Constant coldness

THE CONDITIONING OF DOUGH PIECES SHOULD BE LINKED TO THE CONSTANT HIGH QUALITY OF BAKED GOODS WITH EFFICIENCY AND LOW ENERGY COSTS

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Roll-in shock freezer. Combined with the old plant, there are now seven shock freezing spaces available at the same time

With about 400 employees, production sites in the towns of Oldenburg and Garrel and a turnover of approximately 13m euros, Behrens-Meyer Bakery with almost 50 sales outlets belongs to the larger bakeries in Germany.

A large proportion of the small bakery item range is baked in the branches. Due to a more streamlined production line, the weekly fine bakery ware supply is produced in only one day. If under these circumstances the quality is to remain high, then sufficient storage space for dough pieces, sufficient area for conditioning (retarder proofer) and powerful freezing capacity for dough pieces are required.

Since the production volume had increased so much, the old refrigeration plant was unable to meet the demand, so Behrens-Meyer installed a completely new refrigeration concept with the goal to ensure uniform and high product quality. Partner for planning and construction was Hein, the bakery oven engineering company from Luxembourg.

Optimal climate

The parameters for the new refrigeration concept were easy to determine: A daily production volume of approximately 50,000 dough pieces (rolls and fine bakery items) that could be completely frozen. Up to now, the company had only one shock freezer for three rack trolleys available. This freezer's capacity was just sufficient for the continuous freezing of the output of one average roll making plant. This meant for the company that due to the limited freezer performance the dough pieces could only be produced in product groups one after the other but never simultaneously. Today this has changed. One decisive part of the new refrigeration concept was an additional shock freezer by Hein for four rack trolleys with a freezing capacity of 420 kg/hour. This corresponds to an hourly performance of approximately 8,400 pieces with a weight of 50 g per individual piece. High-performance upright evaporators which are supplied with air from vents located behind the freezing unit ensure a rapid and uniform decrease in temperature. "The new shock freezer has fully met our expectations. With it we save two hours work for our bakers," explains general manager Bernhard Meyer. However enlarging the shock freezing capacities was not all that they did. The storage space in the frozen goods area has also been increased by adding a new cell with

Supracooler

Unlike traditional refrigeration plants, the new cooling/freezing concept is not equipped with thermo valves or electronic injection valves. Traditionally the refrigerant is directly injected into the evaporator for evaporation. According to Supracooler manufacturer Lillnord, this is the reason why only approximately one third to a maximum of a half of the evaporator's surface reaches the nominal temperature. This problem is well known in room radiators. If there is air inside the heating element, only parts of the radiator will reach the correct temperature, the rest will be only lukewarm. The 100% utilization of the surface is achieved because the transition from the liquid to the gaseous phase (full floated technology) of the refrigerant takes place only during the return flow to the compressor. Therefore, the entire Supracooler surface will have the same temperature which is close to the freezing room temperature (minimum Delta t) thus ensuring a maximum humidity at all times. The efficiency compared to common evaporators is increased by two to three times. +++

80 parking spaces for rack trolleys (0.58 x 1.00 m). This cell was made by Hein, with its operation following the patented Supracooler process of Lillnord, the Danish manufacturer of refrigeration technology. Both shock freezers operate eight hours a day at full load which corresponds to a freezing capacity of more than 5.5 tons of dough for both plants each day.

Different requirements

The dough pieces by Behrens-Meyer must fulfill different requirements. Firstly, an initial amount of each product for almost 50 branches must be baked; secondly a large number of pre-conditioned and unproofed dough pieces are needed for further sales. To meet those conditions, the retarder proofing technology with its different temperature curves must function reliably. In total, the company has six retarder proofers. Two of the fully automatic units can accept up to 12 rack trolleys, two units can accommodate 9 and one unit can house 21 rack trolleys. New is an additional fully automatic unit for 24 trolleys. In total the bakery has now 87 roll-in spaces for retarding.

The whole frozen storage has a capacity for about 120 rack trolleys, although the dough pieces are not exclusively stored in racks. There are also plastic boxes and thermo containers in which unproofed dough pieces are kept for transport to the branches. After the acquisition of the Tantzen Bakery in Oldenburg, Germany, in 1999, the company had a large baking area of 245 m2 in Garrel and Oldenburg available. The bakery in Oldenburg mainly produces bread. The entire production of dough pieces is combined in the bakery in Garrel. This division of tasks makes sense because efficient batch sizes can be produced. Bernhard Meyer is very satisfied with the quality of this refrigeration concept. "The cooling power

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in the new shock freezer was very even from the beginning which can not be said of the older system (not made by Hein) that had posed problems for many years. The storage temperature in the new frozen storage is absolutely uniform without any loss of volume or drying out of the dough pieces as had happened with the older plant. Most of the dough pieces are stored unpacked. Even after one week in storage there is no noticeable difference after conditioning and baking."

Meyer is also pleased with the new retarding unit by Hein. "In the past, we often encountered problems during the heating-up phase. Considerable amounts of condensed water accumulated on dough pieces and trays. This problem has been solved with the new plant." The concept in terms of positioning and size of the plant was not developed alone by the bakery and Hein. They also relied on the consultation of Bäko Weser Ems (German service company for bakeries) which provided advice regarding the size of all plant components based on the situation in the company and the scheduled growth targets. The new cell block including frozen storage, shock freezer and full automate is located at the outer wall of the company. +++