

SECTION 2.3 PREVENTING HAZARDS IN THE FLOW OF FOOD

The flow of food begins well before the food is prepared for service. Responsibility for keeping food safe begins before a finished plate is presented to a customer. The steps that an operation takes to buy, store, prepare, cook, and serve food all pose risks to food safety. Understanding where contamination can happen in these steps and how to prevent it are critical tasks for restaurant and foodservice professionals.

Study Questions

After studying Section 2.3, you should be able to answer the following questions:

- What are the ways to prevent cross-contamination?
- How can time-temperature abuse be prevented?
- What are the different temperature measuring devices and their uses?
- What are the characteristics of an approved food source?
- What are the criteria for accepting or rejecting food during receiving?
- What are the proper procedures for storing food?
- What are the minimum internal temperature requirements for cooking various TCS foods?
- What are the proper procedures for holding, cooling, and reheating TCS food?
- How should food be handled for service?
- What are the proper procedures for preparing and serving food for off-site service?

Cross-Contamination

Think about the foodservice kitchens you have seen at school or in restaurants: lots of people and lots of food, all moving quickly. Pathogens can move around just as quickly in an operation. They can be spread from food or unwashed hands to prep areas, equipment, utensils, or other food. The spread of pathogens from one surface or food to another is called **cross-contamination**. It can happen at almost any point in the path that food takes in an operation. This path is known as the **flow of food**. It begins when you buy the food and ends when you serve it, as shown in Figure 2.19.



Figure 2.19: The flow of food.

When foodhandlers know how and when cross-contamination can happen in the flow of food, then they can prevent it. The most basic way to prevent cross-contamination is to separate raw food and ready-to-eat food. To do this, follow these guidelines:

- Make sure workstations, cutting boards, and utensils are clean and sanitized.
- Do not allow ready-to-eat food to touch surfaces that have come in contact with raw meat, seafood, or poultry.
- If using the same table to prepare many kinds of food, prepare raw meat, seafood, and poultry at a different time than ready-to-eat food. Be sure to clean and sanitize work surfaces and utensils between each product.

Time-Temperature Abuse

Most foodborne illnesses happen because TCS food has been **time-temperature abused**. Food has been time-temperature abused any time it remains at 41°F to 135°F. This is called the **temperature danger zone** because pathogens grow in this range. They grow especially fast in the middle of the range, between 70°F and 125°F.

Food is time-temperature abused any time it is cooked to the wrong internal temperature, held at the wrong temperature, or cooled or reheated incorrectly. Figure 2.20 shows food being measured for the correct temperature.

The longer food stays in the temperature danger zone, the more time pathogens have to grow. To keep food safe, reduce the time it spends in this temperature range. If food is held in this range for four or more hours, throw it out.



Figure 2.20: Food temperatures must be checked often. Food held in the temperature danger zone will grow pathogens.

Thermometers

The most important tool used to monitor temperature is the thermometer. Three types of thermometers are commonly used in operations—bimetallic-stemmed thermometers, thermocouples, and thermistors. The infrared thermometer, while not as common, is becoming more popular.

All of these tools will be effective only if foodhandlers follow specific guidelines for using them. Tools also have to be adjusted regularly, or **calibrated**, to keep them accurate.

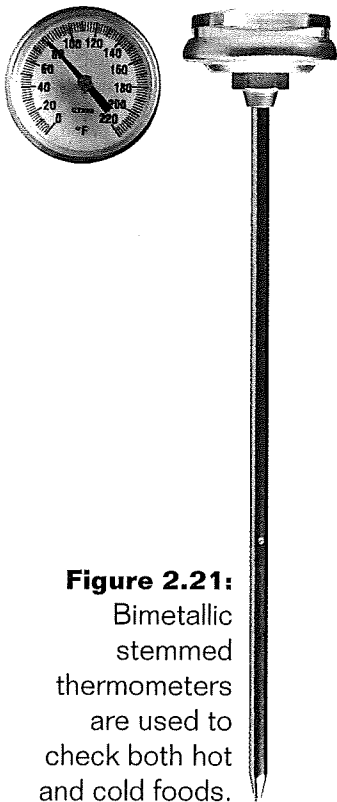


Figure 2.21: Bimetallic stemmed thermometers are used to check both hot and cold foods.

