MIWE bäckerkälte

2 | You bake your dough to perfection in the oven. But oven-fresh taste actually comes from bakery refrigeration

It is really quite a paradox when you sit back and think about it. An excellent range of oven-fresh baked goods is the mark of a first-rate baker in the eyes of many consumers. However, the availability of baked goods fresh from the oven at any time of the day (or night) has less to do with the oven itself than with a technology which is at the opposite end of the temperature scale, namely refrigeration.

This is where you find the methods and techniques which allow bakers to prepare the dough at a different time (and often a different place) from the actual baking process. It is the real secret behind the success of remote baking stations and today's round the clock availability of a great assortment of baked goods.

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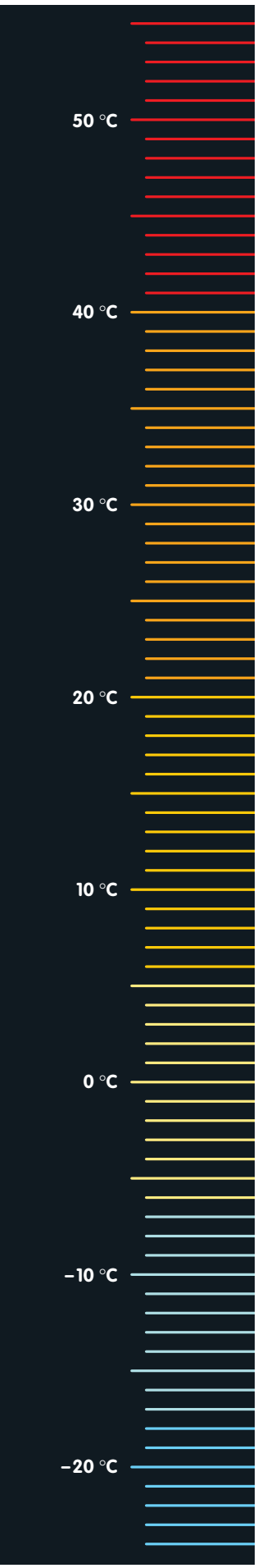
Separating dough preparation from the baking stage has dramatically increased efficiency, and it was the factor which originally led to the breakthrough of bakery refrigeration systems. Refrigeration and freezing equipment now takes up about three times as much floor space as baking systems.
To an increasing extent, rationalization is no longer the primary goal. Instead, refrigeration systems are being used to enhance product quality. Clever bakers have long realized that skillful manipulation of refrigeration parameters such as temperature and humidity can do much more than simply extend the long-term availability of their baked goods.

In this way, refrigeration systems have now become a crucial success factor in any size baking operation.

As you can see, there are plenty of reasons why you should look for nothing less than the very best when you choose your bakery refrigeration systems.

MIWE bakery refrigeration systems. The best thing that can happen to your baking goods.



50 °C The yeast's cell protein coagulates. The yeast proofing breaks down.

Reducing enzyme and yeast activity due to heat deactivation.

32 °C "Optimum proofing" – maximum yeast activity.

Reducing enzyme and yeast activity due to cold inhibiting. The latter falls considerably faster than the enzyme activity.

5 °C Reduced yeast activity with continued relatively high enzyme activity results in much better quality (primarily in terms of aroma and taste).

Hardly any yeast activity.

–7 °C "Yeast stop" – the yeast proofing activity breaks down almost completely. Continued enzyme activity at a low level. Also the "freezing point" of bakery products (the majority of the water is frozen out).

–18 °C Almost total stop of the enzyme activity as well. Deep freeze storage temperature to bridge across lengthy periods.

The ability to skillfully manipulate temperature and humidity is the sign of a truly good baker. The real pro has to be a master of his craft at the oven but also long before that as well when the dough rises and the aroma develops during the first and second proofing stage.

The range of practical proofing temperatures is defined by the ingredients in the "raw material" which every baker around the world works with, namely dough. There are two ingredients in particular that can be influenced by chilling. Yeast makes the dough and dough pieces more tender by generating gas bubbles. A variety of enzymes break down starch in a series of complex biochemical processes, and this has a crucial effect on factors that determine aroma, color and taste.

Besides choosing the right ingredients and recipes, bakers use temperature variation and a variety of refrigeration techniques to regulate the biochemical processes.

The temperature-dependent activity of the yeast and enzymes determines the main temperature ranges which are used in bakery refrigeration:

+20 to +40 °C: Proofing

Temperatures ranging from room temperature to forced proofing (optimal proofing at +32 °C).

~ +5 to +20 °C: Long-cycle proofing

Refrigeration is used to stretch proofing time (i.e. slow proofing) at temperatures above 0 °C. Proofing time can be 4, 8 or up to 24 hours depending on the process.
In this temperature range, the dough preparation and proofing process is not completely separate from the baking process.

–6 to +5 °C: Proofing retardation

Temperature range for low or lowest yeast activity, but the water in the dough does not freeze (in other words the dough is practically at the freezing point).

Because the refrigeration equipment does not operate in the energy-intensive range below -7 °C and enzyme activity is maintained, retarded proofing produces high-quality results over a period of up to 36 hours with relatively low energy consumption.

–18 to –7 °C: Interrupted proofing

Yeast proofing ceases. Enzyme activity slows down significantly but does not stop completely. The shelf life of products stored at this temperature is limited depending on the item and type of packaging. Goods that are packed do not exchange air and moisture with the surrounding air, and this increases shelf life. Unpacked items are very susceptible to drying out or picking up excess moisture from the surrounding air.

Rolls can be stored for 3–4 days, and Danish pastry can be kept on the shelf for 7–10 days.

Before they reach this temperature range, the goods have to go through the freezing phase at around –7 °C, and this significantly increases energy consumption compared to retarded proofing.

< –18 °C: Deep freeze

At temperatures below –18 °C, yeast activity ceases completely and enzyme activity largely stops. In this temperature range, the shelf life of semi-baked goods, which are particularly sensitive, is several weeks or even months. Unproofed dough, (pre)proofed dough and (par)baked goods can be frozen.
In practice (and there is scientific evidence to support this), the negative effects of freezing are minimized if freezing takes place as quickly as possible.

This prevents the formation of large ice crystals which can damage the consistency of the dough, and baked goods have better volume. MIWE flash freeze stations have ample cooling performance and can be regulated down to –38 °C to freeze your products gently and quickly, even if they are "hot out of the oven" when you place them into the freezer.

Because dough pieces need very specific humidity conditions depending on the product, proofing state and temperature interval, it is a mark of excellent refrigeration systems that the relative humidity can be controlled and monitored very accurately in the cooling chambers.

The art of baking consists of skillfully manipulating temperature and moisture to achieve the color, aroma, taste, volume, etc. you want in the end product by maintaining a harmonious balance of yeast and enzyme activity.

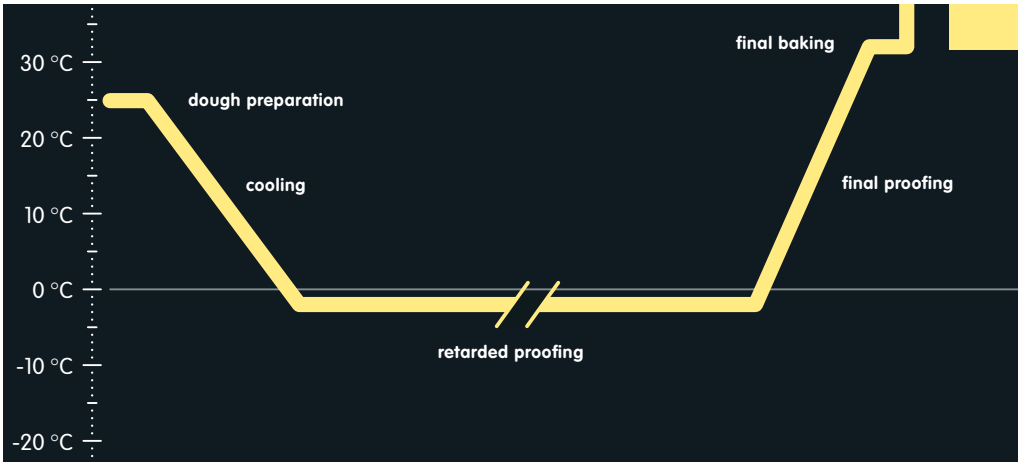
Our role is to supply the best possible bakery refrigeration systems which help you manage this challenging task regardless of whether you plan to handle 200 kilograms of dough or 20 tons.

