
Canning Process Characterization



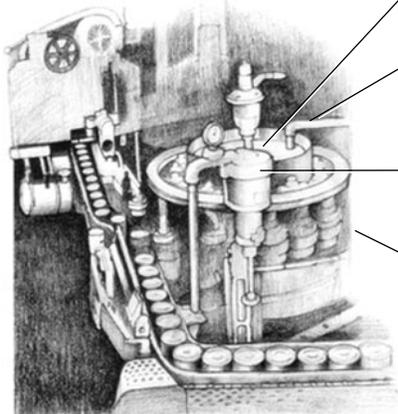
HP Data Acquisition Application Note

Description

In the canning industry, hermetically sealed cans are subjected to heat in order to kill micro-organisms and ensure a long and stable shelf life. A retort is used to control the heat and pressure around the sealed cans. The amount and duration of the heat treatment must kill the micro-organisms and still guarantee that the food or dairy product is not damaged.

Problem

An automated system is needed to measure and control the amount of heat applied to sealed cans. By adjusting the heat, pressure, and cycle times, an optimum process can be found where micro-organisms are killed, the food product is not damaged, and process time is minimized.



Temperature
monitoring

Temperature
control

Pressure
monitoring

Pressure
control

Solution

A VXibus data acquisition and control system from Hewlett-Packard is ideal for characterizing processes like those used in the canning industry. Temperatures and pressures are accurately measured and controlled with the data acquisition system. Flexibility and expandability give the system the ability to characterize different aspects of the application. A computer in the system ensures that accurate records can be maintained so that an optimum process can be found. Once found, this process can be repeated consistently with the same equipment.

Applications

Vegetable
Fruit
Fish
Milk
Beer
Soft drinks

Departments

Research
Production
Quality

Implementation

Temperature monitoring

Thermocouples, thermistors, and RTDs can be used to monitor the temperature of the steam in the retort, of the sealed cans, and of the products inside the cans. Any necessary transducer linearizations can be carried out by either the computer or the instrument.

Pressure monitoring

Another important factor in the heat treatment process is the pressure in the retort and in the sealed can. By correlating pressure and temperature, the optimum heat treatment can be applied. Pressure transducers typically output a voltage or current proportional to pressure.

Temperature control

When an optimal process is found, temperature must be accurately controlled. The data acquisition system can be used to control this temperature using either an actuator to turn heaters on and off or a voltage D/A converter to set the correct temperature level. Using the intelligence of the data acquisition and control system, temperature can be varied under strict control limits.

Pressure control

Pressure can also be controlled with the data acquisition and control system. Digital outputs can control actuators that turn pressure pumps or valves on and off. Voltage or current D/A converters can also be used for positioning of pressure valves. Cycling the pressure can easily be carried out under strict control of the system.

Key System Features

- VXIbus open architecture
- Data Acquisition and Control on a single programmable VXIbus card (E1419A)
- Graphical programming language (HP VEE)
- Flexibility with deterministic control
- Wide choice of inputs/outputs
- Built-in control algorithms
- Up to 32 user-written "C" code algorithms
- 65,000 reading FIFO buffer
- 500 reading Current ValueTable (CVT)
- All algorithms can write to FIFO/CVT
- Data can be time-stamped

Typical Configuration

Data Acquisition System	Qty
HP E1421B VXI 6-Slot Card Cage	1
HP E1406B VXI Slot 0 Command Module	1
HPE1419A Multifunction Measurement & Control Card	1-2
Analog input channels	10-40
Counters channels	2-10
Voltage DAC channels	5-15
Digital output channels	26-62
Computer and Software	
HP Vectra Series PC with HP 82341C HP-IB Interface Card	
HP VEE for Windows 95	
HP LaserJet or InkJet printer	