many process errors that are resulting in poor quality?

Freshness specification exceeded		Process errors		Processes with errors	
Error rate	10 week trend	No.	10 week trend	No.	Error rate
		8		5	
		12		8	
		5		5	
		17		11	

negative development    positive development



Which baking programs are used in Fitchburg on which days of the week and how often? Do delivery quantities need adjusting? Or can daily promotions be used to “push” profitable products?

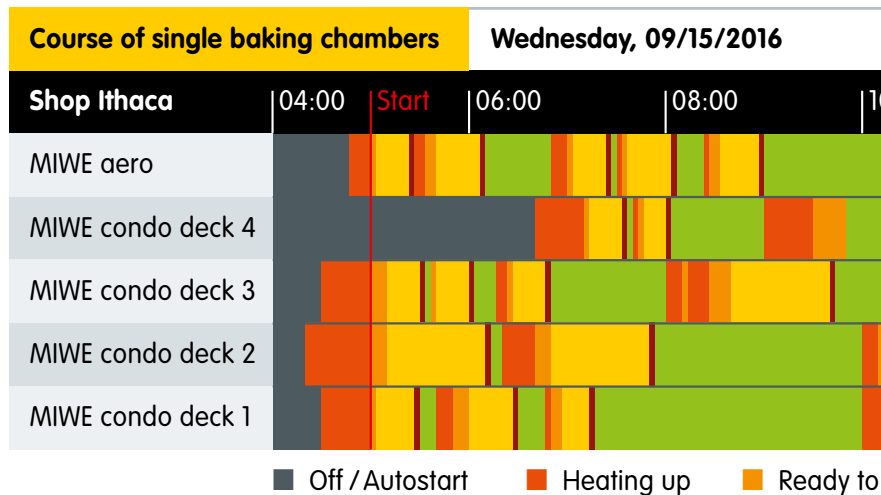
show usage data for all baking stations, broken down by (actual) baking times, heating up times, ready-to-bake times, non-operating times and times in MIWE eco mode. This graphic would also clearly show whether oven efficiency could be optimised at a specific location.

The daily view for an individual location also provides a graphical overview of the baking programs used at specific intervals and on specific baking stations. A freely selected freshness trend line could also be displayed, if necessary. In this case, the usage overview would even cover single baking chambers (if multiple baking stations with multi-

ple decks/chambers are installed at the location). Of course these are all merely examples meant to illustrate the information that can be visualised with the MIWE data analytics tool. In principle, the tool can analyse any data that can be retrieved from baking stations.

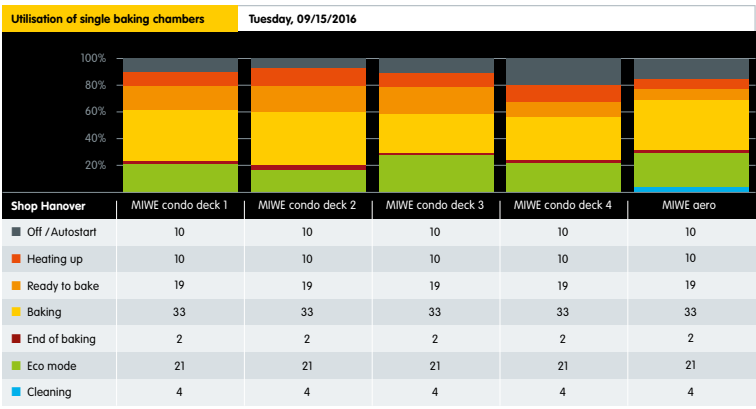
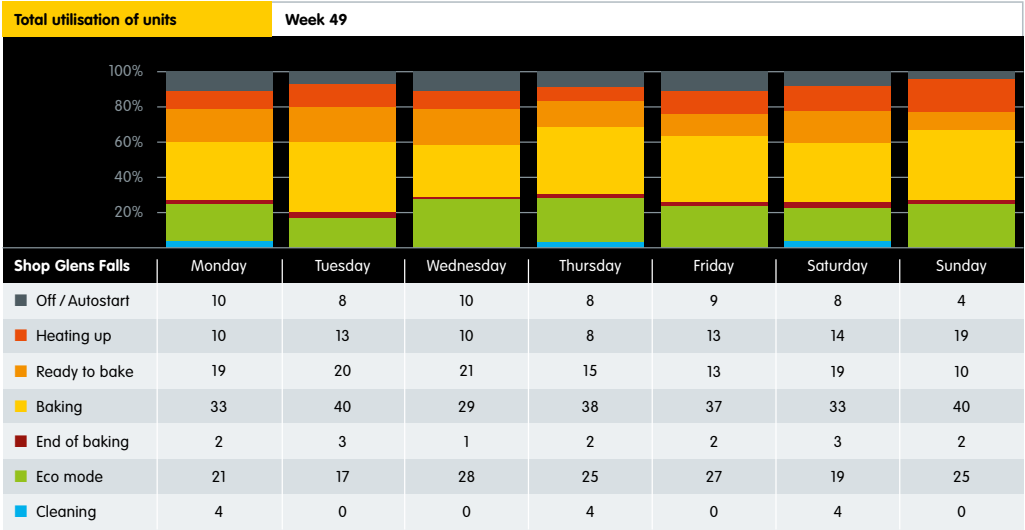
Many of our customers view this as an important step forward and a valuable resource for optimising their company’s workflows and processes. We have by no means reached the final goal of our mission. Our road map for new MIWE connectivity products is full of innovative ideas. We’re working intensively on new functions and tools