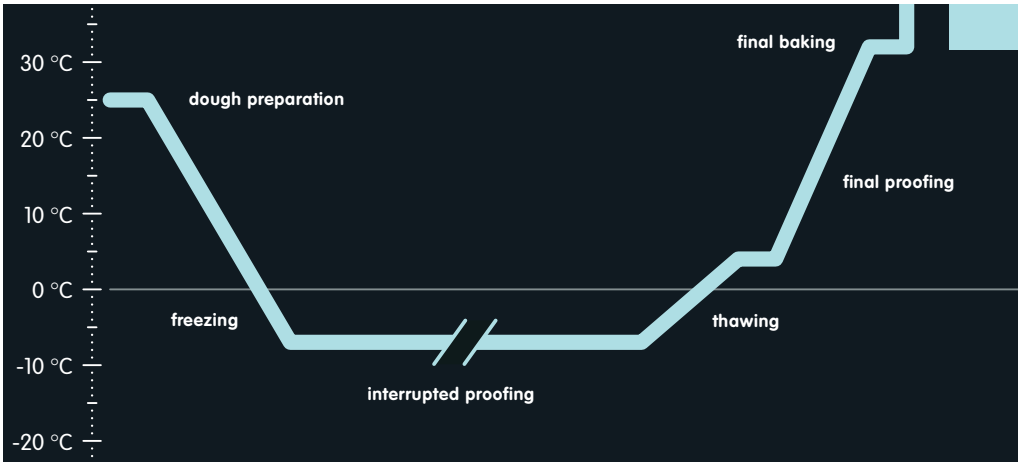
The dough preparation process uses a controlled sequence of climatic conditions for dough and dough pieces, and it is a vital tool in the hands of a baker. The two major goals are to control product quality and optimize operations from the bakery floor to the point of sales.

The dough preparation process is affected by trends. New combinations of the familiar temperature / humidity profiles frequently appear on the market. These solutions, which sometimes have very creative names, promise to deliver specific organizational and/or quality advantages.

You are on the safe side when you stick with MIWE bakery refrigeration systems (and MIWE ovens as well). Whatever process you choose to use, you always get the quality you want.

MIWE bakery refrigeration systems put you in the driver's seat.





Long cycle / proofing retardation

With this method, proofing time can be extended to 36 hours maximum at a storage temperature of –6 to +18 °C.
Yeast activity is reduced to a minimum, but the temperature does not fall below the energy-intensive freezing threshold (at about –7 °C). Enzyme activity decreases at this temperature, but it does not cease. In this way, it can significantly enhance aroma and taste.

At the same time, bakers can keep goods on the shelf for a relatively long time, which they can then bake without having to defrost them. Energy consumption is relatively low, and the variable time horizon relieves pressure at peak times.

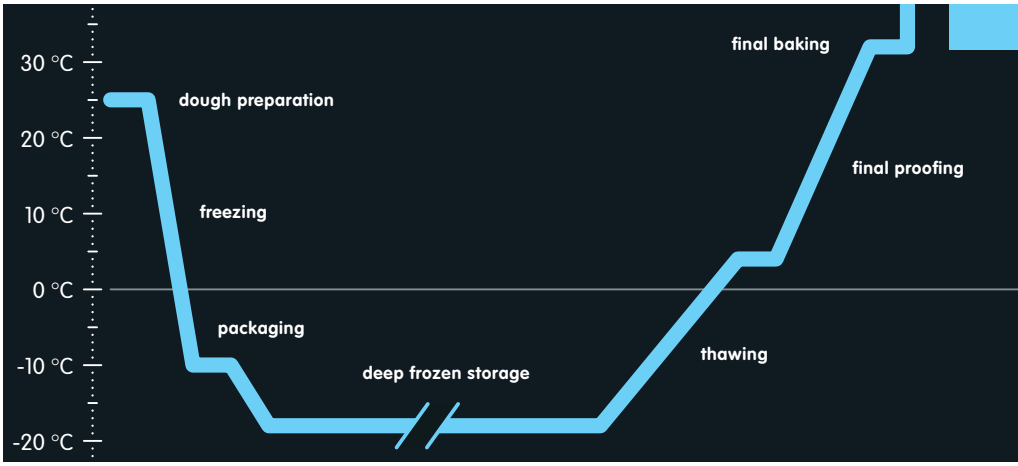
▶ Recommended equipment:
MIWE GV, MIWE GUV, MIWE GVA, MIWE SF-D.

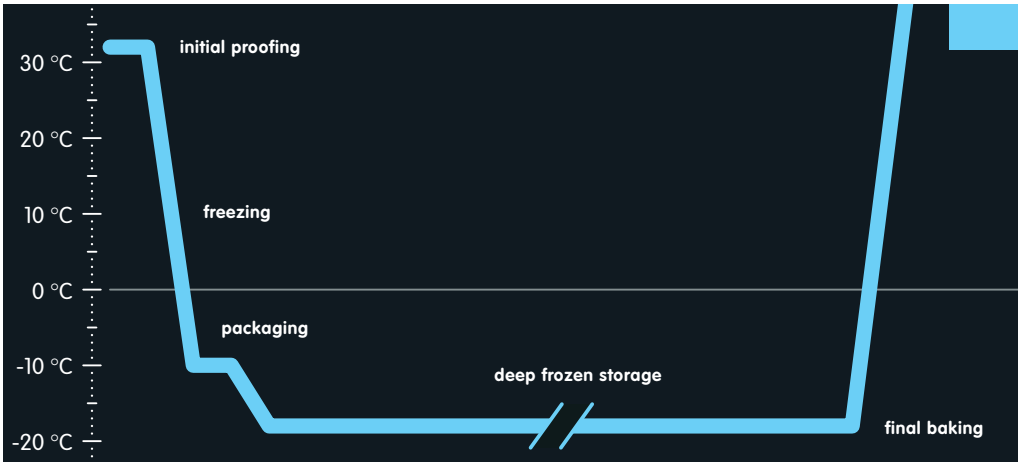
Proofing interruption

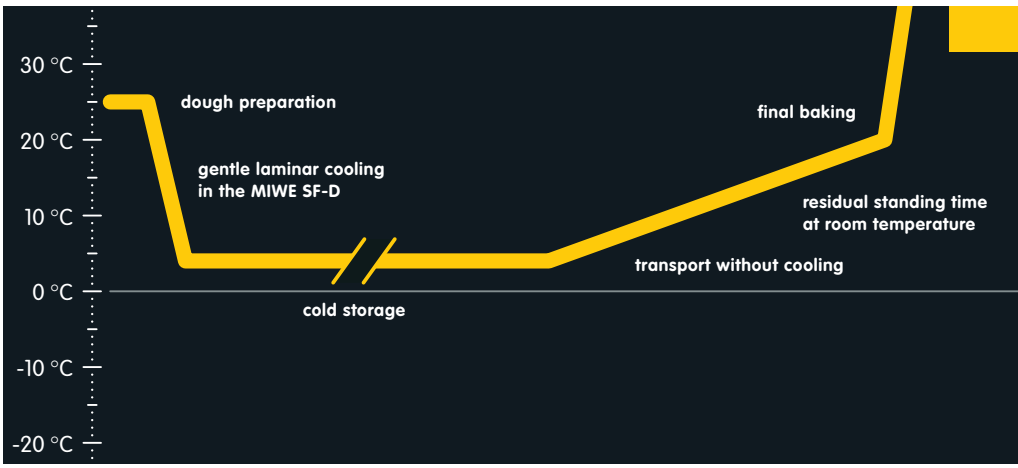
Proofing interruption operates at a temperature range of –7 to –18 °C. Yeast activity ceases completely while enzyme activity still continues at a reduced level. Because the enzymes are still active, the time horizon remains limited. However, unpacked dough can already be stored for up to 72 hours.
This enables bakers to produce a large variety of products, and they can also get consistent results with relatively small volumes.
Proofing interruption can significantly help to relieve pressure at peak times.

▶ Recommended equipment:
MIWE GUV, MIWE GVA, MIWE SF, MIWE TLK.

Freezing: With all freezing methods, the products are chilled to a temperature level of at least –18 °C at which enzyme activity comes to a virtual standstill. With this method even unproofed, packed dough can be frozen and stored for one to two weeks, other products even for up to several months. Freezing is used at various stages during the production process.







Freezing unproofed dough

The dough is frozen directly after preparation, ideally with a high-performance flash freezer which rapidly cools down to –38 °C to avoid damage to the cell structure. A long shelf life offers ample opportunity to rationalize the production flow. Dough which is frozen using this method is available any time of the day, but it has to be defrosted and proofed before it can be baked. This places some restrictions on how quickly the dough can be made available, and you need a skilled worker who is knowledgeable in the proofing process. This method offers a very effective way of relieving the stress during peak production times, and allows you to offer a varied assortment of products. Space requirements during storage and transport are kept to a minimum.

- Recommended equipment:
  MIWE SF, MIWE TLK, MIWE TKL, MIWE TK.
- For retail outlets: MIWE GVAS.

Freezing proofed dough

Dough that has been through the (minimum) proofing process is frozen. Then it can be baked in an oven which has a program to defrost the frozen dough in a controlled manner (for example the MIWE aero) without second proofing. This method is particularly useful for flexible, demand-driven loading of baking stations. Proofed, frozen dough can be packed and stored for several weeks or months.

Frozen dough is easy to handle, and it takes very little time to get oven-fresh products onto the store shelves. This process offers a variety of options for rationalizing individual baking operations, and it helps bakers to continuously offer their customers a broad range of oven-fresh products.

