

# Cold times

COOL RISING CREATES FREE SPACE. THE FREUNDL BAKERY HAS INSTALLED THE NEW REFRIGERATION CONCEPT BY WACHTEL STAMM. CORE PARTS OF THE LAYOUT ARE KÜBA EVAPORATORS



**+** The bakery images the pastoral environment in the foreland of the Alps. Here, craft quality is a tradition. For 60 years, the Freundl bakery has used high quality raw materials from the region and traditional family recipes to create premium baked products utilizing the latest refrigeration technology. Approximately two years ago, the owner Martin Freundl invested in the future and replaced the 20 year old refrigeration plant with a coherent refrigeration concept produced by Wachtel Stamm. Further expansion of the production space was not necessary as the refrigeration area could be enlarged due to a sophisticated system that uses high performance evaporators by GEA-Küba.

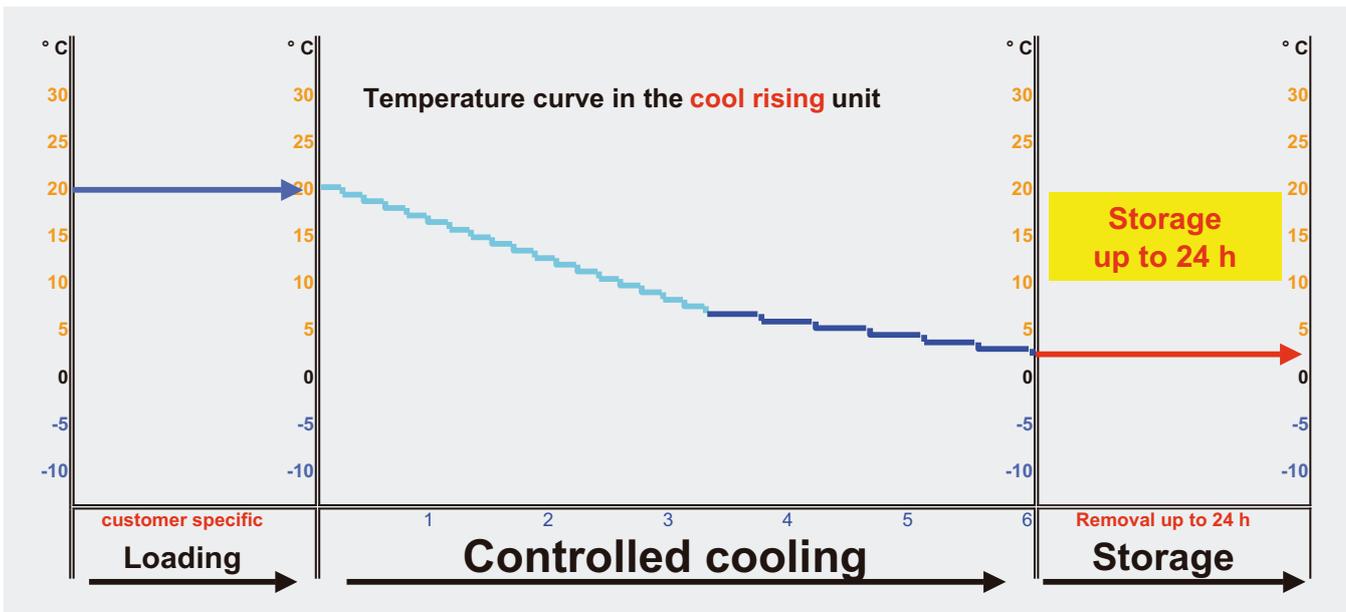
The former technology was outdated in terms of energy consumption and was also running at the limit of its performance. In the long term, the area used for refrigeration was too small to ensure the company's commitment to quality and freshness in combination with the growing demand for products. Therefore, something had to change. "It was apparent that a new installation would make more sense from an economical point of view than having the former plant revamped", reports Freundl.

The most coherent concept was offered by Wachtel Stamm; the cool rising technology. The computersupported system controls the cooling and proofing of the dough pieces while keeping the temperature differences at the coldest spot, the

evaporator, as small as possible. The controlled cooling process allows the keeping of the required moisture and leads to the desired proofing process, without shrinkage. The flavor-promoting enzymes remain active and are under control. In this way, dough pieces can be stored for up to 48 hours. They are ready for bake-off at any time without further proofing. During production, this creates the highest possible safety and capacity reserves.

Next to the technical innovation, the room layout and concept also set a benchmark. A part of the bakery with a width of 2.3 m in front of the three individual cooling chambers is integrated into the refrigeration concept as a multi-purpose room. It serves as an additional refrigeration area and connecting passage to the chambers. Before, cold air from the freezer chambers flowed directly into the warm bakery; now it cools the room down in front of the chambers to +8 °C. With this highly energy efficient and therefore cost minimizing concept, Freundl has gained a significant plus in refrigeration space and an uninterrupted cooling chain.

The main part of all dough pieces are moved directly into the different chambers through the lock tunnel of the Flash 300 blast freezer, which comprises two Küba floor evaporators standing next to each other. Pretzel-type products are moved into the multi-purpose room for crusting. There is enough room for 20 rack wagons without blocking the traffic



ways. This makes the production of pretzels much easier. Besides this, the staff members also use the combination room for packaging and picking dough pieces.

The Flash 300 blast freezer is made from stainless steel (quality 1.4103). Its footprint of 248 x 66 cm accommodates up to 4 rack wagons and guarantees a cooling capacity of 40 KW with to = -35 °C and tc = +45 °C (R404). The high performance floor evaporators produced especially for Wachtel Stamm will cool down small dough pieces within 10-12 minutes and par-baked pieces within maximal 20 minutes to the desired core temperature. The blast freezer is automatically thawed daily at 9pm. A PLC, developed by Wachtel Stamm for cooling processes in the bakery, controls and monitors all individually set parameters.