This analysis shows detailed, minute-by-minute oven/deck usage throughout the course of the day. You can clearly see that someone forgot to activate the auto-start function for deck 4, that the same deck was taken out of eco mode at 9 am for no apparent reason, and that the finished product was not removed from the oven on time at 2:40 pm. The oven was then heated up completely unnecessarily... At 8:00 am, the wrong program was selected on deck 3, which caused the oven to heat up again.



■ Off / Autostart    ■ Heating up    ■ Ready to

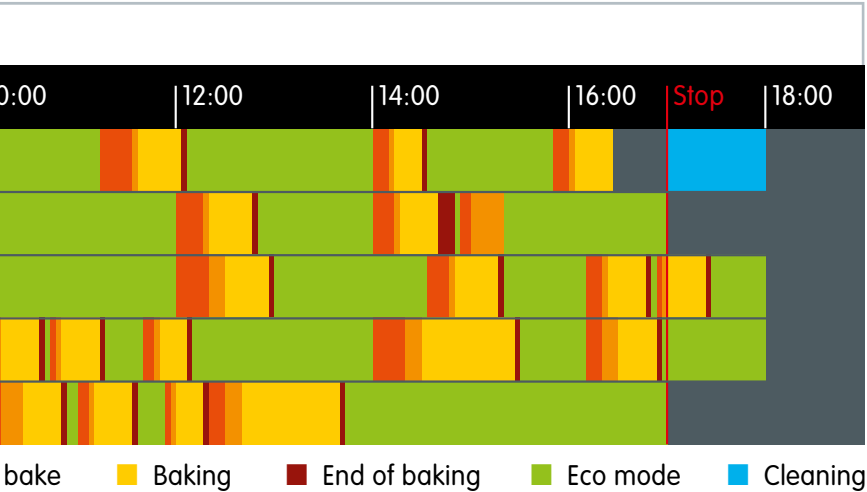




MIWE data analytics also shows you where a second look might be needed at a specific location: Are the ovens in Glens Falls being well utilized during the week? Are they overloaded or is too much (expensive) baking area left unused? Why is there so much wasteful heating up instead of eco mode use during the first three days of the week? And why are finished products only removed from the oven quickly on Wednesdays? Of course the tool can also be used for analysing the individual baking chambers or decks of a branch outlet during any period (see small figure on the left).

and are continually expanding our IT capacities and competencies. We will pave the way to your digital

future with MIWE connectivity. All in the name of improving your baked products and your business. ■



A young boy with dark hair, wearing a light blue button-down shirt, a tan corduroy flat cap, and blue sunglasses perched on his head, is shown in profile eating a large sandwich. He has his eyes closed and a focused expression. The background is a soft-focus outdoor scene with green foliage and a bright sky. The text "Snack! Attack!" is overlaid in large white font on the sandwich.

**Snack!  
Attack!**

**Hot snacks can boost sales and revenue and revitalise business during slow periods of the day. This is no longer a new realisation for bakeries. For many years, they have been working to integrate a wide range of snack concepts into their business models and are constantly improving their sales statistics for take-away products. But opportunities for business still abound, and the technical capabilities are by no means exhausted.**

With the MIWE gusto snack, all of a bakery's products can be easily baked on up to three trays. Not surprising, since the oven comes from the people who invented professional in-store baking. It's also no surprise that our smallest convection baking oven is designed for constant use during batch-after-batch baking. And of course it's also perfect for proofed, frozen dough pieces thanks to a convenient interface that controls the thawing and baking process for these small frozen products.