- Recommended equipment:
  MIWE SF, MIWE TK, MIWE TLK, MIWE TKL.
- For retail outlets: MIWE TKS.

Freezing (par)baked goods

This process offers the fastest availability of oven-fresh baked goods at the point of sales. It is also an ideal way to react to peak demand in branch locations or on delivery routes. The dough is pre-baked (up to 80 % of the full baking cycle) and then frozen. Only minimal baking is needed after the frozen baked goods are defrosted, and sometimes the term "regeneration" is used to describe the process.

Packaged (par)baked goods can be stored for several weeks or months.

- Recommended equipment:
  MIWE SF, MIWE TK.
- For retail outlets: MIWE TKS.

MIWE smartproof™

This is the method of choice when you want to bake off high-quality products at your retail outlets. It offers a whole range of advantages. Logistics are less complex, and because proofing time tolerances are very generous, the partially-baked goods can be stored for up to 36 hours. You get significantly better taste, aroma and coloring with low investment costs and minimal space requirements.

It combines a proofing curve, which must be maintained within relatively strict limits and which is primarily in the high-aroma temperature range at around +6 °C, with a special logistics solution, namely a stackable plank. The dough is protected against the effects of temperature and moisture during delivery, and it is supplied in a thermally insulated box when outdoor temperatures are high.

A suction-type flash freezer like the MIWE SF-D delivers excellent uniformity and very high throughput.

- Recommended equipment:
  MIWE SF-D, MIWE GV (for smartproof)

It should be obvious from this very basic outline of the opportunities which bakery refrigeration systems can offer that bakery refrigeration goes far beyond conventional refrigeration technology. There is more to the design of a truly effective bakery refrigeration solution than a stainless steel housing and refrigeration machinery. What you really need is an in-depth understanding of the characteristics and behavior of dough, which is the baker's raw material.

Dough is an active substance, and you have to handle it with great care and skill if you want your customers to like your products so much that they come back for more.

If you want to get the best results from your bakery refrigeration systems, you have to look at other aspects of the process, because the factors which determine whether your dough preparation process produces the results you want are not limited to the refrigeration cell. The raw materials, recipe, kneading and last but not least the oven at the end of the production process all have a major role to play.

When you choose your bakery refrigeration systems, it makes a lot of sense to place your trust in an experienced partner. MIWE has a professional team of advisers who have been providing welcome support to bakers around the world for many years. These experts help identify additional opportunities to improve a product or an entire range of products or to get even better quality from a well-designed process. The ultimate goal of course is to improve your bottom line. If you have a good handle on the overall process and all of the control parameters, then you have the opportunity to identify superior solutions at various points in your process.

MIWE's expertise covers the entire range of temperature control equipment in the bakery. This holistic experience base places the company in an excellent position to offer holistic

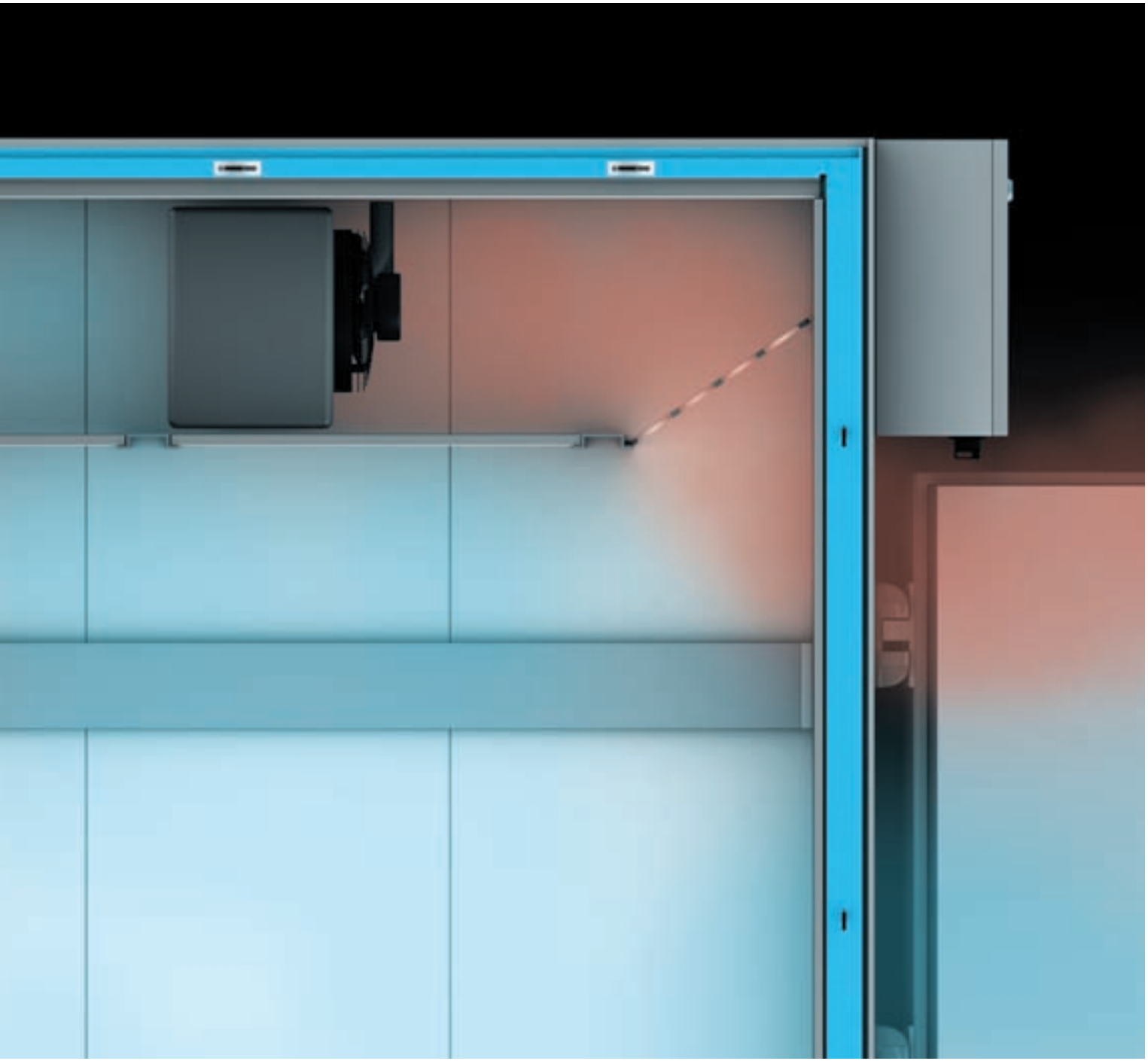
From the air system made of hygienic stainless steel whose elements can be removed very easily for cleaning, through practical floor trays to the all-round collision guard: All this makes baking simple.

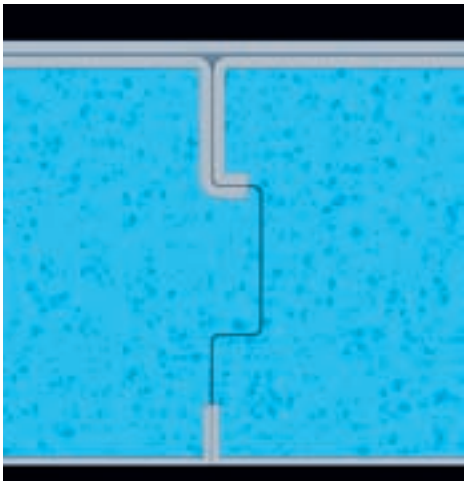
solutions that are more than just a sum of parts. We give you the specific support you need to stay ahead of the competition by improving product quality, process reliability, automation capabilities and the versatility of your production operations.

MIWE has the know-how, expertise, experience and people that it takes to come up with the best solutions which are tailored to the customer's product range, from the bakery floor right through to baking stations in the retail outlets. We offer a mix of standardized components (to keep costs down), customized refrigeration systems (which help you make the most of your capabilities) as well as innovative solutions which help you maximize efficiency and minimize your maintenance and cleaning effort. There is good reason why MIWE sets the quality standard in the world of baking.

Because we are very familiar with so many bakeries around the world, we know all about the myriad of details that are so important in the baking business. This is why for example the flooring in our refrigeration units was designed with the bakery in mind.
We also include impact protection on all sides and an air management system made of hygienic stainless steel elements which can be quickly removed for cleaning. Our in-depth manufacturing know-how and state-of-the-art laser and CNC production systems, which we also use in our oven manufacturing operations, have a beneficial impact on the quality of our refrigeration systems.

When we produce our ovens, provide automation tools to speed up your operations, or supply refrigeration systems which improve the quality and versatility of your bakery, our overriding goal is to make baking simple.





