

دائرة التخطيط والتطوير مؤسسة الموانئ والجمارك والمنطقة الحرة حكومة دبسي

SUPPLEMENTAL – Section 2

Drawing Review Guide for Food Facilities

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مؤسسة الموانئ والجمارك والمنطقة الحرة

Introduction

Environment, Health and Safety (EHS) has developed this Plan Review for the purpose of assisting both regulatory and industry personnel in achieving greater uniformity in the plan review process.

This guide is designed to assist food industries with the plan review process by providing technical assistance for the preparation of food service plans and completion of the plan review application. Review of proposed plans prior to work activity being done is to ensure compliance with safe food handling procedures and regulatory requirements, avoid misunderstanding, and prevent costly errors. By listing and locating equipment on floor plans and diagramming specifications for electrical, mechanical and plumbing systems, potential physical facility problems that may impact upon food safety can be spotted while still on paper and modifications made before costly purchases, installation and construction.

Scope

Plan review of food service establishments, retails food stores, and all other food operations is maintained as a high priority by EHS for both new and existing facilities. The goal of this document is to promote the uniform design and construction standards for food facilities which are not only conducive to safe food handling and sanitary facility maintenance but which encourage both. It is recognized as an important component because it ensures:

- That facility equipment and design will enable and facilitate safe food handling. \square
- That food establishment are built or renovated according to current standards. $\mathbf{\Lambda}$
- That code violations are eliminated prior to establishment changes in operation, alteration or $\mathbf{\nabla}$ modification, and new construction.

Definition of Terms

"Acceptable food equipment"	means food equipment that is deemed to be in conformance with Local and International Food Regulations provisions such as equipment that is
"Air Break"	means a piping arrangement in which a drain from a fixture, appliance, or device discharges indirectly into another fixture, receptacle or interception at a point below the flood level rim. The connection does not provide an unobstructed vertical distance and is not solidly connected but precludes
"Air Gap"	means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or outlet supplying fixture, or other device, and the flood level rim of the receptacle.
"Approved"	means acceptable to the regulatory authority based on a determination of conformity with principles, practices, and generally recognized standards that protect public health.
"aw"	means water activity which is a measure of the free moisture in a food, is the quotient of the water vapor pressure of the substance divided by the vapor pressure of pure water at the same temperature, and is indicated by the symbol aw.
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"Backflow"	means the flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from any source or sources other than its intended source. Back-siphonage is one type of backflow.
"Backflow Preventer"	means a device or means to prevent backflow.
"Back-siphonage"	means the flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel or other sources into a potable water supply pipe due to a negative pressure in such pipe.
"Corrosion-resistant material"	means free of cracks or other openings that allow the entry or passage of moisture.
"Disassembled Equipment"	 means equipment that is accessible for cleaning and inspection by: (a) Disassembling without the use of tools, or (b) Disassembling with the use of handheld tools commonly available to maintenance and cleaning personnel such as screwdrivers, pliers, openend wrenches, and Allen wrenches.
"Easily Movable"	means having no utility connection, a utility connection that disconnects quickly, or a flexible utility connection line of sufficient length to allow the equipment to be moved for cleaning of the equipment and adjacent area.
"Equipment"	(a) "Equipment" means an article that is used in the operation of a food establishment such as a freezer, grinder, hood, ice maker, meat block, mixer, oven, reach-in refrigerator, scale, sink, slicer, stove, table, temperature measuring device for ambient air, vending machine, or ware washing machine.
	(b) "Equipment" does not include items used for handling or storing large quantities of packaged foods that are received from a supplier in a cased or over wrapped lot, such as hand trucks, forklifts, dollies, pallets, racks, and skids.
"Food Employee"	means an individual working with unpackaged food, food equipment or utensils, or food-contact surfaces
"Food Establishment"	 (a) "Food establishment" means an operation that stores, prepares, packages, serves, vends, or otherwise provides food for human consumption: (i) Such as a restaurant; catering operation if the operation provides food directly to a consumer or to a conveyance used to transport people; market; vending location; conveyance used to transport people; institution; or food bank; and (ii) That relinquishes possession of food to a consumer directly, or indirectly through a delivery service such as home delivery of grocery orders or restaurant takeout orders, or delivery service that is provided by common carriers.



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	 (b) "Food establishment" includes: (i) An element of the operation such as a transportation vehicle or a central preparation facility that supplies a vending location or satellite feeding location unless the vending or feeding location is permitted by the regulatory authority; and
	(c) "Food establishment" does not include: (i) A produce stand that only offers whole, uncut fresh fruits and
	(ii) A kitchen in a private home, such as a small family day-care provider; or a bed-and-breakfast operation that prepares and offers food to guests if the number of available guest bedrooms does not exceed 6, breakfast is the only meal offered, the number of guests served does not exceed 18.
"HACCP Plan"	means a written document that delineates the formal procedures for following the Hazard Analysis Critical Control Point principles developed by The National Advisory Committee on Microbiological Criteria for Foods.
"Highly susceptible populatio	n" means a group of persons who are more likely than other populations to experience food borne disease because they are immuno-compromised or older adults and in a facility that provides health care or assisted living services, such as a hospital or nursing home; or preschool age children in a facility that provides custodial care, such as a day care center.
"Linens"	means fabric items such as cloth hampers, cloth napkins, table cloths, wiping cloths, and work garments including cloth gloves.
"Physical facilities"	means the structure and interior surfaces of a food establishment including accessories such as soap and towel dispensers and attachments such as light fixtures and heating or air conditioning system vents.
"Plumbing fixture"	means a receptacle or device that: (a) Is permanently or temporarily connected to the water distribution system of the premises and demands a supply of water from the system; or (b) Discharges used water, waste materials, or sewage directly or indirectly to the drainage system of the premises.
"Plumbing system"	means the water supply and distribution pipes; plumbing fixtures and traps; soil, waste, and vent pipes; sanitary and storm sewers and building drains, including their respective connections, devices, and appurtenances within the premises; and water-treating equipment.
"Potentially Hazardous Food (PHF)"	 (a) "Potentially hazardous food" means a food that is natural or synthetic and that requires temperature control because it is in a form capable of supporting: (i) The rapid and progressive growth of infectious or toxigenic microorganisms; (ii) The growth and toxin production of Clostridium botulinum; or
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(iii) In raw shell eggs, the growth of Salmonella enteriditis.

