EUROPEAN BAKER & BISCUIT
Supporting the international baking & biscuit industry
ASIA PACIFIC BAKER & BISCUIT
Supporting the international baking & biscuit industry

European Baker & Biscuit

TECHNOLOGY: VACUUM COOLING Q&A

- Vacuum cooling technology is not new. Why has it found applications in the bakery industry only recently?

Vacuum cooling for bakery applications have been tried and applied over several decades now. Several reasons have prevented the widespread usage of vacuum for this application: The first is the fact that – contrary to all other vacuum cooling applications, for bread & bakery vacuum cooling will directly influence the quality of the product, as the baking process continues in the cooler! You need to understand the implications, and adapt your process to it, reducing your baking times, increasing your oven temperature and even sometimes modifying your proofing time and recipe. Not doing this will give you a less good quality. Embracing the advantages, the technology can bring will result in premium bakery product, with respect to structure, volume and shelf life & longer crispness. Another reason has been the availability of (affordable) vacuum coolers suited for bakery applications. A standard vacuum cooler will not do the job, as a multitude of modifications need to be made to get a good bakery vacuum cooler. Several years ago some bakery machinery suppliers developed suitable systems, but at very high cost. Now Weber Cooling – the world largest supplier of systems for all other areas of vacuum cooling, had designed a range of affordable and highly efficient solutions for the bakery market!

- What are some of the most obvious benefits of using vacuum cooling, referring strictly to the product qualities? And what types of products is it best suited for?

Vacuum cooling can be used for almost all bread types. Some bread types (like gluten free and products with high rye and wheat content or with a high water content) are more difficult to cool, but adapting both the vacuum cooler as the baking process makes it possible for even the most difficult product to cool. The quality advantages which can achieved:

- *A larger volume, as during the cooling process there is a pulling effect on the bread, resulting in a volume increase*
- *A more homogenous and tender internal structure, as the gelation process continues under vacuum, giving a finer structure, and even a whiter color*
- *A crispier crust which will stay crispy for a longer time, as the moisture is mostly sucked out here (also for cookies: less moisture will lead to a longer crispness!)*
- *Longer shelf life, as less bacteria will be formed during the minimalized cooling time.*

- What is your customer profile and what are some of the most common demands you get from clients regarding equipment capacity and customization? Who makes up the majority of your clients?

The customers can be divided firstly in two groups: Artisan vs Industrial. Weber Cooling currently serves only the Artisan customers, working with normal (rotary) ovens. Most economic advantages can be achieved as of three ovens; as you will be able to reduce your baking time by up to 40% (on average 30%) the installation of a vacuum cooler will bring you substantial more capacity; the more ovens, the more capacity you will gain! In practice, one vacuum cooler will serve up to 5 ovens, resulting in up to 2 "oven capacities" extra, free of charge. Weber Cooling supplies standard solutions for the most commonly used rack sizes (600 x 800 mm, 600 x 1000 mm and 800 x 1000 mm), and offers standardized solutions for one and two racks, plus cost-effective multiple room solutions for larger customers.

The industrial customers require a continuous solution. This can be supplied by means of a multi-level vacuum cooling system. The investment level here is substantially higher; and the number of systems supplied here is still limited. For this market group Weber Cooling is currently designing its first solutions and expects to supply a first solution in 2019.

A second selection can be made on the bread being cooled. Simple "French" bread, baguettes and hard buns can be perfectly cooled with the low-cost ECO coolers, for all other bread types Weber has developed the POWER cooler.

- From a business perspective, what are the main advantages of using this technology in a bakery, and what would you say would be its main selling point? Please illustrate referring to energy efficiency, overall productivity, time management, etc.

In general, quality increase should be the main driver. For gluten-free bakeries the introduction of vacuum cooling is a no-brainer; the advantages vacuum can bring are just that huge. With vacuum you can easily bake even the most difficult gluten free recipe and can produce bread which has a texture & bite comparable to normal bread.

The economic advantages however also can play a main role, not only by increasing your capacity by up to 40%, but also because you can save on ALL your cooling costs (we gladly make a calculation) and you can reduce your cooling space by 90%. Adding a vacuum cooler can bring you just so much more capacity – while reducing your space & cooling requirements at the same time.

- How has the market demand for vacuum cooling equipment evolved in recent years and what are the possible drivers of this evolution?

The market is growing – as more and more bakeries see how others profit from the technology. The future driver for accelerated growth comes from Weber Cooling; we've reduced the average cost price of vacuum coolers by roughly 40 – 50 % and can offer vacuum coolers for the same price a customer now buys an oven; customers understand these price levels, and can easily calculate that their payback time now is reduced to only a few years!

- How do you minimize down-time and necessary maintenance while ensuring rapid product changeover and productivity?

By using modular and simplified technology, you can design a system for minimized maintenance. Combining this with top quality components and a regular service program, you can reduce down time to almost zero. For larger bakeries redundancy can easily be included by adding extra capacity (at minimal costs).

- What are some of the possible unwanted side-effects of this process (e.g. surface cracks) and how do you overcome these challenges?

You can get surface cracks and inhomogeneities if you do not apply vacuum cooling in the correct way. At our vacuum bakery center in the Netherlands we can test with customers, and reproduce these effects, and show how to solve them. In many cases by adapting the cooling cycle (pressure curve control), in other cases by adapting baking or proofing times, by tackling issues with the mixer or by slight modification of the recipe. Until now – all issues could be solved, as long as the baker is willing to share the way he bakes with us, and allows us to help us to optimize all steps of the baking process.

- What are the various degrees of automation that come with your products? And what are the trade-offs between the variations?

For Artisan bakeries it's simple – no further automation is needed. Only the clevere integration of the vacuum cooling solution. For Industrial lines you will need full automation. Here the system integrator from the bakery can support in offering the best solutions. There are no trade-off's: For both customer groups the solution is clear, and beneficial to obtain premium results and higher profits.

- What steps and innovations have you implemented to ensure equipment hygiene and food safety?

The vacuum rooms are constructed of stainless steel, and it is easy to clean the inside of the room! The air in the room will flow in a controlled way, ensuring no contaminated air can return to the room. By adding filtration & clean air solutions (Virobuster) a next level cleanness can be achieved. Oil used in the vacuum pumps is food approved, and no machine contact is made to the floor. All outside casing is stainless steel as well!

- What solutions do you offer customers who want to integrate your equipment with existing production lines?

Space is the issue when you want to integrate a vacuum cooler. For the Artisan bakery you will only need around 2 x 2 meters in space (+ an outside cooling system) for a double rack vacuum cooler; this space can be found at most customers. For industrial customers it's more challenging finding the space in existing lines. The best solutions here can be found for greenfield operations.

- What features do you think will play a key part in the future design of this technology and where do you see it in the long run?

Weber Cooling has finalized its design for the bakery market. There's not much more that can be optimized. We can offer cost effective solutions, with great performance. And have the knowledge to support the customers all the way. Small steps still can be made in heat recovery from the cooling system, but this can be also offered as of 2019. As of 2020 we will offer full GWP-free refrigerants for all our bakery cooling solutions, adding a complete ecological friendly cooling solution!