All this makes baking simple:
The inclined suction intake in the MIWE TLK feeds entering hot air straight to the evaporator, thus preventing unnecessary icing (large picture).
Or – from left to right:
The hygienic, easy-to-clean base pan with overhanging drip edge; the stainless steel covering stuck across the whole surface and with a joint offset to the base pan, preventing moisture from entering; practical concepts for energy recovery; individually optimised evaporator-plate spacings (important in 24-hr operation!) and, last but not least, the energy-saving operating mode as an intelligent, load-optimised combined cooling system.

Take for example the great flexibility of our systems. We do not force you to stick to a limited set of standard dimensions. We can give you the size system you want (in cm increments), so that you can make the best use of the available space.

Or take a look at the flooring of our systems. MIWE can provide a variety of flooring designs to match your requirements. The seamless floor, which is very easy to clean, is a standard feature on many versions, and we can supply it as on option on all others.

A whole range of practical details reflect true craftsmanship. A special floor joint with a double-bend improves hygiene and provides much more effective protection against moisture escaping from the cell than the floor elements with simple butt joints which are normally used.

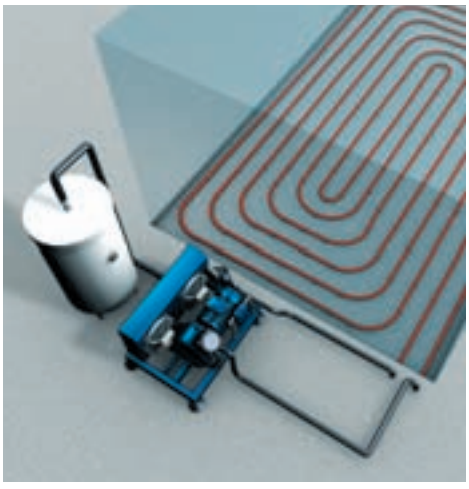
The walls and floors on MIWE systems are held together with tongue and groove joints and a special turnbuckle.
This solution increases long-term stability and reduces the number of heat bridges (an important consideration at a time when energy prices are increasing), and it decreases your operating costs.

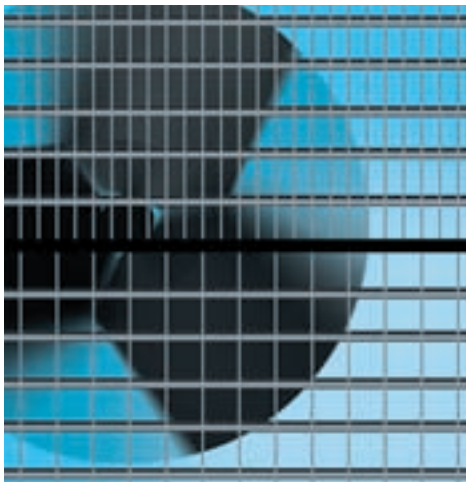
We also think of minimizing your energy consumption when we develop an individual heat recovery concept together with you for hot and process water.

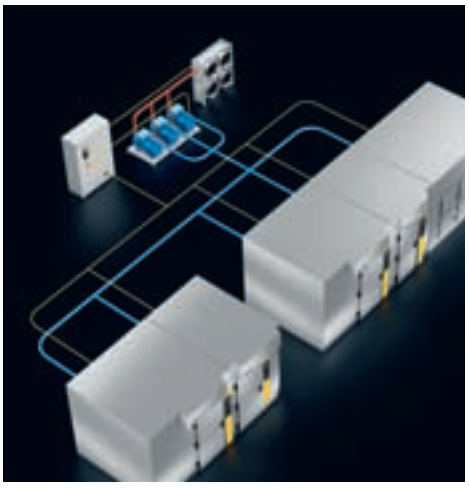
We will not (and cannot) list all of the details which set our refrigeration systems apart from the rest, but we would like to mention one more feature, because it illustrates very nicely how having a firm grasp of the basics leads to better bakery refrigeration solutions.

There is a rule of thumb which says that a large evaporator surface delivers good cooling performance. In principle, that is correct, but the right spacing of the evaporator fins is just as important. You have to be careful that the frost which automatically forms on the fins is spaced properly to ensure that cooling performance does not automatically drop or the frequency of defrosting phases does not have to be increased. This is why MIWE offers 5 different fin spacing options to handle any situation.

It is also the only way to ensure that you are thoroughly satisfied with your refrigeration systems. This is after all what MIWE bakery refrigeration systems are all about.







- Flash Freeze Station MIWE SF: Frigid temperatures that are gentle on your product.

The flash freeze station MIWE SF is the ideal choice when you want to gently freeze large volumes of dough. We achieve the desired evenness in the cooling results with a stationary evaporator that has been designed for the dimensions of the room.
The stations are individually designed to customer requirements (e.g. for 12 trolleys an hour), and from a capacity of 3 trolleys upward they are all configured as flow-through units. Guide rails on both sides ensure a smooth flow of rack trolleys.
An automatic conveyor system is available as an option to link the freezing station into an automated production process.
Hygienic stainless steel surfaces are a standard feature on this product line, including the seamless floor which is easy to clean.
Various specialized versions of the flash freezer are available:

- **Flash Freeze Station MIWE SF-V:**
  The allrounder – for non-proofed, pre-proofed, fully proofable and hot goods.

This station has been designed specifically for pre-proofed dough and hot baked goods right from the oven. Pre-proofed dough pieces (50–70 g each) are cooled down to -7 °C in 25–30 minutes. Upright evaporators with defrosters (to accelerate the defrosting process) are mounted at the side, and this feature along with variable speed fans provides the versatility needed to accommodate a wide range of products.

- **Flash Freeze Station MIWE SF-D:**
  Bringing out the quality.

This station is different. It uses a suction fan rather than a blower. This significantly decreases the risk that the dough will dry out, and it produces much more uniform results, making it the ideal choice for all types of long-cycle dough preparation and proofing retardation. It is also perfect for one special application, namely the MIWE smartproof™ method. It exploits the logistical and climatic advantages of stackable planks. It is the core element in a process which enables you to combine outstanding product quality, excellent flow management, low space requirements and minimum investment costs. It will handle small amounts of dough or extremely large volumes.

**Ensures up to 30% shorter cycle times:
A handle can be used to adjust the air flow to the height of the stackable trays.**

The ventilator column can simply be folded to the side for easy cleaning.

▶ **Dough Storage Unit MIWE TLK:**
Gentle freezing and storage.

The dough storage unit MIWE TLK is an excellent choice when you are looking for a system which enhances product quality during gentle freezing and long-term storage in a high humidity environment. We can build and deliver the system you want in virtually any size. The MIWE air management system (the stainless steel pressure walls can be easily removed for cleaning) ensures maximum compliance with two major criteria which influence the final quality of your products, namely a uniform cooling environment and minimal air circulation. Keeping air circulation to a minimum prevents the loss of moisture and the formation of skin on the dough. The MIWE TLK rapidly cools the products. A cleverly designed inclined suction intake at the entrance reduces the amount of warm air that is let in when the access door is opened, and this in turn minimizes ice formation. Impact protection on all sides provides added security, especially when things get hectic in bakery refrigeration. A separate unloading hatch and a rapid cooling zone inside the cell are available as options.

▶ **Bay Freezer Storage Unit MIWE TKL:**
Freeze and store goods on trays.

Perhaps you prefer to freeze and store your products right on the trays. If so, then the bay freezer storage unit MIWE TKL is right for you. You can have between two and eight storage bays plus a flash freezer compartment where you can concentrate up to 75 % of the cooling power but which can also be used as an additional storage bay. You can simply adjust a control flap to change the distribution of the cooling power. Each bay can hold up to 12 baking trays (60 x 80 cm). Even if you decide to start small, you still keep all your options open, because storage bays can be added at a later time (always in pairs). It is hardly surprising that the bay freezer storage unit MIWE TKL is so popular in small bakeries, pastry shops and any other business where bakers want to be sure that aroma is not transferred from one product to another (from bay to bay).

▶ **Freezer Storage MIWE TK:**
The industry standard for storage of packed frozen products.

Bakers use the freezer storage MIWE TK whenever they have a need to store packed frozen goods. The units are very versatile, efficient and simple to clean.

▶ **Cold Storage MIWE NK:**
For everything else that must be kept cool in the bakery.

Dough is by no means the only thing that has to be kept cool in a bakery. Butter, eggs and yeast are examples of items which can be stored at temperatures a few degrees above zero (centigrade), and this is just what the cold storage MIWE NK does best.

▶ **Cream Cold Storage MIWE SK:**
Designed with pastry in mind.

MIWE cream cold storage units were designed specifically for pastry products that need a lot of moisture to retain their quality, from in-process goods to finished products. In order to provide the ideal climate for pastries, the cream cold storage MIWE SK has a very large evaporator surface. However, very little moisture bonds to the evaporator, because the storage temperatures for cream remain above freezing. The humidity stays in the room and more importantly in the products. Clever bakers know that they can exploit the special temperature / humidity profile of the MIWE SK for classic long-cycle dough preparation.

▶ **Freezer Cabinet MIWE TKS:**
Efficient cooling in a small space.

