

# Round or square?

DEPENDING ON THE TYPE OF PRODUCT, DIFFERENT TYPES OF PLANTS ARE AVAILABLE FOR PROOFING AND FREEZING PROCESSES

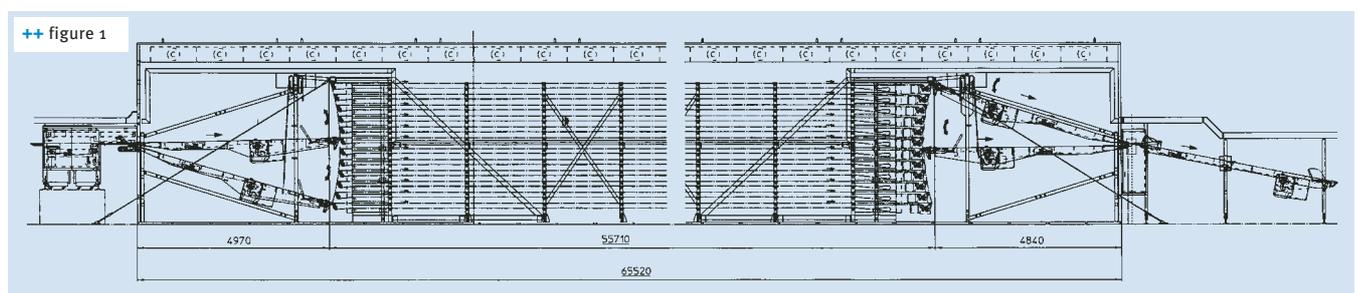


**+** Long processing times and/or high capacity with small footprint – this combination of features is only available from spiral plants. Therefore, cream gateaux which need more than two hours to reach the desired core temperature, when conventionally frozen, are in general moved through a spiral freezer. This example is one of the few applications where the decision for a specific type of system is rather easy. If other investment aspects are important, details make the difference. One large evaporator is sufficient for spiral systems, but they are also available with several evaporators thus allowing sequential defrosting of the plant and minimizing the risk of a complete shutdown of the plant in case the evaporator fails. Vertical freezers as well as belt freezers operate with one evaporator for each module.

The investment volume is significant depending on the number of transfer stations and the loading technology. Belt frosters, in particular single deck freezers, are commonly built in the same width as the upstream tunnel oven or tunnel proofer. The belt width in spiral systems does not exceed 900 mm. For multi-deck freezers, loading and unloading stations are mandatory. It is not important whether the

products are frozen directly on the belt or if trays are pulled by chains through the decks. In vertical freezers, also called multi-step freezers, the trays enter the freezing section without loading devices. They are moved cycle-wise in the freezer in one segment up and the other segment down. If needed the cycle is repeated through more segments. Spiral systems also, do not need a loader. Products from the proofer or the oven that come on a belt wider than the spiral belt arrive in general at a 90° angle at the spiral belt and are pushed or drawn into the spiral equipment. One advantage of the spirals is that they can have the product discharge at any place within the spiral. This allows unusually angled combinations for which, in a linear belt arrangement several transfer stations would be necessary. If trays are moved through the spiral, the investment requirements increase because of skirts needed on each side of the belt to prevent the trays from protruding and because of the tray handling at the feeding and discharge sections.

Each belt in a multi-deck belt plant is moved and controlled by its own motor. If one motor breaks down, all other decks are not affected in their functioning. However, it is ▶



