

# Revolution on the bread shelf

IN-STORE BAKING IS PERFECTLY SUITABLE FOR THE CUSTOMER'S EXPERIENCE OF BUYING ABSOLUTELY FRESHLY BAKED GOODS

## ++ figure 1

A picture of the new vacuum oven. A par-baked bread item is loaded into the oven. After only a few minutes a completely baked, sliceable bread loaf is ready

## ++ figure 2

The top curve shows the development of weight and moisture in an 800 g bread item over the entire baking and cooling time. The bottom curve is a plot of the core temperature over the processing time

## ++ figure 3

Loading the oven with par-baked bread which has previously been stabilized by vacuum cooling for proper shape and an ambient shelf life of 3-4 days

## ++ figure 4

After a baking and cooling time of 8-9 minutes, the bread is ready and then cooled down to about 32°C. During the baking process, a core temperature of at least 73°C has been achieved and kept at a temperature of 73-80°C for at least 2 minutes. Subsequently, the bread has been sliced

## ++ figure 5

The oven can also be loaded with frozen bread. The core temperature rises from -12°C to +80°C within 7 minutes. At the end of the cooling phase the bread loaves have gained about 3.5% in weight in this oven

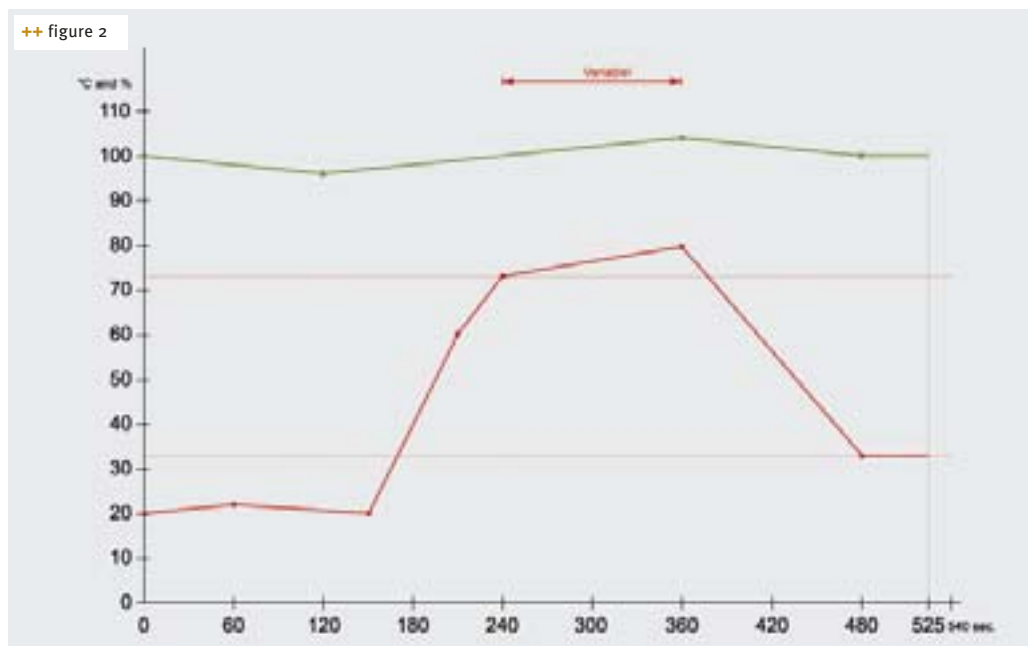


**+** In-store baking has long become standard for baguettes, rolls and all baked goods sold as individual items. A new Swiss-Dutch development now opens a marketing opportunity for sliced bread.

Bread coming straight out of the oven, immediately sliced and packed in front of the customer – that's what the consumers want. However, bread baked freshly in the oven must cool down before it can be sliced. At least that was true until now. Swiss CETRAVAC

FOOD TECHNOLOGY, a pioneer in the field of vacuum cooling, in cooperation with Dutch partners has introduced a system which provides for both:

- +** In-store baking to allow a visual and sensory freshness experience – there is no other marketing tool that is as effective.
- +** A sliceable bread loaf with a crust temperature of about 35°C, only after the par-baked bread has been baked in the oven for a few minutes.





The key point in this process is the generation of a vacuum during part of the baking process while also applying phase-wise steam at the same time. The vacuum is also used for the cooling of the bread.

Different heat sources and a vacuum are combined in such a way as to allow the core temperature of the bread to rise to about 70°C within four minutes. In a subsequent phase, lasting several minutes, the crust is stabilized precisely as the customer requires. A second vacuum, applied at the end of the process ensures cooling and stabilization so that the bread can be divided in a bread slicer into the desired amount of slices without chipping the crust or the crumb being pulled to pieces.

#### No weight loss

The process has already passed a practical test with a very positive response from the trade and from consumers. Contrary to common bake-off processes, this process does not support weight or moisture losses. With optimum control, it is even possible to achieve a slightly higher bread weight at the end of the process when comparing the par-baked product that was loaded into the oven. The reason is a highly sophisticated interaction of heat, pressure or vacuum and steam which penetrates through the once again permeable crust into the bread. The steam transports heat and moisture into the bread as can be seen from the increase in weight and moisture starting in the third minute (see fig. 2). In the last phase of the baking process, the vacuum effects a removal of moisture from the crust, but only to such an extent so that



the crust remains stable and sliceable and the crumb keeps its juiciness. The weight gain and moisture loss compared to the initial weight can be controlled just as can the extent of browning and crispness of the crust and its stability.

#### Industrial application

This type of baking is not limited to par-baked products baked-off in the store but offers completely new ways for long-time baking processes. Another ideal application is to bake-off frozen products. A 800 g bread loaf will need only 7 minutes to rise its core temperature from -12°C to +80°C. After the cooling phase, the loaf has also gained about 3.5% in weight.

Vacuum baking was developed for products in different stages of part-baking. It works with very light baked breads as well as with ones completely baked. With that, the quality of the bread is again defined by the production process alone. +++

#### Vacuum cooling

Vacuum cooling makes use of the physical interaction between pressure and the boiling point of water for the cooling of moisture-containing products. A vacuum is generated in a closed box, the boiling point decreases and the free water in the product starts to boil. The moisture escapes while withdrawing heat from the product. Within a really short time, the product cools down from the inside out.

When applied to baked goods, this process has the advantage that any product cooled in this way quickly crosses the temperature range in which microorganisms grow well. The result is a prolonged ambient shelf life. This saves time because the par-baked products delivered to the in-store bakeries can be directly baked-off. They do not need to be thawed in advance which also saves a lot of energy. No frozen logistics and frozen storage are required. One positive side effect is that the product is stable in shape. When applying this process to baguette-type bread, it can be cut and packed immediately, without a prolonged cooling time. +++