The cabinet version of the MIWE freezer is the perfect solution for bake-off stations at your retail outlets or as a low-cost alternative for small bakeries. When we deliver it to your door, all you have to do is plug it in. It gives you all of the excellent performance, hygiene and reliability that you have come to expect and appreciate from our large refrigeration systems. The MIWE TKS comes with two doors which are hinged on the right or left (it's your choice) to minimize the amount of heat and moisture which gets into the freezer when you open the door. Full-length handles ensure that the doors are easy to open when things start to get hectic. The internal surfaces are made of hygienic stainless steel.

▶ **Cream Cold Storage Cabinet MIWE SKS:**
Ideal conditions for cream in a very compact design. Just plug it in.

If space is limited but you still want perfect climate conditions for your cream, the cream cold storage cabinet MIWE SKS is the obvious choice. This low-cost alternative is ideal for a small bakery or pastry shop, and it comes ready to be plugged in. The MIWE SKS has two doors that optionally opens to the right or to the left. Full-length handles ensure that the doors are easy to open when things get hectic. The exterior walls and internal surfaces are made of hygienic stainless steel.


MIWE TLK

▶ **Proofing Retardation Unit MIWE GV:**
Controlled long-cycle preparation for professionals.

Long-cycle dough preparation at temperatures just above freezing is a tried and tested method of improving the freshness, aroma, dough consistency and quality of your products. The option of baking the products over a period of several hours has significant advantages. The MIWE GV can handle several different variations of long-cycle dough preparation. Products can be stored for up to 36 hours depending on the configuration. A specially designed heating unit can be used to defrost the products under controlled conditions. You can easily control all of these functions with the user-friendly MIWE TC touchscreen control system. Air management through the stainless steel intermediate ceiling ensures outstanding uniformity and product quality. Particularly at a time when energy prices are increasing, you will quickly come to appreciate the energy-saving design of the MIWE GV.

▶ **Proofing Interruption Unit MIWE GUV:**
Optimized for long-cycle preparation and freezing.

The proofing interruption unit MIWE GUV operates in the temperature range around the freezing point, making it ideal for proofing retardation, long-cycle dough preparation, rapid chilling and proofing interruption. It is the solution of choice when you need a wide range of cooling temperatures but do not need the special proofing features of the fully automatic proofing unit MIWE GVA. Otherwise the proofing interruption unit offers all of the other great features that you get with the MIWE GVA. Both have the same precise air conduction system, the convenient MIWE TC control and a generous freezing capacity. An optional humidifier is available to augment the high (passive) relative humidity in the MIWE proofing interruption unit, which also makes an excellent defrosting and recovery cell.

▶ **Fully Automatic Proofing Unit MIWE GVA:**
Everything you could ever want.

You have several refrigeration options to choose from which can help you improve the quality of your dough or increase your flexibility. This truly versatile unit can handle any refrigeration job on the bakery floor. The fully automatic proofing unit MIWE GVA covers the temperature range between a frigid –20 °C and forced proofing at around +40 °C. You can also vary the relative humidity up to 98 %. Forced proofing, proofing retardation, rapid cooling, proofing interruption and dough setting are no problem at all for the MIWE GVA. The MIWE GVA masters all temperature control tasks in any order and in freely selectable time units. In addition to this, it is easy to control with the touchscreen control system MIWE TC. Complete process cycles can therefore be simply defined and reliably and efficiently retrieved. This enables you to achieve reproducible results of the highest level.

The MIWE GVA e+, which has been awarded the e+ seal of quality, combines perfect hygiene, extremely low levels of energy use and excellent product quality.

▶ **Fully Automatic Proofing Cabinet MIWE GVAS:**
The big world of proofing on a small foot print.

When you want forced, controlled proofing as well as proofing interruption and proofing retardation, but space is limited, then the fully automatic proofing cabinet MIWE GVAS is just what you are looking for. It operates in the temperature and humidity range that you want. You get a very compact unit which gives you the flexibility you need to get top quality results with your individual product range, which is also and especially true for your branch locations. Like all of the other cabinet versions in the MIWE product range, this system is ready to plug in when it is delivered to your door. The MIWE GVAS is equipped with one door that can be hinged on either the right or left. Full-length handles ensure that the doors are easy to open when things get hectic.

A magnetic water valve with evaporation pan acts as a simple, efficient source of humidity. The exterior panels and internal surfaces are all made of hygienic stainless steel.

▶ Proofing Chamber MIWE GR,
Air-Conditioned Chamber MIWE KR:
The specialists for proofing.

When it comes to the accelerated proofing of products under controlled conditions, the solutions of choice are the proofing chamber type MIWE GR and the air-conditioned chamber type MIWE KR, whereby the latter offers the extra flexibility of cooling and dehumidification as well as heating. Both can be installed in a classical arrangement directly alongside the baking oven or else be operated as independent industrial units – transport systems included.
In both cases the temperature and humidity are regulated with appropriate control of air flow. There is even a choice of interior fittings to suit the size of operation and the spectrum of products in question. A cell-based design permits individual configurations within certain grid widths.

▶ Proofing Chamber MIWE GR

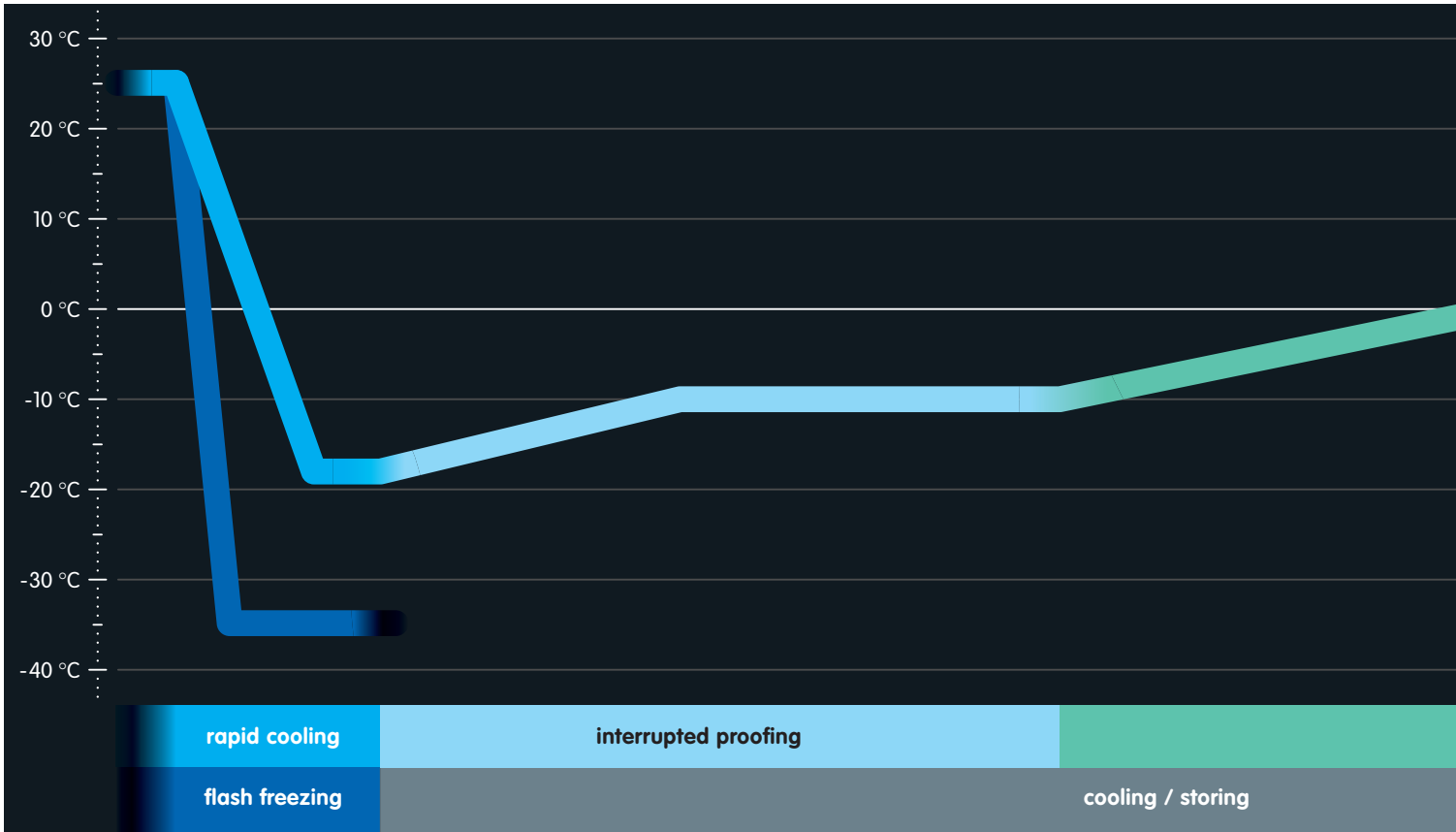
In a new design offering even greater functionality, with an insulated glass door (to prevent the formation of condensate) and more user-friendliness. Made from ISO-HPL composite panels, optionally with stainless steel finish. Hot air circulator with external humidification or own evaporator tray.

