

# Vessel Sanitation Program

## 2011 Operations Manual



U.S. Department of Health and Human Services

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Centers for Disease Control and Prevention/  
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The *VSP 2011 Operations Manual* and updates are available at <http://www.cdc.gov/nceh/vsp>.

Use of trade names is for identification only and does not imply endorsement by the Centers for Disease Control and Prevention, the Public Health Service, or the U.S. Department of Health and Human Services.

## Foreword

The Centers for Disease Control and Prevention (CDC) established the Vessel Sanitation Program (VSP) in the 1970s as a cooperative activity with the cruise ship industry. The program assists the cruise ship industry in fulfilling its responsibility for developing and implementing comprehensive sanitation programs to minimize the risk for acute gastroenteritis. Every vessel that has a foreign itinerary and carries 13 or more passengers is subject to twice-yearly inspections and, when necessary, reinspection.

VSP operated continuously at all major U.S. ports from the early 1970s through 1986, when CDC terminated portions of the program. Industry and public pressures resulted in Congress directing CDC through specific language included in CDC appropriations to resume the program. CDC's National Center for Environmental Health (NCEH) became responsible for VSP in 1986.

NCEH held a series of public meetings to determine the needs and desires of the public and cruise ship industry and on March 1, 1987, a restructured program began. In 1988, the program was further modified by introducing user fees to reimburse the U.S. government for costs. A fee based on the vessel's size is charged for inspections and reinspections. A *VSP Operations Manual* based on the Food and Drug Administration (FDA) 1976 model code for food service and the World Health Organization's *Guide to Ship Sanitation* was published in 1989 to assist the cruise ship industry in educating shipboard personnel.

In 1998, it became apparent that it was time to update the 1989 version of the *VSP Operations Manual*. Changes in the FDA *Food Code*, new science on food safety and protection, and newer technology in the cruise ship industry contributed to the need for a revised operations manual. Over the next 2 years, VSP solicited comments from and conducted public meetings with representatives of the cruise industry, general public, FDA, and international public health community to ensure that the 2000 manual would appropriately address current public health issues related to cruise ship sanitation. A similar process was followed to update the *VSP 2000 Operations Manual* in 2005.

Although the *VSP 2005 Operations Manual* was in use for almost 6 years, new technology, advanced food science, and emerging pathogens require updates to the manual. The *VSP 2011 Operations Manual* reflects comments and corrections submitted by cooperative partners in government and private industry as well as the public. We would like to thank all those who submitted comments and participated throughout this process.

As new information, technology, and input are received, we will continue to review and record that information and maintain a public process to keep the *VSP Operations Manual* current.

The *VSP 2011 Operations Manual* continues the 40+-year tradition of government and industry working together to achieve a successful and cooperative Vessel Sanitation Program that benefits millions of travelers each year.

Jaret Ames (CAPT, USPHS)  
Vessel Sanitation Program

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- Carnival Cruise Line
- Carnival UK (P&O Cruises and Cunard)
- Disney Cruise Line
- Holland America Line
- Norwegian Cruise Line
- MSC Cruises
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## Information to Assist the User on the Manual Format

### Organization

The *Vessel Sanitation Program Operations Manual* is divided into chapters and subsections that focus on each operational area important to safeguarding public health aboard vessels.

### Section Number

The international numbering system is used to organize the guidelines in this document.

### Keywords

Each of the guidelines is formatted with a title, keyword, or phrase after the section number.

### Description

The public health compliance recommendation is provided in this statement.

### Green Bold Text

Portions of some sections of these guidelines are written in **green bold**. These provisions are not requirements, but are provided to convey relevant information about specific exceptions and alternative means for compliance.

### Inspection Report Number

The individual inspection report item number is shown in parentheses after the section number and keywords; for example, 7.2.4.2.1 Hair Restraints (14).

### Critical Items

Critical compliance items are written in **bold red underlined text** in parentheses after the section number and keywords; for example, **7.5.5.1 Food-contact Surfaces (24 C)**. The number in parentheses is the individual inspection report item number.

### Noncritical Items

Noncritical compliance items are the other items in this manual.

## **1.0 Introduction**

This section includes the following subsections:

1.1 Introduction and Background

1.2 Activities

1.3 Operations Manual

### **1.1 Introduction and Background**

#### **1.1.1 Cooperative Activity**

##### **1.1.1.1 History**

The Centers for Disease Control and Prevention (CDC) established the Vessel Sanitation Program (VSP) in 1975 as a cooperative activity with the cruise ship industry. This program assists the cruise ship industry in fulfilling its responsibility for developing and implementing comprehensive performance-based systems to protect the health of the traveling public.

##### **1.1.1.2 Cooperation**

The program fosters cooperation between the cruise ship industry and government to define and reduce health risks associated with vessels and to ensure a healthful and clean environment for vessels' passengers and crew. The industry's aggressive and ongoing efforts to achieve and maintain high standards of food safety and environmental sanitation are critical to the success of protecting public health.

### **1.2 Activities**

#### **1.2.1 Prevention**

##### **1.2.1.1 Inspections**

VSP conducts a comprehensive food safety and environmental sanitation inspection on vessels that have a foreign itinerary, call on a U.S. port, and carry 13 or more passengers.

##### **1.2.1.2 Surveillance**

The program conducts ongoing surveillance of acute gastroenteritis (AGE) and coordinates/conducts outbreak investigations on vessels.

#### **1.2.2 Information**

##### **1.2.2.1 Training**

VSP provides food safety and environmental sanitation training seminars for vessel and shore operations management personnel.

#### **1.2.2.2 Plan Review**

The program provides consultative services for reviewing plans for renovations and new construction.

#### **1.2.2.3 Construction Inspections**

The program conducts construction inspections at the shipyards and when the vessel makes its initial call at a U.S. port.

#### **1.2.2.4 Information**

The program disseminates information to the public.

### **1.3 Operations Manual**

#### **1.3.1 Revisions**

##### **1.3.1.1 Manual**

The *VSP 2011 Operations Manual* has been modified as a result of emerging public health issues, industry recommendations, introduction of new technologies within the industry, new guidance from sources used in the previous edition, and CDC's experience.

##### **1.3.1.2 Program Guidance**

The program operations and inspections are based on this manual.

##### **1.3.1.3 Periodic Review**

The *VSP 2011 Operations Manual* will be reviewed annually in the public meeting with written submissions for revision based on emerging public health issues and new technologies that may better address the public health issues on vessels.

## 2.0 Authority

This section includes the following subsection:

- 2.1 Public Health Service Act
- 2.2 Jurisdiction

### 2.1 Public Health Service Act

#### 2.1.1 Communicable Disease Prevention

##### 2.1.1.1 Communicable Disease Prevention

Although cooperation by vessels with VSP is voluntary, the Public Health Service (PHS) is authorized by the Public Health Service Act (42 U.S.C. Section 264. QUARANTINE and Inspection - Regulations to control communicable diseases) to take measures necessary to prevent the introduction, TRANSMISSION, or spread of communicable diseases into the United States from a foreign country.

##### 2.1.1.2 Regulation Promulgation

In addition, the Public Health Service Act (42 U.S.C. Section 269. QUARANTINE and Inspection - Bills of Health authorizes the promulgation of regulations applicable to vessels for preventing the introduction into the United States of “any communicable disease by securing the best sanitary condition of such vessels, their cargoes, passengers, and crews.”)

##### 2.1.1.3 Inspections

Regulations promulgated to carry out these duties authorize PHS to conduct sanitary inspections on carriers traveling to a U.S. port from a foreign area (42 CFR Section 71.41. General Provisions, Foreign QUARANTINE - Requirements Upon Arrival at U.S. Ports: Sanitary Inspection). The purpose of the inspection is to determine the existence of vermin, contaminated food or water, or other insanitary conditions that may contribute to the introduction, spread, or TRANSMISSION of communicable disease.

### 2.2 Jurisdiction

VSP’s mission is to prevent AGE transmission to U.S. ports by ships sailing from foreign ports. Cruise lines should be aware that although ships sail outside of U.S. waters, there could be occasions when a ship violates the *VSP Operations Manual* while sailing outside of the United States and this violation has a potential to impact a U.S. port. During an operational inspection, VSP must review both present and past practices in order to evaluate the ship’s compliance with the requirements set out in the *VSP Operations Manual*.

The *VSP Operations Manual* requires several records to be maintained on board for periods of 30 days to 1 year, including

- medical,
- potable water,
- recreational water,
- food safety, and
- housekeeping.

These records are reviewed during operational inspections. VSP has and will continue to cite violations identified in the record review, even if the ship was not sailing in U.S. waters when the violation occurred. If the record review reveals violations that could result in illness when the ship arrives in a U.S. port, points may be deducted according to the violations identified during the inspection. One example of these violations is ships producing water in ports, harbors, and polluted waterways.

## 3.0 Definitions

This section includes the following subsections:

- 3.1 Scope
- 3.2 Definitions
- 3.3 Acronyms

### 3.1 Scope

This *VSP 2011 Operations Manual* provides definitions to clarify commonly used terminology in this manual. The definition section is organized alphabetically. Where a definition specifically applies to a section of the manual, that will be noted in the definition.

Terms defined in section 3.2 are identified in the text of these guidelines by SMALL CAPITAL LETTERS, or SMALL CAPS. For example, section 5.7.1.1.4 states “A CROSS-CONNECTION control program must include at a minimum: ...” CROSS-CONNECTION is in SMALL CAPS and is defined in section 3.2.

### 3.2 Definitions

**Accessible:** Exposed for cleaning and inspection with the use of simple tools including a screwdriver, pliers, or wrench. This definition applies to use in FOOD AREAS of the vessel only.

**Accredited program:** A food protection manager certification program that has been evaluated and listed by an accrediting agency as conforming to national standards for organizations that certify individuals.

An accredited program refers to the certification process and is a designation based on an independent evaluation of factors such as the sponsor’s mission; organizational structure; staff resources; revenue sources; policies; public information regarding program scope, eligibility requirements, recertification, discipline and grievance procedures; and test development and administration.

**Accredited program does not refer to training functions or educational programs.**

**Activity pools:** Include but are not limited to the following: wave pools, activity pools, catch pools, water slides, INTERACTIVE RECREATIONAL WATER FACILITIES, lazy rivers, action rivers, vortex pools, and continuous surface pools.

**Acute gastroenteritis (AGE):** Irritation and inflammation of the digestive tract characterized by sudden onset of symptoms of diarrhea and/or vomiting, as well as other constitutional symptoms such as fever, abdominal cramps, headache, or muscle aches.

**AGE case:** See REPORTABLE AGE CASE.

**AGE outbreak:** Cases of ACUTE GASTROENTERITIS, characterized by diarrhea and vomiting, that are in excess of background rates. For the purposes of this manual, more than 3% is considered in excess of background rates. In addition, an AGE outbreak may be based on two or more laboratory-confirmed cases associated with food or water consumption during the cruise.

**Additive**

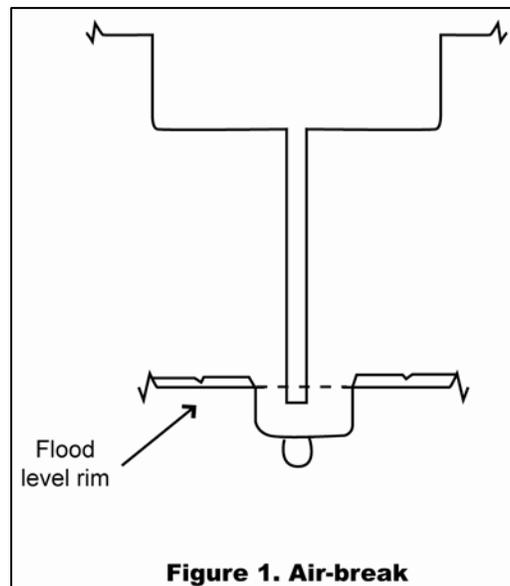
(a) **Food additive:** as stated in the Federal Food, Drug, and Cosmetic Act, §201(s) and 21 CFR 170.