| Suppliers  | Proofing | Freezing |
|--|----------|----------|
| <b>Spiral systems</b>  |          |          |
| Alit, Marsango, I<br>www.alit.it   | x        | x        |
| Capway Systems, Driebergen, NL<br>www.capway.nl                                | x        | x        |
| Heinen, Varel, D<br>www.heinen.biz   | x        | x        |
| Kaak, Terborg, NL<br>www.kaak.nl   | x        | x        |
| Kunze Bäckereitechnik GmbH,<br>Remshalden-Geradstetten, D<br>www.kunze-gmbh.de | x        | x        |
| Tecno Pool S.p.A., San Giorgio in Bosco, I<br>www.tecnopool.it                 | x        | x        |
| Vulganus Oy, Nastola, F<br>www.vulganus.fi                                     | x        | x        |
| <b>Multi-deck systems</b>  |          |          |
| Fritsch GmbH, Markt Einersheim, D<br>www.fritsch.info                          | x        |          |
| GBT Fördertechnik GmbH,<br>Villingen-Schwenningen, D<br>www.gbtgmbh.de         | x        | x        |
| Kaak, Terborg, NL<br>www.kaak.nl   | x        | x        |
| Koma Koeltechniek B.V., Roermond, NL<br>www.koma.com                           |          | x        |
| Kunze Bäckereitechnik GmbH,<br>Remshalden-Geradstetten, D<br>www.kunze-gmbh.de | x        | x        |
| Rademaker, Daltsen, NL<br>www.rademaker.nl                                     | x        |          |
| WP Bakery Cooling, Dinkelsbühl, D<br>www.wpbakerygroup.org                     | x        | x        |
| <b>Vertical belt systems</b>   |          |          |
| Gouet, Rouen, F<br>www.gouet.com   | x        | x        |
| Kaak, Terborg, NL<br>www.kaak.nl   | x        | x        |
| Mecatherm, Barembach, F<br>www.mecatherm.fr                                    | x        | x        |
| <b>Single deck tunnel systems</b>  |          |          |
| GBT Fördertechnik GmbH,<br>Villingen-Schwenningen, D<br>www.gbtgmbh.de         | x        | x        |
| Kaak, Terborg, NL<br>www.kaak.nl   | x        | x        |
| Koma Koeltechniek B.V. Roermond, NL<br>www.koma.com                            |          | x        |
| Kunze Bäckereitechnik GmbH,<br>Remshalden-Geradstetten, D<br>www.kunze-gmbh.de | x        | x        |
| WP Bakery Cooling, Dinkelsbühl, D<br>www.wpbakerygroup.org                     | x        | x        |

## ++ figure 1

The multi-deck proofer by Fritsch has a belt width of 1.2 m with 12 decks being served with one swiveling loading and unloading belt.

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 E P  
 E  
 S

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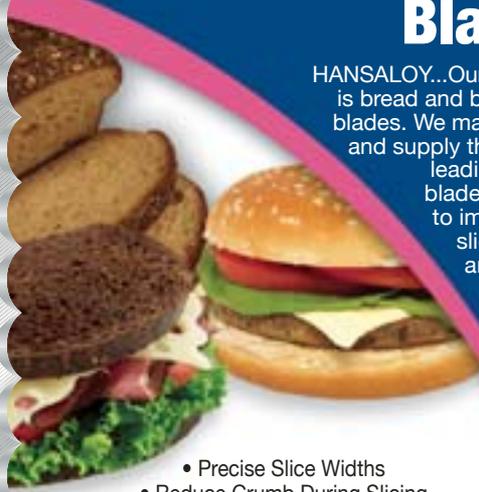
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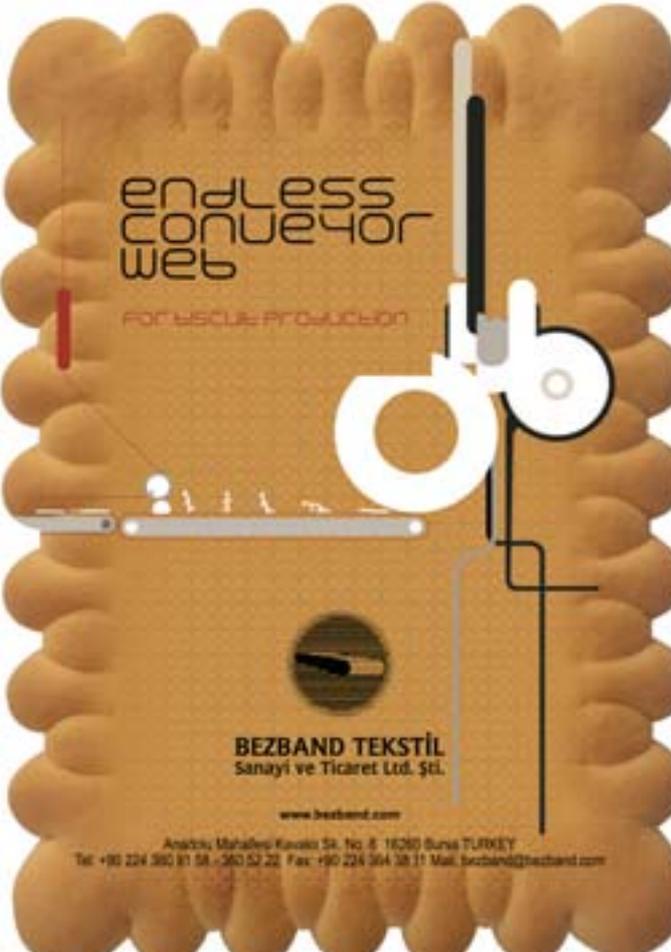
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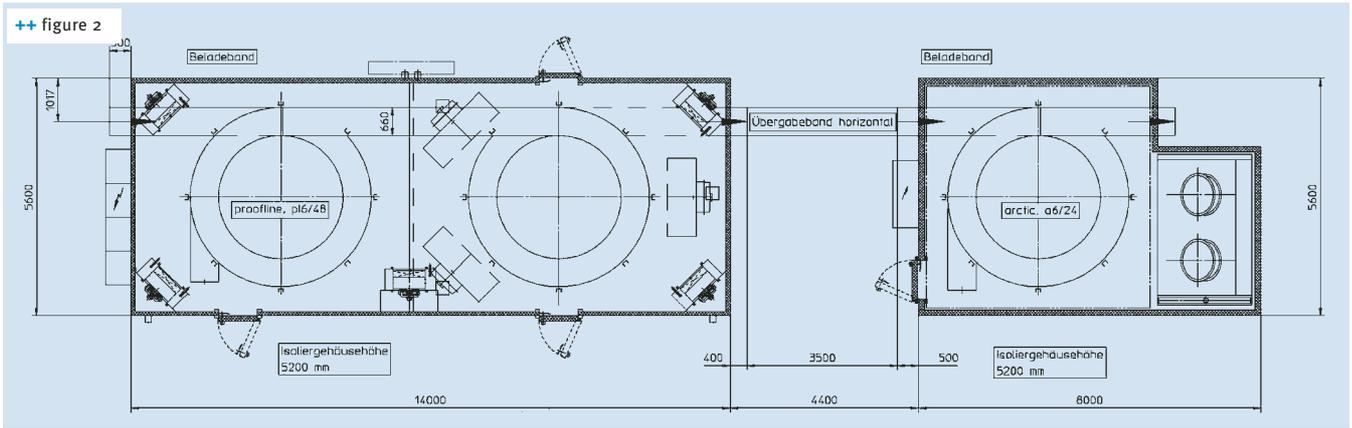
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**++ figure 2**  
Spiral systems are often combined with other spiral systems so that the product discharge is positioned at the lower end. Here is a spiral system combination of proofer and freezer by Heinen