▶ Air-Conditioned Chamber MIWE KR

The air-conditioned chamber type MIWE KR can be equipped with an optional counter-cooling feature (with evaporators) and with a dehumidification system based on continuously working dryer units.
Cell-based construction with foamed PU panels. Heating unit with electrical, steam or hot water as heating medium.

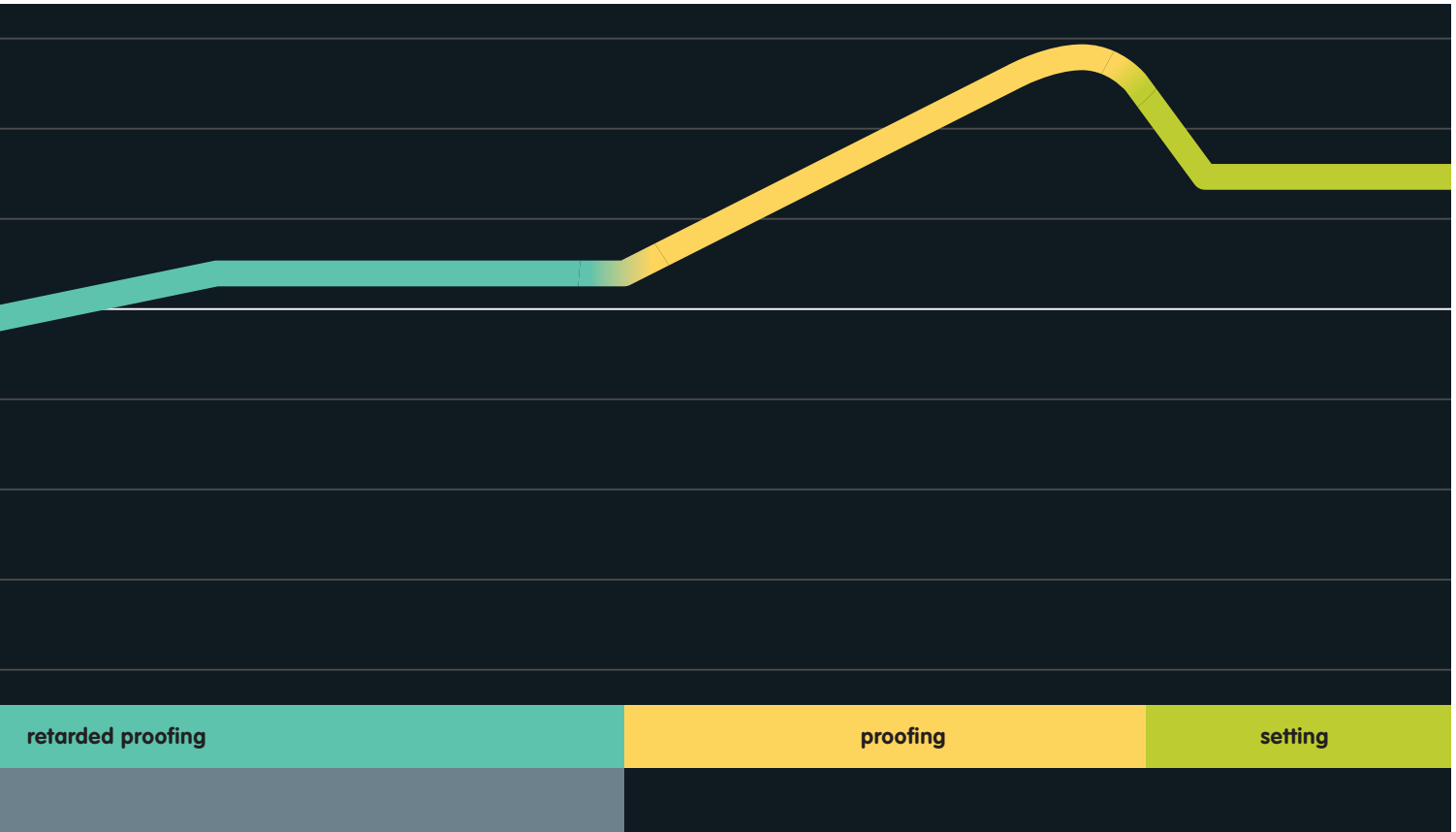
process phase	type	proofing and refrigeration	temperature range	rel. humidity	control system
■ □ □ □ □ □ □	**SF-V**	Flash Freeze Station	–38 °C to –20 °C	85–95 %	FP opt. TC
■ ■ □ □ □ □ □	**SF-D**	Flash Freeze Station	–30 °C to –15 °C	85–95 %	Touch
□ ■ ■ □ □ □ ■	**TLK**	Dough Storage Unit	–25 °C to –5 °C	85–95 %	FP
■ ■ ■ □ □ □ ■	**TKL**	Bay Freezer Storage Unit	–25 °C to –10 °C	approx. 90 %	FP
□ ■ ■ □ □ □ ■	**TKS**	Freezer Cabinet	–25 °C to –5 °C	80–90 %	FP 3
□ □ ■ □ □ □ ■	**TK**	Freezer Storage	–25 °C to –5 °C	low	FP 8
□ □ □ □ □ □ ■	**NK**	Cold Storage	+3 °C to +10 °C	low	FP 8
□ □ □ □ □ □ ■	**SK**	Cream Cold Storage	±0 °C to +10 °C	up to about 92 %	FP 8
□ □ □ □ □ □ ■	**SKS**	Cream Cold Storage Cabinet	±0 °C to +15 °C	approx. 92 %	FP 3
□ □ □ ■ □ □ □	**GV**	Proofing Retardation Unit	–5 °C to +15 °C	up to about 95 %	TC
□ ■ ■ ■ □ □ □	**GUV**	Proofing Interruption Unit	–20 °C to +15 °C	up to about 95 %	TC
□ ■ ■ ■ ■ ■ □	**GVA / GVA e+**	Fully Automatic Proofing Unit	–20 °C to +40 °C	up to about 98 %	TC
□ □ ■ ■ ■ □ □	**GVAS**	Fully Automatic Proofing Cabinet	–12 °C to +35 °C	up to about 85 %	FP 8
□ □ □ □ ■ □ □	**GR**	Proofing Chamber	up to +40 °C	up to about 98 %	FP 8
□ □ □ □ ■ ■ □	**KR**	Air-conditioned Chamber	+5 °C* to +40 °C	up to 99 %	TC / FP 8

* In the case of optional counter-cooling



insulation	products	charging
120 mm / optional 150 mm	unpacked: unproofed, (pre)proofed, "hot out of the oven"	rack trolley
100 mm / optional 120 mm	unpacked: unproofed, (pre)proofed	rack trolley, planks
100 mm / 120 mm, or 150 mm	unpacked: unproofed, (pre)proofed	rack trolley
100 mm	unpacked: unproofed, (pre)proofed, "hot out of the oven"	baking trays
60 mm	unpacked: frozen	baking trays
100 mm / 120 mm / 150 mm optional	packed: frozen	pallet or other packaging unit
80 mm / 100 mm	raw materials such as yeast, eggs, etc.	pallet or other packaging unit
80 mm / 100 mm	cream pastry	rack trolley
60 mm	cream pastry	baking trays
80 mm / 100 mm	unpacked: unproofed, frozen **	rack trolley
80 mm / 100 mm / 120 mm	unpacked: unproofed, frozen **	rack trolley
80 mm / 100 mm / 120 mm	unpacked: unproofed, proofed, frozen **	rack trolley
60 mm	unpacked: frozen	baking trays
20 mm–100 mm	unpacked: unproofed	all options
80 mm	unpacked: unproofed	all options