So it's not at all surprising that many bakeries also rely on the oven as a system for producing small, continuously oven-fresh batches of baked goods. Besides classic on-the-go treats like croissants, the gusto snack is great for keeping a constant oven-fresh supply of trendy, profitable products like muffins or other tempting American-style baked snacks. The oven is also perfect for modern convenience bakery snacks that are made at production facilities or purchased from suppliers, and it's a great choice for hot food counter items like meat balls or cutlets.

This all-rounder excels at much more than just hot-air baking. For example, the special top heat

function is perfect for adding an extra blast of heat to cheese pretzels and baguettes, producing that finishing touch that customers love. It's also excellent for browning and cooking au gratin everything from a vegetable casserole to a crispy roast.

With this oven, you can offer a full lunch menu and expand beyond a few hot items at the counter.

The optional coated aluminium booster plate enables you to bake with top and bottom heat.

Products like pizza, tartes flambée, quiche and more come out with a perfect crust.

Plus, the MIWE gusto snack now has a continuous steam function, which is already a feature of many larger

*How you can reap big benefits from our smallest baking oven*

**A roast that's crispy all around? Consistently easy to achieve with the compact and versatile MIWE gusto snack, which is also perfect for ...**



... delicious gratin potatoes ...



MIWE convection ovens. This technology goes beyond the powerful injection of steam that the MIWE gusto snack requires during baking by allowing for continuous control of the steam injected into the baking chamber.

This opens up a wide range of possibilities that can significantly expand your snack and food business. Our small oven features three dedicated operating modes:

... a crispy, flavourful tarte flam-bée (or pizza), a juicy spinach and noodle casserole or perfectly tender salmon fillets.

▶ Hot-air baking up to 250 °C for conventional baked goods as well as for roasting, grilling and cooking

au gratin fish and meat

▶ Steaming at temperatures between 90 to 130 °C with a relative humidity of 100 % (ideal for all gentle cooking processes used for desserts, meat, fish or vegetables, or for heating up prepared convenience foods/dishes)

▶ Combined steaming and hot-air mode for temperatures up to 250 °C with adjustable humidity. Ideal for foods that require longer cooking, such as fricassee, meatloaf, pot roast, large roasts and game, as well as lasagne and casseroles.



All this in an oven that is much more compact than a conventional convection oven and uses standard mains voltage (230 V) for easy plug-and-go operation. With the MIWE gusto snack, you can live up your menu to include poached salmon, crunchy steamed vegetables, tender roasts and much more.

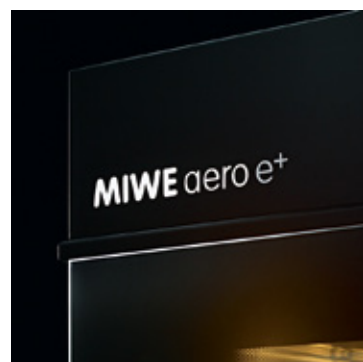
This versatility also allows you to use the oven efficiently around the clock. It can serve as a full-fledged baking oven for the breakfast menu, and also as a lunchtime oven thanks to the gastronomic function. It can bake new batches in the afternoon and oven-fresh pastries for the coffee shop, not to mention take-way snacks for evening commuters who stop in at closing time. No other oven of this size delivers so much versatility for food service applications. What's more, two ovens can be installed on top of each other for greater capacity and added flexibility (MIWE gusto snack on the bottom, MIWE gusto on top).

Another useful feature for cooking of all kinds of food to perfection is the core temperature sensor,

which comes as an optional feature of the MIWE gusto snack. It takes the guesswork out of cooking a tender sirloin to perfection and ensures that crusted roasts come out juicy every time.

Greasy foods always leave more to clean up in the baking chamber than baked goods. As a result, we also offer the fully automatic MIWE cleaning control feature with the MIWE gusto snack. This cleaning system can be easily auto-started at night so that the oven will be squeaky clean and ready to bake when you arrive the next morning. The tank for the cleaning agent is directly integrated into the body of the oven to save space. It can be easily and safely refilled so that you never have to come into contact with the cleaner. But even if you did, it wouldn't be a problem because the oven uses MIWE cleaner, a biodegradable, non-toxic and food-safe liquid cleaning agent developed specifically for baking stations. No rinsing agent is required.

