



## **THERMOMETERS**

### **Purpose**

This instruction defines how to calibrate thermometers to be used by USDA graders.

### **Policy**

Graders and Supervisors will ensure all thermometers are calibrated prior to production. Accuracy is critical when certifying temperature for contract acceptance and commodity specifications. Graders are to utilize thermometers provided by the production facility which have been calibrated.

### **Procedure**

If thermometers are not available, the following procedure for calibrating thermometers will be utilized. For calibration of metal stem thermometers, certified thermometers have been provided to all Supervisors. The frequency and procedures for checking thermometer accuracy will be as follows:

1. Certified Test Thermometer – These certifications are good for one year. When the certification period expires or the thermometer becomes damaged, the Supervisor is to order a new certified test thermometer. The old thermometer can no longer be used and since it does not contain mercury can be discarded in any trash receptacle.
2. Digital Thermometer – The accuracy of each digital thermometer is to be verified by the Supervisor or assigned representative at least annually. This is to be accomplished by comparing the temperature readings of the digital thermometer, coupled with the immersion probe, with a certified test thermometer. A certified digital thermometer can be used to verify the accuracy of another digital thermometer.

To verify accuracy, collect a test medium from tap water. While agitating the water, read both thermometers for comparison. If there is more than a 1°F difference, the Supervisor is to request a new digital thermometer thru the Business Operations Branch in Little Rock, AR. If the temperature of the digital thermometer is within 1°F of the test thermometer, the digital thermometer is considered accurate.

3. Grader's Pocket Thermometer – The accuracy of the grader's metal stem pocket thermometer (including any back-up thermometers) is to be verified by the Supervisor or assigned representative on a semi-annual basis. This is to be accomplished by collecting a test medium from tap water. With continuous agitation, place the digital thermometer and the pocket thermometer in the center of the water bath. After the temperature of both thermometers has stabilized, read and compare the temperatures to assure that they are within 2°F of each other.

If there is more than a 2°F difference, the pocket thermometer must be adjusted or replaced. In either case, the thermometer must be re-tested for accuracy.



During periods between the semi-annual verification when the grader suspects that the pocket thermometer is not accurate or they have been provided a new thermometer which has not been certified as accurate, they are to use the following method:

Prepare an ice water bath (mixture of ice and water). With continuous agitation, immerse the pocket thermometer in the center of the water bath. After the thermometer temperature has stabilized, the temperature reading should be between 31°F and 33°F. If the temperature is out of the accepted range, the thermometer cannot be used and must be adjusted or replaced.

During the next supervisory visit, graders are to request supervisors to formally re-test the pocket thermometer as outlined in item 3. If the temperatures are within 1° F of each other, the pocket thermometer is considered accurate.

Thermometers are also to be calibrated when:

1. Product is rejected based on thermometer readings and the thermometer had not been calibrated that day.
2. There is any reason to suspect readings may be in error.
3. Requested by applicant or financially interested party.

Note: Mishandling can impair a thermometer's accuracy. Handle thermometers with care and use only to take temperatures. Keep thermometers in their cases when not in use. Carefully clean thermometers before storing. Only expose thermometers to temperatures within range shown on dial.

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