

ZEPPELIN SYSTEMS' PNEUMOTHERM BATCH PROCESS

FLOUR COOLING FOR THE BAKED GOODS INDUSTRY



zeppelin-systems.com

 **ZEPPELIN**[®]
WE CREATE SOLUTIONS

INDUSTRIAL BAKING

THE RIGHT DOUGH TEMPERATURE IS CRUCIAL

FOUNDATION FOR REPRODUCIBLE QUALITY

Large bakeries produce a wide range of baked goods made from different types of dough. To ensure that the baked goods are always of the same quality, dough should have a certain target temperature after kneading. This is best achieved if flour and liquids are evenly tempered before processing.

The optimal dough temperature is approx. 24 to 26 °C for wheat dough with a dough yield of DY165. This requires a water temperature of 10 to 12 °C and a flour temperature of 20 °C. With standard intensive mixers, a high amount of energy is introduced into the dough so that the dough heats up by 8 to 10 °C.

IF THE FLOUR IS TOO HOT...

Many bakers use the baker's formula below to determine the optimal dough temperature. However, achieving the required flour temperature of 20 °C is not that easy. This is because it is often exceeded, especially in summer. Very warm ambient temperatures and long transport distances heat up the flour. This is compounded by storage in uninsulated silos that are exposed to direct sunlight. In this case, flour temperatures of up to 40°C are not uncommon.

Water temperature + flour temperature

2

+ kneading temperature difference = dough temperature

THE SOLUTION

FLOUR COOLING USING THE PNEUMOTHERM BATCH PROCESS

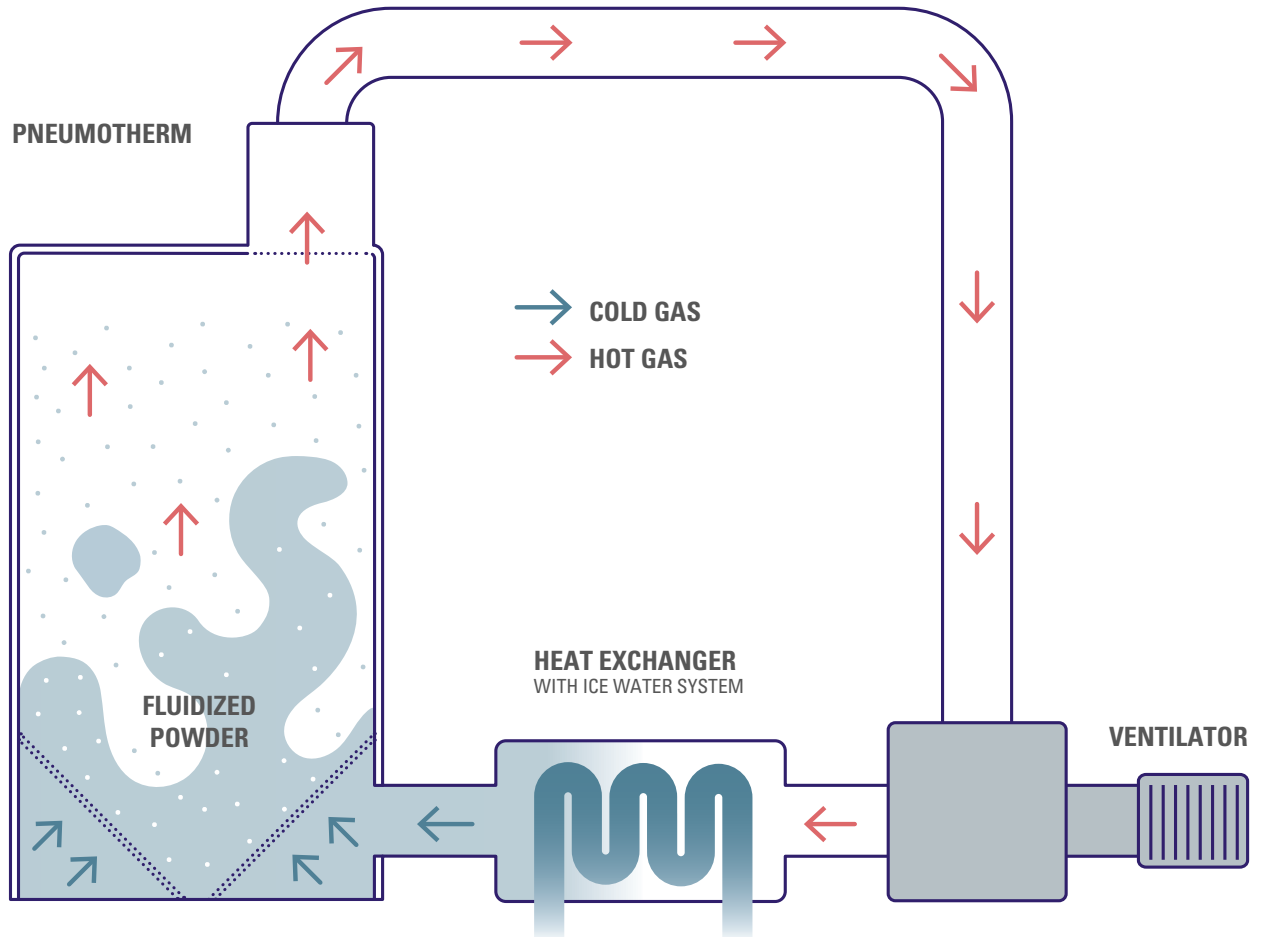
Cooling the flour with liquid carbon dioxide before it goes in the kneading bowl is a frequently used method – but this is cost-intensive and harmful to the environment. Zeppelin Systems therefore developed the PneumoTherm batch process, a technology that has been installed in countless plants over the last few decades.