Bimetallic Stemmed Thermometers

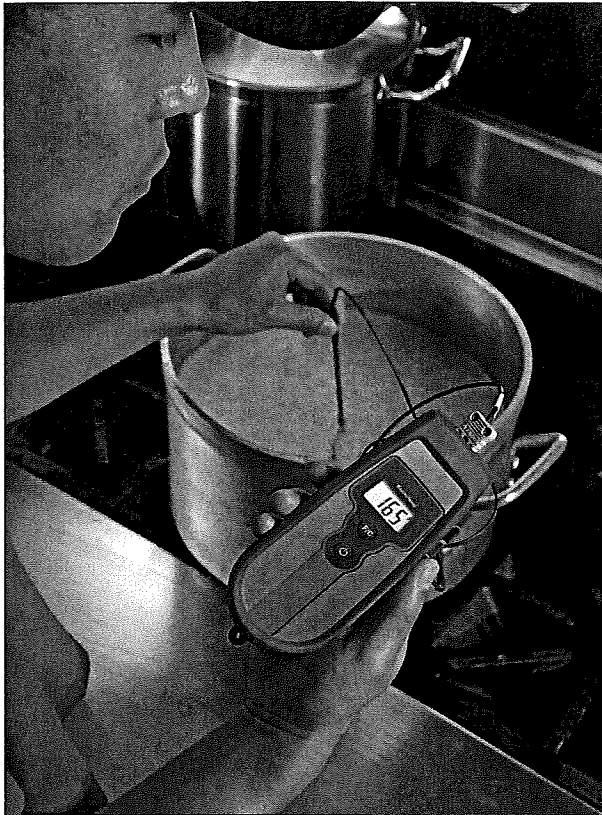
A **bimetallic stemmed thermometer** can check temperatures from 0°F to 220°F. This makes it useful for checking both hot and cold types of food. It measures temperature through its metal stem. When checking a temperature, insert the stem into the food up to the dimple, because the sensing area of the thermometer goes from the tip of the stem to the dimple. This trait makes the thermometer particularly useful for checking the temperature of large or thick food. It is usually not practical for thin food such as hamburger patties. Adjust this thermometer by using its calibration nut. Figure 2.21 shows a bimetallic stemmed thermometer.

Thermocouples and Thermistors

Thermocouples and **thermistors** are also common in restaurant and foodservice operations. They measure temperatures through a metal probe and display them digitally. The sensing area on

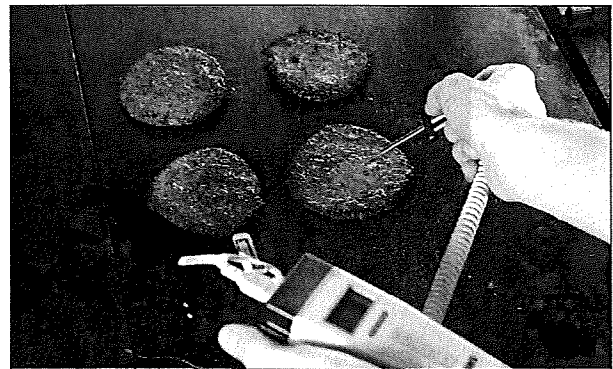
thermocouples and thermistors is on the tip of the probe. This means they don't have to be inserted into the food as far as bimetallic stemmed thermometers to get a correct reading, making them good for checking the temperature of both thick and thin foods.