** defrost feature integrated

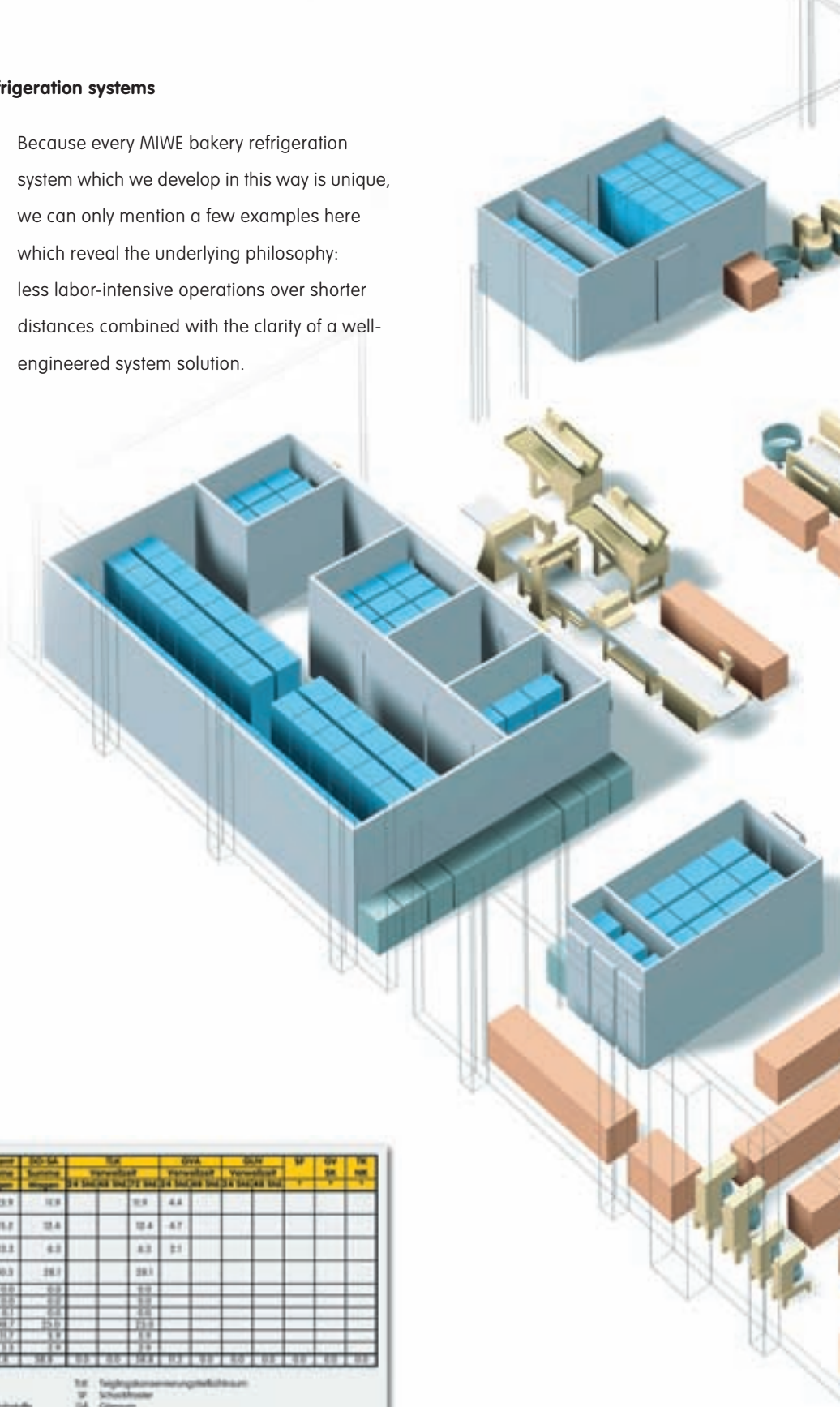


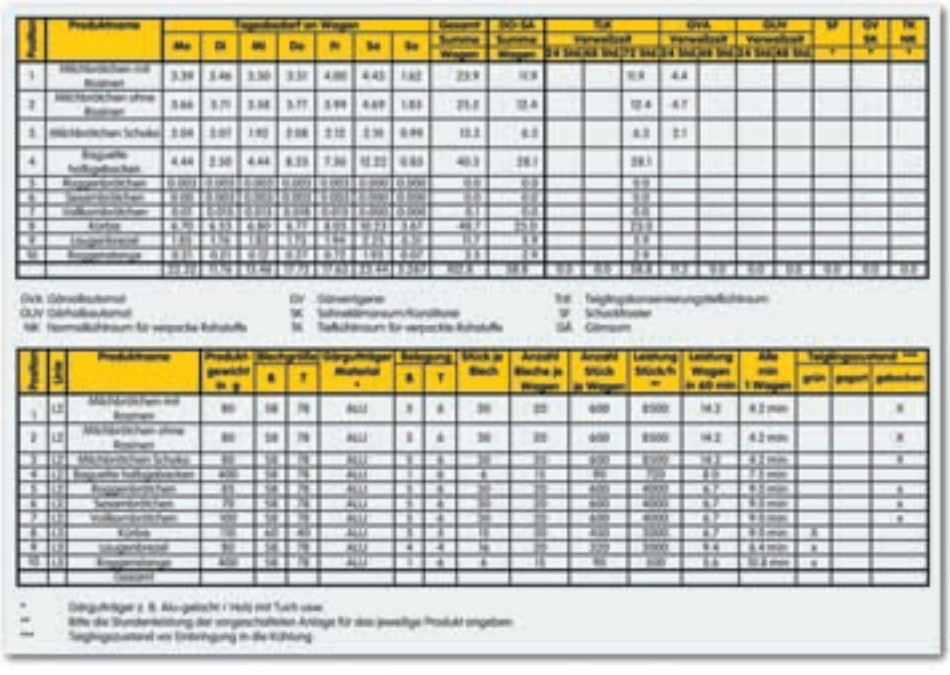
To provide the best solution for your business, large bakery refrigeration systems have to be more than just a collection of mass-produced elements. The system design has to be based on a detailed requirements profile, which reflects an in-depth analysis of your products and your bakery operations.

This at any rate is the MIWE view of the world. We take a close look at your business structure and operations (for example how you organize your shifts). We analyze the number and geographic distribution of your branch locations and the frequency of your deliveries.
We review your product range and take a look at the individual products. Naturally, we include the systems and machines that you already have and the available space in our evaluation.

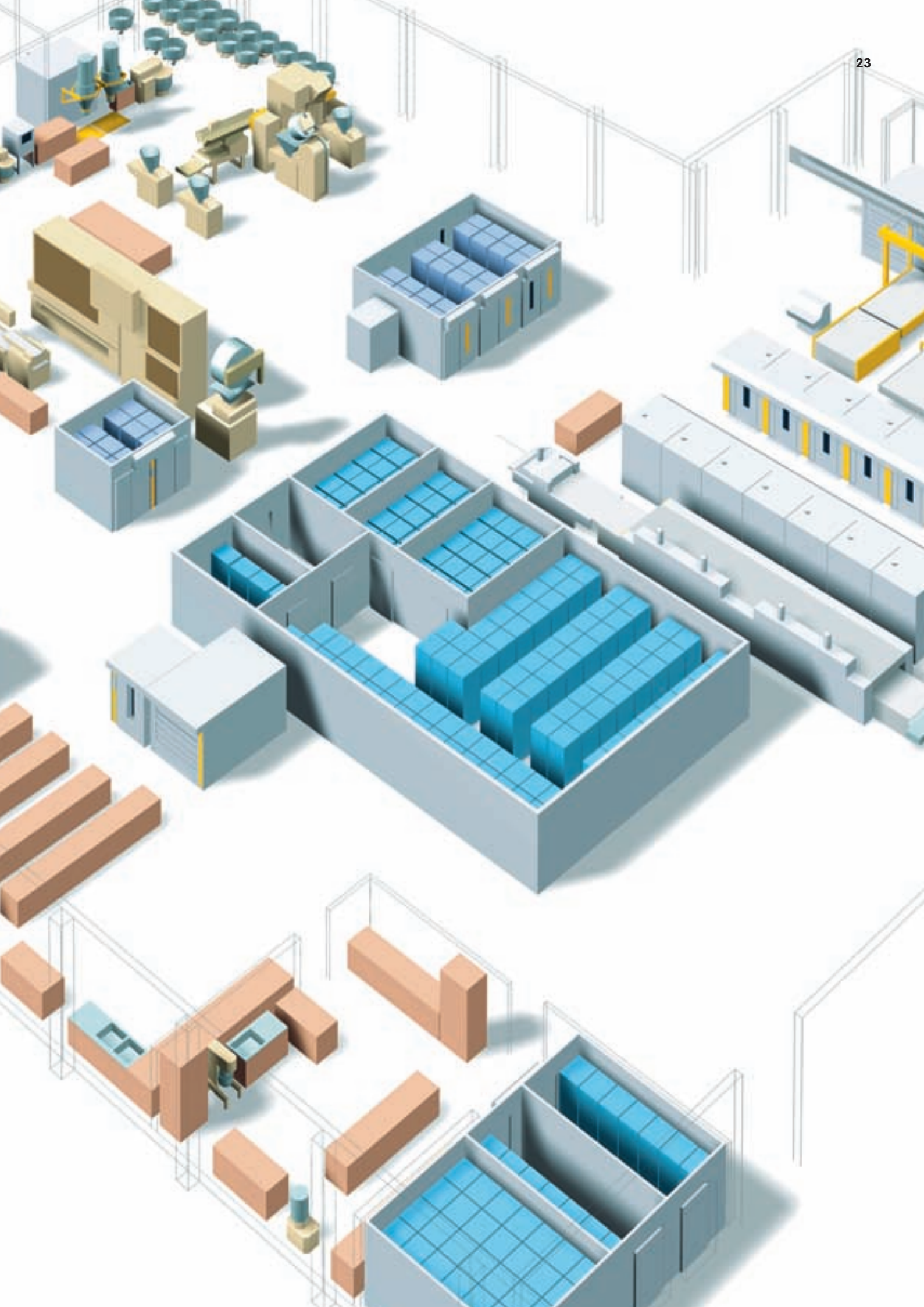
Based on this analysis and keeping a close eye on your budget constraints, we develop the solution which best suits your needs and simplifies your workflows as much as possible. We select the best combination of basic components from our extensive product range and scale them to exactly the size you need.

