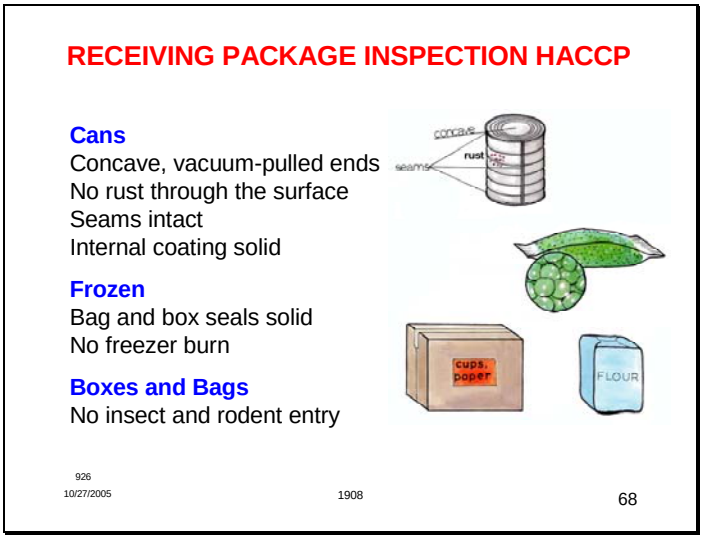
SECTION 5



926

Receiving

Delivery vehicles should be inspected and receiving personnel should reject any product if the food temperature is not appropriate to the food. The FDA Food Code recommends that cold ready-to-eat food be received at 41ºF or below. Shell eggs and milk and dairy products must be received at 45ºF or below and must be cooled to 41ºF within 4 hours after receipt. Shelf stable items can be received at ambient temperature.

There is no specified receiving temperature for frozen foods in the FDA Food Code. Foods that are labeled frozen must be received frozen and there should be no evidence that the food has been thawed and refrozen.

Incoming food products should be inspected for frozen or chill temperatures, date codes, damage, suspicious odors and drips, and pest infestation. Refrigerated and frozen items should be stored within 10 minutes of receipt.

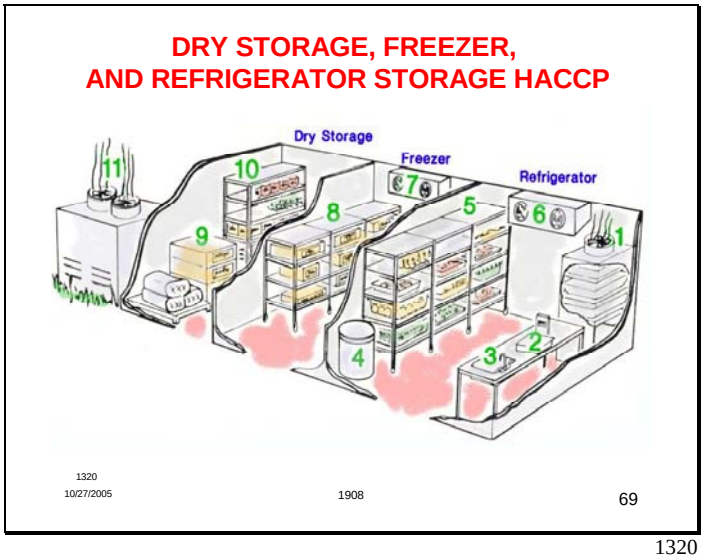
The top, bottom, and side seams of food cans should be checked. Any that are dented in these sensitive areas should be rejected. Dents in the solid areas are not hazardous. Check also to see that the ends of each can are concave. This means that the vacuum seal is still present. Any convex or bulging cans of food should be rejected. Bulging cans of food should not be opened because botulinum toxin could squirt in the face and mouth of the individual opening the can. Bulging cans of food should be wrapped tightly in a plastic container and returned to the supplier.

Unopened cans of food may be refrigerated. After opening cans of food, the contents should be placed in food grade containers before being stored in the refrigerator. Some cans still have lead seams that will dissolve into the food and contribute to heavy metal poisoning.