Thermocouples and thermistors come in several styles and sizes, with different types of probes. Figure 2.22 shows the types of temperature probes:

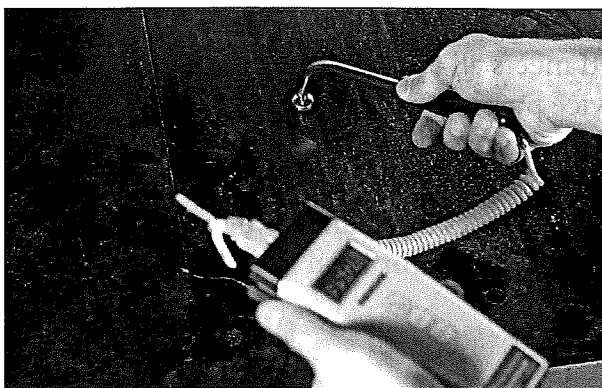


1) Immersion probe checking the temperature of soup.

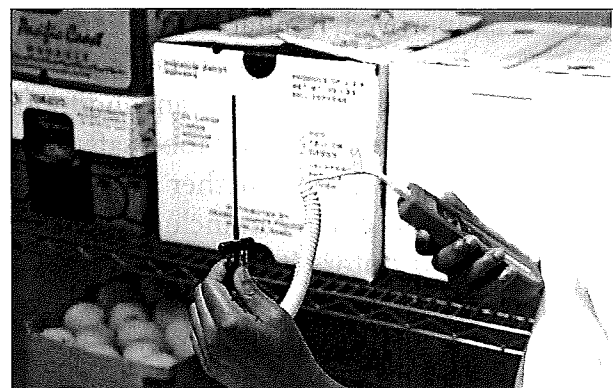
- Immersion probes check the temperature of liquids.
- Surface probes check the temperature of flat cooking equipment, such as a griddle.
- Penetration probes are useful for checking the internal temperature of thin food.
- Air probes check the temperature inside refrigerators and ovens.



3) Penetration probe checking the temperature of a hamburger.



2) Surface probe checking the temperature of a griddle.



4) Air probe checking the temperature of a cooler.

Figure 2.22: The four types of temperature probes.

Infrared Thermometers

Infrared thermometers measure the temperatures of food and equipment surfaces. These thermometers are quick and easy to use. Infrared thermometers do not need to touch a surface to check its temperature, so there is less chance for cross-contamination and damage to food. However, these thermometers cannot measure air temperature or the internal temperature of food. Figure 2.23 shows an infrared thermometer.



Figure 2.23: Infrared thermometers measure the temperatures of both food and equipment.

Purchasing

All the food used in a restaurant or foodservice operation should come from approved, reputable suppliers. An approved food supplier is one that has been inspected by appropriate agencies and meets all applicable local, state, and federal laws. Restaurant and foodservice purchasers must make sure that their suppliers use good food safety practices. This applies to all suppliers along the supply chain, whether a local farmer or a large-sized corporation. An operation's supply chain can include growers, shippers, packers, manufacturers, distributors (trucking fleets and warehouses), and/or local markets.

Receiving

To keep food safe during receiving, an operation needs to have enough trained staff available to receive, inspect, and store the food. Deliveries should be carefully

and immediately inspected and then put away quickly. Follow the guidelines reviewed below when deciding if an item should be accepted or rejected.

Temperatures

Use thermometers to check food temperatures during receiving. Figure 2.24 shows how to check the temperature of various foods.

Deliveries of cold TCS food should be 41°F or lower, unless otherwise specified by the manufacturer. Deliveries of hot TCS food should be 135°F or higher. Frozen food should be frozen. Reject any frozen food that has ice crystals on the product or packaging. (This means the product may have thawed and refrozen.) You should also reject the food if any fluids or frozen liquids appear in the bottom of its case.