Because every MIWE bakery refrigeration system which we develop in this way is unique, we can only mention a few examples here which reveal the underlying philosophy: less labor-intensive operations over shorter distances combined with the clarity of a well-engineered system solution.





A thorough and extensive production analysis provides the basis for future-proof and profitable investments.



Control systems that simply make life easier

If you are used to working with a MIWE oven or an existing refrigeration system, then you have a slight advantage, because if you already know how to operate a MIWE system, then you can operate any other system from us with virtually no learning curve.

However, even if you get your first introduction to our control system when you start operating your new refrigeration equipment, it will not take you long to get up to speed.
The MIWE FP control and the MIWE TC touch-screen control system with a large LCD screen are largely self-explanatory and completely intuitive. The MIWE FP is the ideal choice on systems with constant temperature/humidity profiles, whereas the MIWE TC, which offers a large range of entry and control options, is the preferred solution wherever there is a need for simple, user-friendly control of changing process curve and variables.

Both controls monitor and control the key parameters on bakery refrigeration systems, including temperature, humidity, fan speed and of course time.

The MIWE TC control system guarantees not only maximum convenience but also a maximum number of control options. From the left: Convenient, intuitive manual operation; professional mode: a clearly organized overview of all data; Weekly schedule: What's operating, how, and what next?

▶ MIWE FP / Mini-touchscreen

- user-friendly program entry
- fully automatic control, digital display
- current status always available on screen
- display of all process parameters (temperature, humidity, time, air regulation)
- automatic defrost mode
- acoustic cycle-complete and fault signals
- automatic data back-up ensures fail-safe operation in case of power failure
- numeric key lock code
- powerful networking feature via link to the MIWE CAB System using standard interfaces
- the MIWE fault warning system ensures operational reliability

▶ MIWE TC

- All information on the current program and operating status clearly displayed on a large color touchscreen
- Graphic display of target/actual curves in both professional mode and in the weekly overview (real time)
- Adjustable programming of up to 99 programs with a maximum of 8 stages
- Multilingual user guide with help functions and plaintext error messages
- Manual control is possible at all times; supplementary manual mode for tests etc.
- Clear user rights thanks to integrated user administration
- Efficient connections via various standard interfaces (Ethernet/USB), naturally also to the MIWE error message system
- Maximum operational safety through separation of control system (operator terminal) and refrigeration devices
- Energy-saving thanks to optimized heating system, intelligent defrosting technology, extremely high control accuracy and efficient use of residual energy
- 40-day history memory directly accessible
- Back-up and program transfer in the network or via USB
- Software updates online
- Cold zone control according to your needs*
- Intelligent door recognition*
- Remote monitoring and online diagnosis*

- Comprehensive energy package*:
  - Refrigeration device/Compress control via frequency convertor (freely adjustable)
  - Reduced product drying thanks to the adjustable "Delta T"
  - Further performance optimization in extremely high ambient temperatures
  - Fewer/Shorter defrosting cycles thanks to less freezing of vapor
  - Greater efficiency through even better refrigerant flow

* Optional

The success of any size bakery operation is becoming increasingly dependent on the ability to synchronize the various process steps. You need baking systems that have enough capacity to meet your needs, but the ability to link the individual operations effectively has also become a crucial factor.

Here, MIWE offers complete solutions for bakery refrigeration, too. No matter if you plan to install fully automated solutions for an entire line or partial automation solutions for individual line segments.

Whichever solution you choose, MIWE automation systems will help you to eliminate potential sources of error, speed up product flow through the process and optimize your material transfer stations. The end result will be a better quality product. You will get a better handle on complex operations and production sequences, giving you a crucial advantage in tomorrow's competitive market.

All of our flow-through freezers convert the time it takes to cool the products into distance. Through-put speed and freezer temperature can be easily modified to suit the product.

The only difference between the different variations is the layout of the material transport path. Performance, control and air conditioning options remain the same. All of our systems are tailored to the particular application, and you get all of the economic benefits of modular design.

▶ MIWE tunnel freezer

Tunnel freezers are typical flow-through devices. A conveyor belt 120 to 200 cm wide (featuring a cost-effective modular design with floor drain) passes through the units. All standard transfer technologies are supported at the loading and delivery stations. The entry and exit hoods are well insulated and have a double strip curtain as well as an air curtain. 150 mm of insulation is provided to save energy. Pans with a slight incline are installed on the floors for easy cleaning. A washer for the conveyor belt is built-in, too. The interior surfaces and all of the support frames are made of stainless steel to improve hygiene.

▶ MIWE spiral freezer

Spiral freezers make good use of vertical space. When a flat surface is not available or the best possible use must be made of the available space, spiral freezers which move the products in long circular spirals through the cooling zone become the solution of choice. At a height of about 5–6 m, conveyors up to 400 m in length can be deployed. Two lines can be linked together if more length is needed. Tailored cleaning systems facilitate continuous operation. Because of the radial motion, spiral freezers are less suitable for certain products that have to retain their shape.

▶ MIWE step freezer

Step freezers are always the solution of choice when sensitive products would lose their shape in a spiral freezer and there is not sufficient space for a tunnel freezer. The design is similar to a paternoster conveyor. The height and length can be selected to suit the available space. Step freezers can be loaded at several levels simultaneously.

▶ MIWE rack trolley conveyor system

If rack trollies play a central role in your bakery operations, then rack trolley conveyor systems will certainly be right for you. You benefit from ideal integration into your existing process flow and optimal utilization of your refrigeration system. Each rack trolley can be controlled individually and independently, and this gives you the option of using different flash freeze, proofing and setting times. You can define the trolley dwell time in the refrigeration unit very precisely, because the control system accommodates pre-defined time settings. Flexible layouts and extensions to existing systems can be installed. The fully modular system uses linear drives and linear rotary units. All MIWE rack trolley conveyor systems have automatic sliding doors to maximize energy efficiency.

Low floor space requirement by using the room height: MIWE spiral freezer.

The first choice if you have designed your processes on rack trolleys: conveyor systems offer maximum flexibility.

Leave the planning to us

You already know how good our consulting and engineering services are, so why not let us take the weight off your shoulders when the time comes to design your new fully automated bakery refrigeration system?

Right from day one, our network of professional advisers and worldwide partners give you the expert support you expect. We draw on our extensive know-how and experience base to develop the engineering solution you need.

We are also ready and willing to assume overall project responsibility for installation and commissioning on schedule, and we remain at your side once you have started using your system, because we want to be sure that you can say:

MIWE makes baking simple.

A good refrigeration system is one that keeps running even after months and years of intensive use. We have done everything possible to guarantee that MIWE systems deliver maximum availability in the long term.
Our systems offer excellent design, rugged, low-maintenance refrigeration machinery and controls that have a proven track record in the baker environment.

We carefully scrutinize the quality of the components and subsystems which we use. More than 80 % of our purchased parts are made in Germany. We consciously and rigorously resist the temptation to use cheap parts (for example in places where you cannot see them). Experience shows that over the long term customers wind up paying two or three times as much as the original savings, and if they are really unlucky, the entire system may have to be replaced. We want to give you systems that you can rely on.

Even if something does go wrong, we are well-prepared to help. For example using MIWE remote: Since it is browser based and capable of Internet connection, this innovative service tool offers flawless monitoring and – if needed – remote control of your entire system, 24 hours a day, 7 days a week and 365 days a year.

The system detects faults long before they bring the system to a halt. The MIWE TC offers a very user-friendly troubleshooting option. It selects MIWE fault monitoring and transfers all the necessary data. Our specialists then decide what action to take to ensure that the system keeps running. It could be that a program needs to be modified, or the best course of action might be to get a service engineer on site to see what is going on. Our refrigeration systems are extremely reliable, but we still maintain a large network of service engineers and centers and an efficient spare parts service anywhere in the world where our systems are installed.
In Germany alone, more than a dozen refrigeration engineers are continually on the road working for you. We simply want to make sure that your MIWE refrigeration systems continue working without interruption.

By the way, you can help by ensuring that regular maintenance is performed on your system. We would be glad to carry out the maintenance for you, and we can offer you a range of comprehensive service contracts. We would be pleased to discuss the details with you.

You can always rely on it: MIWE service. Just relax.

MIWE makes baking simple:

With a range of classical baking ovens that includes not only efficient in-store ovens and reliable oven solutions for small bakers, but also fully automatic large-scale baking plants.

With a complete range of bakery refrigeration equipment that simplifies and ensures the quality of your baking preparations.

With loading systems that make hard physical work a thing of the past.

With a wide selection of control options – from "single-button-operation" for unskilled workers to sophisticated monitoring and documentation systems.

And with customer support that you can always rely on.

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