

Slide 153



The content in this section is based on Chapter 4 (Equipment, Utensils, and Linens), Chapter 5 (Water, Plumbing, and Waste), and Chapter 6 (Physical Facilities) of the 2005 Food Code. The Food Code is available at: <http://www.cfsan.fda.gov/~dms/fc05-toc.html>

foodsafety

Plan Review

The local health department must assess your facility and equipment before:

- Beginning construction of a food establishment
- Converting an existing structure for use as a food establishment
- Remodeling or renovating an existing food establishment

Contact the local health department before making minor structural repairs to be certain that they are acceptable.

Equipment and Facilities 154

In conjunction with the Conference for Food Protection Plan Review committee, FDA has participated in developing a document that is intended to assist regulators in reviewing food establishment plans, and industry in understanding what is expected in the plan review process. For several years, this Plan Review Manual has been used in the FDA State Training Team Plan Review courses. It was endorsed by the CFP at the Conference's 1998 meeting and continues to undergo expansion to address temporary food events. It can be accessed through <http://www.cfsan.fda.gov/~dms/prev-toc.html>.

At the plan review stage, the regulatory authority may be dealing with an agent of the permit applicant who is seeking a building permit and who is not in a position to discuss plans for safely conducting the food operation. Nonetheless, the plan review step presents a unique opportunity to lay a foundation that enables the proposed operation to proactively sustain compliance with the Code over time. Standard operational procedures (SOPs) are a part of that foundation and ideally are developed in tandem with designing the facility. Consequently, as an integral part of the plan review process, discussion needs to occur about such procedures and their scope.

SOPs need to be developed by the time of the preoperational inspection and put into effect when the food operation begins. It is recommended that such procedures be written, available for reference by the person in charge, conveyed to the appropriate employees, and available for review by the regulatory authority during inspections. Operating procedures should include definitive practices and expectations that ensure that:

Managing job applicants and food employees prevent the transmission of foodborne disease.


Food is received from approved sources.

Food is managed so that the safety and integrity of the food from the time of delivery to the establishment throughout its storage, preparation, and transportation to the point of sale or service to the consumer is protected,

Potentially hazardous food is maintained, including freezing, cold holding, cooking, hot holding, cooling, reheating, and serving in conformance with the temperature and time requirements specified in the Food Code.

Warewashing is effective, including assurance that the chemical solutions and exposure times necessary for cleaning and sanitizing utensils and food-contact surfaces of equipment are in the Food Code: Chapter 4. Records that are specified under §§ 3-203.11, 3-203.12, and 5-205.13 of the Food Code are retained for inspection.

During the plan review stage, the regulatory authority and a management representative of the proposed food establishment should discuss available training options that may be used to train food employees and the person in charge regarding food safety as it relates to their assigned duties. By the time of the preoperational inspection, operating procedures for training should include definitive practices and expectations of how the management of the proposed food establishment plans to comply with the part of the Food Code that requires the person in charge to assure that food employees are properly trained in food safety as it relates to their assigned duties.



Submit the Following Plans:

- Menu
- Volume of food to be stored, prepared, sold or served
- Proposed layout, mechanical schematics, construction materials, and finish schedules
- Proposed equipment, including manufacturer, model number, locations, dimensions, performance capacities, and installation specifications
- Written standard operating procedures
- Other information required by the health department

Equipment and Facilities 155

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Facilities Requirements

- Surfaces**
 - Smooth, durable, and easily cleanable
- Utility lines and pipes**
 - Not unnecessarily exposed
 - Should not prevent the cleaning of floors, walls, and ceilings
- Floors**
 - Coved and durable



Equipment and Facilities 156

Surfaces, Indoor Areas

Floors, walls, and ceilings that are constructed of smooth and durable surface materials are more easily cleaned. Floor surfaces that are graded to drain and consist of effectively treated materials will prevent contamination of foods from dust and organisms from pooled moisture. The special requirements for carpeting materials and nonabsorbent materials in areas subject to moisture are intended to ensure that the cleanability of these surfaces is retained.

