



9

Safe Facilities and Pest Management

Unwanted Guests

A foodservice operation located on old Route 66 was closed by the local regulatory authority. A long list of violations was cited by the inspector. The operation, which opened its doors in the 1950s, was infested with roaches in its storage areas. Food was unprotected from potential sources of contamination during storage, preparation, and service. It was also discovered that the operation had been using old, broken equipment, and the building was in disrepair. Several pieces of equipment were being held together with duct tape, and some tabletop equipment was in such disrepair that the inspector told the operator to throw it out immediately.

The long-time owners said that they and their managers were fully committed to implementing the inspector's recommendations to bring their operation up to state and local codes.

You Can Prevent This

Broken, outdated equipment and a building in disrepair can lead to contamination no matter how clean an operation is. To make sure your facility is safe for food service, you should keep equipment and the building well maintained. It is also important to prevent the entrance of pests, which you will learn more about in this chapter.

Study Questions

- How do you pick materials and equipment that are safe for use in foodservice operations?
- What are ways to install and maintain equipment?
- What are ways to avoid food safety hazards caused by utilities?
- What are ways to maintain your facility?
- What are the best ways to handle emergencies?
- What are ways to prevent and control pests?

Interior Requirements for a Safe Operation

The materials, equipment, and utilities in your operation play a part in keeping food safe. Given the opportunity, you should choose these items with food safety in mind. It is also important to recognize that you may need to consult your local regulatory agency before making changes to your operation, including the facility or equipment.

Floors, Walls, and Ceilings

When choosing flooring, wall, and ceiling materials, pick those that are smooth and durable. This makes cleaning easier.

Once installed, flooring, walls, and ceilings must be regularly maintained. Replace missing or broken ceiling tiles. Do the same for flooring. Repair all holes in walls.



Floors should have coving. Coving is a curved, sealed edge between a floor and a wall. It gets rid of sharp corners or gaps that are hard to clean. Coving should be glued tightly to the wall to get rid of hiding places for insects. This also protects the wall from moisture.

If standing water occurs due to spraying or when flushing the floors during cleaning, remove it as quickly as possible.

Equipment Selection

Foodservice equipment must meet certain standards if it will come in contact with food. NSF International is an organization that creates these national standards. NSF, whose logo is shown at left, is accredited by the American National Standards Institute (ANSI). NSF/ANSI standards for food equipment require that it be nonabsorbent, smooth, and corrosion resistant.

Food equipment must also be easy to clean, durable, and resistant to damage.

Installing and Maintaining Equipment

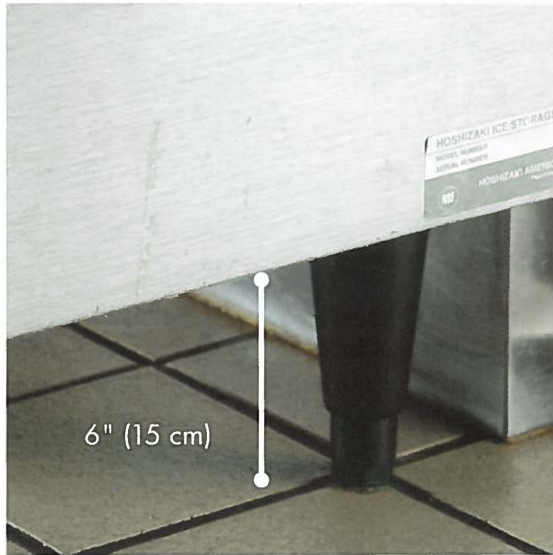
Stationary equipment should be easy to clean and easy to clean around. In the photo at left, the dishwasher is installed so that the floor can be cleaned easily.

When installing equipment, follow the manufacturer's recommendations. Also check with your regulatory authority for requirements. In general, stationary equipment should be installed as follows.



Floor-mounted equipment Put floor-mounted equipment on legs at least six inches (15 centimeters) high, as shown in the photo below. Another option is to seal it to a masonry base.

Tabletop equipment Put tabletop equipment on legs at least four inches (10 centimeters) high, as shown in the photo below. Or, seal it to the countertop.



Once you have installed equipment, make sure it is maintained regularly by qualified people. Also, set up a maintenance schedule with your supplier or manufacturer. Check equipment regularly to be sure it is working correctly.

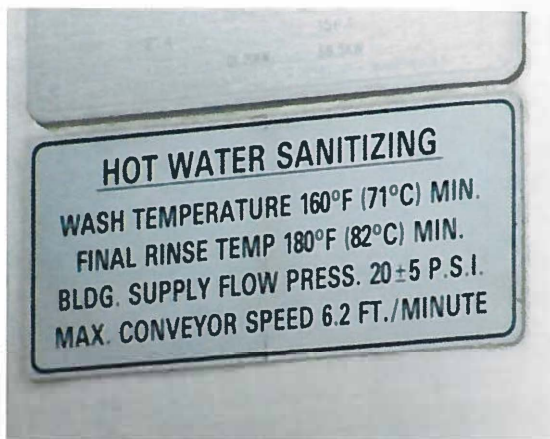
Dishwashing Machines

Dishwashers vary by size, style, and sanitizing method. For example, some sanitize with very hot water. Others use a chemical solution.

Consider these guidelines when selecting and installing dishwashers.

Installation Dishwashers must be installed so that they are reachable and conveniently located. That installation must also keep utensils, equipment, and other food-contact surfaces from becoming contaminated. Always follow the manufacturer's instructions when installing, operating, and maintaining dishwashers.

Supplies Use detergents and sanitizers approved by the local regulatory authority.



Settings Purchase dishwashers that have the ability to measure the following:

- Water temperature
- Water pressure
- Cleaning and sanitizing chemical concentration

Information about the correct settings should be posted on the machine. The label in the photo at left shows an example.

Cleaning Clean dishwashers as often as necessary. Follow the manufacturer's recommendations and local regulatory requirements.

Three-Compartment Sinks

Many operations use three-compartment sinks to clean and sanitize items manually in the operation. Purchase sinks that are large enough to accommodate large equipment and utensils. You should also have other methods for cleaning these large items, such as cleaning them in place.

Handwashing Stations

Handwashing stations should be put in areas that make it easy for staff to wash their hands often. Handwashing stations are required:

- In restrooms or directly next to them
- In areas used for food prep, service, and dishwashing

Handwashing sinks must be used only for handwashing and not for any other purpose. And, to prevent cross-contamination, make sure adequate barriers, as seen in the photo at left, are present on handwashing sinks, or that there is an adequate distance between handwashing sinks and food and food-contact surfaces so that water cannot splash on these items.

Make sure these stations work correctly and are well stocked and maintained. They must also be available at all times. This means that handwashing stations cannot be blocked by portable equipment or stacked full of dirty kitchenware. An example of this is shown in the photo at left.

See Table 9.1 for requirements at a handwashing station.



Table 9.1: Requirements at a Handwashing Station

**Hot- and cold-running water**

The water must be drinkable and meet temperature and pressure requirements.

**Soap**

The soap can be liquid, bar, or powder.

**A way to dry hands**

Disposable paper towels or a continuous towel system that supplies the user with a clean towel can be used. Hands can also be dried with a hand dryer using either warm air or room-temperature air delivered at high velocity.

**Garbage container**

Garbage containers are required if disposable paper towels are used.

**EMPLOYEES MUST WASH HANDS
BEFORE RETURNING TO WORK**



**LOS EMPLEADOS DEBEN LAVARSE LAS
MANOS ANTES DE VOLVER A TRABAJO**

Signage

A clearly visible sign or poster must tell staff to wash hands before returning to work.

Utilities and Building Systems

An operation uses many utilities and building systems. Utilities include water, electricity, gas, sewage, and garbage disposal. Building systems include plumbing, lighting, and ventilation. There must be enough utilities to meet the needs of the operation. In addition, the utilities and systems must work correctly. If they do not, the risk of contamination is greater.

Water and Plumbing

There are national standards for water in the U.S. that are enforced by each regulatory authority. Only water that is drinkable can be used for the preparation of food and come in contact with food-contact surfaces. This is called **potable water**. This water may come from the following sources:

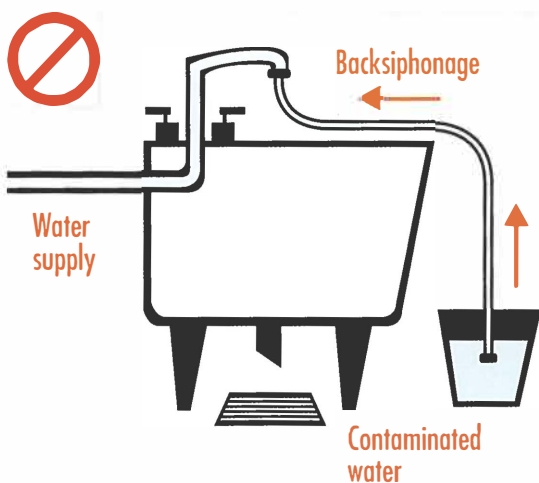
- Approved public water mains
- Private water sources that are regularly tested and maintained
- Closed, portable water containers
- Water transport vehicles

Regardless of where your water comes from, you should know how to prevent plumbing issues that can affect food safety.

If your operation has an on-site septic system, make sure it is properly tested and maintained.

Installation and maintenance Plumbing that is not installed or maintained correctly can allow drinkable and unsafe water to be mixed. This can cause foodborne-illness outbreaks. Have only licensed plumbers work on the plumbing in your operation.

Cross-connection The greatest challenge to water safety comes from cross-connections. A **cross-connection** is a physical link between safe water and dirty water, which can come from drains, sewers, or other wastewater sources.



A cross-connection is dangerous because it can let backflow occur. **Backflow** is the reverse flow of contaminants through a cross-connection into a drinkable water supply. Backflow can be the result of pressure pushing contaminants back into the water supply. It can also happen when high water use in one area of an operation creates a vacuum in the plumbing system that sucks contaminants back into the water supply. This is called **backsiphonage**. A running faucet below the flood rim of a sink is an example of a cross-connection that can lead to backsiphonage. A running hose in a mop bucket is another example, as shown in the illustration at left.

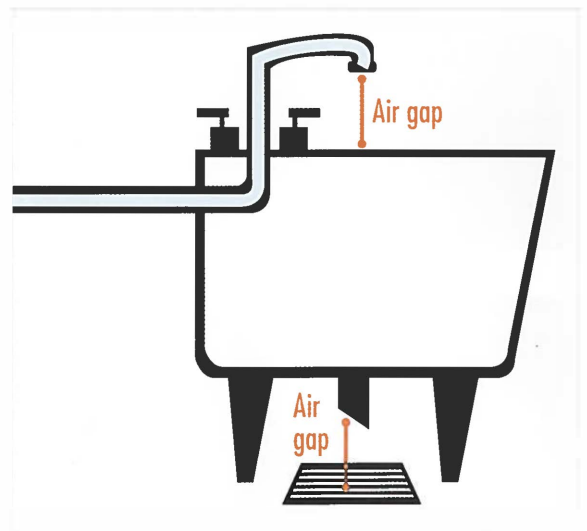
Backflow prevention The best way to prevent backflow is to avoid creating a cross-connection. Some ways to do this include:

- Do **NOT** attach a hose to a faucet unless a backflow prevention device is attached, such as a **vacuum breaker**. A vacuum breaker is a mechanical device that prevents backsiphonage, as seen in the photo at right. It does this by closing a check valve and sealing the water supply line shut when water flow is stopped.
- Other mechanical devices are used to prevent backflow. These include double check valves and reduced pressure zone backflow preventers. These devices include more than one check valve for sealing off the water supply. They also provide a way to determine if the check valves are operational.



Backflow prevention devices must be checked periodically to make sure they are working correctly. This must be done by a trained and certified technician. And the work must be documented. Always follow local requirements and manufacturers' recommendations.

The only sure way to prevent backflow is to create an air gap. An **air gap** is an air space that separates a water supply outlet from a potentially contaminated source. A sink that is correctly designed and installed usually has two air gaps, as shown in the graphic at right. One is between the faucet and the flood rim of the sink. The other is between the drainpipe of the sink and the floor drain of the operation.



Grease condensation A buildup of grease in pipes is another common problem in plumbing systems. Grease traps are often installed to prevent grease buildup from blocking the drain. If used, they should be put in by a licensed plumber and be easy to access. Also, make sure they are cleaned regularly following the manufacturer's recommendations. If the traps are not cleaned often enough or correctly, dirty water can back up. This backup could lead to odors and contamination.

Something to Think About

A popular catering company was shut down after multiple people got sick. The sink used to wash and clean vegetables was connected to the sewage drainpipe without backflow prevention. The company was not allowed to open until the issue was corrected.

Lighting

Good lighting makes it easier to clean things in your operation. It also provides a safer environment.

Lighting intensity—how bright the lights are in the operation—is usually measured in units called foot-candles or lux.

Different areas of the facility have different lighting intensity requirements. Local jurisdictions usually require prep areas to be brighter than other areas. This allows staff to recognize the condition of food. It also allows staff to identify items that need cleaning.

Once the appropriate level of lighting has been installed in each area of the facility, you must monitor it. Replace any bulbs that have burned out. And make sure they are the correct size. All lights should have shatter-resistant lightbulbs or protective covers. These products prevent broken glass from contaminating food or food-contact surfaces.

Ventilation

Ventilation improves the air inside an operation. It removes heat, steam, and smoke from cooking lines. It also eliminates fumes and odors. If ventilation systems are not working correctly, grease and condensation will build up on walls and ceilings.

To prevent this, ventilation systems must be cleaned and maintained according to the manufacturer's recommendations.

Garbage

Garbage can attract pests and contaminate food, equipment, and utensils if not handled correctly. To control contamination from garbage, consider the following.

Garbage removal Garbage should be removed from prep areas as quickly as possible to prevent odors, pests, and possible contamination. Staff must be careful when removing garbage so they do not contaminate food or food-contact surfaces. The food handler in the photo at right has not been careful and may contaminate the prep table.



Cleaning of containers Clean the inside and outside of garbage containers frequently. This will help prevent the contamination of food and food-contact surfaces. It will also reduce odors and pests. Do not clean garbage containers near prep or food-storage areas.

Indoor containers Containers must be leakproof, waterproof, and pestproof. They also should be easy to clean. Containers must be covered when not in constant use. Women's restrooms must include a covered receptacle for sanitary napkins.

Designated storage areas Waste and recyclables must be stored separately from food and food-contact surfaces. The storage of these items must not create a nuisance or a public health hazard.

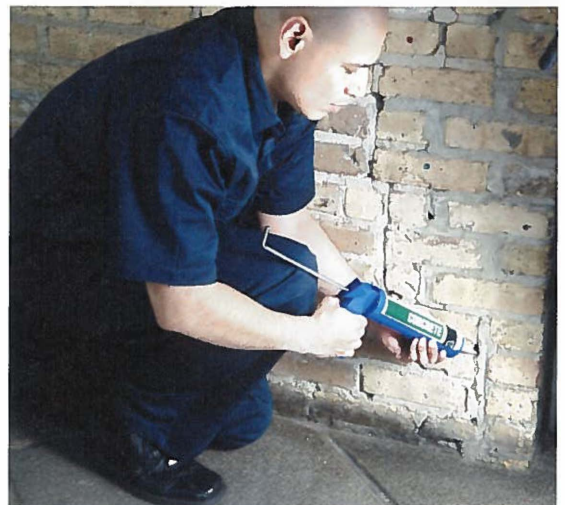
Outdoor containers Place garbage containers on a surface that is smooth, durable, and nonabsorbent. Asphalt and concrete are good choices, as shown in the photo at right. Make sure the containers have tight-fitting lids and are kept covered at all times. Keep their drain plugs in place.



Maintaining the Facility

Poor maintenance can cause food safety problems in your operation. To prevent problems, do the following:

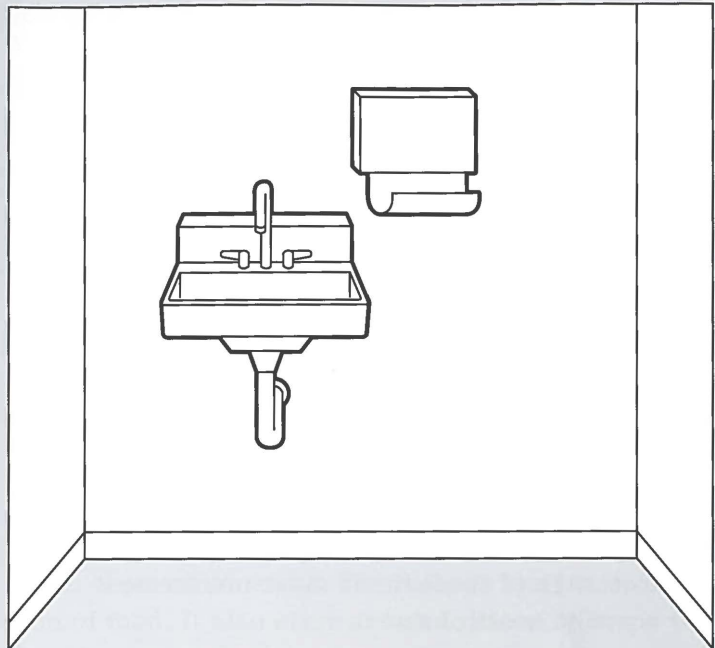
- Clean the operation on a regular basis.
- Make sure all building systems work and are checked regularly.
- Make sure the building is sound. There should be no leaks, holes, or cracks in the floors, foundation, ceilings, or windows. In the photo at right, the maintenance worker is filling a crack in an exterior wall to keep pests out.
- Control pests.
- Maintain the outside of the building correctly, including patios and parking lots.



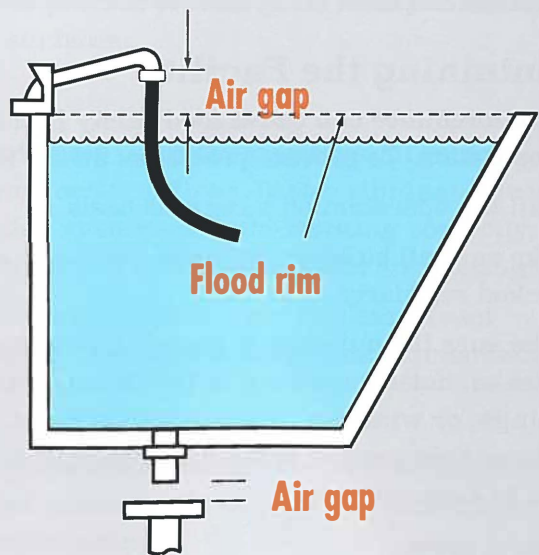
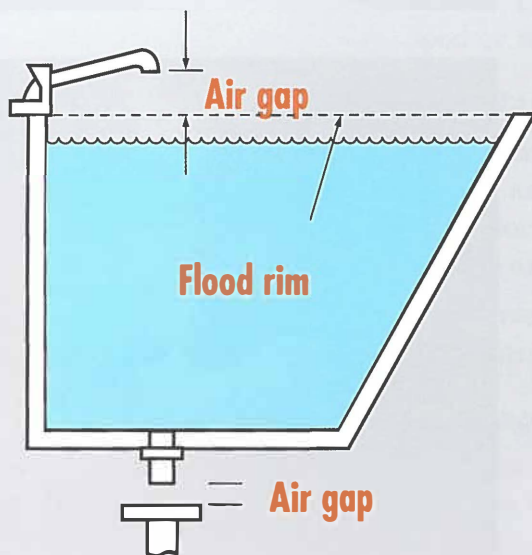
Apply Your Knowledge

What's Missing? The handwashing station is missing 3 items. What are they?

- 1 _____
- 2 _____
- 3 _____



Which Sink? Write an X next to the sink where backsiphonage could occur.



For answers, please turn to page 9.18.

Apply Your Knowledge

Garbage In, Garbage Out Write an X next to each unsafe practice when handling garbage and garbage containers.

- 1 _____ John cleans a garbage can on the floor drain grate, which is next to the grill.
- 2 _____ Dave stacks garbage bags next to the prep table because he wants to take them out all at once.
- 3 _____ Steve sets garbage bags on the asphalt next to the dumpster and then throws each bag inside.
- 4 _____ Michelle throws empty cans into the recycling container, which is stored in the prep area.
- 5 _____ Tunya throws a burned hamburger into the open garbage can next to the sandwich line.

For answers, please turn to page 9.18.

Emergencies That Affect the Facility

Certain crises can affect the safety of the food you serve. Some of the most common include electrical power outages, fire, flooding, and sewage backups. These are considered by the local regulatory authority to be imminent health hazards. An imminent health hazard is a significant threat or danger to health that requires immediate correction or closure to prevent injury.

Other threats should also be considered.

Temperature control Power failures and refrigeration breakdowns can threaten your ability to control the temperature of TCS food. This can result in the growth of pathogens.

Physical security Unauthorized people inside a facility are a risk to food safety. This is especially true when they can access storage and processing areas. Also, acts of nature can weaken a facility's security, such as heavy storms.

Drinkable water supply Threats to the drinkable water supply must also be considered. Broken water mains and breakdowns at water treatment facilities are a risk to the safety of food. Terrorist contamination of the water supply could also be a threat.

When faced with any of these crises, you must first determine if there is a significant risk to the safety or security of your food. If the risk is significant, service must be stopped. Then the local regulatory authority must be notified.

Spoiled or contaminated food must be thrown out, along with food in packaging that is not intact. Finally, you must decide how to correct the problem. This could include:

- Establishing time-temperature control of TCS food
- Cleaning and sanitizing surfaces in the operation
- Reestablishing the physical security of the operation
- Verifying that the water supply is drinkable

Regardless of how the problem is corrected, you will need approval from the local regulatory authority before continuing service.

Pest Management

Rodents, insects, and other pests are more than just unsightly to customers. They can damage food, supplies, and facilities. But the greatest danger comes from their ability to spread diseases, including foodborne illnesses.

Pest Prevention

Prevention is critical in pest control. Follow these three basic rules to keep your operation pest-free:

- 1 Deny pests access to the operation.
- 2 Deny pests food, water, and shelter.
- 3 Work with a licensed pest control operator (PCO).

Deny shelter Careful cleaning eliminates the pests' food supply and destroys insect eggs. It also reduces the places pests can take shelter. Follow these guidelines to deny pests food and shelter:

- Throw out garbage quickly and correctly. Keep garbage containers clean and in good condition. Keep outdoor containers tightly covered. Clean up spills around garbage containers immediately, and wash containers regularly.
- Store recyclables in clean, pest-proof containers. Keep them as far away from your building as local regulations allow.
- Store all food and supplies correctly and as quickly as possible. Keep food and supplies away from walls and at least six inches (15 centimeters) off the floor. Use FIFO to rotate products, so that pests do not have time to settle into them and breed.
- Clean up food and beverage spills immediately, including crumbs and scraps.

Deny access Pests can be brought inside with deliveries or through building openings. Follow these guidelines to prevent this:

- Check all deliveries before they enter your operation. Refuse shipments in which you find pests or signs of pests, as shown in the photo at right. This includes egg cases and body parts (legs, wings, etc.).
- Make sure all of the points where pests can access the building are secure. Screen all windows and vents, and patch or replace them when needed. Seal cracks in floors and walls and around pipes, as shown in the photo at right. Install self-closing doors and air curtains (also called air doors or fly fans) above or alongside doors.



Pest Control

Even after you have made every effort to keep pests out, they may still get into your operation. If this happens, you must work with a PCO to get them under control. Even if you only spot a few pests, they may actually be present in large numbers. This is an infestation and can be very difficult to eliminate. Pests leave signs, letting you know they are there. Look for live or dead insects or rodents, feces, nests, and damage on products, packaging, and the facility itself. An example of a rodent nest is shown in the photo at right. Contact your PCO immediately if you see these or any other pest-related problems, so that control measures can be taken. Poisonous or toxic pest-control materials should only be applied by a certified applicator.



Apply Your Knowledge

Keep 'Em Out! Write an X next to each situation that can lead to a pest infestation.

- ☐ Food in the dry-storage room is stored against the wall and 6 inches off the floor.
- ☐ Air curtains are installed around the back door of a kitchen.
- ☐ Recyclables are stored overnight in a clean container in the kitchen.
- ☐ Food is rotated during storage so that the oldest products are used first.
- ☐ A dumpster is left open during the day to let it air out.
- ☐ A delivery driver brings a food delivery into the kitchen to be inspected.
- ☐ A food delivery is rejected because it contains packages with gnaw marks.
- ☐ The exterior of the operation has a three-inch hole.

Chapter Summary

- Choose flooring, wall, and ceiling materials that are smooth and durable. This will make cleaning easier. Replace and maintain these materials when necessary.
- Make sure equipment that will come in contact with food is smooth, nonabsorbent, and easy to clean. Floor-mounted equipment must be put on legs at least six inches high or sealed to a masonry base. Tabletop equipment must be put on legs at least four inches high or sealed to the countertop.
- Dishwashing machines must be installed so that they prevent contamination of utensils, equipment, and other food-contact surfaces.
- Handwashing stations should include hot and cold running drinkable water, soap, and a way to dry hands. They should also include a garbage container if paper towels are provided, and signage reminding staff to wash hands before returning to work.
- Plumbing must always be installed and maintained by a licensed plumber. This will help prevent cross-connections from occurring. A cross-connection is dangerous because it can let backflow occur. Backflow is the reverse flow of contaminants through a cross-connection into a drinkable water supply.
- Garbage must be removed from prep areas as quickly as possible to prevent odors, pests, and possible contamination. Garbage containers must be leakproof, waterproof, and pest-proof. They must be cleaned frequently, inside and out. Facilities must also be regularly maintained. Clean them on a regular basis, and make sure there are no leaks, holes, or cracks in the floors, foundation, or ceilings.
- To keep your operation pest-free, you must deny pests access to the operation. You can do this by inspecting deliveries before they come into your operation. You also need to eliminate points of access. Deny pests access to food, water, and shelter.

Chapter Review Case Study

Many parts of an operation's facility and equipment affect food safety. These include the materials and equipment used; equipment installation and maintenance; utilities and building systems; and facility maintenance.

Now, take what you have learned in this chapter and apply it to the following case study.

Maria, the manager of Franklin's Tavern, arrived at work at her usual time. A delivery was being checked in by one of her employees. The cooks were prepping for the lunch rush. Today would be a busy day, so Maria greeted her employees and went to her office to try to get some paperwork done before the lunch rush.

Tom, the person receiving the delivery, knocked on Maria's door. He explained that some of the boxes he checked in had gnaw marks and insect wings. He went on to say that the cooks needed these food items for the lunch rush. Maria told him to accept the delivery.

Maria finished her paperwork at 10:45 a.m. She walked through the kitchen to make sure everything was coming together for the lunch rush. Numerous lightbulbs were out, so she asked one of her employees to replace them immediately. She also noticed a pile of garbage stacked by the back door with the back door propped open. She quickly shut the door. Maria washed her hands and went to throw out the single-use towel, but there was no garbage can. Now, she began to smell a strange odor and noticed a puddle of brown liquid around a floor drain. The orders started coming in for lunch, so she would have to take care of these problems later.

1 What did Maria do right?

2 What did Maria do wrong?

For answers, please turn to page 9.19.

Study Questions

Circle the best answer to each question.

- 1 What are the most important food safety features to look for when selecting flooring, wall, and ceiling materials?**
 - A Absorbent and durable
 - B Hard and durable
 - C Porous and durable
 - D Smooth and durable
- 2 What organization creates national standards for foodservice equipment?**
 - A CDC
 - B EPA
 - C FDA
 - D NSF
- 3 When installing tabletop equipment on legs, the space between the base of the equipment and the tabletop must be at least**
 - A 2 inches (5 centimeters).
 - B 4 inches (10 centimeters).
 - C 6 inches (15 centimeters).
 - D 8 inches (20 centimeters).
- 4 An operation has a buildup of grease and condensation on the walls and ceiling. What is the most likely problem?**
 - A The ventilation system is not working correctly.
 - B The cleaning chemicals are not being used correctly.
 - C The staff are not cleaning the walls correctly.
 - D The grill is not being operated at a high-enough temperature.
- 5 A handwashing station should have a garbage container, hot and cold water, signage, a way to dry hands, and**
 - A soap.
 - B a timer.
 - C a clock.
 - D gloves.

Study Questions

- 6 What is the only completely reliable method for preventing backflow?**
- A Air gap
 - B Ball valve
 - C Cross-connection
 - D Vacuum breaker
- 7 A food handler drops the end of a hose into a mop bucket and turns the water on to fill it. What has the food handler done wrong?**
- A Created a cross-connection
 - B Created an air-gap separation
 - C Prevented backflow
 - D Prevented atmospheric vacuuming
- 8 An operation received a violation in the outside area of the facility. The manager reviewed the area and saw that the dumpster was placed on a freshly graveled drive. The lids were closed, and the drain plug was in place to prevent the dumpster from draining. What was the problem?**
- A The dumpster lids should have been open to allow it to air out.
 - B The drain plug should have been removed to allow the dumpster to drain correctly.
 - C The surface underneath the dumpster should have been paved with concrete or asphalt.
 - D The dumpster should have been freshly painted so that food debris would not stick to surfaces.
- 9 A broken water main has caused the water in an operation to appear brown. What should the manager do?**
- A Boil the water for 1 minute before use.
 - B Contact the local regulatory authority before use.
 - C Use the water for everything except dishwashing.
 - D Use the water for everything except handwashing.
- 10 What is the best way to eliminate pests that have entered the operation?**
- A Raise the heat in the operation after-hours.
 - B Lower the heat in the operation after-hours.
 - C Work with a licensed pest control operator (PCO).
 - D Apply over-the-counter pesticides around the operation.

For answers, please turn to page 9.19.

Answers

9.10 What's Missing?

- Soap
- Sign stating that staff must wash hands before returning to work
- Garbage container for used paper towels

9.10 Which Sink?

Sink 2 should be marked.

9.11 Garbage In, Garbage Out

1, 2, and 4 should be marked.

9.13 Keep 'Em Out!

1, 3, 5, 6, and 8 should be marked.

9.15 Chapter Review Case Study

1 What did Maria do right?

- She had the burned-out lightbulbs replaced.
- She closed the door to prevent pests from entering the operation.

2 What did Maria do wrong?

Answers

- She should have rejected the delivery. The gnawed food items and insect wings are signs of pests.
- She should have had the garbage removed from the back door; this can attract pests.
- She should have placed a garbage container near the handwashing station.
- She should not have ignored the brown liquid by the floor drain. She should determine if it is a risk to food safety.

9.16 Study Questions

- 1 D
- 2 D
- 3 B
- 4 A
- 5 A
- 6 A
- 7 A
- 8 C
- 9 B
- 10 C

Answers

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- 1 D
- 2 D
- 3 B
- 4 A
- 5 A
- 6 A
- 7 A
- 8 C
- 9 B
- 10 C