



Thermoforming

Manufacturing of Plastic Cups for Food Packing on Roll-fed Thermoforming Machines

Q

Question

How can you control the correct temperature treatment of plastic cups manufactured on roll-fed machines?



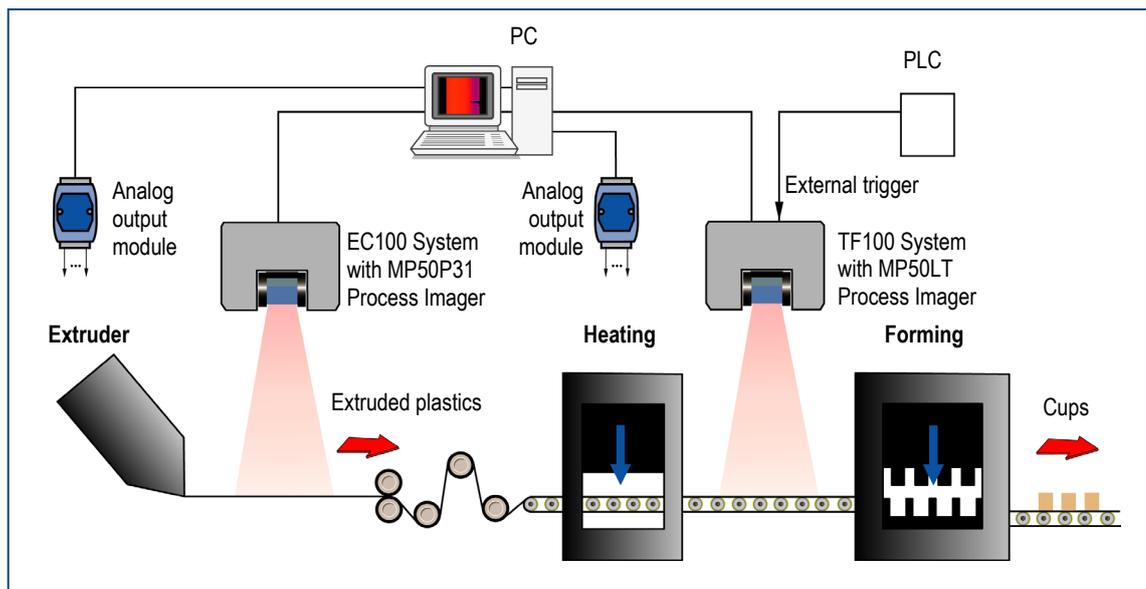
A

Answer

Situation Analysis

Cups for yogurt and milk products are produced. Polypropylene or Polystyrene is extruded to 1 to 3 mm thickness strings of 800 mm width. The plastic material is heated once again by a number of infrared heating elements and transported to the forming section, where, for example, 6 x 3 cups will be formed in one step.

Filled cups were packed in pallets of several hundred pieces. Quality problems caused leakages of cups and wholesalers sent back the complete pallet even if just one of the cups was leaking. Uniformity of the temperature distribution after the extruder is important to achieve a high quality level of the cups (exact wall thickness, same form and stability). Before forming the cups, the edges of the string have to be heated more than the areas in the middle of the string, because the edges were cooled down more. A lower temperature at the edges causes quality problems and a high scrap rate of cups.



A

Answer

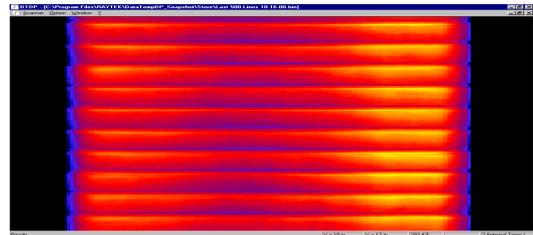
Solution and Improvements

The “Automatic Sector” in the EC100 continuously monitors the whole extruded film and provides automatic edge detection. Temperature gaps or unacceptable “edge running” are detected automatically. The system allows the output of free definable sub-sectors via an analog output module for the regulation of the extruder heating.

The TF100 system captures consecutive snapshots based on an external trigger coming from the PLC. A zone grid overlay represents the infrared heating elements in the oven depending on size and location. The zone average temperature is output to an analog output module, whereby one output channel controls the power of the corresponding heating element.



After the extruder: temperature profile with Automatic Sector and Sub-Sectors



After the heating section: thermal image showing 10 consecutive snapshots

Raytek Product

- MP50P31 Process Imager with DataTemp EC100 Software
- MP50LT Process Imager with DataTemp TF100 Software

Accessories

Analog Output Modules

Benefits

- Regulates the extruder heating
- Detects defects and failed heating elements quickly
- Reduces the scrap rate
- Automates quality documentation (ISO 9000)

www.raytek.com
for up-to-the-minute features

Raytek[®]
A Fluke Company