**++ figure 3**  
WP Bakery Cooling has predominantly been in the market of single deck belt freezers. The latest product, however, is a multi-deck belt freezer

**++ figure 4**  
In a multi-step system, as e.g. provided by Kaak, products on trays move in stacks up and down. Each stack can be cooled separately – which makes sense for 24 h operation – or can be the entire room, with all stacks with one or more cooling devices

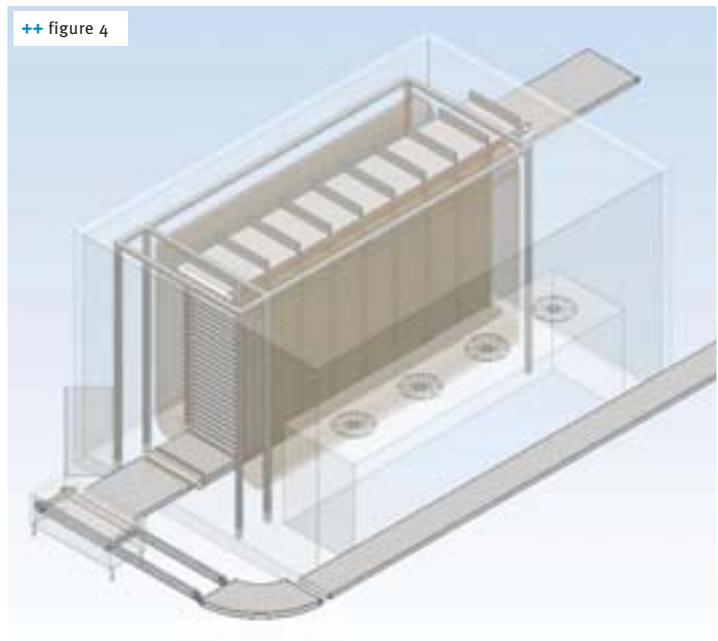
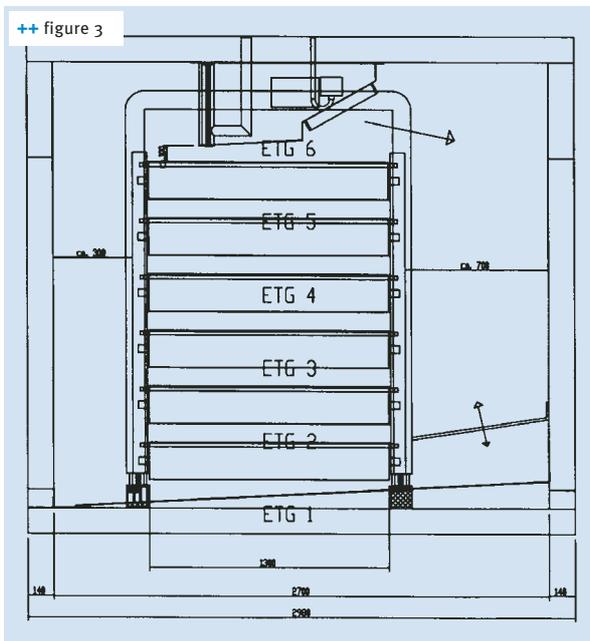
important that the belt control makes sure that the position of the belt at the end of the long path is centered to ensure precise product transfer. Variations of the belt speed allow differences in the length of the freezing time within certain limits.

