Thermometer Use in Retail Foodservice Establishments

Check the detailed descriptions of these commonly used temperature-sensing devices and learn how to use them in your establishment to ensure food safety and quality.

What’s inside
THERMOMETER FACTS & TIPS
Why use thermometers?
Time and temperature abuse of foods is a leading cause of foodborne illness. Preventing time and temperature abuse of foods is a critical responsibility for managers in retail food operations. Guests want hot foods served hot and cold foods served cold. Thermometers and other temperature-sensing devices provide a way to check food during storage, transport, and preparation.

Where and how should thermometers be used?
As the manager, you determine which types of thermometers are used, where they are used, how often they are checked, and who is responsible for checking them. It is a good idea to establish a check/double check system—this means you as a manager may spot check serving temperatures of some products. The types of thermometers needed will depend on scope of production (on-site preparation and service or transporting to other locations) and extent of the menu.

Thermometer Facts

Food Storage and Transport Thermometers

REFRIGERATOR AND FREEZER
Food Code 2005 stipulates that refrigerator storage units hold the internal temperature of the food below 41°F. Freezer storage units should have an air temperature of approximately 0°F or below—low enough to keep foods frozen solid.

Hanging thermometers are ideal for use in the warmest part of a refrigerated unit (near the access point) and also at the coldest point, usually in the back section of the unit at lower level to double check accuracy of gauges. Typical cost is about $3. Use a calibrated thermometer, such as a bi-metallic stem thermometer (see next page), to randomly sample internal temperature of refrigerated foods.

Dry Storage Areas
Recommended dry storage temperatures range from 50°F to 70°F with a humidity level of 50 to 60 percent. Excessive heat or moisture levels can damage products. An indoor thermometer with humidity level reading will cost about $9. A model with a wireless remote sensor will cost about $20.

Temperature loggers help monitor the environmental conditions of temperature-sensitive goods in transit or in storage. The small electronic devices are re-usable. Some can be linked to software for computerized database monitoring. A temperature data logger will cost about $25 to $30.

Package indicators monitor time and temperature of packaged foods to indicate product freshness and safety. They may be used in both cold and dry storage areas and usually take the form of a small badge or label. Products may have either a clear bar that fills with color or a circle that slowly darkens as the food item is exposed to unsafe temperatures. Once attached to the exterior of the packaging, they are indelible, tamper-proof, and impossible to remove. Most are not re-usable. Currently, these are not widely used in industry, but they are potentially useful for planning stock rotation, monitoring supplies, and identifying products that are no longer safe to use. Package indicators cost about $1.50 to $2.00 each.
Food Preparation Thermometers

**FOOD TEMPERATURE MEASURING DEVICES** are designed to check temperatures of food items. Five types are available. Most are not designed to stay in the food during cooking. Many can be calibrated to ensure accurate readings (see page 4 for calibration tips).

**Bi-metallic stem thermometers** are commonly used in operations, but not always correctly. They typically measure temperatures from 0°F to 220°F (-18°C to 104°C) and are accurate to within +2°F (+1°C). Dial sizes vary but are usually at least one inch in diameter. To use effectively, make sure the entire sensor area (from dimple on stem to tip) is in the center of the food and allow up to 15 seconds for sensor to show temperature on dial. These cost about $10 and are a very good investment for retail foodservices.

**Temperature sticks or sensor strips** are disposable and can be purchased at different temperature levels, such as 135°F or 160°F. When inserted into the food, the sensor tab will darken if the specified temperature is reached. Many operations also use sensor strips to check final rinse temperatures in the dish machine. Packaging varies. A tub of 500 costs about $100, or 20 cents each.

**Thermocouples** measure food temperatures at the junction of two fine wires located in the tip of the probe and display results on a digital readout. Some can be purchased with software for computerized record keeping. They can be calibrated for accuracy, are available in a variety of styles and sizes, and often come with immersion probes for measuring temperatures of liquids. Most are not designed to remain in the food during cooking. Prices range from $160 to $300, depending on features.

**Infrared thermometers** use infrared technology to produce accurate temperature readings of food and equipment, such as the surface of a heated griddle. They help to reduce risk of cross contamination because there is no contact with food. However, because the reading is taken only at the surface level of the product, this tool should not be used to measure final temperature of cooked food. Accuracy depends on the specific model. Prices range from $49 for a pocket size to $100.

**Digital thermometers** provide a numerical read-out of the temperature. Many are tip-sensitive, meaning the temperature sensor is at the tip. Thermistors (tip-sensitive thermometers) measure temperature through a ceramic semiconductor bonded in the tip with temperature-sensitive epoxy. Because only the tip needs to be inserted in center of food to get an accurate reading, they can be used for both thin and thick foods. Some are waterproof, allowing them to be mechanically cleaned and sanitized in the dish machine. A digital thermometer with a probe of 1.5 mm that can be calibrated will cost between $16 and $35.

**Oven thermometers** are designed to monitor temperature of the cooking unit to ensure, for example, that a dial setting for 350°F is indeed cooking at 350°F, thus producing the desired level of heat specified by a recipe. The oven thermometer should be placed next to the food item while cooking. A classic oven thermometer will cost about $4.

**Food Code 2005**

**FOOD CODE 2005 MANDATES USING A SUITABLE** small diameter probe (less than .065 inch or 1.5mm) to measure end point cooking temperature for thin foods (less than 0.5 inches or 13mm), such as meat patties and fish filets. Thermistor probes are generally about .125 inches. If thin foods are part of your menu, invest in a tip-sensitive thermometer with a suitable probe diameter.
How to Check Food Temperatures

- Use a clean, sanitized thermometer each time a food item is checked to avoid cross contamination. Using designated wipes is acceptable. Alternatively, thermometers can be stored in a sanitizing solution near the service area.

- Bi-metallic thermometers should be inserted into the food product so that the sensing area (from dimple to the tip) is in the thickest part of the food. Because the sensing area is not at the tip, allow about 15 seconds for an accurate reading.

- Tip sensitive thermometers should be inserted into the food product so that the tip is in the thickest part of the food.

- Check and record the end point cooking temperature on a sample of each batch of food product.

- If your operation is a self-service unit, assign someone the responsibility to check temperatures each half hour.

- If table service is used in your foodservice, then a sample plate should be checked.

Temperature monitoring logs are available at www.iowahaccp.iastate.edu.

1. Select your type of operation at end of first paragraph of text.
2. Under SOP, click on Flow of Food – you will see different monitoring forms for storage, cooking, holding, and serving.

How to Calibrate a Thermometer

Weekly calibration of thermometers ensures that accurate temperatures are being shown. Dropping or bumping a thermometer can disrupt the effectiveness of the sensor. Thermometers that have been dropped or bumped should be calibrated before using.

Ice Bath Method

1. Fill a large container with crushed ice and water.
2. Submerge the thermometer stem or probe in the water for thirty seconds.
3. Hold the calibration nut and rotate the thermometer head until it reads 32˚F (0˚C).
4. If it does not, adjust the calibration nut on the thermometer dial.

Recommended: Keep a record of the calibration.

Sample Monitoring Log for Storage Units

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