After freezing, the dough pieces are transferred on rack wagons depending on type and future use into the bakery or pastry storage room where the temperature is -18 °C.

Raw dough pieces, to be further processed the next day can be stored intermediately in the cool rising chamber as well. All three cooling chambers are equipped with the Wachtel Stamm DE system which comes up trumps with optimized

air conduction. During the storage period, the uncovered dough pieces do not immediately come into contact with the air flow. This prevents crusting of the dough and increases the product quality sustainably. ▶

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**Cool rising benefits**

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- + Significantly improved product quality
- + Significantly more taste and crispness
- + Significantly increased freshness
- + Constant availability of a defined product range with the smallest of logistic efforts
- + Products ready for bake-off without final proofing
- + Short preparation times at the point of sale as no more proofing is required
- + Increased productivity in the production
- + Proofing and cooling in one chamber +++

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++ figure 1

## ++ figure 1

A refrigerated room with two comfort DP ceiling air coolers was created in front of the individual freezer chambers where e.g. dough pieces with long floor times or pretzel-type products can be kept at +8 °C.

## ++ figures 2+3

The dough storage chamber 1, the storage chamber 1a for pastry products and the cool rising chamber are equipped with ventilation units DE by Wachtel Stamm. During the storage period, the uncovered dough pieces do not come immediately into contact with the air flow. This way, Wachtel Stamm prevents the crusting of the products to be cooled. The customer enjoys higher quality products from the storage rooms.

not used as an alternative preservation method, the dough pieces do not shrink. Another advantage is that proofing and cooling take place in one chamber; the cool rising chamber.

The evaporators in the chambers are thawed once or twice a day, as needed. The thawing process is controlled via timer function and limited inside the chamber via evaporator sensors. The OCTOPUS computer by Wachtel Stamm starts this process. This ensures the optimum refrigeration climate. If the maximum preset time of 50 minutes for the thawing is exceeded, the sensor sends failure information via modem to the service center of Wachtel Stamm in Hilden near Düsseldorf, Germany. Depending on the situation, either the bakery is called by phone to locate the trouble or a service technician is rushed directly to the customer. Thawing times and all temperatures can be changed and monitored online at any time.

After each thawing process, a dripping time of no more 5 minutes is maintained. After that time, the evaporator starts again. As soon as the evaporation temperature of -5°C has been reached, the fans are turned on again. This prevents warm air being blown into the chamber.

The entire cooling system has a modular design. Nevertheless, the three chambers, including the multi-purpose room in front, need only one central condenser. It stands outdoors. "It was important to me that the chambers remain individual and are not combined as in the previous installation. This gives me the chance to replace single chambers or to expand them", reports Martin Freundl.

The reconstruction took four months while the production was still running. It was a logistical master piece. Before the building could be remodeled to house the new equipment, the existing refrigeration equipment had to be completely removed. During this time, the production used mobile cooling containers standing in the yard.

After gutting the site, the base plate had to be cut. The floor had to be lowered in order to install the new blast freezer so that it was level with the ground. "At that time nothing was possible. And all this in the middle of a hot summer", reports Freundl. Since the majority of the products could no longer be made using the refrigeration technology, the staff of 100 had to change to just-in-time production. This in-

Wachtel Stamm established the DE system 25 years ago. It has often been copied and is still state-of-the-art for the storage of uncovered dough pieces.

The bakery freezer has a storage capacity for at least 72 rack wagons. With this load, the main traffic routes remain accessible. "For peak times, we also have a low buffer capacity." Four Küba DEBE evaporators operating with two different cooling cycles ensure reliable low temperatures. Freundl decided in favor of the two-cycle system to be on the safe side. Even if one cycle fails or, if in summer the temperatures outside are very high, one combination of Küba evaporators is sufficient to keep the freezers' temperature at a constant level.

The freezer storage for pastries can house maximal 24 rack wagons. Here, two ceiling-type Küba evaporators are installed with a capacity of 11.5 KW. The cool rising chamber offers room for 36 rack wagons. The performance parameters of the refrigeration unit are comparable with the ones of the pastry freezer. Added to that, the chamber is equipped with two steaming units. They ensure optimum temperature and moisture conditions. The control system reacts even to marginal deviations and automatically corrects them. In the case of the water pick-up of the flour being too low, the steaming units will wet the dough surface. This prevents crusting.

The system cools down the proofed dough pieces within 20 minutes to a core temperature of -7°C. Since blast freezing is



++ figure 2



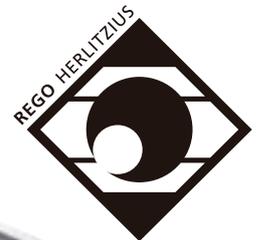
++ figure 3

cluded numerous hours of overtime. "Our delivery contracts were binding. We could neither reduce the output nor the variety of products", reports Freundl.

For almost two years now, the Freundl bakery has used this cooling concept. The target, namely to optimize the production flow and to keep the proven quality and freshness at a high level despite the growing demand, has been accomplished. This is mainly due to the cool rising chamber which

is now used for the production of all small baked goods. After all dough pieces have been placed into the unit in the morning, the process starts at 11 am. The phases are concluded after noon (12.30 pm). The products are then ready for baking. In order to keep the time frame as open as possible, Freundl has integrated another buffer time into the process. The degrees of ripeness of the first products removed from the chamber are post-controlled in the proofing room. This creates free space for further growth. +++

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