

Student Handout- Module Number Seven (7) - Thermal Processing System Components, Instrumentation, and Equipment, and Process Room Operation

Thermal Processing System Components, Instrumentation, and Equipment, and Process Room Operation

Temperature Indicating Devices - Mercury-in-glass (MIG) thermometer serves as the reference instrument for LACF; Alternative devices such as thermocouples or resistance temperature devices (RTD) or digital temperature gauges (DTG) may be used; Each retort is required to have at least one MIG thermometer, DTG, RTD or equivalent thermometer or electronic device (PLC).

Mercury-In-Glass/Equivalent Thermometer- Easily readable to 1°F-MIG range not to exceed 17°F/inch graduation-Installed where easily read-Installation location varies depending on retort type-Tested for accuracy when installed and annually-Defective devices **must** be repaired or replaced.



Records must specify the following information-Identification of the device (MIG/DTG/RTD)- Manufacturer of the device-Identification of the reference device-Equipment and procedures used for check-Date and test results-Name of person or facility performing test-Date of next test (optional)-Each device must have a tag, seal, or other means to identify it and correlate it with the accuracy check record-A record is necessary for documenting the accuracy of the reference device-For acidified foods, no specific requirements on the type of device – should still test for accuracy.

Temperature/Time Recording Devices

Low-acid foods: Required for each retort; Can be combined with the steam controller to be a recorder controller; Provides a permanent record of temperature and time for the thermal process



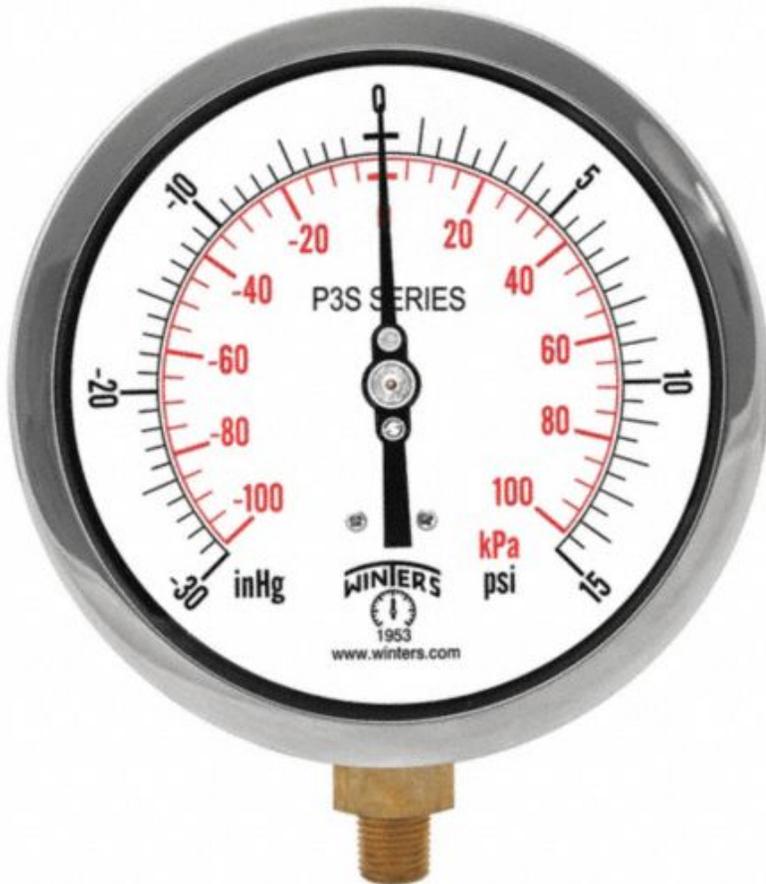
The temperature/time recorder should agree as close as possible with MIG/RTD but never higher- Accuracy to 1°F-Pen arc adjusted properly-Time of day set properly-Prevent unauthorized changes with a lock or notice.

Chart-Type Recorders - Use appropriate chart paper; Graduations not to exceed 2°F within a range of $\pm 10^{\circ}\text{F}$ of the process temperature; Scale not to exceed 55°F/inch within $\pm 20^{\circ}\text{F}$ of the process temperature. **Continuous line or multipoint plotter** - Installation location of recorder bulb or sensor will vary based on the type of thermal processing system.

Each retort **must** have an automatic steam controller.

Instrument Air Supply Requires: Adequate filter system; Clean, dry air at the proper pressure; Independent air supply system.

Pressure Gauges - Scale should not exceed 2 PSI; Useful when processing with overpressure, pressure cooling and as safety device.



Timing Devices - Wristwatches are not permitted; Use analog or digital clock
Located where easily and accurately read.

Maintenance - The regulations require that each thermal processing system be examined at least once a year.

Steam Supply: Steam is the most common heating medium; Supply of steam to thermal processing area must be adequate to bring the retort up to process temperature.

Valve Types and Uses - Gate or Ball: Used on vents for rapid discharge and are full flow; Air and water lines connected to the retort must be equipped with a globe valve or other suitable valve to prevent leaking into the retort; Double block and bleed configurations or three-way valves are often installed on water or air lines used for cooling.

Bleeders - Small openings on retorts used for: Circulation of steam; Air removal that comes in with the steam; Condensate removal. Required on external wells when the MIG/DTG and recorder probes are installed in an external well.

Mufflers - Used on vents and bleeders to reduce noise; Must not reduce air removal or interfere with heat distribution; Cartridges must be inspected and replaced as needed.

Posting of Thermal Processes - Operating processes and procedures **must** be posted in conspicuous place or be readily available to the operator and CSI.

A system for product traffic control **must** be established to prevent containers from bypassing the retort. Each crate or at least one container in each crate **must** be marked with a heat sensitive indicator.

Each container **must** be coded; Codes are embossed or imprinted; May be legibly marked on a securely affixed container label.

Code Requirements: Product unless printed on the container; Year packed; Day packed.

Initial Temperature (IT) - Temperature of the coldest component in the product when thermal process begins. Must be determined for coldest container in retort.