Surfaces, Outdoor Areas

The requirements concerning surface characteristics of outdoor areas are intended to facilitate maintenance and minimize the accumulation of dust and mud on walking and driving areas, provide durable exterior building surfaces, and prevent the attracting, harboring, or breeding of insects, rodents, and other pests where refuse, recyclables, or returnables are stored.

Floors

Floors, walls, and ceilings that are constructed of smooth and durable surface materials are more easily cleaned. Floor surfaces that are graded to drain and consist of effectively treated materials will prevent contamination of foods from dust and organisms from pooled moisture. The special requirements for carpeting materials and nonabsorbent materials in areas subject to moisture are intended to ensure that the cleanability of these surfaces is retained. Requirements and restrictions regarding floor carpeting are intended to ensure that regular and effective cleaning is possible and that insect harborage is minimized. The restrictions for areas not suited for carpeting materials are designed to ensure cleanability of surfaces where accumulation of moisture or waste is likely. Requirements regarding mats and duckboards are intended to ensure that regular and effective cleaning is possible and that accumulation of dirt and waste is prevented.

When cleaning is accomplished by spraying or flushing, coving and sealing of the floor/wall junctures is required to provide a surface that is conducive to water flushing. Grading of the floor to drain allows liquid wastes to be quickly carried away, thereby preventing pooling which could attract pests such as insects and rodents or contribute to problems with certain pathogens such as *Listeria monocytogenes*.

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The slide features a decorative header with a semi-circular image of various vegetables including white rice, green peas, red bell peppers, and yellow bell peppers. The main content area is white with a black border. At the bottom, there is a wavy orange footer bar. The text is centered on the white background.

Activity

Facilities – Right or Wrong?

Equipment and Facilities 157

ACTIVITY INSTRUCTIONS: Have the program participants review the following slides and determine if the situation that is presented is right or wrong.

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Facilities – Right or Wrong?



Equipment and Facilities 158

Right. Equipment is draining over floor drain.

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Facilities – Right or Wrong?



Equipment and Facilities 159

The image shows a room with a quarry tile floor, white walls, and a small mat on the floor. The room appears to be a kitchen or food preparation area. The floor is made of reddish-brown quarry tiles with a grid pattern. The walls are white with a dark baseboard. There is a small mat on the floor in the center of the room. The room is empty and well-lit.

Right. Quarry tile floor is acceptable flooring.

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Equipment Standards

Constructed from materials that are:

- Safe
- Durable, corrosion-resistant, and nonabsorbent
- Sufficient in weight and thickness to withstand repeated washing
- Smooth and easily cleanable
- Resistant to pitting, chipping, crazing, scratching



Equipment and Facilities 160

Multiuse equipment is subject to deterioration because of its nature, i.e., intended use over an extended period of time. Certain materials allow harmful chemicals to be transferred to the food being prepared which could lead to foodborne illness. In addition, some materials can affect the taste of the food being prepared. Surfaces that are unable to be routinely cleaned and sanitized because of the materials used could harbor foodborne pathogens. Deterioration of the surfaces of equipment such as pitting may inhibit adequate cleaning of the surfaces of equipment, so that food prepared on or in the equipment becomes contaminated.

Inability to effectively wash, rinse and sanitize the surfaces of food equipment may lead to the buildup of pathogenic organisms transmissible through food. Studies regarding the rigor required to remove biofilms from smooth surfaces highlight the need for materials of optimal quality in multiuse equipment.

Proper maintenance of equipment to manufacturer specifications helps ensure that it will continue to operate as designed. Failure to properly maintain equipment could lead to violations of the associated requirements of the U.S. *Food Code* that place the health of the consumer at risk. For example, refrigeration units in disrepair may no longer be capable of properly cooling or holding potentially hazardous foods at safe temperatures. Also, the cutting or piercing parts of can openers may accumulate metal fragments that could lead to food containing foreign objects and, possibly, result in consumer injury.

Adequate cleaning and sanitization of dishes and utensils using a warewashing machine is directly dependent on the exposure time during the wash, rinse, and sanitizing cycles. Failure to meet manufacturer and *Food Code* requirements for cycle times could result in failure to clean and sanitize. For example, high temperature machines depend on the buildup of heat on the surface of dishes to accomplish sanitization. If the exposure time during any of the cycles is not met, the surface of the items may not reach the time-temperature parameter required for sanitization. Exposure time is also important in warewashing machines that use a chemical sanitizer since the sanitizer must contact the items long enough for sanitization to occur. In addition, a chemical sanitizer will not sanitize a dirty dish; therefore, the cycle times during the wash and rinse phases are critical to sanitization.

SOURCE: Annex 3: Public Health Reasons. U.S. *Food Code*. 2003.



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Lighting Requirements

- Light bulbs must be shielded, coated, or shatter-proof in food preparation areas.
- Walk-ins and dry storage – 110 lux of light
- Self-service bars or where fresh produce or packaged food is displayed – 220 lux of light
- Food preparation areas – 540 lux of light

Equipment and Facilities 161

Lighting levels are specified so that sufficient light is available to enable workers to perform certain functions, such as:

reading labels;

discerning the color of substances;

identifying toxic materials;

recognizing the condition of food, utensils, and supplies; and

safely conducting general food establishment operations and clean-up.

Properly distributed light makes the need for cleaning apparent by making dirt more noticeable.

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Lighting – Right or Wrong?




Equipment and Facilities 162

Right. The storage area has bright and adequate lighting so workers can read labels; discern the color of substances; identify toxic materials; recognize the condition of food, utensils, and supplies; and safely conduct general food establishment operations and clean-up.

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Ventilation Requirements

- Fresh air, at correct temperatures and humidity, is essential to worker comfort.
- Ventilation systems must meet local regulations *and* be:
 - properly constructed
 - properly maintained
 - properly cleaned



Equipment and Facilities 163

When mechanical ventilation is necessary, it must have adequate capacity to ensure that: soiling of walls, ceilings, and other equipment is minimized; obnoxious odors or toxic fumes are effectively removed; and no hazards or nuisances involving accumulation of fats, oils, and similar wastes are created. Balancing of the exhaust and make-up air must be ensured so that the system can operate efficiently.

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Garbage and Refuse Disposal

- Refuse is solid waste that cannot go through a sewage disposal system.
- Garbage is all food waste that cannot be recycled.
- Disposal Rules:
 - Provide trash cans that are large enough
 - Clean cans frequently
 - Dispose of regularly



Equipment and Facilities 164

Proper storage and disposal of garbage and refuse are necessary to minimize the development of odors, prevent such waste from becoming an attractant and harborage or breeding place for insects and rodents, and prevent the soiling of food preparation and food service areas. Improperly handled garbage creates nuisance conditions, makes housekeeping difficult, and may be a possible source of contamination of food, equipment, and utensils.

Storage areas for garbage and refuse containers must be constructed so that they can be thoroughly cleaned in order to avoid creating an attractant or harborage for insects or rodents. In addition, such storage areas must be large enough to accommodate all the containers necessitated by the operation in order to prevent scattering of the garbage and refuse.

All containers must be maintained in good repair and cleaned as necessary in order to store garbage and refuse under sanitary conditions as well as to prevent the breeding of flies. Garbage containers should be available wherever garbage is generated to aid in the proper disposal of refuse. Outside receptacles must be constructed with tight-fitting lids or covers to prevent the scattering of the garbage or refuse by birds, the breeding of flies, or the entry of rodents. Proper equipment and supplies must be made available to accomplish thorough and proper cleaning of garbage storage areas and receptacles so that unsanitary conditions can be eliminated.

Refuse, recyclables, and returnable items, such as beverage cans and bottles, usually contain a residue of the original contents. Spillage from these containers soils receptacles and storage areas and becomes an attractant for insects, rodents, and other pests. The handling of these materials entails some of the same problems and solutions as the handling of garbage and refuse. Problems are minimized when all of these materials are removed from the premises at a reasonable frequency.

Slide 165

The slide features a decorative top border with a semi-circular image of various vegetables including white rice, green peas, red bell peppers, and yellow bell peppers. The main content area is white with a black border. At the bottom, there is a wavy orange border. The text is centered on the white background.

Activity

Garbage – Right or Wrong?

Equipment and Facilities 165

ACTIVITY INSTRUCTIONS: Have the program participants view slides 166-169 and determine if the situation depicted is right or wrong.

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Garbage – Right or Wrong?



Equipment and Facilities 166

Wrong. All garbage needs to be in the dumpster and not stored next to the dumpster to prevent the scattering of the garbage or refuse by birds, the breeding of flies, or the entry of rodents.

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Garbage – Right or Wrong?



Equipment and Facilities 167

The image shows two brown metal dumpsters placed side-by-side in a clean, paved area enclosed by a metal fence. The dumpsters are closed, and there is no visible trash or clutter around them. A person is partially visible in the background near the right dumpster. The slide has a yellow decorative border at the top and bottom.

Right. The dumpsters are closed and the area surrounding them is clean.

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Garbage – Right or Wrong?



Equipment and Facilities 168

The image shows a blue recycling bin placed against a brick wall. The bin is overflowing with cardboard boxes, and several more boxes are scattered on the ground next to it. This illustrates an incorrect practice for recycling storage.

Wrong. Recycled items must be stored in covered containers. The exception to this is cardboard boxes.

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Garbage – Right or Wrong?



Equipment and Facilities 169

Wrong. Garbage needs to be stored in enclosed containers and not stacked in the backroom of the establishment. This situation will attract pests.

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Requirements for Utensils

Utensils include:

- Kitchenware, tableware, single-service or single-use, gloves, and thermometers

Utensils must be:

- Durable
- Smooth
- Easily cleanable



Equipment and Facilities 170

Once a food employee begins to use a utensil such as a ladle, spatula, or knife, that has been previously cleaned and sanitized, it is then considered an in-use utensil. In-use utensils, used on a continuous or intermittent basis during preparation or dispensing, must be cleaned and sanitized on a schedule that precludes the growth of pathogens that may have been introduced onto utensil surfaces. In-use utensils may be safely stored in hot water maintained at 140°F or above during intermittent use because microbial growth is controlled at such temperatures.


A food utensil should be designed and used to prevent bare hand contact with ready-to-eat food or to minimize contact with food that is not in a ready-to-eat form. On-site evaluations can be made to determine if a utensil is improperly designed for the task or whether a food employee is misusing an appropriately designed utensil.

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Requirements for Linens

Linens are fabric items, such as cloth hampers, cloth napkins, wiping cloths, work clothes.

- Store in clean area.
- Wash in a washing machine.
- Wiping cloths can be washed in a sink.



Equipment and Facilities 171

Because of their absorbency, linens and napkins used as liners that contact food must be replaced whenever the container is refilled. Failure to replace such liners could cause the linens or napkins to become fomites.

Wiping Cloths

Soiled wiping cloths, especially when moist, can become breeding grounds for pathogens that could be transferred to food. Any wiping cloths that are not dry (except those used once and then laundered) must be stored in a sanitizer solution at all times, with the proper sanitizer concentration in the solution. Wiping cloths soiled with organic material can overcome the effectiveness of, and neutralize, the sanitizer. The sanitizing solution must be changed as needed to minimize the accumulation of organic material and sustain proper concentration. Checking the solution periodically with an appropriate chemical test kit should ensure proper sanitizer concentration.

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Water

Water for drinking, food preparation, and washing must be from an approved source.

- Public water systems must meet national drinking water regulations
- Nonpublic water systems must meet state drinking water quality standards

A non-drinking water supply can only be used *if* its use is approved. If approved it can be used for:

- Air conditioning, nonfood equipment cooling, fire protection, and irrigation

Equipment and Facilities 172

Approved System

Water, unless it comes from a safe supply, may serve as a source of contamination for food, equipment, utensils, and hands. The major concern is that water may become a vehicle for transmission of disease organisms. Water can also become contaminated with natural or man-made chemicals. Therefore, for the protection of consumers and employees, water must be obtained from a source regulated by law and must be used, transported, and dispensed in a sanitary manner.

System Flushing and Disinfection

During construction, repair, or modification, water systems may become contaminated with microbes from soil because pipes are installed underground or by chemicals resulting from soldering and welding. Floods and other incidents may also cause water to become contaminated. Chemical contaminants such as oils may also be present on or in the components of the system. To render the water safe, the system must be properly flushed and disinfected before being placed into service.

Bottled Drinking Water

Bottled water is obtained from a public water system or from a private source such as a spring or well. Public health law to protect the consumer from contaminated water must control either means of production.

Standards

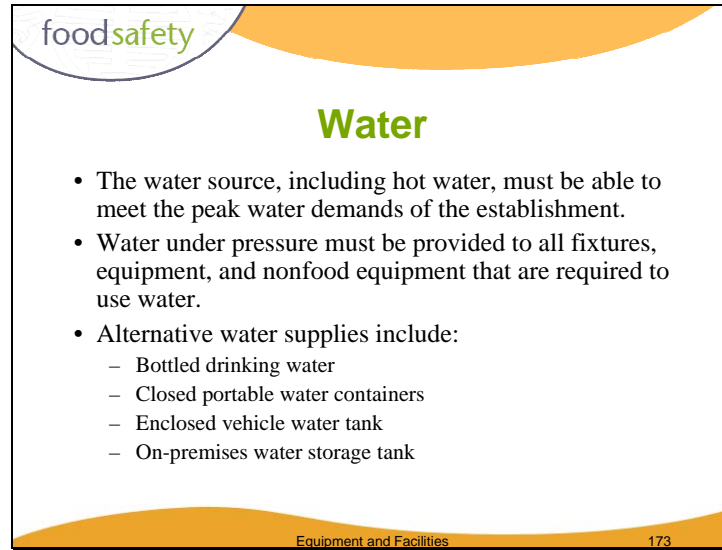
Bacteriological and chemical standards have been developed for public drinking water supplies to protect public health. All drinking water supplies must meet standards required by law.

Nondrinking Water. Food establishments may use nondrinking water for purposes such as air-conditioning or fire protection. Nondrinking water is not monitored for bacteriological or chemical quality or safety as is drinking water. Consequently, certain safety precautions must be observed to prevent the contamination of food, drinking water, or food-contact surfaces. Identifying the piping designated as nondrinking waterlines and inspection for cross connections are examples of safety precautions.

Sampling. Wells and other types of individual water supplies may become contaminated through faulty equipment or environmental contamination of ground water. Periodic sampling is required by law to monitor the safety of the water and to detect any change in quality. The controlling agency must be able to ascertain that this sampling program is active and that the safety of the water is in conformance with the appropriate standards. Laboratory results are only as accurate as the sample submitted. Care must be taken

not to contaminate samples. Proper sample collection and timely transportation to the laboratory are necessary to ensure the safety of drinking water used in the establishment.

Sample Report. The most recent water sampling report must be kept on file to document a safe water supply.



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Water

- The water source, including hot water, must be able to meet the peak water demands of the establishment.
- Water under pressure must be provided to all fixtures, equipment, and nonfood equipment that are required to use water.
- Alternative water supplies include:
 - Bottled drinking water
 - Closed portable water containers
 - Enclosed vehicle water tank
 - On-premises water storage tank

Equipment and Facilities 173

Capacity

Availability of sufficient water is a basic requirement for proper sanitation within a food establishment. An insufficient supply of safe water will prevent the proper cleaning of items such as equipment and utensils and of food employees' hands.

Hot water required for washing items such as equipment and utensils and employees' hands, must be available in sufficient quantities to meet demand during peak water usage periods. Booster heaters for warewashers that use hot water for sanitizing are designed to raise the temperature of hot water to a level that ensures sanitization. If the volume of water reaching the booster heater is not sufficient or hot enough, the required temperature for sanitization can not be reached. Manual washing of food equipment and utensils is most effective when hot water is used. Unless utensils are clean to sight and touch, they cannot be effectively sanitized.

Pressure

Inadequate water pressure could lead to situations that place the public health at risk. For example, inadequate pressure could result in improper handwashing or equipment operation. Sufficient water pressure ensures that equipment such as mechanical warewashers operate according to manufacturer's specifications.

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Plumbing

Handwashing sinks must:

- provide water at a temperature of at least 100° F (38° C)
- provide a flow of water for at least 15 seconds without the need to reactivate the faucet.

Automatic handwashing equipment must:

- be installed according to manufacturer's instructions.



