

Retort Thermom

The following information is a tool to help seal for the retort thermometer or other thermometers

For calibration, the following items are needed:

1. The thermometer to be calibrated.
2. The standard reference thermometer (preferably a partially submergible mercury-in-glass thermometer) can be purchased to order to include reference temperatures of 32° F, 212° F, and 250° F, which is needed to reference retort cooking of crabs. The reference thermometer is calibrated to the National Institute of Standards and Technology and certified by the manufacturer to be accurate within a certain F to 300° F. It is desirable to have a thermometer gauged in small increments, i.e., 1 or 2° F.
3. A water and ice bath that is constantly stirred and maintained at 32° F.
4. A silicon oil bath that is constantly stirred (silicon oil can be purchased from a scientific equipment supplier).
5. A magnetic plate stirrer and heater to heat the oil bath and assure the constant mixing needed in items 3 & 4.
6. A 500 ml beaker to hold the bath solution.
7. A clamp stand and two clamps to secure the thermometers.

Step 1: Test for accuracy at 32° F

- Fill a beaker halfway with ice, add water to the beaker until the level of the water and ice is 3/4 of the way to the top of the beaker.
- Place the beaker on the magnetic plate stirrer, insert the magnet, and begin stirring the solution.

- Clamp the reference thermometer and the thermometer you wish to calibrate. Immerse them in the ice and water. (Note: the reference thermometer has a mark showing how deep it is to be immersed.)
- When the reference thermometer is at 32° F record the temperature of the thermometer to be calibrated. Also record the difference in the readings of the two thermometers. This difference is the accuracy at 32° F.
- Remove the thermometers from the ice water and empty the beaker. Dry the beaker thoroughly.

Step 2: Test for accuracy at 212° F

- Fill three-quarters of a beaker with the silicon oil solution.
- Place the beaker on the magnetic plate stirrer, insert the magnet, and begin stirring the silicon oil solution.
- Turn on the heater.
- Clamp the reference thermometer and the thermometer you wish to calibrate.
- Immerse the thermometers in the silicon oil solution. (Note: the reference thermometer has a mark showing how deep it is to be immersed.) Increase the heat to the constantly stirred solution until the temperature reaches 212° F on the reference thermometer. Record the temperature of the thermometer being calibrated. Note the difference in readings of the two thermometers. This difference is the accuracy at 212° F.

Retort Thermometer Protocol

Food companies establish a calibration protocol for retort thermometers used in the processing plant.

Step 3: Test for accuracy at 250° F

- Add heat to the silicon oil solution until the temperature on the reference thermometer is 250° F.
- Record the temperature of the thermometer to be calibrated and the difference of that temperature from 250° F.
- Turn off heater and stirrer; remove thermometers from clamp. Use care in cleaning and returning each thermometer to its location as sudden jarring or dropping will affect their calibration and accuracy.
- Return silicon oil to container after cooling to room temperature.

The accuracy of the retort thermometer should be within plus or minus 1° F or as specified by State or Federal regulatory authorities.

If the accuracy does not fall within the guidelines, the retort thermometer should be adjusted and recalibrated following this protocol. If the thermometer cannot be adjusted to these guidelines, a new calibrated thermometer (calibrated to this protocol) should be put into service.

Calibration of retort thermometers should be done annually during each production season, whenever damaged, and after each extended period of equipment shut-down. Reference thermometers should be calibrated, based upon the manufacturer's recommendations.



The recorded temperatures of both thermometers and the recorded difference between each is information you need to have on file. The record of calibration should be dated and signed by the individual performing the calibration. Other information to maintain includes the certification of calibration of the reference thermometer and this recommended protocol.

References

- Dr. William Mangum, National Institute of Standards and Technology, Gaithersburg, MD, Personal Communication, June 19, 1992.
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- Ms. Mary Wright, Virginia Department of Shellfish Sanitation, Richmond, VA, Personal Communication, June 19, 1992.

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