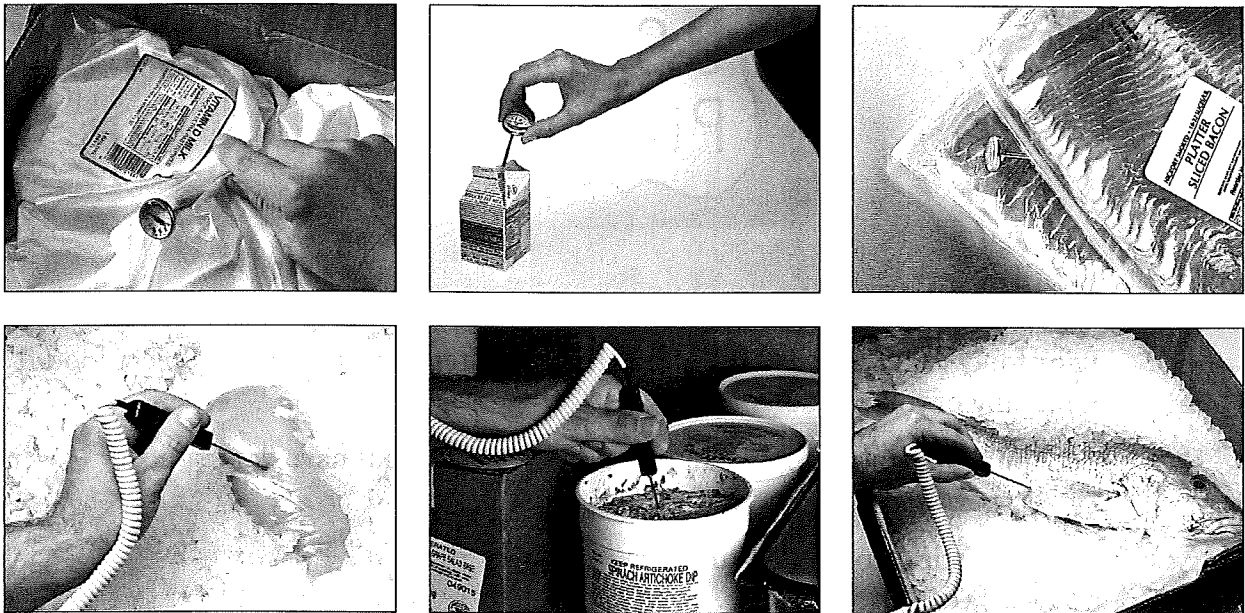


Figure 2.24: Checking the temperature of various types of food.

Packaging

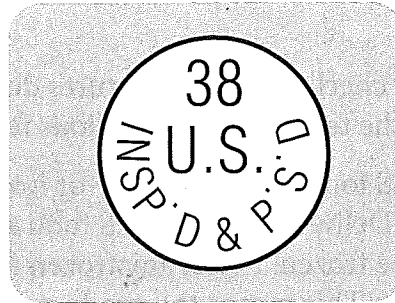
The packaging of food and nonfood items should be intact and clean. Reject any items with packaging problems, such as tears, holes, punctures, leaks, dampness, or water stains. You should also reject any items with signs of pest damage or expired use-by dates.

Meat, poultry, and eggs should also have an inspection stamp on their packaging. See Figure 2.25. The stamps prove that the items meet the safety standards of the U.S. Department of Agriculture (USDA) or a state department of agriculture.

Figure 2.25: Checking for inspection stamps is a way to make sure food is coming from an approved source. The inspection stamps for meat and poultry are mandatory.

Inspection and Grading Stamps for Meat

USDA Inspection Stamp



USDA Grading Stamp

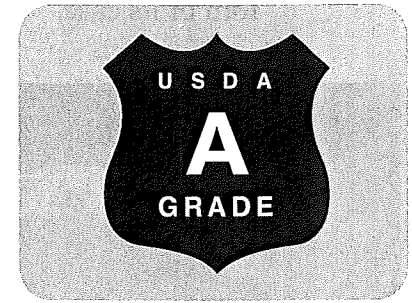


Inspection and Grading Stamps for Poultry

USDA Inspection Stamp



USDA Grading Stamp



Product Quality

Poor food quality is sometimes a sign of time-temperature abuse. Reject food if it has any of these problems:

- Abnormal color (for example, fresh fish should not have dark spots or discoloration)
- Slimy, sticky, or dry texture
- Soft flesh that leaves an imprint when you touch it
- Abnormal or unpleasant odor (for example, fish that smells like ammonia)

Some products have additional specific guidelines for receiving.

