



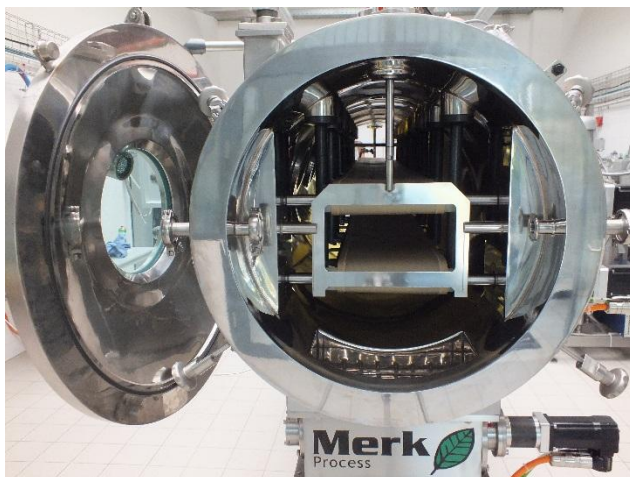
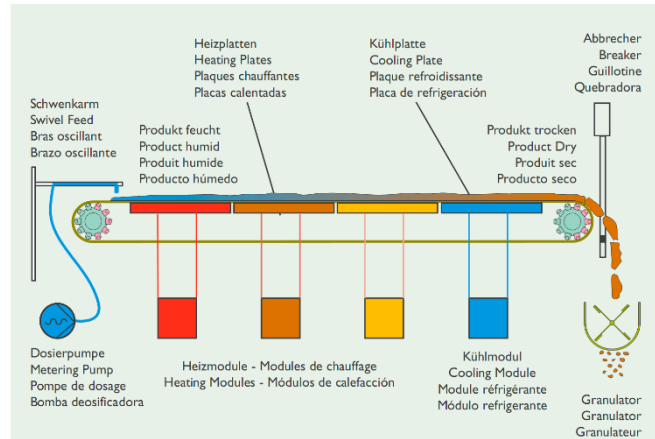
Successful Vacuum Drying!



## Quantum Jump at Drying in Vacuum Belt Dryer

Vacuum Belt Dryers VBD are built since 1930 and have established in food drying. They are used for gentle drying of aromas, reaction aromas, enzymes, proteins, plant extracts, malt cocoa beverages, fruit powders, florentine masses, choco-crums, baby nutrition und much more products.

In the past was heated with steam, pressurized water or thermal oil by contact heating plates arranged under the belts. VBD heated like that are limited in their evaporative capacity.

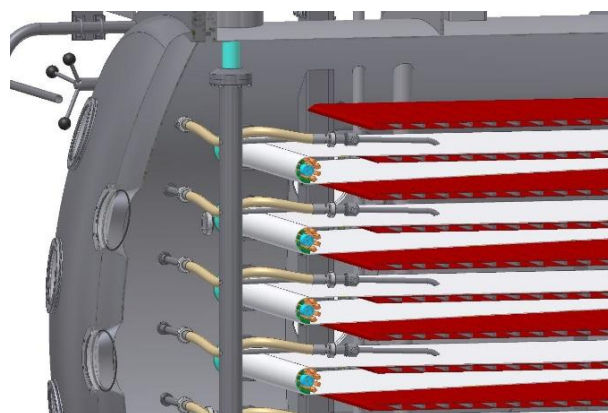


With the **additional radiant heating in VBD patented by Merk Process** the possibility was created to triplicate the evaporative capacity. Under these circumstances Maillard reaction now could be controlled perfectly. The Maillard reaction is a non-enzymatic browning reaction of reducing sugar with amino groups. It provides the desired aroma change (roasting aromas) and flavor intensification.

### Process:

Even feeding of high-viscous and pasty products (up to ca. 500.000 mPas) is possible. The higher the feeding temperature may be the bigger is the flash effect after product inflow into vacuum und the bigger is drying capacity of the vacuum belt dryer.

Generation of vacuum can be managed very cost-efficiently by several vacuum plants. In this connection it is important to know that the condenser is the real vacuum pump and the downstream pump is for discharging non-condensable gases and false air amounts only. A constant evacuation with laminar flow inside the dryer is





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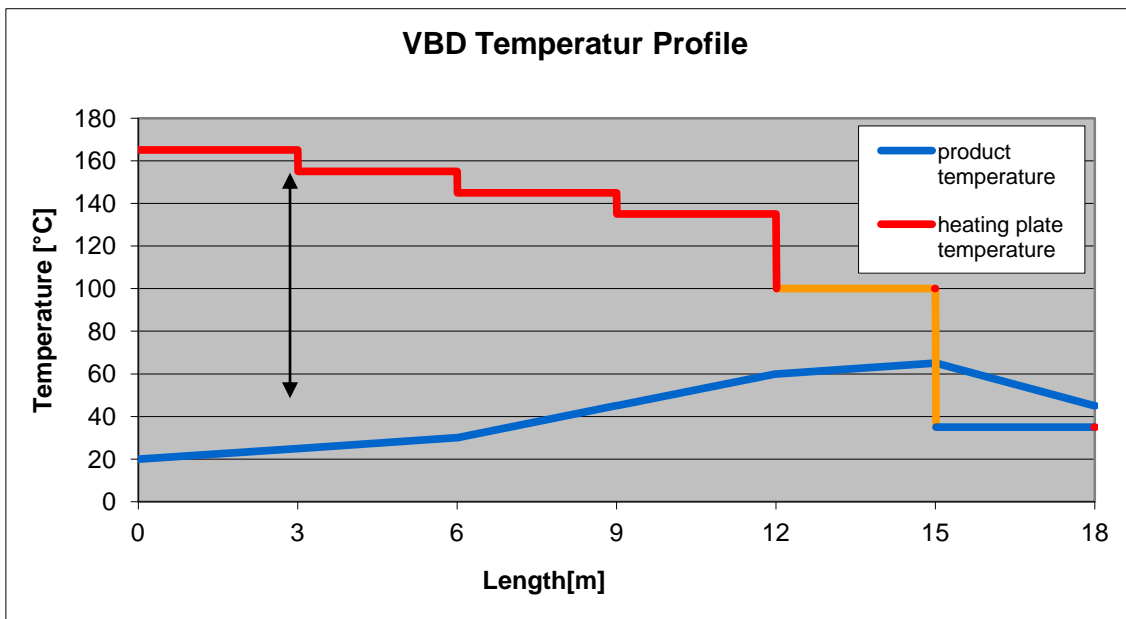


indispensable. By carrier gas injection from the dry side the vapors will be accelerated and chilled.



The pasty products will be dried gently in vacuum for instance at 15 mbar and a corresponding evaporation temperature of 13°C. A temperature profile extended over several heating zones provides the necessary energy input.

Radiant heating will be set 10 to 30 K higher than contact heating. Ca. 80 to 90 % of evaporation takes place in the first zone. By energy input from above the product cake will be lowered.



When drying with a vacuum belt dryer knowledge about the glass transition temperature is an important factor. By cooling in the last one or two zones the dry but soft product should be cooled under the glass transition temperature and consequently get hard. In this connection it is important that the temperature of the cooling zone is set ca. 5 K higher than the evaporation temperature. So a condensation in the cooling area could be avoided.

The dry product cake is broken off by a guillotine at the end and falling into a crusher-granulator for milling. Afterwards the dry product will be discharged out of vacuum by a double flap sluice.

Written by D. Merk