The MIWE gusto snack also features our brand-new MIWE go! touch con-

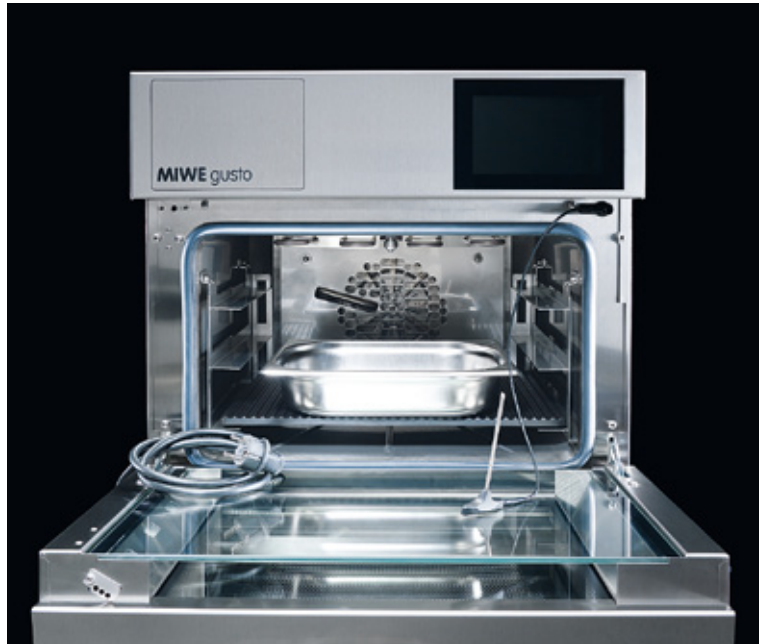


**If you need something a little bigger, our flagship oven, the MIWE aero e+, of course and above all offers all the same features as our smallest oven.**

**Other systems can't compare: The MIWE gusto snack is also a full-fledged convection oven for oven-fresh baked goods (below).**



Just plug it in and go. Thanks to a standard power connection, built-in water tank, intuitive touchscreen interface, booster plate with core temperature sensor (both optional), you can have a successful snack business up and running in a matter of minutes.



control system, which enables even absolute beginners to achieve perfect results without extensive training. That way you or your employees won't have to spend ages learning how to use the oven and can start using it straight away. "If you can operate a smartphone, you can operate the MIWE go! control system," said one of the first bakers to opt for the MIWE gusto snack. He's right: Nowadays everyone is familiar with the swipe gestures that the new MIWE go! interface supports.

With its wide range of user-based modes (such as easy mode for operators and professional mode for experienced users); its natural step-by-step, process-based operating sequence; its completely redesigned user interface with signal colours, logical icons and easily accessible help and info functions as well as a brilliant 7-inch glass display, which is easily visible from a distance, your MIWE gusto snack will always deliver exactly what you expect: perfectly baked goods, a wide variety of snacks, and at the end of the day: better sales. ■



- ▶ **IBIE**  
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08 – 11 Oct. 2016
- ▶ **südback**  
Stuttgart / Germany  
22 – 25 Oct. 2016
- ▶ **HACE**  
Cairo / Egypt  
30 Oct. – 02 Nov. 2016
- ▶ **World Food**  
Almaty / Kazakhstan  
02 – 04 Nov. 2016
- ▶ **Alles für den Gast**  
Salzburg / Austria  
05 – 09 Nov. 2016
- ▶ **Gulfood Manufacturing**  
Dubai / UAE  
07 – 09 Nov. 2016
- ▶ **Retail Show**  
Warsaw / Poland  
16 – 17 Nov. 2016
- ▶ **IBEX**  
Teheran / Iran  
06 – 09 Dec. 2016
- ▶ **SIGEP**  
Rimini / Italy  
21 – 25 Jan. 2017
- ▶ **Sirha**  
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17 – 21 Mar. 2017
- ▶ **Hotelex**  
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28 – 31 Mar. 2017

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MIWE Michael Wenz GmbH  
PO Box 20 · 97450 Arnstein  
Phone +49-(0)9363-680  
Fax +49-(0)9363-688401  
e-mail: [impulse@miwe.de](mailto:impulse@miwe.de)

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Editorial Office:  
Charlotte Steinheuer  
Eike Zuckschwerdt

Authors:  
C. Braun, F. Bruske, U. Klatt,  
J. Koch, B. Marx, R. Romczinski,  
S. Seipp, T. Stannek,  
R. Steinfelder, C. Weigel

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Dr. Hans-Jürgen Stahl

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# Sneak a Peek Into the Future.

Die Zukunft des Backstuben-Engineerings





**MIWE** Michael Wenz GmbH  
97448 Arnstein  
Germany  
Phone +49-(0)9363-680  
Fax +49-(0)9363-68 8401  
e-mail: [impulse@miwe.de](mailto:impulse@miwe.de)