This is also true for spirals which, in general, are operated by only one motor. Vertical plants are mainly integrated into rolls and baguette lines which operate around the clock. They are less flexible in terms of freezing time except if the upstream processing devices and the freezer can be separated by a buffer. However, this is counterproductive because the advantage of a vertical system is a synchronized operation from proofer via oven into cooling and freezing.

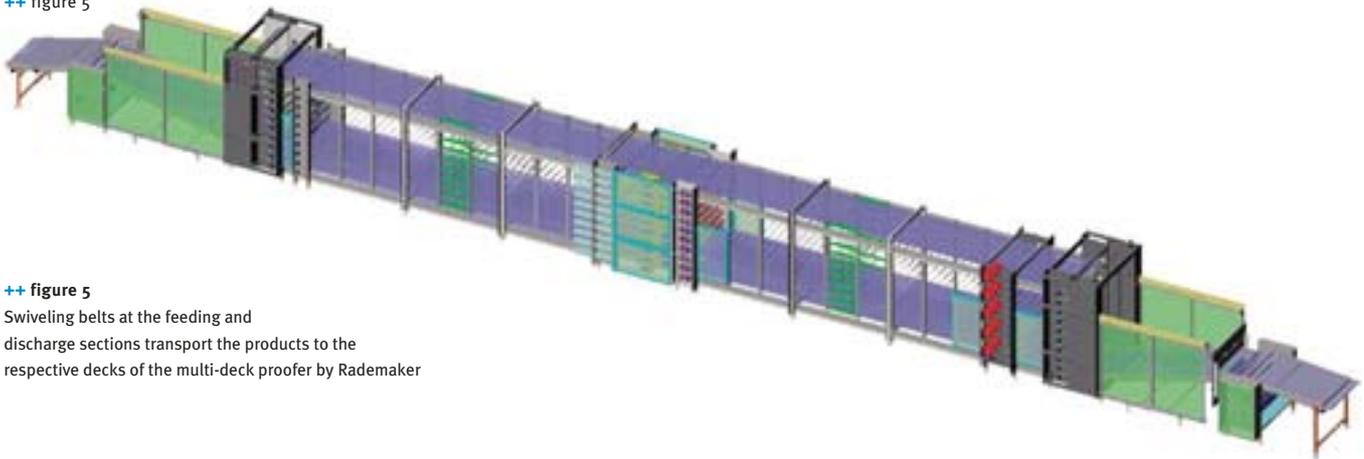
Products on trays in a vertical system or a belt freezer will not change their position during the journey. In spiral systems, the movement of the belt with a tighter radius near the center

than at the outer side of the spiral belt will change the order of the rows resulting in the need for a new alignment prior to further processing.

Multi-deck freezers have their evaporators located on the right and the left side of the belt and chain systems. They alternately blow cold air through the product carrying level. At the end of the belt, which is also the end of the freezer, the product must have the target core temperature. This requires a relatively strong air flow. The product must be flushed with cold air as much as possible to remove the product's heat. The other side of the coin: If the baked goods or their toppings are very light they are literally blown off. This hardly happens in spiral freezers. While belt freezers always have a horizontal air flow, spiral freezers offer the option to choose between horizontal and vertical air conduction. For vertical air flow, the air is introduced at the top of the spiral and flows to the bottom so that the coldest product is flushed



++ figure 5



++ figure 5

Swiveling belts at the feeding and discharge sections transport the products to the respective decks of the multi-deck proofer by Rademaker

first. The air then moves through the levels downwards to remove the heat from the other products.

If spiral freezers are equipped with one evaporator only, several fans in the spiral system ensure uniform distribution of the cold air. The energy requirement of these fans and the heat generated by their motors must also be taken into consideration when comparing energy consumption values. This is similarly true for the special situation of belt freezers.

For spiral and horizontal freezers, several types of belts are available so that a suitable belt material can be found for each product. Of course, both types of freezers are equipped with belt washing devices. Attention must be paid to the amount of moisture possibly carried into the plants. Moisture is not only introduced via belts but also via products. Here the rule is that spirals have an advantage because of the smaller openings compared to belt freezers which might need a lock at the feeding section. +++

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