(b) **Color additive:** as stated in the Federal Food, Drug, and Cosmetic Act, §201(t) and 21 CFR 70.

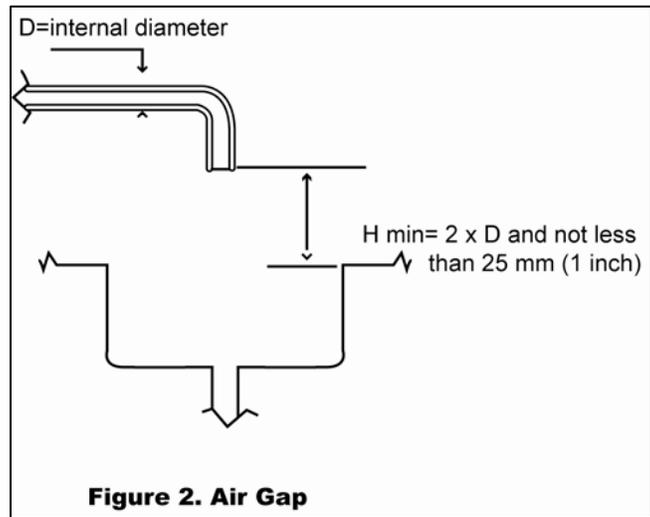
**Adequate:** Sufficient in number, features, or capacity to accomplish the purpose for which something is intended and to such a degree that there is no unreasonable risk to health or safety.

**Adulterated:** As stated in the Federal Food, Drug, and Cosmetic Act, §402.

**Air-break:** A piping arrangement in which a drain from a fixture, appliance, or device discharges indirectly into another fixture, receptacle, or interceptor at a point below the flood-level rim (Figure 1).



**Air gap (AG):** The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, PLUMBING FIXTURE, or other device and the flood-level rim of the receptacle or receiving fixture. The air gap must be at least twice the inside diameter of the supply pipe or faucet and not less than 25 millimeters (1 inch) (Figure 2).



**Antientanglement cover:** A cover for a drain/SUCTION FITTING that is designed to prevent hair from tangling in a drain cover or SUCTION FITTING in a RECREATIONAL WATER FACILITY.

**Antientrapment cover:** A cover for a drain/SUCTION FITTING that is designed to prevent any portion of the body or hair from becoming lodged or otherwise forced onto a drain cover or SUCTION FITTING in a RECREATIONAL WATER FACILITY.

**Approved:** Acceptable based on a determination of conformity with principles, practices, and generally recognized standards that protect public health (e.g., American National Standards Institute [ANSI], National Sanitation Foundation International [NSF International], American Society of Mechanical Engineers [ASME], or American Society of Safety Engineers [ASSE] standards, Underwriter's Laboratory [UL], federal regulations, or equivalent international standards and regulations).

**Attack rate:** (1) The proportion of individuals exposed to an infectious agent who become clinically ill. (2) The cumulative incidence of infection in a group observed over a period during an epidemic.

**Atmospheric vacuum breaker (AVB):** A BACKFLOW PREVENTION DEVICE that consists of an air inlet valve, a check seat or float valve, and air inlet ports. The device is not APPROVED for use under continuous water pressure and must be installed downstream of the last valve.

**$a_w$  (water activity):** Measurement of the free moisture content in a food.

**Baby-only water facility:** RECREATIONAL WATER FACILITY designed for use by children in diapers or who are not completely toilet trained. This facility must have zero water depth. Control measures for this facility would be detailed in a VARIANCE.

**Backflow:** The reversal of flow of water or other liquids, mixtures, or substances into the distribution pipes of a potable supply of water from any source or sources other than the source of POTABLE WATER supply. BACKSIPHONAGE and BACKPRESSURE are forms of backflow.

**Backflow prevention device:** An APPROVED backflow prevention plumbing device that must be used on POTABLE WATER distribution lines where there is a direct connection or a potential CROSS-CONNECTION between the POTABLE WATER distribution system and other liquids, mixtures, or substances from any source other than the POTABLE WATER supply. Some devices are designed for use under continuous water pressure, whereas others are noncontinuous pressure types. **VSP only accepts vented devices.**

(See also:

- ATMOSPHERIC VACUUM BREAKER [AVB].
- CONTINUOUS PRESSURE BACKFLOW PREVENTION DEVICE.
- DOUBLE CHECK VALVE with intermediate atmospheric vent.
- HOSE BIB CONNECTION VACUUM BREAKER.
- PRESSURE VACUUM BREAKER ASSEMBLY.
- REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY.)

**Backpressure:** An elevation of pressure in the downstream piping system (by pump, elevation of piping, or steam and/or air pressure) above the supply pressure at the point of consideration that would cause a reversal of normal direction of flow.

**Barometric loop:** A continuous section of supply piping that rises at least 35 feet above the supply point and returns back down to the supply. Typically the loop will be in the shape of an upside-down “U.” A barometric loop only protects against BACKSIPHONAGE because it operates under the principle that a water column cannot rise above 33.9 feet at sea-level pressure.

**Backsiphonage:** The reversal or flowing back of used, contaminated, or polluted water from a PLUMBING FIXTURE or vessel or other source into a water supply pipe as a result of negative pressure in the pipe.

**Beverage:** A liquid for drinking, including water.

**Black water:** Wastewater from toilets, urinals, medical sinks, and other similar facilities.

**Blast chiller:** A unit specifically designed for rapid intermediate cooling of food products from 57°C (135°F) to 21°C (70°F) within 2 hours and 21°C (70°F) to 5°C (41°F) within an additional 4 hours.

**Blockable drain/suction fitting:** A drain or suction fitting in a RECREATIONAL WATER FACILITY that that can be completely covered or blocked by a 457 millimeters x 584 millimeters (18 inches x 23 inches) body-blocking element as set forth in ASME A112.19.8M.

**CFR (Code of Federal Regulations):** Compilation of the general and permanent rules published in the *Federal Register* by the executive departments and agencies of the federal government. The CFR is published annually by the U.S. Government Printing Office and contains FDA rules in 21 CFR, USDA rules in 7 CFR and 9 CFR, EPA rules in 40 CFR, and Wildlife and Fisheries rules in 50 CFR.

**Chemical disinfectant:** A chemical agent used to kill microbes.

**Child activity center:** A facility for child-related activities where children under the age of 6 are placed to be cared for by vessel staff.

**Children's pool:** A pool that has a depth of 1 meter (3 feet) or less and is intended for use by children who are toilet trained.

**Child-sized toilet:** Toilets whose toilet seat height is no more than 280 millimeters (11 inches) and the toilet seat opening is no greater than 203 millimeters (8 inches).

**CIP (cleaned in place):** Cleaned in place by circulating or flowing mechanically through a piping system of a detergent solution, water rinse, and sanitizing solution onto or over EQUIPMENT surfaces that require cleaning, such as the method used—in part—to clean and sanitize a frozen dessert machine. **CIP does not include the cleaning of EQUIPMENT such as band saws, slicers, or mixers that are subjected to in-place manual cleaning without the use of a CIP system.**

**Cleaning locker:** A room or cabinet specifically designed or modified for storage of cleaning EQUIPMENT such as mops, brooms, floor-scrubbing machines, and cleaning chemicals.

**Comminuted:** Reduced in size by chopping, flaking, grinding, or mincing. **Examples include FISH or MEAT products that are reduced in size and restructured or reformulated (e.g., gefilte FISH, gyros, ground beef, and sausage) and mixtures of two or more types of MEAT that have been reduced in size and combined (e.g., sausages made from two or more MEATS).**

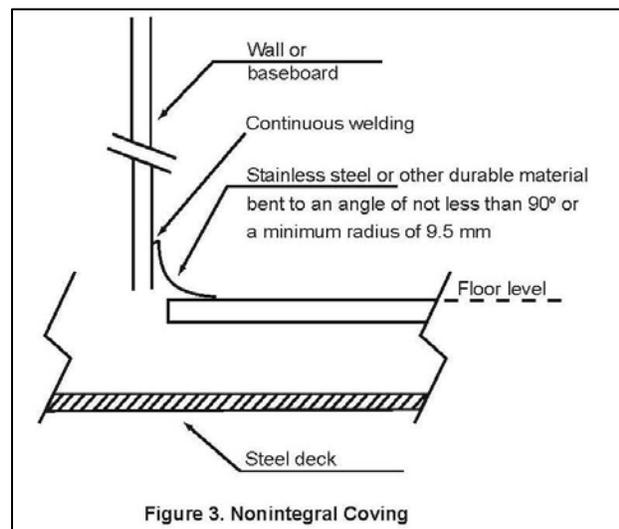
**Confirmed disease outbreak:** A **FOODBORNE** or **WATERBORNE DISEASE OUTBREAK** in which laboratory analysis of appropriate specimens identifies a causative agent and epidemiologic analysis implicates the food or water as the source of the illness.

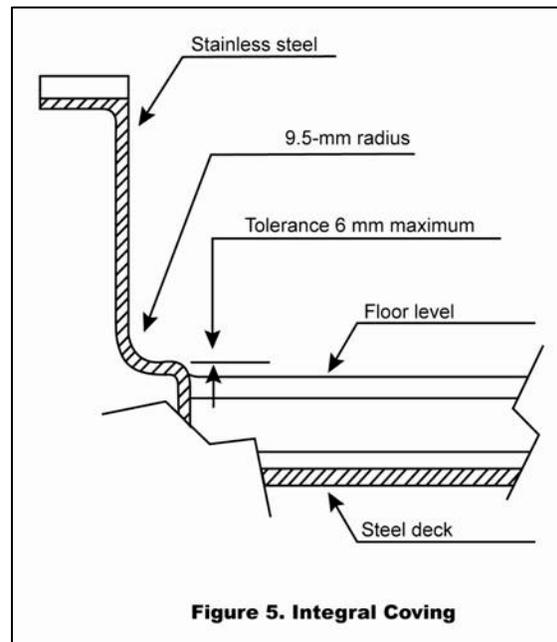
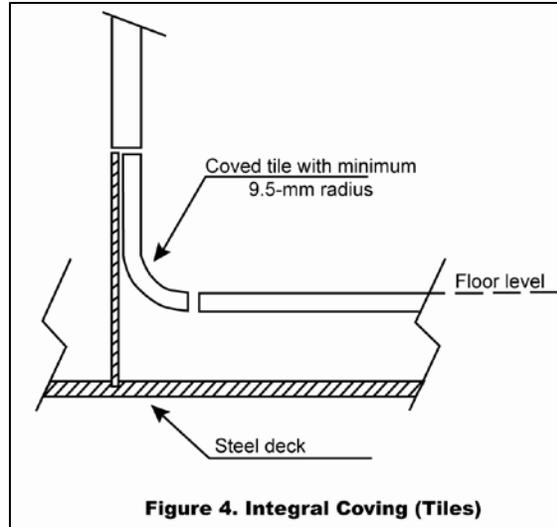
**Consumer:** A person who takes possession of food, is not functioning as an operator of a food establishment or **FOOD-PROCESSING PLANT**, and does not offer the food for resale.

**Contamination:** The presence of an infectious agent on a body surface, in clothes, in bedding, on toys, on surgical instruments or dressings, or on other inanimate articles or substances including food and water.

**Continuous pressure (CP) backflow prevention device:** A device generally consisting of two check valves and an intermediate atmospheric vent that has been specifically designed to be used under conditions of continuous pressure (greater than 12 hours out of a 24-hour period).

**Coving:** A concave surface, molding, or other design that eliminates the usual angles of 90° or less at deck junctures (Figures 3, 4, and 5).