Any frozen foods that show signs of thawing and refreezing should be rejected. The quality of the product is greatly reduced when this occurs. Watch for ice crystals, solid ice, and stains on the surface and in the package. A torn package causes the condition of freezer burn, where water has been permanently dehydrated from the food surface.

Any boxes and bags that are not clean, not intact, and show signs of rodent or insect entry should be rejected. All food should be unpacked at the back door because it is common to find cockroaches and mice in boxes, depending on the cleanliness of the warehouse from which the items were shipped.

The manager or supervisor should be immediately notified of any substandard food item to determine if the product should be kept, discarded, salvaged, or returned to the supplier on the delivery vehicle. Discarded items should be recorded on the waste control report.



1320

Storage HACCP

The FDA Food Code recommended cold holding temperature for food is 41°F or below.

An accurate thermometer must be placed in each refrigerator and freezer. It should be placed in the warmest part of each unit, which is usually near the door.

Refrigerators

For extended quality, refrigerated food should be stored at 33 to 40°F. When meat, fish, and poultry are stored at or less than 32ºF off-flavors in meat, fish and poultry products are reduced because the multiplication of spoilage bacteria is reduced.

The usual air flow in a refrigerator, about 20 to 40 feet per minute, is not enough to rapidly chill food within a safe period of time. A rapid chilling area can be created by installing one or more fans on a rack in a suitable space in the refrigerator. (**1** in the figure above) There must be air at less than 35°F with a velocity of more than 1,000 feet per minute flowing across the pans of food, in order to cool 2-inch deep product in less than 6 hours.

An optimal salad preparation area **(2, 3)** in the refrigerated area allows preparation of top-quality cold food.

Refrigerator and freezer floors must be kept dry to avoid personal injury. Food should be kept 6 inches off of the floor. Only in some cases, where certain non-hazardous foods are kept in specific moisture-proof containers, can food be stored on the floor **(4)**. However, there are some health agencies that do not allow any floor storage.

Ready-to-eat food must be stored above raw food, especially raw meat, fish, and poultry, to avoid cross-contamination **(5)**. Store food in FDA-approved plastic or stainless steel containers. Aluminum foil and aluminum containers are dissolved by food acid. Cloth is not acceptable for covering food. Seamed metal cans, glass jars, and plastic bread bags should not be used for storing food after the original contents are removed.

Label and date all food on the front of the container. Do not label lids, as lids may get separated from containers. Rotate the food according to the date. Refrigerated food should be used within 7 days at 41ºF to assure that low-temperature pathogens will not multiply to hazardous levels.

Floors, walls, and shelves should be cleaned and then sanitized with a quaternary ammonium sanitizer solution (or equivalent sanitizing solution) to control spoilage bacteria, on a regular basis (at least once a month or more often if necessary).

Freezers

The FDA Food Code states that "stored frozen food shall be maintained frozen." There is no FDA required temperature for freezer operation. However, the quality of frozen food is better when the freezer temperature is -10°F or below. Frozen food should not be stored any longer than necessary because freezers fluctuate in temperature and cause quality changes in frozen food **(7)**. Boxes of food should be separated to allow air circulation **(8)**. The freezer should be swept out monthly, cleaned and sanitized, and inventoried on a regular basis.

Compressor Maintenance

The refrigerator (and freezer) compressor must be kept cool **(11)**. The standard NSF refrigerator is only good for keeping cold food cold. It is not sized for cooling. For every 10°F the compressor is above 90°F, it loses 10% of its cooling capacity. In order to keep foods at 41ºF, refrigeration units should operate at 38°F or below.

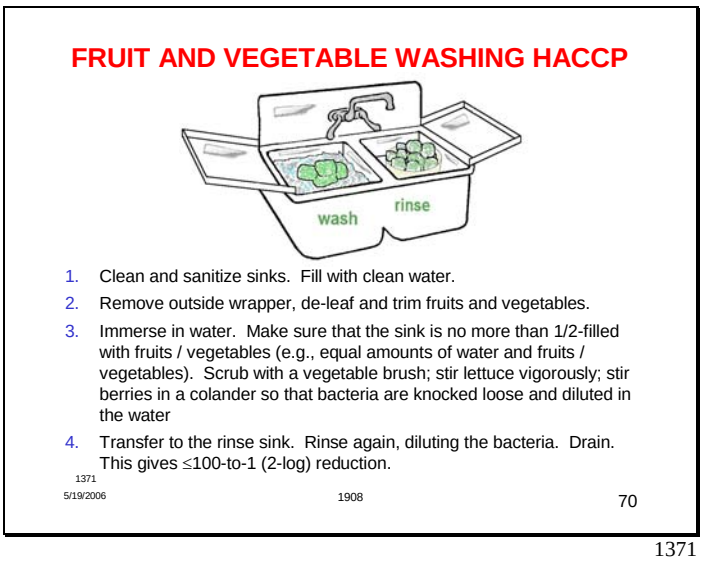
Shelf-Stable (Non-Perishable) Food Storage

Non-perishable storage areas should be kept below 70°F and 70% humidity. Floors and surfaces must be kept spotlessly clean in order to discourage the presence of insects and rodents. (Pesticides do not keep insects and rodents out of the facilities.) Free-standing shelves, 2 inches from the wall, and at least 6 inches off of the floor, should be used for product storage. Drainage racks, shelving, pallets, dollies, or similar devices should be used to store food 6 inches above the floor and away from the walls to ensure good air flow around the inventory **(9, 10)**. No food should be stored on the floor. Duckboards should not be used as storage racks. No food should be stored in restrooms, lockers or dressing rooms, or vestibules. No food should be stored under unprotected overhead sewer waste or water lines (except fire protection sprinkler heads).

All stored foods should be kept properly covered except during periods of preparation and service. Unused portions of opened food must be stored in a tightly closed approved food-grade bulk container and labeled. Stock should be dated and labels turned so that they can be seen. All bulk food and food ingredients containers must be labeled with the common name of the product, name and address of manufacturer, net weight, and ingredients in descending order of predominance.

Chemical Storage

Chemicals (detergents, sanitizing chemicals, pesticides, etc.) must be labeled and kept separate from foods and stored in a separate cabinet or storage area away from the food storage areas. All empty chemical containers must be disposed of properly.



1371

Contamination of Fruits and Vegetables

Fruits and vegetables are commonly washed to remove surface residue and soil as well as pesticides and herbicides.

It is now also recognized that there are health risks associated with the consumption of fresh fruits and vegetables. Fresh fruits and vegetables can support the growth of pathogens. They have been involved in foodborne illness outbreaks because of the consumption of products contaminated by pathogenic microorganisms such as hepatitis A virus, *Cryptosporidia*, *Listeria monocytogenes*, *Yersinia enterocolitica*, *Escherichia coli* O157:H7, *Shigella* spp., and *Salmonella* spp. Fruits and vegetables are also subject to the growth of various spoilage microorganisms that include bacteria, yeast, and mold.

Contamination of fruits and vegetables occurs at all points of production, from growing and harvesting to processing. Polluted growing conditions and/or poor hygienic practices during processing increase the risk of contamination with foodborne pathogens.

Washing Fresh Produce

Washing fresh fruits and vegetables will not completely eliminate all microorganisms from fruit / vegetable surfaces, but it must be done sufficiently enough to reduce numbers of microorganisms to an acceptable level.

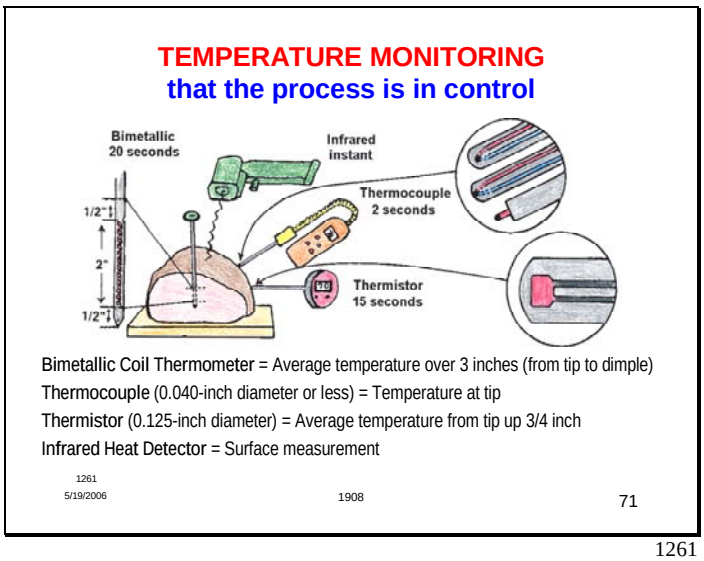
Procedure

To reduce the risk of high levels of pathogens and chemical contaminants on fruits and vegetables, the following procedure should be used.

1. Clean and sanitize sinks. Fill with clean water.
2. Remove outside wrapper, de-leaf and trim fruits and vegetables.
3. Immerse in water. Make sure that the sink is no more than 1/2-filled with fruits / vegetables (e.g., equal amounts of water and fruits / vegetables). Scrub with a vegetable brush; stir lettuce vigorously; stir berries in a colander so that bacteria are knocked loose and diluted in the water
4. Transfer to the rinse sink. Rinse again, diluting the bacteria. Drain. This gives ≤100-to-1 (2-log) reduction.

This washing procedure must be used in the production of cold, ready-to-eat salads, desserts, and any other menu items to which fresh fruits and vegetables are added without cooking or any type of pasteurization step.

Immune-compromised people are encouraged not to consume any fresh fruits and vegetables. They should consume only canned fruits and vegetables or items that are well cooked.



1261

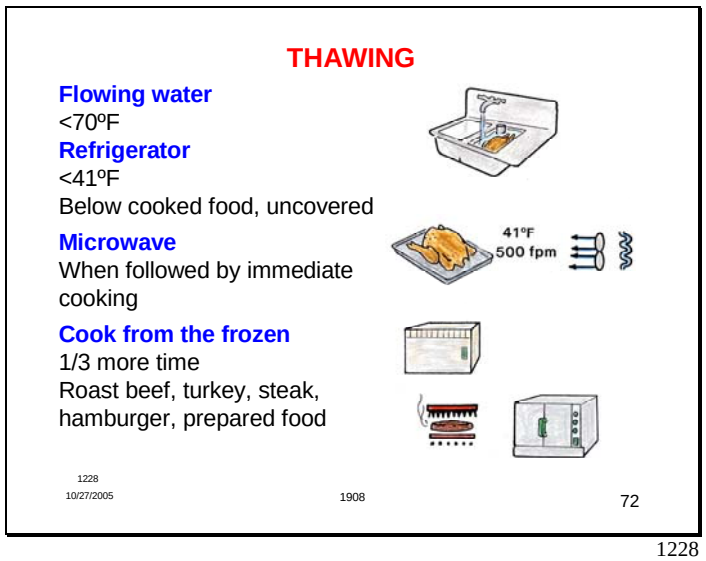
Temperature Measurement of Food

A critical procedure in microbiological hazard control is to correctly measure food temperature. A major cause of many foodborne outbreaks has been that the cook could not accurately measure the temperature of cooked eggs, pork chops, hamburgers, etc. because of the government-recommended bimetallic coil thermometer. As shown in the figure, the temperature sensor is a bimetallic coil in the end of the stem. However, it extends up the thermometer approximately 3 inches. To make a temperature measurement, the thermometer must be inserted in the food more than 3 inches. The problem is that the coil only averages the temperature over the 3 inches. Therefore, it is impossible to accurately measure the temperature of any food other than a pot of soup or gravy that is being vigorously stirred to assure that the entire pot of soup has no more than a 1ºF variance anywhere in the pot. When a foodservice operator uses a bimetallic coil thermometer with the intent to assure that the food is cooked enough to make it safe, he/she has no defense if a customer is made ill and sues the establishment. Following the FDA Food Code when the code is incorrect is no defense in a lawsuit.

Another problem with the bimetallic coil thermometer is that it must be calibrated almost every day because the dial changes. To calibrate this type of device, first an insulated container of crushed ice (90% ice, 10% water) is made. This provides a 32ºF reference temperature. Then, the thermometer is immersed in the ice at least 3 inches. A pair of pliers is used to hold the nut behind the head of the thermometer, and the head and dial are twisted with the fingers until 32ºF lines up under the pointer. Since these thermometers get out of adjustment so easily, they must be checked and adjusted daily if used daily.

The correct way to measure temperature is with a **thermocouple** or **thermistor** thermometer. These devices are electronic thermometers and essentially, need no adjustment. When they do not work, it is time to change the battery. The thermocouple thermometers shown in the figure are highly accurate to)1ºF and measure temperature at the junction of two very fine wires that are the diameter of a hair, which are in the tips of the probes. The meters come to temperature in approximately 3 seconds and measure the temperature at a point of about 0.05 inch. Hence, it is easy and accurate to find the hottest and coldest points in eggs, hamburger, pork chops, fish, chicken, etc., before they are removed from the cooking device.

The thermistor electronic thermometers shown in the figure are also highly accurate, ±2ºF, and do not require calibration. Their limitation is that they are slow to come to less than 1ºF of the actual food temperature, about 20 seconds. The reason is that the temperature sensor is a small resistor in the tip, about 0.125 inch in diameter, and it takes time to heat up or cool down. Because of the size of the sensor resistor, this device can only measure a spot about 0.5 inch in diameter.



1228

Thawing

The critical issue when raw meat, poultry, and fish are thawed is that they can be contaminated with high levels of pathogens. Care must be taken so that other products do not become cross-contaminated.

When food thaws, spoilage begins. Yeasts and molds begin to multiply at 15°F and spoilage bacteria at 23°F, because enough ice has become liquid in the interior of the food. Food should be thawed rapidly under controlled conditions in order to delay spoilage. The three FDA-approved thawing methods are: refrigerator thawing, thawing in running water, and thawing during cooking

Refrigerator Thawing

Food may be safely thawed in a refrigerator at 41°F or less. It may take 2 to 3 days to thaw some foods in ordinary refrigerators. There are special refrigerators designed for rapid thawing of frozen foods. These rapid thaw refrigerators have fans for quick heat transfer to the food. If frozen food is removed from its packing case and placed within 4 inches of a fan blowing full force on the product, it will thaw in 12 hours instead of 3 days.

Running Water

Running drinking (potable) water can be used if the water temperature is less than 70°F. The water must have enough force and agitation to float away loose food particles and prevent nutrient build-up. The easiest way to thaw with running water is to put a pot in the sink, place the food in the pot, and then let the water run into the pot. A second method is to clean and sanitize a sink, especially the drain area; install an overflow pipe; place the food in the sink; and add the flowing water. The running water method of thawing has never been tested in a laboratory, and care should be taken when this method is used. When this method is used, the outside of the food soon reaches 70°F, which is a good growth temperature for pathogens and spoilage bacteria. This method of thawing could lead to a food safety problem if not controlled. The method is probably based on the idea that water will remove some bacteria from the surface.

Thawing During Cooking

The best way to avoid all thawing problems is to cook food from the frozen state. Foods such as frozen vegetables are thawed during the cooking process. Any item, from hamburgers and roasts to frozen prepared entrees can be cooked from the frozen state. More cooking time is required when food is cooked from the frozen state in order to ensure product doneness. The internal temperature of products (particularly raw meat and poultry items) cooked from the frozen state should be measured with a thermistor thermometer to assure that adequate temperatures have been reached.

Food may be thawed in a microwave oven if immediate cooking follows such thawing. When food is thawed in the microwave, there is usually overheating of the food's edges. Bacteria will multiply in these areas if these foods with warm spots are held a long time before cooking.

Thawing at Room Temperature

While research has shown that food can be safely thawed at room temperature, this is not accepted by any regulatory agency.

Food should not be thawed with a fan blowing hot kitchen air at 95°F on the food. Hot air warms the surface of the food or food product allowing pathogens and spoilage microorganisms to multiply rapidly.