Equipment and Facilities 174

Warm water is more effective than cold water in removing the fatty soils encountered in kitchens. An adequate flow of warm water will cause soap to lather and aid in flushing soil quickly from the hands.

An inadequate flow or temperature of water may lead to poor handwashing practices by food workers. A mixing valve or combination faucet is needed to provide properly tempered water for handwashing. Steam mixing valves are not allowed for this use because they are hard to control and injury by scalding is a possible hazard.

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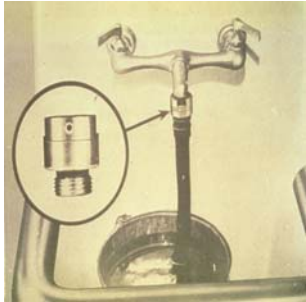
Backflow Prevention

Air gap

- An air gap between the water supply inlet and the flood level rim must be at least twice the diameter of the water supply inlet but not less than 1 inch.

Backflow or backsiphonage

- Must meet American Society of Sanitary Engineering (ASSE) standards.



Equipment and Facilities 175

During periods of extraordinary demand, drinking water systems may develop negative pressure in portions of the system. If a connection exists between the system and a source of contaminated water during times of negative pressure, contaminated water may be drawn into and contaminate the entire system. Standing water in sinks, dipper wells, steam kettles, and other equipment may become contaminated with cleaning chemicals or food residue. To prevent the introduction of contaminated liquid into the water supply through back siphonage, various means may be used.

The water outlet of a drinking water system must not be installed so that it contacts water in sinks, equipment, or other fixtures that use water. Providing an air gap between the water supply outlet and the flood level rim of a plumbing fixture or equipment prevents contamination that may be caused by backflow.

In some instances an air gap is not practical such as is the case on the lower rinse arm for the final rinse of warewashers. This arm may become submerged if the machine drain becomes clogged. If this failure occurs, the machine tank would fill to the flood level rim, which is above the rinse arm. A backflow prevention device is used to avoid potential backflow of contaminated water when an air gap is not practical. The device provides a break to the atmosphere in the event of a negative pressure within the system.

Minerals contained in water and solid particulate matter carried in water may coat moving parts of the device or become lodged between them over time. This may render the device inoperative. To minimize such an occurrence, only devices meeting certain standards of construction, installation, maintenance, inspection, and testing for that application may be used. Installing these devices in accessible locations can facilitate the necessary maintenance.

Hose Bibb

The delivery end of hoses attached to hose bibbs on a drinking water line may be dropped into containers filled with contaminated water or left in puddles on the floor or in other possible sources of contamination. A backflow prevention device must be installed on the hose bibb to prevent the back siphonage of contaminated liquid into the drinking water system during occasional periods of negative pressure in the water line.

Carbonator

When carbon dioxide is mixed with water, carbonic acid, a weak acid, is formed. Carbonators on soft drink dispensers form such acids as they carbonate the water to be mixed with the syrups to produce the soft drinks. If carbon dioxide backs up into a copper water line, carbonic acid will dissolve some of the copper. The water containing the dissolved copper will subsequently be used in dispensing soft drinks and the first few customers receiving the drinks are likely to suffer with the symptoms of copper poisoning.


An air gap or a vented backflow prevention device will prevent this occurrence, thereby reducing incidences of copper poisoning.

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Plumbing

Numbers

- One handwashing sink
- One toilet and urinal
- At least one service sink or one curbed cleaning facility equipped with a floor drain for cleaning of mops and disposing of wastewater.



Equipment and Facilities 176

Handwashing Facilities

Because handwashing is such an important factor in the prevention of foodborne illness, sufficient facilities must be available to make handwashing not only possible, but also likely.

Toilets and Urinals

Adequate, sanitary toilet facilities are necessary for the proper disposal of human waste, which carries pathogenic microorganisms, and for preventing the spread of disease by flies and other insects. Toilet facilities must be of sanitary design and kept clean and in good repair to prevent food contamination and to motivate employees to use sanitary practices in the establishment.

Service Sink

Mop water and similar liquid wastes are contaminated with microorganisms and other filth. Waste water must be disposed of in a sanitary manner that will not contaminate food or food equipment. A service sink or curbed cleaning facility with a drain allows for such disposal.