**Critical item:** A provision of these guidelines that, if in noncompliance, is more likely than other deficiencies to contribute to food or water CONTAMINATION, illness, or environmental health hazard. These are denoted in these guidelines in **bold red underlined text** in parentheses after the section number and keywords; for example, **7.5.5.1 Food-contact Surfaces (24 C)**. The number indicates the individual inspection report item number.

**Critical control point:** A point or procedure in a specific system where loss of control may result in an unacceptable health risk.

**Critical limit:** The maximum or minimum value at a CRITICAL CONTROL POINT to which a physical, biologic, or chemical parameter must be controlled to minimize the occurrence of risk from an identified safety hazard.

**Cross-connection:** An actual or potential connection or structural arrangement between a POTABLE WATER system and any other source or system through which it is possible to introduce into any part of the POTABLE WATER system any used water, industrial fluid, gas, or substance other than the intended POTABLE WATER with which the system is supplied.

**CT value:** Numerical value used for identifying level at which pathogen destruction/inactivation occurs. **For the purposes of this manual, CT values will be based on free chlorine levels in MG/L (ppm) and time in minutes (CT value=MG/L x minutes).**

**Cut leafy greens:** Fresh leafy greens whose leaves have been cut, shredded, sliced, chopped, or torn. Leafy greens include iceberg lettuce, romaine lettuce, leaf lettuce, butter lettuce, baby leaf lettuce (i.e., immature lettuce or leafy greens), escarole, endive, spring mix, spinach, cabbage, kale, arugula, and chard. Herbs such as cilantro or parsley are not considered leafy greens.

**Date/time of onset:** Date/time on which the first symptom appeared.

**Deck drain:** The physical connection between decks, SCUPPERS, or DECK SINKS and the GRAY or BLACK WATER systems.

**Deck sink:** A sink recessed into the deck and sized to contain waste liquids from tilting kettles and pans.

**Diarrheal disease:** Three or more episodes of loose stools in a 24-hour period or a greater than normal (for the person) number of loose stools.

**Disinfectant:** A chemical or physical agent used to kill microbes.

**Disinfection:** A process (physical or chemical) that destroys many or all pathogenic microorganisms, except bacterial and mycotic spores, on inanimate objects.

**Distillate water:** Water condensed from vapor during the evaporation process.

**Distillate water lines:** Pipes carrying water that is condensed from the evaporators and that may be directed to the POTABLE WATER system. This is the VSP definition for pipe striping purposes.

**Double check (DC) valve assembly:** A BACKFLOW PREVENTION ASSEMBLY consisting of two internally loaded, independently operating check valves located

between two resilient-seated shutoff valves. These assemblies include four resilient-seated test cocks. **These devices do not have an intermediate vent to the atmosphere and are not APPROVED for use on CROSS-CONNECTIONS to the POTABLE WATER system of cruise vessels. VSP accepts only vented BACKFLOW PREVENTION DEVICES.**

**Double check with an intermediate atmospheric vent (DCIV):** A BACKFLOW PREVENTION DEVICE with double check valves and an intermediate atmospheric vent located between the two check valves.

**Drinking water:** See POTABLE WATER.

**Drip tray:** READILY REMOVABLE tray to collect dripping fluids or food from food dispensing EQUIPMENT.

**Dry storage area:** A room or area designated for the storage of PACKAGED or containerized bulk food that is not potentially hazardous and dry goods such as SINGLE-SERVICE ITEMS.

**Easily cleanable:** A characteristic of a surface that

- Allows effective removal of soil by normal cleaning methods;
- Is dependent on the material, design, construction, and installation of the surface; and
- Varies with the likelihood of the surface's role in introducing pathogenic or toxigenic agents or other contaminants into food based on the surface's APPROVED placement, purpose, and use.

**Easily movable:** EQUIPMENT that

- Is PORTABLE; mounted on casters, gliders, or rollers; or provided with a mechanical means to safely tilt it for cleaning; and
- Has no utility connection, has a utility connection that disconnects quickly, or has a flexible utility connection line of sufficient length that allows it to be moved for cleaning of the EQUIPMENT and adjacent area.

**Equipment:** An article 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 WAREWASHING machine. **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 overwrapped lot, such as hand trucks, forklifts, dollies, pallets, racks, and skids.**

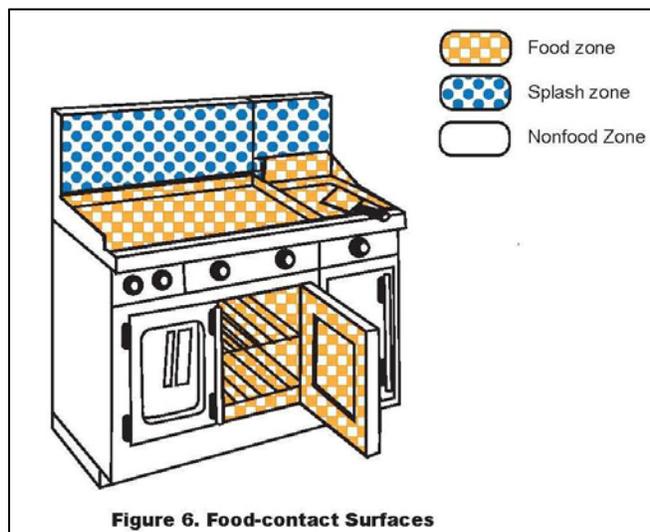
**Fish:** Fresh water or saltwater finfish, crustaceans, and other forms of aquatic life (including alligator, frog, aquatic turtle, jellyfish, sea cucumber, sea urchin, and the roe of such animals) other than birds or mammals, and all mollusks, if such animal life is intended for human consumption. **Fish includes an edible human**

**food product derived in whole or in part from fish, including fish processed in any manner.**

**Food:** Raw, cooked, or processed edible substance; ice; BEVERAGE; or ingredient used or intended for use or for sale in whole or in part for human consumption. Chewing gum is also classified as food.

**Food area:** Includes food and BEVERAGE display, handling, preparation, service, and storage areas; warewash areas; clean EQUIPMENT storage areas; and LINEN storage and handling areas.

**Food-contact surface:** Surfaces (food zone, splash zone) of EQUIPMENT and UTENSILS with which food normally comes in contact and surfaces from which food may drain, drip, or splash back into a food or surfaces normally in contact with food (Figure 6).



**Food display areas:** Any area where food is displayed for consumption by passengers and/or crew. Applies to displays served by vessel staff or self service.

**Food employee:** A person working with unpackaged food, food EQUIPMENT or UTENSILS, LINENS, or FOOD-CONTACT SURFACES.

**Food-handling areas:** Any area where food is stored, processed, prepared, or served.

**Food preparation areas:** Any area where food is processed, cooked, or prepared for service.

**Food-processing plant:** A commercial operation that manufactures packages, labels, or stores food for human consumption and does not provide food directly to a CONSUMER.

**Food service areas:** Any area where food is presented to passengers or crew members (excluding individual cabin service).

**Food storage areas:** Any area where food or food products are stored.

**Food transportation corridors:** Areas primarily intended to move food during food preparation, storage, and service operations (e.g., service lift [elevator] vestibules to FOOD PREPARATION service and storage areas, provision corridors, and corridors connecting preparation areas and service areas). **Passenger and crew corridors, public areas, individual cabin service, and dining rooms connected to galleys are excluded. Food loading areas used solely for delivery of food to the vessel are excluded.**

**Food waste system:** A system used to collect, transport, and process food waste from FOOD AREAS to a waste disposal system (e.g., pulper, vacuum system).

**Foodborne disease outbreak:** An incident in which two or more persons experience a similar illness resulting from the ingestion of a common food.

**Game animal:** An animal, the products of which are food, that is not classified as cattle, sheep, swine, goat, horse, mule, or other equine in 9 CFR Subchapter A - Mandatory MEAT Inspection, Part 301, as POULTRY in 9 CFR Subchapter C - Mandatory POULTRY Products Inspection, Part 381, or as FISH as defined under Subparagraph 1-201.10(B)(25).

**Game animal includes mammals such as reindeer, elk, deer, antelope, water buffalo, bison, rabbit, squirrel, opossum, raccoon, nutria, or muskrat, and nonaquatic reptiles such as land snakes.**

**Game animal does not include RATITES such as ostrich, emu, and rhea.**

**Gap:** An open juncture that is more than 3 millimeters (1/8 inch).

**General-use pesticide:** A pesticide not classified by EPA for restricted use as specified in 40 CFR 152.175.

**Grade A standards:** Requirements of the FDA Grade A Pasteurized Milk Ordinance and Grade A Condensed and Dry Milk Ordinance with which certain fluid and dry milk and milk products comply.

**Gravity drain:** A drain fitting used to drain the body of water in a RECREATIONAL WATER FACILITY by gravity and with no pump downstream of the fitting.

**Gray water:** Wastewater from galley EQUIPMENT and DECK DRAINS, dishwashers, showers and baths, laundries, washbasins, DECK DRAINS, and recirculated

RECREATIONAL WATER FACILITIES. Gray water does not include BLACK WATER or bilge water from the machinery spaces.

**Gutterway:** See SCUPPER.

**HACCP plan:** 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.

**Halogen:** The group of elements including chlorine, bromine, and iodine used for the DISINFECTION of water.

**Hand antiseptic:** Antiseptic products applied to human skin.

**Harbor:** The portion of a port area set aside for vessel anchorage or for ports including wharves; piers; quays; and service areas, the boundaries are the high-water shore line; and others as determined by legal definition, citation of coordinates, or other means.

**Hazard:** A biological, chemical, or physical property that may cause an unacceptable CONSUMER health risk.

**Hermetically sealed container:** A container designed to be secure against the entry of microorganisms and, in the case of low-acid canned FOODS, to maintain the commercial sterility of its contents after processing.

**Hose bib connection vacuum breaker (HVB):** A BACKFLOW PREVENTION DEVICE that attaches directly to a hose bib by way of a threaded head. This device uses a single check valve and vacuum breaker vent. It is not APPROVED for use under CONTINUOUS PRESSURE (e.g., when a shut-off valve is located downstream from the device). This device is a form of an AVB specifically designed for a hose connection.

**Imminent health hazard:** A significant threat or danger to health that is considered to exist when evidence is sufficient to show that a product, practice, circumstance, or event creates a situation that requires immediate correction or cessation of operation to prevent injury.

**Injected meats:** Manipulating MEAT so that infectious or toxigenic microorganisms may be introduced from its surface to its interior through tenderizing with deep penetration or injecting the MEAT such as with juices, which may be referred to as injecting, pinning, or stitch pumping. This does not include routine temperature monitoring.

**Integrated pest management (IPM):** A documented, organized system of controlling pests through a combination of methods including inspections, baits,

traps, effective sanitation and maintenance, and judicious use of chemical compounds.

**Interactive recreational water facilities:** Facilities that provide a variety of recreational water features such as flowing, misting, sprinkling, jetting, and waterfalls. These facilities may be zero depth.

**Isolation:** The separation of persons who have a specific infectious illness from those who are healthy and the restriction of ill persons' movement to stop the spread of that illness. **For VSP's purposes, isolation for passengers with AGE symptoms is advised and isolation for crew with AGE symptoms is required.**

**Kitchenware:** Food preparation and storage UTENSILS.

**Law:** Applicable local, state, federal, or other equivalent international statutes, regulations, and ordinances.

**Linens:** Fabric items such as cloth hampers, cloth napkins, tablecloths, wiping cloths, and work garments including cloth gloves.

**Making way:** Progressing through the water by mechanical or wind power.

**Meat:** The flesh of animals used as food including the dressed flesh of cattle, swine, sheep, or goats and other edible animals, **except FISH, POULTRY, and wild GAME ANIMALS.**

**Mechanically tenderized:** Manipulating MEAT with deep penetration by processes that may be referred to as blade tenderizing; jaccarding; pinning; needling; or using blades, pins, needles, or any mechanical device. It does not include processes by which solutions are injected into MEAT.