	(b) Potentially hazardous lood includes an animal lood (a lood of animal
	origin) that is raw or heat-treated; a food of plant origin that is heat-treated
	or consists of raw seed sprouts; cut melons; and garlic and oil mixtures that
	are not acidified or otherwise modified at a food processing plant in a way
	that results in mixtures that do not support growth as specified under
	Subparagraph (a) of this definition.
	(c) "Potentially hazardous food" does not include:
	(i) An air-cooled hard-boiled egg with shell intact:
	(ii) A food with an a _w value of 0.85 or less:
	(iii) A food with a pH level of 4.6 or below when measured at 24° C
	(75°F).
	(iv) A food in an unonened hermetically sealed container that is
	commercially processed to achieve and maintain commercial sterility under
	conditions of non-refrigerated storage and distribution; and
	(u) A feed for which laboratory evidence demonstrates that the
	(V) A 1000 101 Which laboratory evidence demonstrates that the
	the arouth of Q astericitie is a reason Q, het discussion and a source and the
	the growth of S. enteriditis in eggs or C. botulinum can not occur, such as a
	food that has an a_w and a pH that are above the levels specified under
	Subparagraphs (c)(II) and (III) of this definition and that may contain a
	preservative, other barrier to the growth of microorganisms, or a
	combination of barriers that inhibit the growth of microorganisms.
	(vi) A food that may contain an infectious or toxigenic
	microorganism or chemical or physical contaminant at a level sufficient to
	cause illness, but that does not support the growth of microorganisms as
	specified under Subparagraph (a) of this definition.
"Premises"	means the physical facility, its contents, and the contiguous land or
"Premises"	means the physical facility, its contents, and the contiguous land or property under the control of the permit holder; or the physical facility, its
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"Premises" "Refuse"	means the physical facility, its contents, and the contiguous land or property under the control of the permit holder; or the physical facility, its contents, and the land or property which are under the control of the permit holder and may impact food establishment personnel, facilities, or operations, if a food establishment is only one component of a larger operation such as a health care facility, hotel, motel, school, recreational camp, or prison. means solid waste not carried by water through the sewage system.
"Premises" "Refuse" "Regulatory Authority"	means the physical facility, its contents, and the contiguous land or property under the control of the permit holder; or the physical facility, its contents, and the land or property which are under the control of the permit holder and may impact food establishment personnel, facilities, or operations, if a food establishment is only one component of a larger operation such as a health care facility, hotel, motel, school, recreational camp, or prison. means solid waste not carried by water through the sewage system. means the local, state, or federal enforcement body or authorized
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"Premises" "Refuse" "Regulatory Authority" "Safe material"	 means the physical facility, its contents, and the contiguous land or property under the control of the permit holder; or the physical facility, its contents, and the land or property which are under the control of the permit holder and may impact food establishment personnel, facilities, or operations, if a food establishment is only one component of a larger operation such as a health care facility, hotel, motel, school, recreational camp, or prison. means solid waste not carried by water through the sewage system. means the local, state, or federal enforcement body or authorized representative having jurisdiction over the food establishment. an article manufactured from or composed of materials that may not reasonably be expected to result, directly or indirectly, in their becoming a
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"Premises" "Refuse" "Regulatory Authority" "Safe material" "Sealed"	 means the physical facility, its contents, and the contiguous land or property under the control of the permit holder; or the physical facility, its contents, and the land or property which are under the control of the permit holder and may impact food establishment personnel, facilities, or operations, if a food establishment is only one component of a larger operation such as a health care facility, hotel, motel, school, recreational camp, or prison. means solid waste not carried by water through the sewage system. means the local, state, or federal enforcement body or authorized representative having jurisdiction over the food establishment. an article manufactured from or composed of materials that may not reasonably be expected to result, directly or indirectly, in their becoming a component or otherwise affecting the characteristics of any food; means free of cracks or other openings that allow the entry or passage of moisture
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"Premises" "Refuse" "Regulatory Authority" "Safe material" "Sealed" "Sewage"	 means the physical facility, its contents, and the contiguous land or property under the control of the permit holder; or the physical facility, its contents, and the land or property which are under the control of the permit holder and may impact food establishment personnel, facilities, or operations, if a food establishment is only one component of a larger operation such as a health care facility, hotel, motel, school, recreational camp, or prison. means solid waste not carried by water through the sewage system. means the local, state, or federal enforcement body or authorized representative having jurisdiction over the food establishment. an article manufactured from or composed of materials that may not reasonably be expected to result, directly or indirectly, in their becoming a component or otherwise affecting the characteristics of any food; means free of cracks or other openings that allow the entry or passage of moisture.



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"Smooth"	 means: (a) A food-contact surface having a surface free of pits and inclusions with cleanability equal to or exceeding that of (100 grit) number 3 stainless steel; (b) A nonfood-contact surface of equipment having a surface equal to that of commercial grade hot-rolled steel free of visible scale; and (c) A floor, wall, or ceiling having an even or level surface with no roughness or projections that renders it difficult to clean.
"Ware washing"	means the cleaning and sanitizing of food-contact surfaces of equipment and utensils.





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Food Establishment Guide for Design, Installation and Constructions

A. <u>Menu</u>

The MENU is an integral part of the Plan Review Process. The menu or a listing of all of the food and beverage items to be offered at the food service establishment must be submitted by the applicant together with the other necessary documents when applying for a License. This process focuses on the food and what will happen to the food. The source and quantity of food to be served shall be reviewed along with the preparation and post-preparation operations and the proposed storage practices.

Food preparation processes shall be evaluated to determine the types and volumes of foods to be prepared. Special attention shall be given to review the food processes which will involve:

- multiple ingredients being assembled or mixed
- potentially hazardous foods (PHF)
- foods which will be prepared or held for several hours prior to service
- foods requiring cooling and reheating
- Multiple step processing (passing through the critical temperature zone, 41°F to 149°F (5°C to 65°C) more than once.

The style of food service should also be reviewed. The style of food service may be:

- Cook-to-order (cook-serve)
- Self-service (buffet or salad bar)
- Service of pre-packaged foods
- Service of large volumes of food
- Food preparation requiring multiple steps and handling, etc.

Menu evaluation involves the review of food sources, categories of foods and their required preparation such as:

- Approved and Inspected food source.
- Thin meats such as poultry, fish, eggs (hamburgers, sliced meats, & fillets)
- Thick meats and whole poultry (roast beef, whole turkey, whole chickens, & hams)
- Cold processed foods (salads, sandwiches, vegetables)
- Hot processed foods (soups, stews, casseroles)
- Bakery goods

This system is useful since the critical control points for each process remain the same regardless of the individual menu ingredients.

The menu for a food service establishment dictates the space and equipment requirements for the safe preparation and service of various food items. The menu will determine if the proposed receiving and delivery areas, storage area, preparation and handling areas, and thawing, cooking, and reheating areas are available and adequate to handle the types and volumes of foods being served.

i. Food Flow

The flow of food through a kitchen can greatly affect food safety, thus, contamination of ready-to-eat (RTE) foods can occur with poor food flow. These will help to understand how the menu will be prepared in the proposed physical facilities.

Flow may be in a straight "assembly" line format or be organized to move food through departments that perform different functions. These helps to better identify problems in the layout.



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The floor plan layout should determine the flow from the receiving, storage, preparation, cooking, assembly and hot holding, ending in serving the food to the customer. This should include how soiled dishes/utensils and solid waste will move through the facility.

Food flow of a food establishment should also enable to:

- Gain an understanding of how food, dishes and solid waste will move through the facility.
- Look for points where cross-contamination of bacteria from raw to ready-to-eat foods may occur.
- Determine where soiled dishes, solid waste, outside dirt or mop water may contaminate ice, food or preparation areas.
- Determine which sinks and preparation tables will be used for washing and preparing vegetables, meat and seafood.
- Identify what items will be stored in working refrigeration units.
- Pin-point if there is an adequate separation between raw and ready-to-eat foods in storage and during preparation.

If areas of concern are found, one of the following may occur:

- A change will be required.
- A change will be recommended.
- A standard operating procedure (SOP) will be required to address how contamination will be avoided using the existing plan.
- An option may be given to either make a plan change or develop SOP.

B. Facilities to Maintain Product Temperature

Sufficient hot-holding and cold-holding facilities shall comply with the international standards and shall be designed, constructed and installed in conformance with the requirements of these standards.

i. Refrigeration Facilities: Sizing and Design

Plan review for Storage room needs to provide adequate refrigeration facilities for the proper storage, transportation, display, and service of potentially hazardous foods. Specific refrigeration needs will be based upon the menu, number of meals, frequency of delivery, and preparation in advance of service. All refrigerators must be capable of maintaining potentially hazardous foods (PHF) at 41°F (5°C) or below.

If potentially hazardous foods are prepared a day or more in advance of service, a rapid cooling procedure capable of cooling potentially hazardous foods from 149°F to 41°F (65°C to 5°C) within 6 hours or 149°F to 70°F (65°C to 21°C) in 2 hrs. and 70°F to 41°F (21°C to 5°C) in 4 hrs. should be provided. The capacity of the rapid cooling facilities must be sufficient to accommodate the volume of food required to be cooled to 41°F within 6 hours.

Provide point-of-use refrigerators and freezers at work stations for operations requiring preparation and handling of potentially hazardous foods. Refrigeration units, unless designed for such use, should not be located directly adjacent to cooking equipment or other high heat producing equipment which may strain the cooling system's operation.

To plan reserve storage, the following need to be considered:

- menu, type of service
- number of meals per day
- number of deliveries per week and
- Adequate air ventilation in the area where refrigeration system will be located.



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The following is a suggested formula to establish required reserve storage:

Formula 1: Based on Meals served between deliveries (note: only 40% of any walk-in unit actually provides usable space):

Total Interior Storage Volume Needed:

Vol. per meal (Cu. ft.) x number of meals .40

Below are estimated typical meal volumes for each of three types of refrigerated storage:

Meat, Poultry and Seafood	=	.010030 Cu. ft. per meal
Dairy	=	.007015 Cu. ft. per meal
Vegetables and fruit	=	.020040 Cu. ft. per meal

Thus for a restaurant serving 1000 meals between deliveries (assume a minimum of 4 day storage) the following storage capacities are needed:

Most refrigerated storage	_	<u>.030 cu. ft./meal x 1000 meals</u>
meat reingerated storage	=	.40
	=	75 Cu. Ft.
Vegetable refrigerated storage	_	<u>.040 cu. ft./meal x 1000 meals</u>
vegetable reingerated storage	_	.40
	=	100 Cu. Ft.
Dairy refrigerated storage	_	<u>.015 cu. ft./meal x 1000 meals</u>
Daily reingerated storage	_	.40
	=	37.5 Cu. Ft.

To calculate the interior storage space (in square feet) required for the above example, divide the volume (Cu. ft), in each case, by the height of the unit.

Example for meat storage	=	<u>75 cu. ft.</u> 6 ft. (height)
	=	12.5 sq. ft.

The interior floor area would have to be 12.5 sq. ft. to accommodate refrigeration storage of meat for 1000 meals.

To estimate total interior volume or space, add together the requirements for each type of food. To convert interior measurements to exterior floor area, multiply by 1.25. Thus, for meat storage, in the above example an exterior floor area = 1.25×12.5 sq. ft., or 15.6 sq. ft. would be needed.

Formula 2: Based on seating

This formula cannot be used for:

- a. Facilities with no seating
- b. When a facility caters, or
- c. Whenever the seating is not a representative of the volume of food served, and
- d. Facilities proposing reach-ins as storage units.



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Total Interior walk-in storage volume needed:

Number of serving period x number of seats x 0.5 x 1.25 (for establishments with drive-in facilities)

One serving period should be allotted for each of the following: breakfast, lunch, dinner, late-night and 24hour service.

Example:

Fast food establishment, open from 7:00am to 11:00pm (4 meals period), 90 seats, drive-up window.

4 meal periods x 90 seats x $0.5 \times 1.25 = 225 \text{ sq.ft.}$

Additional recommendations for Refrigerated Storage Facilities

- A. Interior finishes and shelving for walk-in and reach-in refrigeration units should be certified or classified for sanitation by an accredited certification program. Galvanized metal is not recommended because of its tendency to rust.
- B. All refrigeration units must have numerically scaled thermometers indicating accurately <u>+3</u>°F. The temperature sensing device must be located in the unit to measure air temperature in the warmest part. All such thermometers should have an externally mounted indicator to facilitate easy reading of the temperature of the unit. Refrigerators and freezers shall be capable of maintaining appropriate temperatures when evaluated under test conditions of an accredited certification program.
- C. Air circulation within refrigeration and freezer units should not be obstructed and should allow for an even and consistent flow of cold air throughout the units. Refrigeration Unit maximum operating temperature (cabinet air) should be:

		Max Compressor
Type	<u>Max Temp</u>	Operating time
Refrigerated buffet units	Cabinet air temp 41°F Food Temp 33-41°	70%
Storage & display refrigerators	Cabinet air temp 41°F Food temp 33-41°F	70%
Storage & display freezer	Cabinet air temp 0°F Food Frozen	80%

Rapid pull down refrigeration units must be capable of cooling cooked PHF's from 140°F to 70°F (60°C to 21°C) within 2 hours, and from 70°F to 41°F (21°C to 5°C) within 4 hours or less.

- D. Approved coved juncture base around the interior.
- E. Approved coved junction base around the exterior.
- F. Enclosure between the top of the unit and the ceiling should have a space of twenty-four inches (24") or less. Fixed equipment shall be spaced to allow for cleaning along the sides and behind, or sealed to adjoining equipment or walls.
- G. Refrigeration units should not be installed exterior to the building if non-packaged foods will be transported from the unit to the food establishment.
- H. If the walk-in floors are water-flushed for cleaning or receive the discharge of liquid waste or excessive melt water, the floors should be non-absorbent (i.e. quarry tile or equal) with silicone or

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epoxy impregnated grout and, sloped to drain. Drains may be required to be located away from of the cooling box and within 5 feet from it.

- I. Walk-in freezer doors should be equipped with pressure relief ports.
- J. All walk-in units should be constructed and installed in accordance with local and internationally recognized standards.
- K. Each walk-in unit shall be equipped with lighting that provides 110 lux (10 foot candles) of light throughout the unit when it is full of product.

WALK-IN REFRIGERATOR and FREEZER SPACE ESTIMATE					
Magle* Interior		Surface Area (sq.ft)			
IVIEAIS	(cubic feet)	4' Ceiling	5' Ceiling	6' Ceiling	7' Ceiling
500	46-106	12-27	9-21	1-18	7-15
1000	93-213	23-53	19-43	15-35	13-30
1500	139-319	35-80	28-64	23-53	20-46

OR

STORAGE REACH-IN REFRIGERATOR & FREEZER SPACE ESTIMATE**			
Meals* Interior (cubic feet)			
500 25-57			
1000 50-113			
1500 74-170			

* Number of meals served between deliveries

** Reach-in refrigerators and freezers only count toward the required refrigeration space if they are storage units.

ii. Hot Holding and Reheating Facilities

The hot holding facilities must be capable of maintaining potentially hazardous foods at an internal temperature of 149°F (65°C) or above during display, service and holding periods.

Reheating equipment must be capable of raising the internal temperature of potentially hazardous foods rapidly (within a maximum of 2 hours) to at least 167°F (75°C). Appropriate product thermometers will be required to monitor the food temperature.





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C. Facilities to Protect Food

Adequate facilities must be provided to promote good hygienic practices, sanitary food handling and to minimize the potential of cross contamination between ready to eat and raw products.

i. General Food Protection

Provide a separate food preparation area for handling, washing and preparing raw meat, fish, and poultry, if served. Where portable cutting boards are planned, they should be color coded or labeled for specific use.

All food being displayed, served, or held must be adequately protected from contamination by the use of: packaging; serving line, storage or salad bar protector devices; display cases, or by other effective means including dispensers.

Salad bars and sneeze guards shall comply with the international standards of an accredited certification program. Food shields shall provide a barrier between the mouth of the customer and the unpackaged food. On the average, the vertical distance from the customer's mouth to the floor is 4 feet 6 inches to 5 feet. This average must be adjusted for children in educational institutions and for other special installations such as to accommodate the wheel chair bound. See <u>figure #3-1 thru #3-3</u>. Food shields shall be transparent and designed to minimize obstruction of the customer's view of the food. To protect against chipping, exposed edges of glass shall be protected by tight fitting channels.



Figure # 3-1

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Buffet or Smorgasbord Shielding





Figure #3-3



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Cleaned equipment and utensils shall be stored in a clean, dry location where they are not exposed to splash, dust, or other contamination. This should be of particular concern at salad bars and waitress stations.

Running water dipping wells should be provided for the in-use storage of dispensing utensils where frozen desserts are being portioned and dispensed.

Dipping Wells



Adequate facilities must be provided to promote good hygienic practices, sanitary food handling and to minimize the potential of cross-contamination between ready-to-eat and raw products.

ii. Food Preparation Sink

Provide separate areas to segregate food handling operations involving raw and ready to eat products. For washing raw fruits and vegetables, it is advisable to provide a separate food preparation sink with a minimum 18" drain board.

D. <u>Handwashing</u>

i. Hand Washing Facility

Proper hand washing is a critical step in preventing bacterial and viral contamination of food. There should be a separate hand washing sink inside the food establishment and each hand washing sink shall be provided with hot and cold water tempered by means of a mixing valve or a combination faucet to provide water at a temperature of at least 110°F (43°C). Any self-closing, slow-closing or metering faucet shall be designed to provide a flow of water for at least 10 seconds without the need to reactivate the faucet.

Hand washing sink should be provided with a hand drying device, or disposable towels; supply of liquid soap; and footoperated garbage bin for each food preparation area, utensil washing area, and toilet room. Sinks used for food preparation or for washing equipment or utensils shall not be used for hand washing.



Hand washing sinks shall be of sufficient number and conveniently located for use by all employees in food preparation, food dispensing and utensil washing areas. Hand washing sinks shall be easily accessible and may not be used for purposes other than hand washing. It is suggested that a hand wash sink be located within 25 feet of a work station. Splashguard protection is suggested if adequate spacing to adjoining food, food preparation, food contact surfaces, and utensil washing area surfaces (drain boards) is insufficient. Splashguards shall not hinder access to the lavatory and be easily cleanable.





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Some possible guides when allocating hand washing sinks.

- Provide a sink close to each employee's work station.
- Keep sinks within the employee's line of sight.
- Keep hand sink near the flow of food.
- Make sinks easily available for those handling both raw and ready-to-eat foods.

A sign or poster that notifies food employees to wash their hands shall be provided at all hand washing sinks used by food employees.

E. <u>Water Supply</u>

Enough potable water for the needs of the food service establishment shall be provided from an approved source, constructed and operated according to regulations. The pumping and storage capacities, as well as the frequency of testing of a non-municipal water supply must be specified.

An adequate, protected, pressurized, potable supply of hot water at least 120°F (49°C) and cold water shall be provided. In sizing the water heater, peak hourly demands for all sinks are added together to determine the minimum required recovery rate.

WATER USE DATA GUIDE (Suggested Formula)

- Pot sink = 49.399 gals. for a total fill 49.399 x 4 fills per day	= 197.596 gals. per day
- Floor wash = 12 gals. 12 x 3 fills per day	= 36 gals. per day
- General sanitation	= 30 gals. per day
- Prep sink =15 gals 15 x 2 fills per day	= 30 gals. per day
- 3 Full time employees 3 x 30 gals.	= 90 gals per day
- Dish machine 46.2 gals x 2 meal periods Total Daily Usage	= 92.4 gals. per day = 476 gals. per day

F. <u>Sewage Disposal</u>

All liquid waste, including sewage generated by a food establishment, shall be disposed of in an approved manner into either a public sewer system or to an approved on-site sewage disposal system.

If holding tanks shall be used, the design should provide a minimum of 72 hours retention either in multiple tanks or a multiple compartment tanks. Alternatively, separate plumbing with a grease trap for kitchen waste may be installed and septic tank reduced to 24-hour retention time.

i. Grease Traps

All food establishments are required to have a grease trap. When installing a grease trap it shall not be located inside the food preparation area.





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G. **Food Equipment Installation**

All equipment in food establishments should be certified or classified for sanitation by an accredited certification program.

Equipment including ice makers and ice storage equipment shall not be located under exposed or unprotected sewer lines, open stairwells or other sources of contamination.

The following equipment installation requirements will help to ensure proper spacing and sealing which will allow for adequate and easy cleaning:

i. **Floor Mounted Equipment**

Whenever possible, equipment should be mounted on approved castors or wheels to facilitate easy moving, cleaning, and flexibility of operation. Wheeled equipment requiring utility services should be provided with easily accessible quick-disconnects or the utility service lines should be flexible and of sufficient length to permit moving the equipment for cleaning. See figure #6-1 thru 6-3.





Figure #6-1





Flexible Gas Connector With Keeper Chain

Figure # 6-3

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Floor-mounted equipment not mounted on wheels or castors with the above utility connections should be:

- 1. Sealed to the floor around the entire perimeter of the equipment (the sealing compound should be pliable but not gummy or sticky, non-shrinking, retain elasticity and provide a water and vermin-tight seal); or
- Installed on a solid smooth non-absorbent masonry base. Masonry bases and curbs should have a 2. minimum height of 2 inches and be coved at the junction of the platform and the floor with at least a 1/4 inches radius. The equipment should overhang the base by at least 1" but not more than 4". Spaces between the masonry base and the equipment must be sealed; or
- 3. Elevated on legs to provide at least a 6 inches clearance between the floor and equipment and 6 feet equipment to equipment distance. The legs shall contain no hollow ends. See figure #6-4.



4. Display shelving units, display refrigeration units and display freezers may be exempt from the above.

For equipment not readily moveable by one person, spacing between and behind equipment must be sufficient to permit cleaning. Provide at least 6 inches of clear unobstructed space under each piece of equipment. See figure # 6-5.



4' 4'	or less - 8'		
8'	or more		

Equipment Spacing

12"

18'

Figure #6-5



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If all the equipment butts against a wall it must be joined to it and/or sealed in a manner to prevent liquid waste, dust and debris from collecting between the wall and the equipment.

When equipment is butted together or spreader plates are used the resultant joint must prevent the accumulation of spillage and debris therein and to facilitate cleaning.

Provide aisle and working spaces between units of equipment that are unobstructed and are functional. A minimum 36" width is recommended. See <u>figure #6-6</u>.



Floor Mounted Equipment

Figure #6-6

All utility and service lines and openings through the floor must be sealed adequately. Exposed vertical and horizontal pipes and lines must be kept to a minimum. The installation of exposed horizontal utility lines and pipes on the floor is prohibited. Any insulation materials used on utility pipes or lines in the food preparation or dishwashing areas must be smooth, non-absorbent and easy to clean. It is desirable that switch boxes, electrical control panels, wall mounted cabinets, etc. be installed out of the cooking and dishwashing areas. Electrical units which are installed in areas subject to splash from necessary cleaning operations or food preparation should be water-tight and washable.

ii. Table Mounted Equipment

All table mounted equipment shall be:

a. Sealed to the table or counter; or

b. Elevated on approved legs to provide at least a 4 inches clearance between the table or counter and equipment and installed to facilitate cleaning; or

c. Portable: 30 pounds or less, no dimensions exceeding 36", no fixed utility connections.

Equipment open underneath, such as drain boards, dish tables, and other tables should be installed 4 inches away from the wall or sealed to the wall. Metal legs of all tables and sinks in food preparation areas should be made of stainless steel. The under shelves of food preparation tables should also be made of stainless steel.



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H. Dry Good Storage

The dry storage space required depends upon the menu, number of meals, quantities purchased and frequency of delivery. The location of the storeroom should be adjacent to the food preparation area and convenient to receiving. Adequate ventilation should be provided. Ideally, the storeroom should be free of un-insulated steam and water pipes, water heaters, transformers, refrigeration condensing units, steam generators or other heat producing equipment. Temperatures of 50°F to 70°F (10°C to 21°C) are recommended.

A suggested formula used in estimating required storage space is as follows:

Required Storage Area (square feet) =

Volume per meal x number of meals between deliveries Average height x Fraction of usable storeroom floor area

- (1) <u>Volume</u> per meal = .025 to .050 cu. ft. per meal served
- (2) Useful storeroom <u>height</u> = 4 to 7 feet
- (3) Storage time between deliveries = 3 to 14 days
- (4) Fraction of <u>useable</u> storeroom floor area = .3 to .6

Shelving can be constructed of suitably finished hard wood, durable plastic or preferably of corrosion resistant metal. The highest shelf for practical use is 7 feet and the lowest one should be 6 inches from the floor. Clearance between the shelves should be at least 15 inches. Sufficient moveable dunnage racks and dollies (with smooth surfaces, cleanable in case of food spillage or package breakage) should be provided to store all food containers at least 6" above the floor.

Dunnage racks, pallets, etc. should be spaced sufficiently from walls to allow for vermin monitoring and inspection. A space of 18" is recommended. Wooden shelving and pallets require a higher level of maintenance and are more conducive to vermin infestation. Food containers shall not be stored under exposed or unprotected sewer lines or leaking water lines. Approved food containers with tight-fitting covers and dollies should be used for storing bulk foods such as flour, cornmeal, sugar, dried beans, rice and similar foods. Scoops are needed for each food storage container in use.

Dry Storage Calculation:

Two suggested formulas used in estimating required storage space are as follows:

Formula # 1 - Linear feet of shelving for storage (ft) =

Volume per meal x number of meals between deliveries D x H x C

D = Depth of the shelves in feet

H = Clearance between shelves in feet

C = 80% effective capacity of shelf height

For example, assume 400 meals per day and a 10 day storage between deliveries = 4000 meals for which to provide storage, Volume of .035 per meal, shelf depth of 18 inches, clearance of 18 inches between shelves and 80% effective capacity of shelf height:

Linear feet of shelving for storage (ft.) =

<u>.035 cu. ft. x 4000 meals</u> = 7 1.5 ft. x 1.5 ft. x 80%

77.77 Linear feet

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Formula # 2 - Required Storage Area (sq. ft.) =

Volume per meal x number of meals between deliveries Average height x fraction of usable storeroom floor area

- (1) Volume per meal = .025 to .050 cu. ft. per meal served (2) Useful storage height = 4 to 7 feet.
- (2) Storage time between deliveries = 3 to 14 days
- (3) Fraction of useable storeroom floor area = .3 to .6

For example, assume 100 meals per day and a 10 day storage between deliveries = 1000 meals for which to provide storage:

Required Storage Area = .05 cu. ft. x 1000 meals 5 ft. x.3

Required Storage Area = 33 square feet

I. <u>Ware Washing Facilities</u>

i. Manual Ware Washing

For manual washing and sanitizing of utensils, provide a stainless steel sink with no fewer than 3 compartments. The sink compartments shall be large enough to hold the largest pot, pan or piece of equipment. Each compartment shall be supplied with adequate hot and cold potable running water. Integral drain boards of adequate size shall be provided on both sides of the sink for cleaned and soiled utensils. When approved, 2 compartment sinks may be allowable under certain conditions. See <u>figure #8-1</u>.

Drain boards should generally be at least the same size as that of the sink compartments. Recommended size is 36-48 inches long and 30 inches wide.



Recommended warewashing anangement using three-comparisons disk. Drainbuards for solid dishes and for cheaned atensits must be adequate. A 36° diskubcard should have a pitch of %° to %° par foot toward the sink.

Three Compartment Sink With Indirect Waste

Figure #8-1



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Locate a floor drain in the immediate vicinity of the sink in areas where wet pots, utensils and equipment are air-drying. Approved racks, shelves or dish tables are to be provided adjacent to the ware wash sink.

Provide adequate facilities for pre-flushing or pre-scrapping equipment and utensils.

An approved chemical test kit for determining sanitizer strength shall be available and used.

Working supplies of cleaners and sanitizers must be stored in an approved location. A recommended storage location is on a wire shelf below the drain board of the 3 compartment sink.

ii. Mechanical Ware Washing

The waste line for all mechanical ware washing machines must not be directly connected to the sewer line. Except that the waste line may be connected directly on the inlet side of a properly vented floor drain when the floor drain is within 5 feet of the ware washing machine and the drain line from the machine is properly trapped and vented. See <u>figure #8-2</u>.



Adequate facilities shall be provided to air dry washed utensils and equipment. Storage facilities shall be provided to store cleaned and sanitized utensils and equipment at least 12 inches above the floor on fixed shelves or in enclosed cabinets protected from splash, dust, overhead plumbing or other contamination.

An adequate facility for pre-flushing or pre-scrapping shall be provided on the soiled dish side of the dishwashing machine.

Drain boards shall be provided and shall be of adequate size for the proper handling of utensils and located so as not to interfere with the proper use of the ware washing facilities. Mobile dish tables may be acceptable for use in lieu of drain boards.

iii. Chemical Ware Washing

Chemical ware washing machines shall meet internationally recognized standards and be certified by an accredited certification program. The installation must conform to applicable code requirements. Among the specific requirements for the installation of an approved chemical ware washing machine are the following:

1. The chemical sanitizing feeder must meet internationally recognized standards and be certified by an accredited certification program.

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2. An approved chemical test kit for determining sanitizer strength shall be available and used.

Adequate facilities shall be provided to air dry washed utensils and equipment. Storage facilities shall be provided to store cleaned and sanitized utensils and equipment at least 12 inches above the floor protected from splash, dust, overhead plumbing or other contamination, on fixed shelves or in enclosed cabinets. The plan must specify location and facilities used for storing all utensils and equipment.

iv. Ware Washing Utilizing Hot Water Sanitation

A commercial ware washing machine for mechanical ware washing utilizing hot water for sanitization shall be provided that is in compliance with the standards of an ANSI accredited certification program. The installation and required accessories shall be in conformance with local applicable plumbing codes.

An approved maximum registering thermometer or high temperature test papers shall be available and used.

If the detergent dispenser or drying agent dispenser is not equipped with an integral backflow prevention device, the installation point of the dispenser shall be below the vacuum breaker on the ware washing machine. See <u>figure #8-3</u>.



Figure #8-3

Recommended Warewashing Machine Installation



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J. Hot Water Supply Requirements

The hot water supply shall be sufficient to satisfy the continuous and peak hot water demands of the establishment. Hot water for hand washing shall be of a temperature of at least $110^{\circ}F$ ($43^{\circ}C$). Hot water for mechanical dishwashing must be $150^{\circ}F$ to $165^{\circ}F$ ($65^{\circ}C$ to $74^{\circ}C$) for washing and $165^{\circ}F$ to $180^{\circ}F$ ($74^{\circ}C$ to $82^{\circ}C$) for sanitizing. The temperature of the wash solution in spray-type ware washers that use chemicals to sanitize may not be less than $120^{\circ}F$ ($49^{\circ}C$). The water temperature for manual hot water sanitization must be at least $171^{\circ}F$ ($77^{\circ}C$). For purposes of sizing the hot water generating capability, assume a supply temperature requirement of $140^{\circ}F$ ($60^{\circ}C$) to each fixture and to the mechanical dishwashing machines.

In the absence of specific hot water usage figures for equipment, the following chart <u>may</u> be used to provide an approximation:

Equipment Type	Gallons Per Hour	
	<u>High</u>	Low
Vegetable sink	15	15
Single pot sink	20	15
Double pot sink	40	30
Triple pot sink	60	45
Pre-rinse for dishes-shower head type	45	45
Bar sink-three compartment	20	
Bar sink-four compartment	25	
Chemical sanitizing glass washer	60	
Lavatory	5	5
Cook sink	10	10
Hot water filling faucet	15	15
Bain Marie	10	10
Coffee urn	5	5
Kettle stand	5	5
Garbage can washer	50	50
Nine and twelve pound clothes washer	45	45
Sixteen pound clothes washer	60	60
Employee shower	20	20

High - To be used when multi-use eating utensils are utilized

Low - To be used in carry-out food operations where single service eating utensils are utilized.

One way to estimate the projected hot water demand (gallons per hour final rinse) of mechanical ware washing machines, pot and pan washers and silverware washers, is to refer to the manufacturer's specification sheet for the particular make and model of the machine.

All hot water generating equipment should conform to nationally recognized standards and be certified or classified by a certification program. The manufacturers' specification sheets (cut sheets) should be consulted for hot water supply requirements.



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K. <u>Finish Schedule</u>

The following chart and footnotes provide acceptable finishes for floors, walls and ceilings, by area:

	FLOOR	WALL	CEILING	
KITCHEN				
COOKING	Poured seamless, sealed concrete with epoxy coating or ceramic tile	Stainless steel; aluminum; Ceramic tile	Metal clad fiberboard; Glazed surface	
FOOD PREP	Same as above plus commercial grade vinyl composition tile.	Same as above plus approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; epoxy painted drywall; or with glazed surface	Same as above	
BAR	Same as above	Same as above for areas behind sinks	Meets building codes	
FOOD STORAGE	Same as above plus sealed concrete, commercial grade vinyl composition tile or sheets	Approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; epoxy painted drywall; or with glazed surface	Acoustic tile; painted sheetrock	
OTHER STORAGE	Same as above	Drywall painted & smooth surface	Same as above	
TOILET ROOM	Ceramic tile; commercial grade vinyl composition file or sheets	Approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; Ceramic Tiles epoxy painted drywall; or with glazed surface	Plastic coated or metal clad fiberboard; glazed surface; plastic laminate	
DRESSING ROOMS	Same as above	Painted sheetrock	Same as above plus painted sheetrock	
GARBAGE & REFUSE AREAS (Interior)	Quarry tile; Ceramic tiles; poured seamless, sealed concrete; commercial grade vinyl composition tile or sheets	Approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; epoxy painted drywall; filled block with epoxy paint or glazed surface	Plastic coated or metal clad fiberboard; glazed surface; plastic laminate	
MOP SERVICE AREA	Quarry tile; poured seamless sealed concrete	Same as above	Same as above	
WAREWASHING AREA	Same as above plus commercial grade vinyl composition tile	Stainless steel; aluminum; approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; epoxy painted drywall; filled block with epoxy paint or glazed surface	Same as above	

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<u>WALK-IN</u> REFRIGERATORS & FREEZERS	Quarry tile; stainless steel; poured seamless sealed concrete; poured synthetic	Aluminum; stainless steel; enamel coated steel (or other corrosion resistant material)	Aluminum; stainless steel; enamel coated steel (or other corrosion resistant material)
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i. Floors

- 1. All floor coverings in food preparation, food storage, utensil-washing areas, walk-in refrigeration units, dressing rooms, locker rooms, toilet rooms and vestibules must be smooth, non-absorbent, easily cleanable and durable. Anti-slip floor covering may be used in high traffic areas only.
- 2. Any alternate materials not listed in the above chart must be submitted for evaluation.
- 3. There must be coving at base junctures that is compatible to both wall and floor coverings; recommended to provide at least 1/4 inch radius and 4" in height. See figure #10-1.



Figure #10-1

- 4. Properly installed, trapped floor drains shall be provided in floors that are water flushed for cleaning or that receive discharges of water or other fluid waste from equipment or in areas where pressure spray methods for cleaning equipment are used. Floors should be sloped to the drain at least 1/8 inches per foot.
- 5. Grouting should be non-absorbent and impregnated with epoxy, silicone or polyurethane.
- 6. All walk-in refrigeration units both with prefabricated floors and without should be installed in accordance with the manufacturer's installation requirements.



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ii. Walls

- 1. The walls, including non-supporting partitions, wall coverings and ceilings of walk-in refrigerating units, food preparation areas, equipment washing and utensil washing areas, toilet rooms and vestibules shall be smooth, non-absorbent, and capable of withstanding repeated washing. Light colors are recommended for walls and ceilings. Studs, joists and rafters shall not be exposed in walk-in refrigeration units, food preparation areas, equipment washing and utensil washing and utensil washing areas, toilet rooms and vestibules. Where permitted to be exposed, studs, joists and rafters must be finished to provide an easily cleanable surface.
- 2. All alternate materials not listed in the above chart must be submitted for evaluation.
- 3. Glazed surfaces should be glazed block, or brick or ceramic tile. Grouting must be non-absorbent and impregnated with epoxy, silicone, polyurethane or an equivalent compound. Concrete block, if used, must be rendered non-porous and smooth by the application of approved block filler followed by the application of an epoxy-type covering or equivalent. All mortar joints shall be only slightly tooled and suitably finished to render them easily cleanable.
- 4. Plastic laminated panels may find applications but are not recommended. Joint finishes should be compatible with the wall structure. Voids should be eliminated at joints.

iii. Ceiling

Finishes shall be light-colored, smooth, non-absorbent and easily cleanable. Acoustical material free of porous cloth or sponge may be used, provided ventilation is adequate to minimize soiling.

L. <u>Toilet Facilities</u>

Toilets and urinals shall be designed to be easily cleanable and shall have integral backflow prevention devices. Toilet rooms shall be completely enclosed and shall have tight-fitting, self-closing doors and shall be vented to the outside.

Food facilities such as grocery stores, convenience stores and food service facilities may have rest rooms but should not open directly into the food preparation area. Other facilities, typically processing plants, must provide employee rest rooms that do not open into areas where food is exposed to airborne contamination, except where alternate means have been taken to protect against such contamination (such as double doors or positive air-flow systems).

A sign or poster that notifies food employees to wash their hands shall be provided at all hand washing sinks used by food employees and shall be clearly visible to food employees.

Toilet facilities shall be of adequate number for customers, workers and handicapped. The requirements on the number of toilets and handicapped facilities shall be in accordance with EHS regulations.

M. <u>Plumbing and Cross Connection Control</u>

Plumbing shall be sized and installed according to applicable local and international requirements. There shall be no cross connections between the potable water supply and any non-potable or questionable water supply. Where non-potable water systems are permitted for purposes such as air conditioning and fire protection, the non-potable water must not contact directly or indirectly: food, potable water or equipment that contacts food or utensils. The piping of any non-potable water system shall be durably identified so that it is readily distinguishable from piping that carries potable water.



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i. Cross-Connections

A cross-connection is an ACTUAL or POTENTIAL link between the potable water supply and a source of contamination (sewage, chemicals, gas, etc.). A cross-connection can be a temporary or permanent direct connection, by-pass arrangement, jumper connection, submerged inlet, removable section, swivel or change-over device, etc. that could connect a potable system to a non-potable source. it must be properly protected with an acceptable backflow prevention assembly or device to eliminate any potential for a reverse flow back into the potable water supply. An unprotected cross-connection threatens the health and safety of individuals and may contaminate food or beverage products utilizing water from that system.

Two Types of Cross-Connections:

- <u>Direct Connection:</u> Is a physical connection between a potable and non-potable system. A direct pathway exists between the two separate systems for contamination to be transferred into the potable water system. An example of a direct connection is a pipe installed to connect a potable water line to a sewer line.
- Indirect Connection: Is a situation in which, under "normal" conditions, a cross-connection does not exist. However, under "unique" circumstances a pathway for contamination can occur. The source of contamination may be a back-up, be blown across, siphoned, pushed, or diverted into a potable water supply. An indirect connection is only subject to back-siphonage.

Forces Acting on Cross-Connections

Contamination occurs when the pressure between the water supply and another system (via some connection) are sufficient to transfer the contaminant into the water supply. These temporary reversals of pressure can be unpredictable.

<u>Backflow</u> is a reversal in flow that is opposite to the expected or intended direction. The reversal in flow is undesirable. However, a properly protected system can remain safe. There are two types of backflow: "backpressure" and "back-siphonage".

<u>Backpressure</u> occurs when both systems (potable & non-potable) are under pressure (above atmospheric pressure). Backflow occurs when the non-potable system has greater pressure than the potable system. This pressure differential pushes the contaminant into the potable supply.

<u>Back-siphonage</u> occurs when the pressure in the water supply system drops below atmospheric pressure and the non-potable source is drawn or siphoned into the water supply. Back-siphonage can occur with either a direct or indirect connection and the systems can be either open or closed to the atmosphere. Principle causes include:

Undersized sections of pipe can create an aspirator effect in the restricted area.

- A break or repair in a supply line can create a vacuum (as gravity drains the water out) on the elevated portions of the system above the effected area.
- A high water withdrawal, such as fire fighting or water main flushing, can create a vacuum. The withdrawal is more likely to create stronger negative pressure at the higher elevation of the system.
- A vacuum can be induced on the suction side of a booster pump, such as high-rise buildings and processing plants.





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Physical Backflow Prevention Methods

* An air gap means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or outlet supplying fixture, or other device, and the flood level rim of the receptacle. The vertical physical separation shall be at least two times the inside diameter of the water inlet pipe above the flood rim level, but shall not be less than one inch.

* An air break is a piping arrangement in which a drain from a fixture, appliance, or device discharges indirectly into another fixture, receptacle or interception at a point below the flood level rim. The connection does not provide an unobstructed vertical distance through the free atmosphere and is not solidly connected, but precludes the possibility of backflow to a potable water source into a sink or dishwasher/or fixture being drained. See figure #12-5.



There shall be no cross connections between the potable water supply and any non-potable water supply. The potable water system shall be installed to preclude the possibility of back flow and back- siphonage. Devices shall be installed to protect against backflow and back-siphonage at all fixtures and equipment unless an air gap is provided. The air gap must be at least twice the diameter of the water supply inlet, but not less than 1 inch, between the water supply inlet and the fixture's flood level rim. See figure #12-1 & #12-2.



Figure #12-2



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The following provides examples of some of the types of equipment with potentially submerged inlets and required backflow/back-siphonage protection:

	Backflow/Back-siphonage Preventer Required
Equipment	in Lieu of Air Gap
1. Boiler with chemicals added	Reduced pressure device
2. Boiler with no chemicals added	Air vent type backflow preventer
3. Carbonators for beverage dispensers	Approved backflow preventer (in agreement with local plumbing codes)
4. Lawn sprinkler system with no chemicals added	Atmospheric or pressure vacuum breaker
5. Flush valve toilets	Atmospheric or pressure vacuum breaker
6. All hose bibs inside & outside of establishments	Hose bib-type vacuum breaker
Pre-flush hose with a nozzle head that may be submerged	Pressure vacuum breaker
8. Perforated pipe to oriental wok cookers	Atmospheric vacuum breaker
9. Inlets which are or may become submerged:	
a. Supply inlet to garbage grinder	Atmospheric vacuum breaker
b. Supply inlet to dish table trough	"
c. Fill line for steam kettle	"
d. Supply line for mechanical ware washing machine	"
e. Supply line to all soap and chemical dispensing units on mechanical ware washing machine	n
f. Garbage can washer	n
g. Soap portioner on faucet	Soap portioner must contain an internal air gap
h. Water wash system for exhaust hood	Air vent type backflow preventer (RPZ may be required if toxic chemicals are added)



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See figure #12-3 for examples of backflow/back-siphonage prevention devices.

Figure #12-3

*An <u>atmospheric vacuum breaker</u> means a mechanical device which automatically air vents a pipeline to prevent back-siphonage. The device shall be located beyond the last control valve prior to the first outlet and at an elevation 6 inches higher than any source of contamination. Atmospheric vacuum breakers shall be installed so that they are not subject to backpressure or continuous operating pressure of more than 12 hours duration.

ii. Drains

A direct connection may not exist between the sewerage system and any drains originating from equipment in which food, portable equipment, or utensils are placed, except if otherwise required by state plumbing codes. When a ware washing machine is located within 5 feet of a trapped floor drain, the dishwasher waste outlet may be connected directly on the inlet side of a properly vented floor drain trap. See <u>figure #12-4</u>.





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Other examples of required indirect drain line connections are:

Equipment	Indirect Drain Line Connection Required to Sewer Line
 Water-cooled condenser for ice machine or other refrigeration system 	Air gap
Air-cooled condenser for ice machine or other refrigeration system	Air break
3. Ice bin	Air break

N. Inspect and Rodent Control (Pest Control)

Openings to the outside shall be effectively protected against the entrance of rodents. Outside openings shall be protected against the entrance of insects by the installation of tight fitting, self-closing doors, closed windows, self-closing serving windows at drive-throughs, screening, controlled air currents, vestibules or other means approved by the regulatory health authority. Screen doors shall be self-closing and screens for windows, doors, skylights, transoms, intake air ducts and other openings to the outside shall be tight fitting and free of breaks. Openings around pipes, conduit or wiring entering the building from the outside must be sealed.