Shellfish

Shellfish can be received either shucked or live. Make sure that raw shucked shellfish are packaged in containers for one-time use only. Containers must be labeled with the packer's name, address, and certification number. Containers one-half gallon (1.9 L) or smaller must have either a "best if used by" or "sell by" date. Containers larger than one-half gallon (1.9 L) must have the date the shellfish were shucked.

Live shellfish must be received with shellstock identification tags. These tags must remain attached to the delivery container until all of the shellfish have been used. Employees must write on the tags the date that the last shellfish was sold or served from the container. Operators must keep these tags on file for 90 days from the date written on them. Reject shellfish if they are very muddy, have broken shells, or are dead.

Eggs

Eggs must be clean and unbroken when you receive them. Reject eggs if they do not meet the following guidelines:

- Shell eggs must be received at an air temperature of 45°F or lower.
- Liquid, frozen, and dehydrated egg products must be pasteurized and have a USDA inspection mark.
- Eggs also must meet USDA grade standards. See Figure 2.26.

Milk and Dairy Products

Milk and dairy products must be received at 41°F or lower unless otherwise specified by law. They also must be pasteurized and meet FDA Grade A standards.

Storage

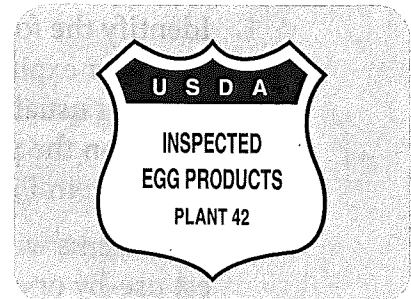
Food can become unsafe if stored improperly. Store all TCS food at 41°F or lower, or at 135°F or higher. Monitor food temperatures regularly.

Label all ready-to-eat TCS food that is prepped in-house if it will be held for longer than 24 hours. The label must include the name of the food and the date by which it should be sold, eaten, or thrown out. Store ready-to-eat TCS food that has been prepped in-house for a maximum of seven days at 41°F or lower. Throw it out after seven days.

Rotate food in storage to use the oldest inventory first. Many operations use the **first-in, first-out (FIFO) method** to rotate refrigerated, frozen, and dry food

Grading and Inspection Stamps for Eggs

USDA Inspection Stamp



USDA Grading Stamp

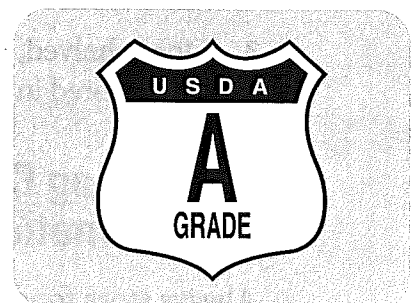


Figure 2.26: These are grading and inspection stamps for eggs.

during storage. Here is one way to use the FIFO method:

1. Identify the food item's use-by or expiration date, which is usually somewhere on the packaging, as shown in Figure 2.27.
2. Store items with the earliest use-by or expiration dates in front of items with later dates.
3. Once shelved, use those items stored in front first.



Figure 2.27: Rotate food using the FIFO method: first-in, first-out.

Preventing Cross-Contamination

Always store food to prevent cross-contamination. Wrap or cover food. Store refrigerated raw meat, poultry, and seafood separately from ready-to-eat food. If raw and ready-to-eat food cannot be stored separately, store ready-to-eat food above raw meat, poultry, and seafood. This will prevent juices from raw food from dripping onto ready-to-eat food.

Store raw meat, poultry, and seafood in coolers in the following top-to-bottom order:

1. Seafood (top)
2. Whole cuts of beef and pork
3. Ground meat and ground fish
4. Whole and ground poultry (bottom)

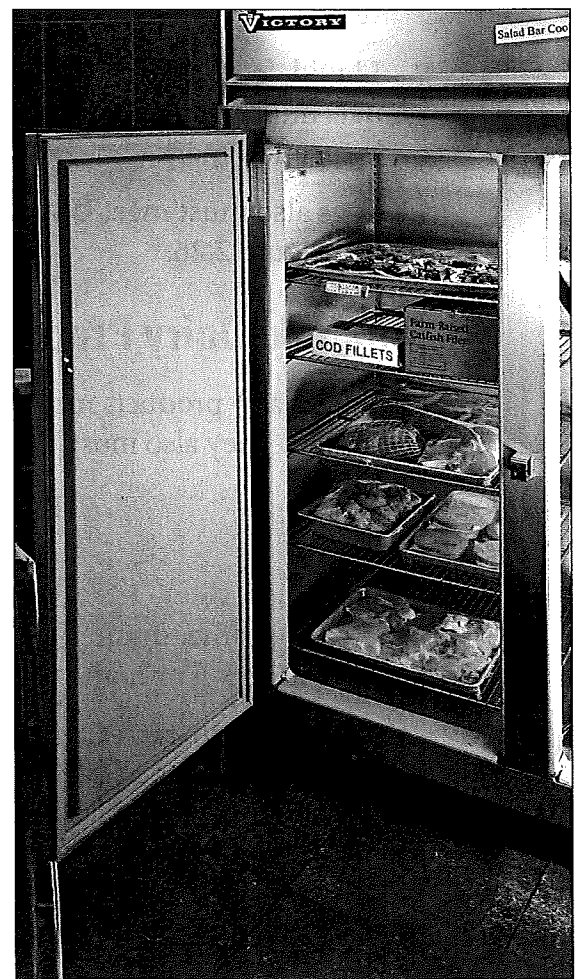


Figure 2.28: Store food in coolers in the correct top-to-bottom order.

This order is based on the minimum internal cooking temperature of each food. Meat cooked to higher temperatures is always stored beneath meat cooked to lower temperatures. Figure 2.28 on the previous page shows how to properly store foods in a cooler.

Do not overload coolers or freezers. Storing too many food items prevents good airflow and makes the units work harder to stay cold. Similarly, do not line cooler or freezer shelves with aluminum foil. This blocks the circulation of cold air.

Preparation

Time-temperature abuse can easily happen during preparation. To avoid time-temperature abuse, remove from the refrigerator only as much food as can be prepared in a short period of time. Prepare food in small batches so that ingredients don't sit out for too long in the temperature danger zone.

When thawing food before preparation, it's important to remember that freezing doesn't kill pathogens. When frozen food is thawed and exposed to the temperature danger zone, any pathogens in the food will begin to grow. To reduce this growth, never thaw food at room temperature. Thaw TCS food in one of these ways:

- Thaw food in a cooler, at a product temperature of 41°F or lower.
- Submerge food under running water at 70°F or lower. Make sure the water is potable—safe to drink.
- Thaw food in a microwave oven if it will be cooked immediately after thawing.
- Thaw food as part of the cooking process.

Figure 2.29 illustrates the acceptable methods for thawing food.

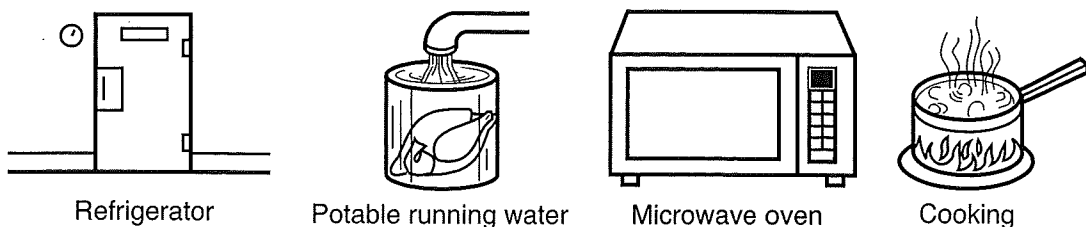


Figure 2.29: Acceptable methods for thawing food.