**mg/L:** Milligrams per liter, the metric equivalent of parts per million (ppm).

**Molluscan shellfish:** Any edible species of fresh or frozen oysters, clams, mussels, and scallops or edible portions thereof, **except when the scallop product consists only of the shucked adductor muscle.**

**Noncorroding:** Material that maintains its original surface characteristics through prolonged influence by the use environment, food contact, and normal use of cleaning compounds and sanitizing solutions.

**Nonfood-contact surfaces (nonfood zone):** All exposed surfaces, other than FOOD-CONTACT SURFACES, of EQUIPMENT located in FOOD AREAS (Figure 6).

**Outbreak:** See AGE OUTBREAK.

**Packaged:** Bottled, canned, cartoned, securely bagged, or securely wrapped, whether packaged in a food establishment or a FOOD-PROCESSING PLANT.

**Packaged does not include a wrapper, carry-out box, or other nondurable container used to containerize food to facilitate food protection during service and receipt of food by the CONSUMER.**

**Permeate water:** Water produced by a reverse osmosis unit.

**Permeate water lines:** Pipes carrying permeate water from the reverse osmosis unit that may be directed to the POTABLE WATER system. This is the VSP definition for pipe striping purposes.

**Person in charge:** The individual present on a vessel who is responsible for the food operation at the time of inspection such as the Food and BEVERAGE Manager, Food Manager, or Chef.

**Personal-care items:** Items or substances that may be poisonous, toxic, or a source of CONTAMINATION and are used to maintain or enhance a person's health, hygiene, or appearance. **Personal-care items include items such as medicines, first-aid supplies, and cosmetics and toiletries (e.g., toothpaste, mouthwash).**

**pH (Potens hydrogen):** The symbol for the negative logarithm of the hydrogen ion concentration, which is a measure of the degree of acidity or alkalinity of a solution. **Values between 0 and 7 indicate acidity and values between 7 and 14 indicate alkalinity. The value for pure distilled water is 7, which is neutral.**

**Plumbing fixture:** A receptacle or device that

- Is permanently or temporarily connected to the water-distribution system of the vessel and demands a supply of water from the system; or
- Discharges used water, waste materials, or SEWAGE directly or indirectly to the drainage system of the vessel.

**Plumbing system:** The water supply and distribution pipes; PLUMBING FIXTURES and traps; soil, waste, and vent pipes; sanitary sewer drains and vessel drains, including their respective connections, devices, and appurtenances within the vessel; and water-treating EQUIPMENT.

**Poisonous or toxic materials:** Substances that are not intended for ingestion. These substances are in four categories:

- Cleaners and SANITIZERS, which include cleaning and sanitizing agents and agents such as caustics, acids, drying agents, polishes, and other chemicals.
- PESTICIDES [**except SANITIZERS**] that include substances such as insecticides and rodenticides.
- Substances necessary for the operation and maintenance of the establishment such as nonfood-grade lubricants and PERSONAL-CARE

ITEMS that may be deleterious to health.

- Substances that are not necessary for the operation and maintenance of the vessel and are on the vessel, such as petroleum products and paints.

**Pollution:** The presence of any foreign substance (organic, inorganic, radiologic, or biologic) that tends to degrade water quality to create a health HAZARD.

**Portable:** A description of EQUIPMENT that is READILY REMOVABLE or mounted on casters, gliders, or rollers; provided with a mechanical means so that it can be tilted safely for cleaning; or readily movable by one person.

**Potable water:** Water that is HALOGENATED and PH controlled and is intended for drinking, washing, bathing, or showering; for use in fresh water SWIMMING POOLS and WHIRLPOOL SPAS; for use in the vessel's hospital; for handling, preparing, or cooking food; and for cleaning FOOD STORAGE and preparation areas, UTENSILS, and EQUIPMENT. Potable water is free from impurities in amounts sufficient to cause disease or harmful physiological effects. The water quality must conform to requirements of the World Health Organization DRINKING WATER standards.

**Potable water tanks:** All tanks in which POTABLE WATER is stored.

**Potentially hazardous food (PHF) (or time/temperature control for safety food [TCS]):** Natural or synthetic food that requires time/temperature control because it is in a form capable of supporting

- The rapid and progressive growth of infectious or toxigenic microorganisms;
- The growth and toxin production of *Clostridium botulinum*; or
- The growth of *Salmonella enteritidis* [in raw shell eggs].

PHF includes an animal food (a food 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; CUT LEAFY GREENS; cut tomatoes or mixtures of cut tomatoes; 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 or any food classified by the FDA as a PHF/TCS.

#### **PHF does not include**

- a) An air-cooled hard-boiled egg with shell intact, or a shell egg that is not hard-boiled, but has been treated to destroy all viable Salmonellae.**
- b) A food with an  $A_w$  value of 0.85 or less.**
- c) A food with a PH level of 4.6 or below when measured at 24°C (75°F).**
- d) A food in an unopened HERMETICALLY SEALED CONTAINER that is commercially processed to achieve and maintain commercial sterility under conditions of nonrefrigerated storage and distribution.**
- e) A food for which laboratory evidence demonstrates that the rapid and**

**progressive growth of infectious or toxigenic microorganisms or the growth of *S. enteritidis* in eggs or *C. botulinum* cannot occur, such as a food that has an  $A_w$  and a pH above the levels specified under Subparagraphs (b) and (c) 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.**

**f) 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.**

**Poultry:**

- Any domesticated bird such as chicken, turkey, duck, goose, or guinea, whether live or dead, as defined in 9 CFR 381 Poultry Products Inspection Regulations.
- Any migratory waterfowl, game bird, or squab such as pheasant, partridge, quail, grouse, or guinea, whether live or dead, as defined in 9 CFR 362 Voluntary Poultry Inspection Program.

**Poultry does not include RATITE.**

**Pressure vacuum breaker assembly (PVB):** A device consisting of an independently loaded internal check valve and a spring-loaded air inlet valve. This device is also equipped with two resilient seated gate valves and test cocks.

**Primal cut:** A basic major cut into which carcasses and sides of MEAT are separated, such as a beef round, pork loin, lamb flank, or veal breast.

**Quarantine:** The limitation of movement of apparently well persons who have been exposed to a case of communicable (infectious) disease during its period of communicability to prevent disease TRANSMISSION during the incubation period if infection should occur.

**Ratite:** A flightless bird such as an emu, ostrich, or rhea.

**Readily accessible:** Exposed or capable of being exposed for cleaning or inspection without the use of tools.

**Readily removable:** Capable of being detached from the main unit without the use of tools.

**Ready-to-eat (RTE) food:** Food in a form that is edible without washing, cooking, or additional preparation by the food establishment or the **CONSUMER** and that is reasonably expected to be consumed in that form.

**RTE food includes**

- **POTENTIALLY HAZARDOUS FOOD that is unpackaged and cooked to the temperature and time required for the specific food.**
- **Raw, washed, cut fruits and vegetables.**
- **Whole, raw fruits and vegetables presented for consumption without the need for further washing, such as at a buffet.**
- **Other food presented for consumption for which further washing or cooking is not required and from which rinds, peels, husks, or shells are removed.**
- **Fruits and vegetables that are cooked for hot holding, as specified under section 7.3.4.1.3.**
- **Substances derived from plants such as spices, seasonings, and sugar.**
- **A bakery item such as bread, cakes, pies, fillings, or icing for which further cooking is not required for food safety.**
- **Products produced in accordance with USDA guidelines and that have received a lethality treatment for pathogens: dry, fermented sausages, such as dry salami or pepperoni; salt-cured MEAT and POULTRY products, such as prosciutto ham, country cured ham, and Parma ham; and dried MEAT and POULTRY products, such as jerky or beef sticks.**
- **Foods manufactured as specified in 21 CFR Part 113, Thermally Processed Low-Acid Foods PACKAGED in HERMETICALLY SEALED CONTAINERS.**

**Recreational water facility (RWF):** A water facility that has been modified, improved, constructed, or installed for the purpose of public swimming or recreational bathing. RWFs include, but are not limited to,

- ACTIVITY POOLS.
- BABY-ONLY WATER FACILITIES.
- CHILDREN’S POOLS.
- Diving pools.
- Hot tubs.
- Hydrotherapy pools.
- INTERACTIVE RECREATIONAL WATER FACILITIES.
- Slides.
- SPA POOLS.
- SWIMMING POOLS,
- Therapeutic pools.
- WADING POOLS.
- WHIRLPOOLS.

**Recreational water facility (RWF) seawater:** Seawater taken onboard while MAKING WAY at a position at least 12 miles at sea and routed directly to the RWFs for either sea-to-sea exchange or recirculation.

**Reduced pressure principle backflow prevention assembly (RP assembly):**

An assembly containing two independently acting internally loaded check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit must include properly located resilient seated test cocks and tightly closing resilient seated shutoff valves at each end of the assembly.

**Refuse:** Solid waste not carried by water through the SEWAGE system.

**Registered design professional:** An individual registered or licensed to practice his or her respective design profession as defined by the statutory requirements of the professional registration LAWS of the state or jurisdiction in which the project is to be constructed (per ASME A112.19.8-2007).

**Regulatory authority:** Local, state, or federal or equivalent international enforcement body or authorized representative having jurisdiction over the food processing, transportation, warehousing, or other food establishment.

**Removable:** Capable of being detached from the main unit with the use of simple tools such as a screwdriver, pliers, or an open-end wrench.

**Reportable AGE case (VSP definition):** A case of AGE with one of the following characteristics:

- Diarrhea (three or more episodes of loose stools in a 24-hour period or what is above normal for the individual, e.g., individuals with underlying medical conditions) **OR**
- Vomiting and one additional symptom including one or more episodes of loose stools in a 24-hour period, or abdominal cramps, or headache, or muscle aches, or fever (temperature of  $\geq 38^{\circ}\text{C}$  [ $100.4^{\circ}\text{F}$ ]); **AND**
- Reported to the master of the vessel, the medical staff, or other designated staff by a passenger or a crew member.

**Nausea, although a common symptom of AGE, is specifically excluded from this definition to avoid misclassifying seasickness (nausea and vomiting) as ACUTE GASTROENTERITIS.**

**Restricted-use pesticide:** A pesticide product that contains the active ingredients specified in 40 CFR 152.175 Pesticides classified for restricted use, and that is limited to use by or under the direct supervision of a certified applicator.

**Sanitizer:** Chemical or physical agents that reduce microorganism CONTAMINATION levels present on inanimate environmental surfaces.

**Two classes of sanitizers:**

- **Sanitizers of NONFOOD-CONTACT SURFACES: The performance**

**standard used by the EPA for these sanitizers requires a reduction of the target microorganism by 99.9% or 3 logs (1000, 1/1000, or 10<sup>3</sup>) after 5 minutes of contact time.**

- **Sanitizers of FOOD-CONTACT SURFACES: The EPA performance standard for these sanitizers requires a 99.999% or 5-log reduction of the target microorganism in 30 seconds.**

**Sanitization:** The application of cumulative heat or chemicals on cleaned food-contact and NONFOOD-CONTACT SURFACES that, when evaluated for efficacy, provides a sufficient reduction of pathogens.

**Scupper:** A conduit or collection basin that channels liquid runoff to a DECK DRAIN.

**Sealant:** Material used to fill SEAMS.

**Seam:** An open juncture that is greater than 0.8 millimeters (1/32 inch) but less than 3 millimeters (1/8 inch).

**Sewage:** Liquid waste containing animal or vegetable matter in suspension or solution and may include liquids containing chemicals in solution.

**Shellstock:** Raw, in-shell MOLLUSCAN SHELLFISH.

**Shucked shellfish:** MOLLUSCAN SHELLFISH with one or both shells removed.

**Single-service articles:** TABLEWARE, carry-out UTENSILS, and other items such as bags, containers, placemats, stirrers, straws, toothpicks, and wrappers that are designed and constructed for one-time, one-person use.

**Single-use articles:** UTENSILS and bulk food containers designed and constructed to be used once and discarded.

**Single-use articles includes items such as wax paper, butcher paper, plastic wrap, formed aluminum food containers, jars, plastic tubs or buckets, bread wrappers, pickle barrels, ketchup bottles, and number 10 cans that do not meet materials, durability, strength, and cleanability specifications.**

**Slacking:** Process of moderating the temperature of a food such as allowing a food to gradually increase from a temperature of -23°C (-10°F) to -4°C (25°F) in preparation for deep-fat frying or to facilitate even heat penetration during the cooking of previously block-frozen food such as spinach.

**Smooth:**

- A FOOD-CONTACT SURFACE having a surface free of pits and inclusions with a cleanability equal to or exceeding that of (100-grit) number 3

stainless steel.

- A NONFOOD-CONTACT SURFACE of EQUIPMENT having a surface equal to that of commercial grade hot-rolled steel free of visible scale.
- Deck, bulkhead, or deckhead that has an even or level surface with no roughness or projections to make it difficult to clean.

**Spa pool:** A POTABLE WATER or saltwater-supplied pool with temperatures and turbulence comparable to a WHIRLPOOL SPA.

General characteristics are

- Water temperature of 30°C-40°C or 86°F-104°F,
- Bubbling, jetted, or sprayed water effects that physically break at or above the water surface,
- Depth of more than 1 meter (3 feet), and
- Tub volume of more than 6 tons of water.

**Spill-resistant vacuum breaker (SVB):** A specific modification to a PVB to minimize water spillage.

**Spray pad:** The play and water contact area that is designed to have no standing water.

**Suction fitting:** A fitting in a RECREATIONAL WATER FACILITY under direct suction through which water is drawn by a pump.

**Swimming pool:** A RECREATIONAL WATER FACILITY greater than 1 meter in depth. This does not include SPA POOLS that meet this depth.

**Table-mounted equipment:** EQUIPMENT that is not PORTABLE and is designed to be mounted off the floor on a table, counter, or shelf.

**Tableware:** Eating, drinking, and serving UTENSILS for table use such as flatware including forks, knives, and spoons; hollowware including bowls, cups, serving dishes, and tumblers; and plates.

**Technical water:** Water that has not been chlorinated or PH controlled on board the vessel and that originates from a bunkering or condensate collection process, or SEAWATER processed through the evaporators or reverse osmosis plant and is intended for storage and use in the technical water system.

**Temperature-measuring device (TMD):** A thermometer, thermocouple, thermistor, or other device that indicates the temperature of food, air, or water and is numerically scaled in Celsius and/or Fahrenheit.

**Time/temperature control for safety food (TCS):** See POTENTIALLY HAZARDOUS FOOD (PHF).

**Transmission (of infection):** Any mechanism by which an infectious agent is spread from a source or reservoir to another person. These mechanisms are defined as follows:

- **Direct transmission (includes person-to-person transmission):** Direct and essentially immediate transfer of infectious agents to a receptive portal of entry through which human or animal infection may take place.
- **Indirect transmission:** Occurs when an infectious agent is transferred or carried by some intermediate item, organism, means, or process to a susceptible host, resulting in disease. Included are airborne, foodborne, waterborne, vehicleborne (e.g., fomites) and vectorborne modes of transmission.

**Turnover:** The circulation, through the recirculation system, of a quantity of water equal to the pool volume. For BABY-ONLY WATER FACILITIES, the entire volume of water must pass through all parts of the system to include filtration, secondary ultraviolet (UV) DISINFECTION, and halogenation once every 30 minutes.

**Utensil:** A food-contact implement or container used in storing, preparing, transporting, dispensing, selling, or serving food. Examples: KITCHENWARE or TABLEWARE that is multiuse, single-service, or single-use; gloves used in contact with food; food TEMPERATURE-MEASURING DEVICES; and probe-type price or identification tags used in contact with food.

**Utility sink:** Any sink located in a FOOD SERVICE AREA not intended for handwashing and/or WAREWASHING.

**Variance:** A written document issued by VSP that authorizes a modification or waiver of one or more requirements of these guidelines if, in the opinion of VSP, a health HAZARD or nuisance will not result from the modification or waiver.

**Wading pool:** RECREATIONAL WATER FACILITY with a maximum depth of less than 1 meter.

**Warewashing:** The cleaning and sanitizing of TABLEWARE, UTENSILS, and FOOD-CONTACT SURFACES of EQUIPMENT.

**Waterborne outbreak:** [U.S. Environmental Protection Agency definition] An outbreak involving at least two people who experience a similar illness after ingesting or using water intended for drinking or after being exposed to or unintentionally ingesting or inhaling fresh or marine water used for recreational purposes and epidemiological evidence implicates the water as the source of illness. A single case of chemical poisoning or a laboratory-confirmed case of primary amebic meningoencephalitis is considered an outbreak.

**Whirlpool spa:** A freshwater or SEAWATER pool designed to operate at a minimum temperature of 30°C (86°F) and maximum of 40°C (104°F) and equipped with either water or air jets.

**Whole-muscle, intact beef:** Whole-muscle beef that is not injected, MECHANICALLY TENDERIZED, reconstructed, or scored and marinated; and from which beef steaks may be cut.

### 3.3 Acronyms

|                   |   |
|-------------------|---|
| AGE               | ACUTE GASTROENTERITIS   |
| ANSI              | American National Standards Institute                                     |
| ASHRAE            | American Society of Heating, Refrigeration and Air-Conditioning Engineers |
| ASME              | American Society of Mechanical Engineers                                  |
| ASSE              | American Society of Safety Engineers                                      |
| ASTM              | American Society for Testing and Materials                                |
| C                 | Celsius   |
| CDC               | Centers for Disease Control and Prevention                                |
| CFR               | CODE OF FEDERAL REGULATIONS   |
| CIP               | CLEAN IN PLACE  |
| CT VALUE          | CONTACT TIME VALUE  |
| DGMQ              | Division of Global Migration and Quarantine                               |
| <i>E. coli</i>    | <i>Escherichia coli</i>   |
| EHO               | Environmental Health Officer  |
| EPA               | U.S. Environmental Protection Agency                                      |
| F                 | Fahrenheit  |
| FIFRA             | Federal Insecticide, Fungicide, and Rodenticide Act                       |
| FDA               | U.S. Food and Drug Administration   |
| HACCP             | HAZARD ANALYSIS AND CRITICAL CONTROL POINTS                               |
| HVAC              | heating, ventilation, and air conditioning                                |
| IATA              | International Air Transport Association                                   |
| IHR               | International Health Regulations  |
| IPM               | INTEGRATED PEST MANAGEMENT  |
| IPS               | iron pipe size  |
| ISO               | International Standards Organization                                      |
| MSDS              | material safety data sheets   |
| MG/L              | MILLIGRAMS PER LITER  |
| mV                | millivolt   |
| NCEH              | National Center for Environmental Health                                  |
| NSF International | National Sanitation Foundation International                              |
| OPRP              | Outbreak Prevention and Response Plan                                     |
| ORP               | oxidation reduction potential   |
| PH                | POTENS HYDROGEN   |
| PHF               | POTENTIALLY HAZARDOUS FOOD  |
| PHS               | U.S. Public Health Service (also USPHS)                                   |
| ppm               | parts per million   |

|             |   |
|-------------|---|
| RP ASSEMBLY | REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY |
| RO          | reverse osmosis   |
| RTE         | READY TO EAT  |
| RWF         | RECREATIONAL WATER FACILITY                             |
| USC         | United States Code                                      |
| USDA        | U.S. Department of Agriculture                          |
| USPHS       | U.S. Public Health Service                              |
| UV          | ultraviolet light                                       |
| VSP         | Vessel Sanitation Program                               |
| WHO         | World Health Organization                               |

## 4.0 Acute Gastroenteritis (AGE) Surveillance

This section includes the following subsections:

- 4.1 Data Collection
- 4.2 Notification
- 4.3 Clinical Specimens
- 4.4 Requirements for Isolating Symptomatic and Primary Contacts of Crew and Passengers with AGE
- 4.5 Knowledge

### 4.1 Data Collection

#### 4.1.1 Reportable Cases

##### 4.1.1.1 Definition

###### 4.1.1.1.1 Reportable Case Definition (02)

A reportable case of AGE is only a case reported to the master of the vessel, the medical staff, or other designated staff by a passenger or a crew member and meets the definition below.

A case is defined as

- Diarrhea (three or more episodes of loose stools in a 24 hour period or what is above normal for the individual. See section 4.1.2.1.3, illness symptoms); or
- Vomiting and one additional symptom including one or more episodes of loose stools in a 24-hour period, or abdominal cramps, or headache, or muscle aches, or fever (temperature of  $\geq 38^{\circ}\text{C}$  [ $100.4^{\circ}\text{F}$ ]);

**Nausea, although a common symptom of AGE, is specifically excluded from this definition to avoid misclassifying seasickness (nausea and vomiting) as AGE.**

###### 4.1.1.1.2 Onset Time (02)

The reportable cases must include crew members with a symptom onset time of up to 3 days before boarding the vessel. Maintain documentation of the 3-day assessment for each crew member with symptoms on the vessel for review during inspections. Retain this documentation for 12 months.

###### 4.1.1.1.3 Definition Purpose

**These case definitions are to be used for identifying and classifying cases, both of which are done for reporting purposes. They should not be used as criteria for clinical intervention or public health action. For many conditions of**

**public health importance, action to contain disease should be initiated as soon as a problem is identified; in many circumstances, appropriate public health action should be undertaken even though insufficient information is available to determine whether cases meet the case definition.**

#### **4.1.1.1.4 Foreign Quarantine Regulations**

U.S. foreign QUARANTINE regulations (42 CFR Part 71) require ships to immediately report on-board deaths and certain communicable illnesses to CDC's Division of Global Migration and QUARANTINE (DGMQ). These reports should be made to the CDC QUARANTINE Station with jurisdiction over the ship's next U.S. port of entry. Reporting requirements for ill passengers or crew are posted at <http://wwwnc.cdc.gov/travel/content/ill-reporting-maritime.aspx>.

The preferred method of reporting illnesses and deaths to DGMQ is electronically via the Maritime Illness and Death Reporting System (MIDRS) Web-based application. MIDRS reports may also be submitted by e-mail. If MIDRS is not available, ships may contact the appropriate QUARANTINE station directly by phone, fax, or e-mail.

- MIDRS Web site address: <https://www.cdc.gov/midrs/>.
- MIDRS e-mail address: [midrs@cdc.gov](mailto:midrs@cdc.gov).
- MIDRS administrative support: [MIDRS\\_DGMQAdmin@cdc.gov](mailto:MIDRS_DGMQAdmin@cdc.gov) or 888-892-1320 (Monday-Friday 8:00 am-4:00 pm EST).
- CDC QUARANTINE Station jurisdictions and contact information: <http://www.cdc.gov/quarantine/QuarantineStationContactListFull.html>.

For significant events or emergencies, ships should notify the appropriate CDC QUARANTINE Station by telephone. If the QUARANTINE station cannot be contacted immediately, please call the CDC Emergency Operations Center at 770-488-7100 or toll-free at 866-477-2553 (at-sea use).

General inquiries and information about quarantine regulations:  
Division of Global Migration and QUARANTINE  
MS E03, 1600 Clifton Road, Atlanta, GA 30333  
Web site: <http://www.cdc.gov/quarantine/>  
E-mail: [MIDRS\\_DGMQAdmin@cdc.gov](mailto:MIDRS_DGMQAdmin@cdc.gov)  
Phone: 404-639-1600

Centers for Disease Control and Prevention  
1600 Clifton Road, Atlanta, GA 30333  
Phone: 800-CDC-INFO (800-232-4636) TTY: 888-232-6348  
Email: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)

## 4.1.2 Records

### 4.1.2.1 Log

#### 4.1.2.1.1 **Responsibility (02)**

A standardized AGE surveillance log for each cruise must be maintained daily by the master of the vessel, the medical staff, or other designated staff.

#### 4.1.2.1.2 **Required Information (02)**

The AGE surveillance log must list

- The name of the vessel, cruise dates, and cruise number.
- All reportable cases of AGE.
- All passengers and crew members who are dispensed antidiarrheal medication from the master of the vessel, medical staff, or other designated staff.

#### 4.1.2.1.3 **Log Details (02)**

The AGE surveillance log entry for each passenger or crew member must contain the following information in separate columns:

- Date of the first medical visit or report to staff of illness.
- Time of the first medical visit or report to staff of illness.
- Case identification number.
- Person's name.
- Person's age.
- Person's sex.
- Designation as passenger or crew member.
- Crew member position or job on the vessel, if applicable.
- Cabin number.
- Meal seating information.
- DATE OF ILLNESS ONSET.
- TIME OF ILLNESS ONSET.
- Illness symptoms, including the presence or absence of the following selected signs and symptoms, with a separate column for each of the following:
  - Number of episodes of diarrhea in a 24-hour period.
  - Number of episodes of vomiting in a 24-hour period.
  - Bloody stools.
  - Recorded temperature.

- Abdominal cramps.
- Headaches.
- Muscle aches.
- Entry (yes/no) for whether this was a reportable case.
- Entry (yes/no) for antidiarrheal medications sold or dispensed by designated medical staff.
- Presence of underlying medical conditions that may affect interpretation of AGE; for example, diabetic diarrhea, inflammatory bowel disease, gastrectomy, antibiotic-induced diarrhea, vomiting from chemotherapy, ear infections in children or others.

The AGE surveillance log must contain the above information in this exact order and entered in the template in Annex 13.2.2. The log data must be exported in the exact order as in the example template in Annex 13.2.2 with analyzable formats such as Excel or Access. Any additional data fields must be entered only outside of the form margins when exported to VSP.

#### **4.1.2.1.4 Medications Sold or Dispensed (02)**

Antidiarrheal medications must not be sold or dispensed to passengers or crew except by designated medical staff.

### **4.1.2.2 Questionnaires**

#### **4.1.2.2.1 Food/Beverage Questionnaire (02)**

Questionnaires detailing activities and meal locations for the 72 hours before illness onset must be distributed to all passengers and crew members who are AGE CASES. The self-administered questionnaires must contain all of the data elements that appear in the questionnaire found in Annex 13.2.2. Completed questionnaires must be maintained with the AGE surveillance log.

**To assist passengers and crew members with filling out the self-administered questionnaires, the following information for the most current cruise may be maintained at the medical center:**

- **Menus, food, and drink selections available at each venue on the vessel, from room service, and on private islands.**
- **Menus, food, and drink selections available for each vessel-sponsored excursion.**
- **Organized activities on the vessel or private islands.**
- **Cruise line sponsored pre-embarkation activities.**

**To assist memory recall for guests and crew completing the 72-hour self-administered questionnaire, an electronic listing of the above information on an interactive system available via an onboard video system can be substituted for the package in the medical center.**

#### **4.1.2.3 Retention**

##### **4.1.2.3.1 Retention and Review (02)**

The following records must be maintained on board for 12 months and available for review by VSP during inspections and outbreak investigations:

- Medical log/record.
- AGE surveillance log.
- 72-hour self-administered questionnaires.
- Interviews with cabin mates and immediate contacts of crew members with AGE (initial, 24-, and 48-hour).
- Documentation of the 3-day assessment of crew members **with AGE** symptoms before joining the vessel.
- Documentation of the date and time of last symptom and clearance to return to work for FOOD and nonFOOD EMPLOYEES.
- Documentation of the date and time of verbal interviews with asymptomatic cabin mates and immediate contacts of symptomatic crew.

**Electronic records of these documents are acceptable as long as the data are complete and can be retrieved during inspections and outbreak investigations.**

#### **4.1.2.4 Confidentiality**

##### **4.1.2.4.1 Privacy**

All personal medical information received by CDC personnel must be protected in accordance with applicable federal LAW, including 5 U.S.C. Section 552a. Privacy Act - Records maintained on individuals and the Freedom of Information Act 5 U.S.C. Section 552. Administrative Procedure - Public information; agency rules, opinions, orders, records, and proceedings.

## **4.2 Notification**

### **4.2.1 Routine Report**

#### **4.2.1.1 Routine Report Timing**

#### **4.2.1.1.1 24-hour Report (01)**

The master, medical staff, or other designated staff of a vessel destined for a U.S. port from a foreign port must submit at least one standardized AGE report based on the number of reportable cases in the AGE log to VSP no less than 24 hours—but not more than 36 hours—before the vessel’s expected arrival at the U.S. port.

#### **4.2.1.1.2 4-hour Update Report (01)**

If the number of cases changes after submission of the initial report, an updated report must be submitted no less than 4 hours before the vessel’s arrival at the U.S. port. The 4-hour update report must be a cumulative total count of the reported crew and passengers during the entire cruise, including the additional cases.

#### **4.2.1.1.3 Report Submission (02)**

Submit routine 24-hour and 4-hour update reports electronically. **In lieu of electronic notification, the reports may be submitted by telephone or fax.** The vessel must maintain proof onboard that the report was successfully received by VSP.

### **4.2.1.2 Report Contents**

#### **4.2.1.2.1 Contents (01)**

The AGE report must contain the following:

- Name of the vessel.
- Port of embarkation.
- Date of embarkation.
- Port of disembarkation.
- Date of disembarkation.
- Total numbers of reportable cases of AGE among passengers, including those who have disembarked because of illness—even if the number is 0 (zero reporting).
- Total numbers of reportable cases of AGE among crew members, including those who have disembarked because of illness—even if the number is 0 (zero reporting).
- Total number of passengers and crew members on the cruise.

#### **4.2.1.2.2 Cruise Length**

**For cruises lasting longer than 15 days before entering a U.S. port, the AGE report may include only those reportable cases and total numbers of passengers and crew members for the 15 days before the expected arrival at a U.S. port.**

## 4.2.2 Special Report

### 4.2.2.1 Special Report Timing

#### **4.2.2.1.1 2% and 3% Illness Report (01)**

The master or designated corporate representative of a vessel with an international itinerary destined for a U.S. port must submit a special report at any time during a cruise, including between two U.S. ports, when the cumulative percentage of reportable cases entered in the AGE surveillance log reaches 2% among passengers or 2% among crew and the vessel is within 15 days of expected arrival at a U.S. port.

A telephone notification to VSP must accompany the special 2% report.

A second special report must be submitted when the cumulative percentage of reportable cases entered in the AGE surveillance log reaches 3% among passengers or 3% among crew and the vessel is within 15 days of expected arrival at a U.S. port.

#### **4.2.2.1.2 Daily Updates (01)**

Daily updates of illness status must be submitted as requested by VSP after the initial submission of a special report. **Daily updates may be submitted electronically, by telephone, fax, e-mail, or as requested by VSP.**

#### **4.2.2.1.3 Routine Reporting Continues (01)**

Routine reports (24-hour and 4-hour) must continue to be submitted by the master or designated corporate representative of a vessel that has submitted a special report.

## 4.2.3 Report Retention

### 4.2.3.1 Retention

#### **4.2.3.1.1 Retention (02)**

The 24-hour, 4-hour, and special reports must be maintained on the vessel for 12 months.

#### **4.2.3.1.2 Review (02)**

The reports must be available for review by VSP during inspections and outbreak investigations.

## 4.3 Clinical Specimens

### 4.3.1 Clinical Specimen Submission

See Annex 13.4 for a list of recommended specimen collection supplies.

#### 4.3.1.1 Specimen/Shipping Containers (02)

The medical staff will be responsible for maintaining a supply of at least 10 clinical specimen collection containers for both viral and bacterial agents (10 for each), as well as a shipping container that meets the latest shipping requirements of the International Air Transport Association (IATA) and U.S. Department of Transportation for Biological Substances, Category B designated shipments (or higher).

The vessel must maintain the appropriate labels and markings required for shipping Biological Substances, Category B shipments. The vessel must maintain appropriate refrigerant materials to keep clinical specimens cool. For guidance, see Annex 13.4 of this manual. **Specific information on vendors where supplies may be ordered is provided on the VSP Web site (<http://www.cdc.gov/nceh/vsp>).**

### 4.3.2 Clinical Specimen Submission Collection Procedures

#### 4.3.2.1 When to Collect (02)

When a vessel reaches 2% REPORTABLE AGE in either passengers or crew members, the medical staff will begin collecting clinical specimens (stool or vomitus specimens) for bacterial and viral analysis. If the etiologic agent is suspected to be parasitic, the medical staff should consult with VSP epidemiology staff for clinical specimen collection requirements.

#### 4.3.2.2 Proper Packing (02)

All clinical specimens must be packed and shipped in accordance with the guidelines outlined in Annex 13.4 and the specific details provided on the VSP Web site (<http://www.cdc.gov/nceh/vsp>). The specimen packaging must include the proper documentation as required by the receiving laboratory.

## 4.4 Requirements for Isolating Symptomatic and Primary Contacts of Crew and Passengers with Gastroenteritis

### 4.4.1 Crew, Staff, Officers, and Other Employees

#### 4.4.1.1 Isolate Ill Crew

#### **4.4.1.1.1 Symptomatic and Meeting the Case Definition for Acute Gastroenteritis (AGE) (11 C)**

##### FOOD EMPLOYEES:

- Isolate in cabin or designated restricted area until symptom-free for a minimum of 48 hours.
- Follow-up with and receive approval by designated medical personnel before returning crew to work.
- Document date and time of last symptom and clearance to return to work.

##### NonFOOD EMPLOYEES:

- ISOLATION in cabin or designated restricted area until symptom-free for a minimum of 24 hours.
- Follow-up with and receive approval by designated medical personnel before returning crew to work.
- Document the date and time of last symptom and clearance to return to work.

#### **4.4.1.1.2 Hygiene and Handwashing Facts (02)**

Advise symptomatic crew of hygiene and handwashing facts and provide written handwashing and hygiene fact sheets.

#### **4.4.1.2 Cabin Mates/Contacts (02)**

##### **4.4.1.2.1 Asymptomatic Cabin Mates or Immediate Contacts of Symptomatic Crew**

##### FOOD and nonFOOD EMPLOYEES:

- Restrict exposure to symptomatic crew member(s).
- Undergo a verbal interview with medical or supervisory staff, who will confirm their condition, provide facts and a written fact sheet about hygiene and handwashing, and instruct them to report immediately to medical if they develop illness symptoms.
- Complete a verbal interview daily with medical or supervisory staff until 48 hours after the ill crew members' symptoms began. The first verbal interview must be conducted within 8 hours from the time the ill crew member initially reported to the medical staff. If the asymptomatic immediate contact or cabin mate is at work, he or she must be contacted by medical or supervisory staff as soon as possible. The date and time of verbal interviews must be documented.

## 4.4.2 Passengers

### 4.4.2.1 Isolate Ill Passengers (11 C)

Symptomatic and meeting the case definition for AGE:

- Advise them to remain isolated in their cabins until well for a minimum of 24 hours after symptom resolution.
- Follow-up by infirmary personnel is advised.

### 4.4.2.2 Hygiene and Handwashing Facts (02)

Advise symptomatic passengers of hygiene and handwashing facts and provide written handwashing and hygiene fact sheets.

## 4.5 Acute Gastroenteritis Surveillance Knowledge

### 4.5.1 Demonstration of Knowledge (44)

The supervisor or PERSON IN CHARGE of medical operations related to AGE on the vessel must demonstrate to VSP—on request during inspections—knowledge of medical operations related to AGE. The supervisor or PERSON IN CHARGE must demonstrate this knowledge by compliance with this section of these guidelines or by responding correctly to the inspector's questions as they relate to the specific operation. In addition, the supervisor or PERSON IN CHARGE of medical operations related to AGE on the vessel must ensure that employees are properly trained to comply with this section of the guidelines in this manual as it relates to their assigned duties.

## 5.0 Potable Water

This section includes the following subsections:

- 5.1 Source
- 5.2 Bunker and Production Halogenation and pH Control
- 5.3 POTABLE WATER System
- 5.4 POTABLE WATER System Chemical Treatment
- 5.5 POTABLE WATER System HALOGEN Monitoring
- 5.6 Microbiologic Monitoring
- 5.7 Water Distribution System Protection
- 5.8 Knowledge

### 5.1 Source

#### 5.1.1 Bunkering

##### 5.1.1.1 Standards

###### **5.1.1.1.1 Safe Source (03 C)**

DRINKING WATER bunkered from shore supplies must be from a potable source that meets World Health Organization standards for POTABLE WATER.

##### 5.1.1.2 Microbiologic Sample Reports

###### **5.1.1.2.1 Water Report (06)**

Where available, the vessel must have a copy of the most recent microbiologic report from each port before bunkering POTABLE WATER to verify that the water meets potable standards. The date of the analysis report must be 30 days or less from the date of POTABLE WATER bunkering and must include an analysis for *Escherichia coli* at a minimum.

###### **5.1.1.2.2 Onboard Test (06)**

**Water samples collected and analyzed by the vessel for the presence of *E. coli* may be substituted for the microbiologic report from each port water system.** The samples must be analyzed using a method accepted in Standard Methods for the Examination of Water and Wastewater. Test kits, incubators, and associated EQUIPMENT must be operated and maintained in accordance with the manufacturers' specifications. **If a vessel bunkers POTABLE WATER from the same port more than once per month, only one test per month is required.**

#### **5.1.1.2.3 Review (06)**

These records must be maintained on the vessel for 12 months and must be available for review during inspections.

### **5.1.2 Water Production**

#### **5.1.2.1 Location**

##### **5.1.2.1.1 Polluted Harbors (03 C)**

A reverse osmosis unit, distillation plant, or other process that supplies water to the vessel's POTABLE WATER system must only operate while the vessel is MAKING WAY. These processes must not operate in polluted areas, HARBORS, or at anchor.

##### **5.1.2.1.2 Technical Water**

**A reverse osmosis unit or evaporator with a completely separate plant/process, piping system, and connections from the POTABLE WATER system, may be used to produce TECHNICAL WATER while in polluted areas, HARBORS, at anchor, or while not MAKING WAY.**

## **5.2 Bunkering and Production Halogenation and pH Control**

### **5.2.1 Procedures**

#### **5.2.1.1 Residual Halogen and pH**

##### **5.2.1.1.1 Halogen and pH Level (03 C)**

POTABLE WATER must be continuously HALOGENATED to at least 2.0 MG/L (ppm) free residual HALOGEN at the time of bunkering or production with an automatic halogenation device. Adjust the PH so it does not exceed 7.8.

The amount of HALOGEN injected during bunkering or production must be controlled by a flow meter or a free HALOGEN analyzer.

##### **5.2.1.1.2 Within 30 Minutes (08)**

The free HALOGEN residual level must be adjusted to at least 2.0 MG/L (ppm) within 30 minutes of the start of the bunkering and production processes.

#### **5.2.1.2 Monitoring**

##### **5.2.1.2.1 Bunkering Pretest (08)**

A free HALOGEN residual and PH test must be conducted on the shore-side water supply before starting the POTABLE WATER bunkering process to establish the correct HALOGEN dosage.

The results of the pretest must be recorded and available for review during inspections.

**5.2.1.2.2 Bunkering/Production Test (08)**

After the free residual HALOGEN level of at least 2.0 MG/L (ppm) and PH level not exceeding 7.8 have been reached, the free residual HALOGEN and PH monitoring must be performed at least hourly during the bunkering of POTABLE WATER.

After the free residual HALOGEN level of at least 2.0 MG/L (ppm) and PH level not exceeding 7.8 have been reached, free residual HALOGEN and PH monitoring must be performed at least once every 4 hours during the production of POTABLE WATER.

**5.2.1.2.3 Records (08)**

Accurate records of this monitoring must be maintained aboard for 12 months and must be available for review during inspections.

**5.2.1.2.4 Analyzer-chart Recorders (06)**

HALOGEN and PH analyzer-chart recorders used in lieu of manual tests and logs must be calibrated at the beginning of bunkering or production, and the calibration must be recorded on the chart.

**5.2.1.2.5 Construction (06)**

HALOGEN and PH analyzer-chart recorders used on bunker water systems must be constructed and installed according to the manufacturer's guidelines.

**5.2.1.2.6 Data Logger**

**Electronic data loggers with certified data security features may be used in lieu of chart recorders.**

**5.2.1.2.7 Halogen Injection (08)**

Water samples for HALOGEN and PH testing must be obtained from a sample cock and/or a HALOGEN analyzer probe located on the bunker or production water line at least 3 meters (10 feet) after the HALOGEN injection point and before the storage tank.

**A static mixer may be used to reduce the distance between the HALOGEN injection point and the sample cock or HALOGEN analyzer sample point.** If used, the mixer must be installed per the manufacturer's recommendations. A copy of all manufacturers' literature for installation, operation, and maintenance **must be maintained.**

#### **5.2.1.2.8 Tank Sample**

**In the event of EQUIPMENT failure, bunker or production water HALOGEN samples may also be taken from POTABLE WATER TANKS that were previously empty.**

### **5.3 Potable Water System**

#### **5.3.1 Potable Water Tanks**

##### **5.3.1.1 Protection**

###### **5.3.1.1.1 Potable Water Tank Walls (07 C)**

POTABLE WATER TANKS must not share a common wall with the hull of the vessel or with tanks or piping containing nonpotable water or other liquids.

###### **5.3.1.1.2 Nonpotable Piping (08)**

Piping systems carrying SEWAGE or other nonpotable liquids must not pass through POTABLE WATER TANKS. Minimize the use of nonpotable lines above POTABLE WATER TANKS. Nonpotable lines above POTABLE WATER TANKS must not have any mechanical couplings.

For SCUPPER lines, factory assembled transition fittings for steel to plastic pipes are allowed when manufactured per American Society for Testing and Materials (ASTM) F1973 or equivalent standard.

###### **5.3.1.1.3 Coatings (08)**

Interior coatings on POTABLE WATER TANKS must be APPROVED for POTABLE WATER contact by a certification organization. Follow all manufacturers' recommendations for application, drying, and curing.

The following must be maintained on board for the tank coatings used:

- Written documentation of approval from the certification organization (independent of the coating manufacturer).
- Manufacturers' recommendations for application, drying, and curing.
- Written documentation that the manufacturers' recommendations have been followed for application, drying, and curing.

### 5.3.1.2 Tank Construction

#### 5.3.1.2.1 *Identification (08)*

POTABLE WATER TANKS must be identified with a number and the words “**POTABLE WATER**” in letters at least 13 millimeters (0.5 inch) high.

#### 5.3.1.2.2 *Sample Cocks (08)*

POTABLE WATER TANKS must have labeled sample cocks that are turned down. They must be identified and numbered with the appropriate tank number.

#### 5.3.1.2.3 *Vent/Overflow (08)*

The POTABLE WATER TANKS, vents, and overflows must be protected from CONTAMINATION.

#### 5.3.1.2.4 *Level Measurement (08)*

Any device for determining the depth of water in the POTABLE WATER TANKS must be constructed and maintained so as to prevent contaminated substances or liquids from entering the tanks.

#### 5.3.1.2.5 *Manual Sounding (08)*

Manual sounding of POTABLE WATER TANKS must be performed only in emergencies and must be performed in a sanitary manner.

### 5.3.2 Potable Water Piping

#### 5.3.2.1 Protection

##### 5.3.2.1.1 *Identification (08)*

POTABLE WATER lines must be striped or painted either in accordance with ISO 14726 (blue/green/blue) or blue only.

DISTILLATE and PERMEATE lines directed to the POTABLE WATER system must be striped or painted in accordance with ISO 14726 (blue/gray/blue).

Other lines must not have the above color designations.

These lines must be striped or painted at 5 meter (15 feet) intervals and on each side of partitions, decks, and bulkheads except where decor would be marred by such markings. This includes POTABLE WATER supply lines in technical lockers.

POTABLE WATER lines after reduced pressure assemblies must not be striped or painted as POTABLE WATER.

**Striping is not required in FOOD AREAS of the vessel because only POTABLE WATER is permitted in these areas.**

All refrigerant brine lines in all galleys, pantries, and cold rooms must be uniquely identified to prevent CROSS-CONNECTIONS.

**5.3.2.1.2 Protection (07 C)**

POTABLE WATER piping must not pass under or through tanks holding nonpotable liquids.

**5.3.2.1.3 Bunker Connection (08)**

The POTABLE WATER bunker filling line must begin either horizontally or pointing downward and at a point at least 460 millimeters (18 inches) above the bunker station deck.

**5.3.2.1.4 Cap/Keeper Chain (08)**

The POTABLE WATER filling line must have a screw cap fastened by a NONCORRODING cable or chain to an adjacent bulkhead or surface in such a manner that the cap cannot touch the deck when hanging free.

The hose connections must be unique and fit only the POTABLE WATER hoses.

**5.3.2.1.5 Identification (08)**

Each bunker station POTABLE WATER filling line must be striped or painted blue or in accordance with the color designation in ISO 14726 (blue/green/blue) and clearly labeled “**POTABLE WATER FILLING**” in letters at least 13 millimeters (0.5 inch) high, stamped on a noncorrosive label plate or the equivalent, and located at or near the point of the hose connection.

**5.3.2.1.6 Technical Water (08)**

If used on the vessel, TECHNICAL WATER must be bunkered through separate piping using fittings incompatible for POTABLE WATER bunkering.

**5.3.2.1.7 Different Piping (08)**

TECHNICAL WATER must flow through a completely different piping system.

### 5.3.3 Potable Water Hoses

#### 5.3.3.1 Construction

##### 5.3.3.1.1 **Fittings (08)**

POTABLE WATER hoses must have unique fittings from all other hose fittings on the vessel.

##### 5.3.3.1.2 **Identification (08)**

POTABLE WATER hoses must be labeled for use with the words “POTABLE WATER ONLY” in letters at least 13 millimeters (0.5 inch) high at each connecting end.

##### 5.3.3.1.3 **Construction (08)**

All hoses, fittings, and water filters used in the bunkering of POTABLE WATER must be constructed of safe, EASILY CLEANABLE materials APPROVED for POTABLE WATER use and must be maintained in good repair.

##### 5.3.3.1.4 **Other Equipment (08)**

Other EQUIPMENT and tools used in the bunkering of POTABLE WATER must be constructed of safe, EASILY CLEANABLE materials, dedicated solely for POTABLE WATER use, and maintained in good repair.

##### 5.3.3.1.5 **Locker Construction (08)**

POTABLE WATER hose lockers must be constructed of SMOOTH, nontoxic, corrosion resistant, EASILY CLEANABLE material and must be maintained in good repair.

##### 5.3.3.1.6 **Locker Identification (08)**

POTABLE WATER hose lockers must be labeled “POTABLE WATER HOSE AND FITTING STORAGE” in letters at least 13 millimeters (0.5 inch) high.

##### 5.3.3.1.7 **Locker Height (08)**

POTABLE WATER hose lockers must be mounted at least 460 millimeters (18 inches) above the deck and must be self draining.

##### 5.3.3.1.8 **Locker Closed (08)**

Locker doors must be closed when not in use.

##### 5.3.3.1.9 **Locker Restriction (08)**

The locker must not be used for any other purpose than storing POTABLE WATER EQUIPMENT such as hoses, fittings, sanitizing

buckets, SANITIZER solution, etc.

### 5.3.3.2 Handling

#### 5.3.3.2.1 **Limit Use (08)**

POTABLE WATER hoses must not be used for any other purpose.

#### 5.3.3.2.2 **Handling (08)**

All hoses, fittings, water filters, buckets, EQUIPMENT, and tools used for connection with the bunkering of POTABLE WATER must be handled and stored in a sanitary manner.

#### 5.3.3.2.3 **Contamination Prevention (08)**

POTABLE WATER hoses must be handled with care to prevent CONTAMINATION from dragging their ends on the ground, pier, or deck surfaces, or from dropping the hose into contaminated water, such as on the pier or in the HARBOR.

#### 5.3.3.2.4 **Flush/Drain (08)**

POTABLE WATER hoses must be flushed with POTABLE WATER before being used and must be drained after each use.

#### 5.3.3.2.5 **Storage (08)**

POTABLE WATER hoses must be rolled tight with the ends capped, on reels, or on racks, or with ends coupled together and stowed in POTABLE WATER hose lockers.

### 5.3.4 Potable Water System Contamination

#### 5.3.4.1 Cleaning and Disinfection

##### 5.3.4.1.1 **Disinfecting (07 C)**

POTABLE WATER TANKS and all affected parts of the POTABLE WATER distribution system must be cleaned, disinfected, and flushed with POTABLE WATER:

- Before being placed in service;
- Before returning to operation after repair, replacement; or
- After being subjected to any CONTAMINATION, including entry into a POTABLE WATER tank.

##### 5.3.4.1.2 **Annual Inspection (08)**

POTABLE WATER TANKS must be inspected, cleaned, and disinfected during dry docks and wet docks, or every 2 years, whichever is less.

##### 5.3.4.1.3 **Record Retention (08)**

Documentation of all inspections, maintenance, cleaning, and DISINFECTION must be maintained for 12 months and must be available for review during inspections.

Records must include method of DISINFECTION, concentration and contact time of the DISINFECTANT, and a recorded HALOGEN value of less than or equal to 5 ppm before the tank is put back into service.

**5.3.4.1.4 *Disinfection Residual (07 C)***

DISINFECTION after potential CONTAMINATION must be accomplished by increasing the free residual HALOGEN to at least 50 MG/L (ppm) throughout the affected area and maintaining this concentration for 4 hours or by way of another procedure submitted to and accepted by VSP.

**In an emergency, this contact time may be shortened to 1 hour by increasing free residual HALOGEN to at least 200 MG/L (ppm) throughout the affected area.**

**5.3.4.1.5 *Documentation (08)***

The free HALOGEN residual level must be documented.

**5.3.4.1.6 *Flush (08)***

The disinfected parts of the system must be flushed with POTABLE WATER or otherwise dechlorinated until the free residual HALOGEN is  $\leq 5.00$  MG/L (ppm). The free HALOGEN test result must be documented.

**5.3.4.1.7 *Alternative Method (08)***

An alternative POTABLE WATER tank cleaning and DISINFECTION procedure that is **ONLY** APPROVED for routine cleaning and DISINFECTION and is **NOT** APPROVED for known or suspected contaminated tanks follows:

- 1) Remove (strip) all water from the tank.
- 2) Clean all tank surfaces, including filling lines, etc., with an appropriate detergent.
- 3) Thoroughly rinse surfaces of the tank with POTABLE WATER and strip this water.
- 4) Wet all surfaces of the tank with at least a 200 MG/L (ppm) solution of chlorine (this can be done using new, clean mops, rollers, sprayers, etc.). The chlorine test to ensure at least 200 MG/L (ppm) chlorine must be documented.
- 5) Ensure that tank surfaces remain wet with the chlorine solution for at least 2 hours.
- 6) Refill the tank and verify that the chlorine level is

≤ 5.0 MG/L (ppm) before placing the tank back into service.  
The chlorine test result must be documented.

## 5.4 Potable Water System Chemical Treatment

### 5.4.1 Chemical Injection Equipment

#### 5.4.1.1 Construction and Installation

##### 5.4.1.1.1 *Recommended Engineering Practices (06)*

All distribution water system chemical injection EQUIPMENT must be constructed and installed in accordance with recommended engineering practices.

#### 5.4.1.2 Operation

##### 5.4.1.2.1 *Halogen Residual (04 C)*

The halogenation injection EQUIPMENT must provide continuous halogenation of the POTABLE WATER distribution system and must maintain a free residual HALOGEN of  $\geq 0.2$  MG/L (ppm) and  $\leq 5.0$  MG/L (ppm) throughout the distribution system.

##### 5.4.1.2.2 *Controlled (08)*

The amount of chemicals injected into the POTABLE WATER system must be analyzer controlled.

##### 5.4.1.2.3 *Halogen Backup Pump (06)*

At least one backup HALOGEN pump must be installed with an active, automatic switchover feature to maintain the free residual HALOGEN in the event that the primary pump fails, an increase in demand occurs, or the low chlorine alarm sounds.

## 5.5 Potable Water System Halogen Monitoring

### 5.5.1 Halogen Analyzer-chart Recorder

#### 5.5.1.1 Installation

##### 5.5.1.1.1 *Distant Point (06)*

A HALOGEN analyzer-chart recorder must be installed at a distant point in the POTABLE WATER distribution system where a significant water flow exists and represents the entire distribution system. In cases where multiple distribution loops exist and no pipes connect the loops, there must be an analyzer and chart recorder for each loop.

#### **5.5.1.1.2 Data Logger**

**Electronic data loggers with certified data security features may be used in lieu of chart recorders.**

### **5.5.1.2 Operation**

#### **5.5.1.2.1 Maintenance (06)**

The HALOGEN analyzer-chart recorder must be properly maintained and must be operated in accordance with the manufacturer's instructions.

A manual comparison test must be conducted daily to verify calibration. Calibration must be made whenever the manual test value is > 0.2 ppm higher or lower than the analyzer reading.

#### **5.5.1.2.2 Calibration (06)**

The daily manual comparison test or calibration must be recorded either on the recorder chart or in a log.

#### **5.5.1.2.3 Accuracy (05)**

The free residual HALOGEN measured by the HALOGEN analyzer must be  $\pm 0.2$  MG/L (ppm) of the free residual HALOGEN measured by the manual test.

#### **5.5.1.2.4 Test Kit (06)**

The HALOGEN test kit used to calibrate the HALOGEN analyzer must be accurate to within 0.2 MG/L (ppm) for HALOGEN and graduated in increments no greater than 0.2 MG/L (ppm) in the range of free residual HALOGEN normally maintained in the POTABLE WATER system.

Ensure that all reagents used with the test kit are not past their expiration dates.

Where available, ensure that appropriate secondary standards are onboard for electronic test kits to verify test kit operation.

### **5.5.2 Halogen Analyzer Charts**

#### **5.5.2.1 Chart Design**

##### **5.5.2.1.1 Range (06)**

HALOGEN analyzer-chart recorder charts must have a range of 0.0 to 5.0 MG/L (ppm) and have a recording period of—and limited to—24 hours.

#### **5.5.2.1.2 Data Logger (06)**

Electronic data loggers with certified data security features used in lieu of chart recorders must produce records that conform to the principles of operation and data display required of the analog charts, including printing the records.

#### **5.5.2.1.3 Increments (06)**

Electronic data logging must be in increments of  $\leq 15$  minutes.

### **5.5.2.2 Operation**

#### **5.5.2.2.1 Charts (06)**

HALOGEN analyzer-chart recorder charts must be changed, initialed, and dated daily. Charts must contain notations of any unusual events in the POTABLE WATER system.

#### **5.5.2.2.2 Retention (06)**

HALOGEN analyzer-chart recorder charts must be retained for at least 12 months and must be available for review during inspections.

#### **5.5.2.2.3 Chart Review (06)**

Records from the HALOGEN analyzer-chart recorder must verify the free residual HALOGEN of  $\geq 0.2$  MG/L (ppm) and  $\leq 5.0$  MG/L (ppm) in the water distribution system for at least 16 hours in each 24-hour period since the last inspection of the vessel.

### **5.5.3 Manual Halogen Monitoring**

#### **5.5.3.1 Equipment Failure**

##### **5.5.3.1.1 Every 4 hours (06)**

Free residual HALOGEN must be measured by a manual test kit at the HALOGEN analyzer at least every 4 hours in the event of EQUIPMENT failure.

##### **5.5.3.1.2 Recording (06)**

Manual readings must be recorded on a chart or log, retained for at least 12 months, and available for review during inspections.

##### **5.5.3.1.3 Limit (06)**

Repairs on malfunctioning HALOGEN analyzer-chart recorders must be completed within 10 days of EQUIPMENT failure.

##### **5.5.3.1.4 Alarm (06)**

Provide an audible alarm in a continuously occupied watch station

(e.g., the engine control room) to indicate low and high free HALOGEN readings at the distant point analyzer.

## 5.6 Microbiologic Monitoring

### 5.6.1 Sampling and Analysis

#### 5.6.1.1 Methodology

##### 5.6.1.1.1 Samples (06)

A minimum of four POTABLE WATER samples per month must be collected and analyzed for the presence of *E. coli*. Samples must be collected from the forward, aft, upper, and lower decks of the vessel.

Sample sites must be changed each month ensure that all of the POTABLE WATER distribution system is effectively monitored.

Follow-up sampling must be conducted for each positive test result.

**Microbiological samples from ice machines and POTABLE WATER storage tanks do not count toward the monthly routine distribution system monitoring.**

##### 5.6.1.1.2 Analysis (06)

Samples must be analyzed using a method accepted in Standard Methods for the Examination of Water and Wastewater. Test kits, incubators, and associated EQUIPMENT must be operated and maintained in accordance with the manufacturers' specifications.

#### 5.6.1.2 Records

##### 5.6.1.2.1 Records (06)

Sample results must be maintained onboard the vessel for at least 12 months and must be available for review during inspections.

## 5.7 Water Distribution System Protection

### 5.7.1 Cross-connection Control

#### 5.7.1.1 Program

##### 5.7.1.1.1 Cross-connections (07 C)

The POTABLE WATER distribution system must be maintained free of CROSS-CONNECTIONS.

### **5.7.1.1.2 Protection (07 C)**

The POTABLE WATER system must be protected against BACKFLOW or other CONTAMINATION by BACKFLOW PREVENTION DEVICES or AIR GAPS. The PERMEATE lines and DISTILLATE lines directed toward the POTABLE WATER system must also be protected.

### **5.7.1.1.3 Control/Program (08)**

The vessel must provide a comprehensive CROSS-CONNECTION control program.

The following connections to the POTABLE WATER system must be protected against BACKFLOW (BACKSIPHONAGE or BACKFLOW) with AIR GAPS or mechanical BACKFLOW PREVENTION DEVICES:

- RWFs such as SWIMMING POOLS, CHILDREN’S/WADING POOLS, WHIRLPOOL SPAS, and similar facilities.
- Decorative water features/fountains.
- Cabin shower hoses, toilets, whirlpool tubs, and similar facilities.
- Photographic laboratory developing machines and UTILITY SINKS.
- Beauty and barber shop spray-rinse hoses.
- Spa steam generators where essential oils can be added.
- Hose-bib connections.
- Garbage grinders and FOOD WASTE SYSTEMS.
- Automatic galley hood washing systems.
- Food service EQUIPMENT such as coffee machines, ice machines, juice dispensers, combination ovens, and similar EQUIPMENT.
- Mechanical WAREWASHING machines.
- Detergent dispensers.
- Hospital and laundry EQUIPMENT.
- Air conditioning expansion tanks.
- Boiler feed water tanks.
- