

Source: 1999 FDA Food Code, Annex 4, Food Establishment Inspection, Sections 4, 8, and 9.

Thermometer Use and Calibration

Employees of food establishments must closely monitor critical processes such as cooking, cooling, and reheating, as well as hot and cold holding of food. Routinely checking food temperatures and holding times are keys to food safety.

To obtain accurate readings of internal temperatures of foods, food employees must:

- Use the right temperature measuring device
- Follow proper procedures for thermometer use

Temperature Measuring Devices (TMDs)

TMDs frequently used to measure the **internal** temperature of food products include:

- Bimetal bayonet-style thermometers

Advantage: Accurately measures the temperature of relatively thick or deep foods such as beef roasts.

Disadvantage: Reads an average temperature of the food around the thermometer from the tip to two inches up the stem (dimpled ring). A bimetal type thermometer should not be used with thin foods.

- Thermistor-style thermometers

Advantage: Inexpensive and accurately measures the temperature of thin foods.

Disadvantage: Inexpensive units usually cannot be recalibrated.

- Thermocouple-style thermometers

Advantages: These units quickly provide accurate temperature measurements in thin foods and capable of finding cold spots/hot spots in food.

Disadvantage: More costly and more cumbersome than other food thermometers.

- Infrared thermometers

Advantage: Quickly measures surface temperatures of food products from a distance; can be used to measure ambient temperatures of food equipment.

Disadvantage: Cannot be used to measure and verify internal temperatures of foods e.g., during cooking, hot holding and cold holding.

Calibration Procedures

Regular calibration of thermometers is required by the Food Code in accordance with manufacturer specifications. Thermometer manufacturers provide calibration instructions and suggested calibration intervals.

A wet ice and boiling water procedure may be used to check thermometer accuracy.

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- Cold Temperature Check

Pack shaved or crushed ice into an insulated container, which is then filled with cold water to form a thick slurry. Place the TMD at the center of the container to a depth of at least 50-mm (approximately 2 inches) and should be frequently agitated. The temperature should be noted after the reading has stabilized (after about 3 minutes) and must be between 30° to 34° F or -0.5° to +0.5° C.

- Hot Temperature Check

Use caution during this procedure to prevent injury to employees and possible damage to TMDs. A 25 cm (>10 inch) deep container of water should be brought to a rolling boil on a stove or other source of constant heat. The temperature should be noted after the reading has stabilized (after about 3 minutes) and must be between 210° - 214° F or 99.5° to 100.5° C.

Key Steps to Taking Accurate Internal Temperatures of Foods

- Use an appropriate type of thermometer for the food being tested and calibrate as recommended by the manufacturer.
- Know the appropriate cooking, cooling, reheating, and hot or cold holding temperatures for foods during transport, preparation, service, storage, and display.
- Wash hands as required in the Food Code.

- Clean and sanitize the probe before checking a food temperature and between uses when taking a series of temperatures so as to prevent cross contamination.
- Test temperatures at the geometric center of a food product, or the point farthest from the heat or refrigeration source.
- When monitoring cooking processes, note the elapsed cooking times as well as temperature.
- Take corrective action when internal food temperatures do not meet temperature requirements, e.g., reheat or discard food.

Note: This document is for educational purposes only and should not be considered a substitute for studying the Food Code of 1999 and Michigan Food Law of 2000. Food safety information and additional copies of this and other fact sheets are available from the Michigan Department of Agriculture's web page www.mda.state.mi.us