HOW IT WORKS

The flour is weighed in a preliminary container and transferred from there to the temperature control container. Cold air blown in from below through a fluidized bed cools the flour to the desired final temperature and creates a fluidized layer.

This ensures that flour particles and cold fluidizing air are optimally mixed. The fluidizing air is circulated and cooled in a heat exchanger until the desired final temperature is reached. The flour is then either pneumatically conveyed directly into the target container or discharged into a secondary container so that the subsequent systems are decoupled in terms of time.

Special versions with two heat exchangers are available for products, e.g., laminated doughs, which require a low flour temperature of min. 5°C. This enables fluidizing air of less than 0°C.



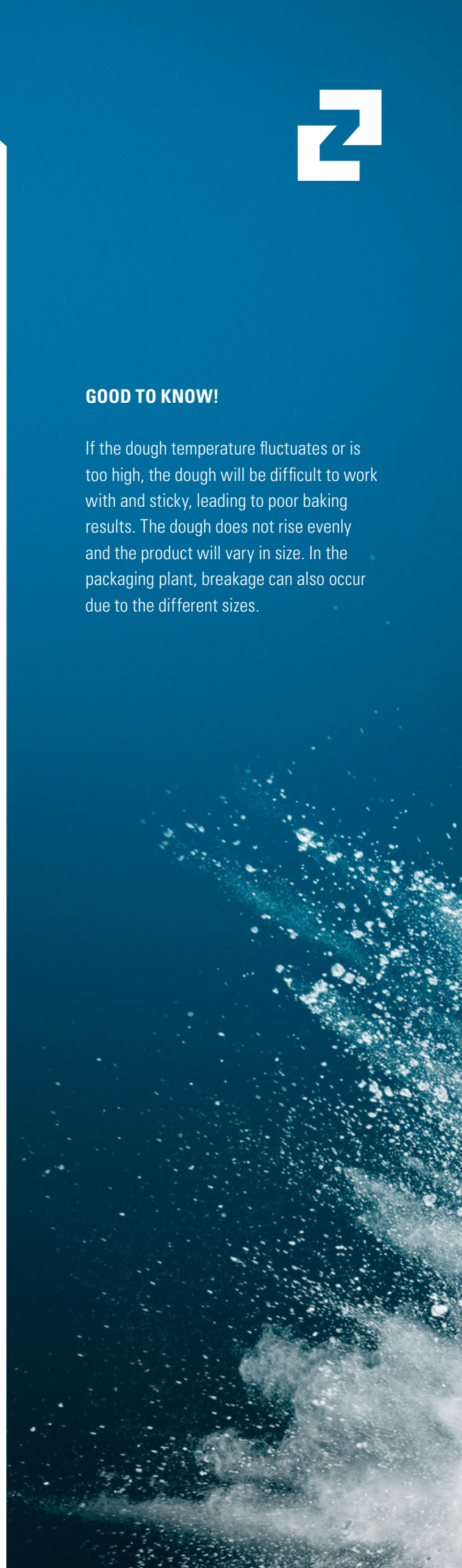


**FAST, HYGIENIC, EXTREMELY FLEXIBLE:
THE ADVANTAGES**

- Tried-and-tested process, durable technology
- Precise temperature control
- Minimized dust exposure
- Independent of fluctuating environmental conditions
- Low operating costs and environmental impact compared to CO2 cooling
- Very easy to clean the temperature control tank
- No condensation inside the container
- System adapts to sudden load changes and does not need to be powered up and down – flour type can be changed easily
- The PneumoTherm batch process:
One system – many baked goods

GOOD TO KNOW!

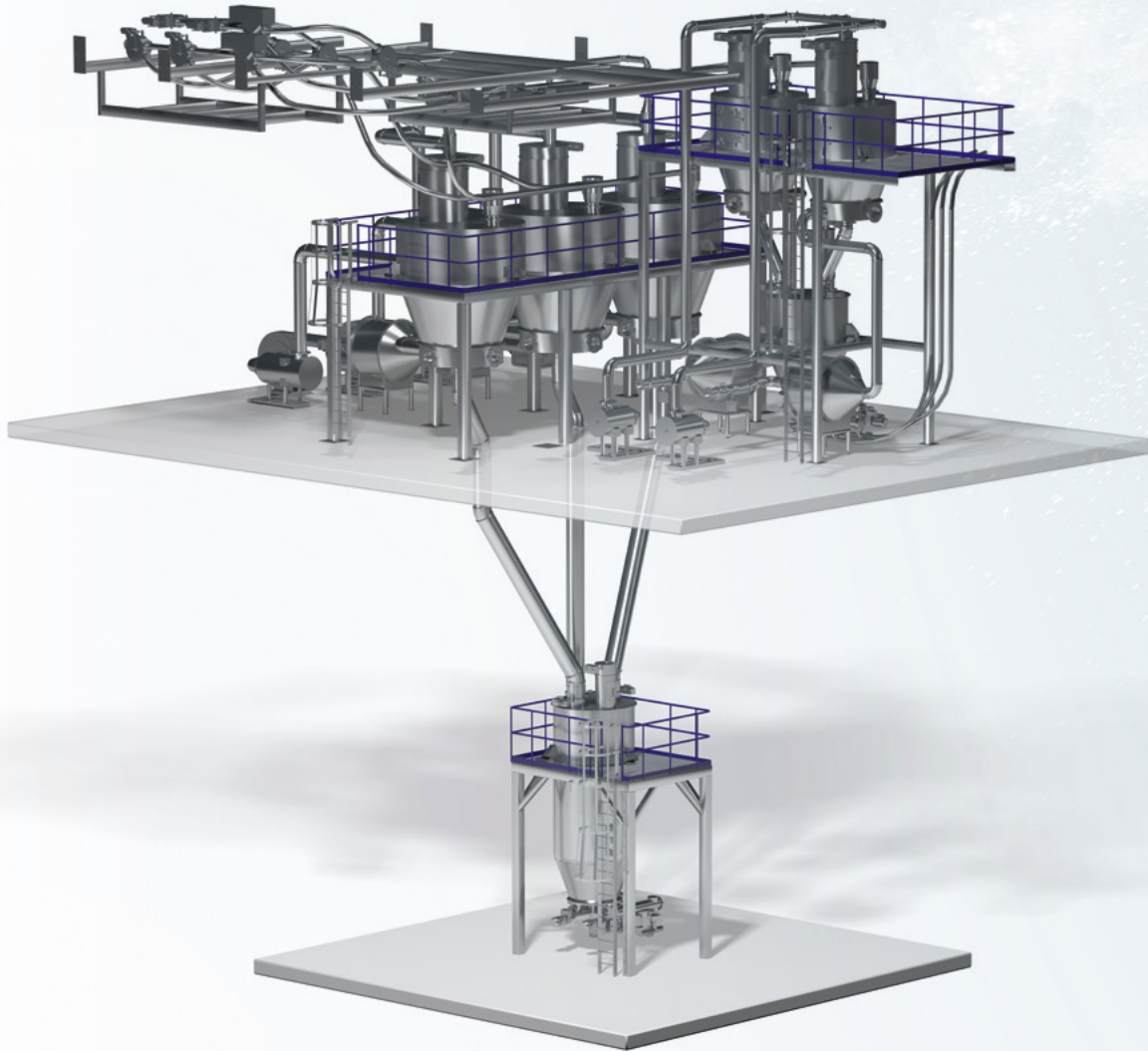
If the dough temperature fluctuates or is too high, the dough will be difficult to work with and sticky, leading to poor baking results. The dough does not rise evenly and the product will vary in size. In the packaging plant, breakage can also occur due to the different sizes.



ZEPPELIN SYSTEMS



TECHNOLOGY FOR PERFECT BAKED GOODS



To achieve optimal and, above all, reproducible baking results, you need to maintain consistent overall conditions. Dough temperature plays an essential role here, which is particularly affected by the raw materials flour and water. Zeppelin Systems' PneumoTherm batch process has established itself as the most effective and economical method for flour cooling.



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