Loading docks and delivery doors must be provided with effective air curtains or vestibules with self-closing doors to preclude the entrance of insects. It is recommended that outside lighting around loading areas and entrances be sodium vapor rather than mercury vapor to decrease insect attraction.

All foundations shall be rodent proof. Openings between the floor and bottom of outer doors shall be adequately flashed with rodent proof material to eliminate any opening.

O. <u>Lighting</u>

The light intensity shall be at least 110 lux (10 foot candles) at a distance of 75 cm (30 inches) above the floor, in walk-in refrigeration units and dry storage areas and in other areas and rooms during periods of cleaning.

The light intensity shall be at least 220 lux (20 foot candles) at a surface where food is provided for consumer self-service such as buffets and salad bars where fresh produce or packaged foods are sold or offered for consumption; inside equipment such as reach-in and under-counter refrigerators; and at a distance of 75 cm (30 inches) above the floor in areas used for hand washing, ware washing, and equipment and utensil storage and in toilet rooms.

The light intensity shall be at least 540 lux (50 foot candles) at a surface where a food employee is working with food or working with utensils or equipment such as knives, slicers, grinders, or saws where employees safety is a factor.

Darker colored walls and floors may require additional lighting. Shielding such as plastic shields, plastic sleeves with end caps, shatterproof bulbs and/or other approved devices shall be provided for all artificial lighting fixtures located in areas where there is exposed food; clean equipment, utensils, and linens; or unwrapped single-service and single-use articles.

Heat lamps, where permitted, shall be protected against breakage by a shield surrounding and extending beyond the bulb, leaving only the face of the bulb exposed.



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P. <u>Ventilation</u>

i. General

All rooms shall have sufficient ventilation to keep them free of excessive heat, steam, condensation, vapors, obnoxious odors, smoke and fumes. Ventilation systems shall be designed and installed accordingly.

All hoods should be tested prior to use, to ensure the hoods exhaust adequately. Lighting within the hood may be required to comply with state or local code requirements.

ii. Cooking

Cooking ventilation hoods and devices shall be designed and installed to prevent grease or condensation from collecting on walls, ceilings, and fire suppression supply piping and from dripping into food or onto food contact surfaces. See <u>figure #15-1</u>.

Figure #15-1 Illustration of a Canopy Hood



All hoods shall comply with the standards of an accredited certification program and be designed, constructed and installed in conformance with the Local and International requirements, and other applicable fire safety codes.

Make up air intakes must be screened (bird screen) and filtered to prevent the entrance of dust, dirt, insects and other contaminating material. Where the introduction of make up air will cause condensation, drafting or interfere with the exhaust or vapor capture efficiency of the hood, the make up air must be tempered.

The installation of fire suppression system piping in the unfiltered air space in exhaust hoods should be limited to vertical runs as much as physically possible to minimize grease collection. Exposed piping must be cleanable.

iii. Exhaust hood

The purpose of an exhaust hood is to provide a method of collecting, as nearly as possible, all of the grease produced from the cooking process, while furnishing a means of removing heat, smoke, and odors from the cooking area.





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For the hood to fulfill its purpose there must be a sufficient volume of air movement (capture velocity) to draw grease particles and cooking vapors directly from the cooking surface to the grease extractors. This air flow removes cooking odors and keeps grease particles from settling onto nearby surfaces.

In the case of heat and steam producing equipment, the purpose of the hood or ventilation system (such as a pants-leg duct system) is to control humidity, heat, and unwanted condensation.

A major cause of unacceptable hood performance is a lack of coordination between the Heating, Ventilation, and Air Conditioning (HVAC) system and the exhaust hood system. These systems should be coordinated prior to installation, and balanced when installation is completed, to ensure the proper performance of both.

The amount of air exhausted through a hood exhaust system is dependent upon the size of the hood, its particular installation, and its use.

iv. Duct Location and Size

Exhaust ducts should never be located at the sides of the hood. For hoods that are 6 feet or less in length, only one outlet should be provided. Long hoods should be provided with multiple outlets no closer than 6 feet apart and no further than 12 feet apart. For hoods equipped with multiple ducts, it is advisable to install a manual air volume damper on each outlet so that the system can be easily balanced.

v. Grease Filter Area and Number of Grease Filters Required

There are two general types of grease filters: wire mesh and extractor filters. The extractor filter removes grease in the exhaust process by centrifugal motion or by impingement on a series of baffles. Standard size filters should be used to avoid additional cost and to allow ease of replacement. Any space in the filter bank not covered by filters/extractors shall be fitted with sheet metal blanks.

Filters are sized and made removable so that they may be passed through a ware washing machine or cleaned under a steam jet. Standard size grease filters are:

12 inches x 16 inches 16 inches x 20 inches 16 inches x 25 inches 20 inches x 20 inches 20 inches x 25 inches

Q. <u>Utility Facility</u>

At least one utility sink or curbed cleaning facility with a floor drain shall be provided for cleaning mops and for the disposal of mop water or similar liquid wastes.

Mop sinks are acceptable; the water supply must be properly protected against back-siphonage.

A properly sized mop and broom rack shall be provided.

All toxic materials including cleaning compounds, pesticides, sanitizers, etc. must be stored in an area away from food preparation and in a secured area. See <u>figure #16-1</u>.





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إدارة البيئية والصحية والسيلامية

ص.ب ١٧٠٠٠، دبي، الامارات العربية المتحدة

هاتف: ٨٨١١٨٨١ لا ٩٧١ + • فاكس: ٨٨١٨٨٥ ٤ ٩٧١+



دائــرة الـتـخطـيـط والـتـطـويــر مؤسسة الموانئ والجمـارك والمنطقة الحرة حـكـومــة ديــــي

R. Dressing Rooms and Lockers

Rooms or areas separate from food preparation, storage or service areas and separate from utensil washing or storage areas should be provided if employees will routinely change clothes within the establishment.

Lockers or other suitable storage facilities shall be located in dressing areas.

If dressing rooms are not required, separate facilities should be provided for the storage of coats, sweaters and other personal belongings.

S. Garbage and Refuse Storage

Garbage or refuse storage rooms shall be constructed of easily cleanable, nonabsorbent, washable materials and shall be insect-proof and rodent-proof with tight-fitting lids or covers.

Garbage and refuse containers, dumpsters, and compactor systems located outside shall be stored on or above a smooth surface of nonabsorbent material such as 4 inches sealed concrete.

i. Structural requirements for internal refuse disposal rooms and areas:

Floors shall be smooth, durable, grease resistant, nonabsorbent, coved, easily cleanable and sloped to a floor drain discharging to the sanitary sewer.

Walls and ceilings shall be durable, easily cleanable, impervious to grease and moisture, and capable of withstanding the expected impacts.

The room or enclosure shall be well ventilated.

Hot and cold running water through a mixing valve protected with a backflow protection device shall be provided and located so that the room or enclosure can be cleaned.

ii. Structural requirements for external refuse disposal facilities.

A securable enclosure is recommended

Ground surfaces and enclosure surfaces should be constructed so as to be durable and cleanable. Where wash down facilities are provided, liquid waste shall be disposed of in an approved manner.





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