

Industrial Wafer Baking

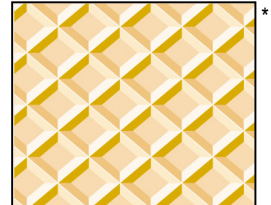
Automatic Production of Flat Wafer Sheets



Q

Question

How can you control the correct heating of the baking plates for manufacturing of flat wafer sheets?

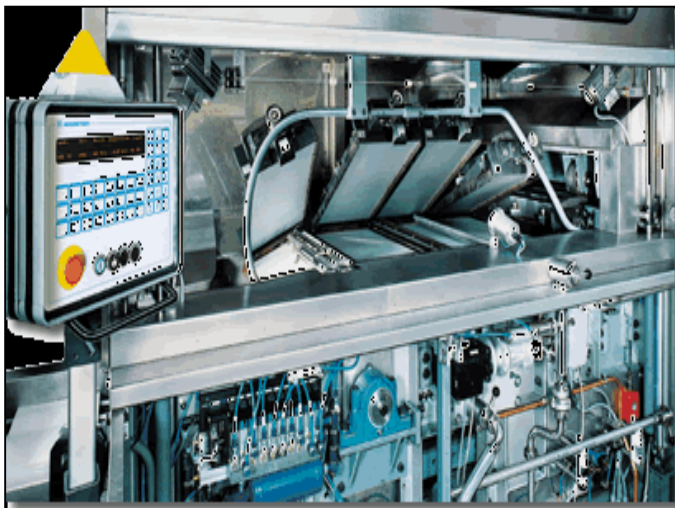


A

Answer

Situation Analysis

The baking machine consists of a conveyor of cast iron baking molds approximately 700 by 350 mm (27x14 inches). All molds in the machine run in an endless rotating chain. For baking the wafers in the mold, the baking plates are preheated by a natural gas flame. Afterwards, the batter is filled onto the lower baking plate of an opened mold. During the movement of the closed mold, the wafer is baked and automatically removed at the end of the machine. The plate temperature is critical for the baking process and the final properties of the wafer sheets.



*Automatic Wafer Baking Machine**



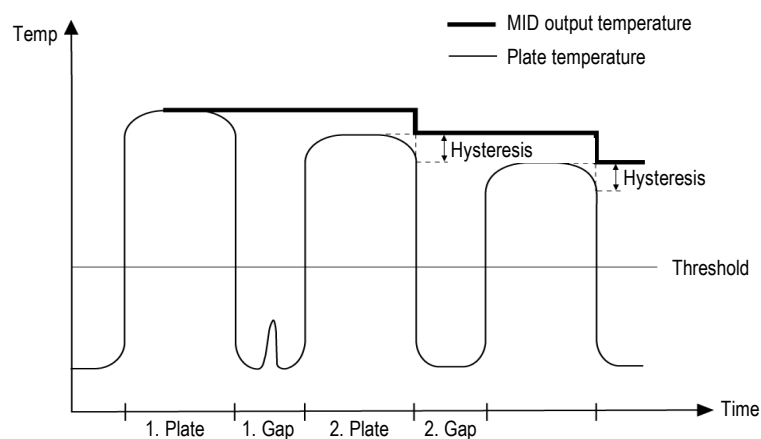
*Baking plates of an opened mold**

A

Answer

Solution and Improvements

After the heating section but before the batter filling station, the temperature of the lower baking plate of the opened mold is measured by a Raytek MID sensor. The mA current output of the MID controls the gas inlet for preheating the molds. If the plate temperature is not in the required temperature range, the batter is not filled into the mold and the gas inlet is controlled accordingly. The emissivity of the MID is set to a high value, as in normal operation the plates are dark due to a build up of baking residues. The signal processing for the MID is set to "Advanced Peak Hold" to gate the gaps between the two plates. Only temperatures above threshold are considered for searching a local peak. Hysteresis is typically set to 1 K to ensure the actual peak is found.



Run of plate temperature and MID output temperature (principle)

Raytek Product

- MID10LT

Benefits

- Optimized baking temperature
- Reduced waste, as all molds are filled before passing through machine
- Optimized gas consumption
- Improve profitability of the baking machine

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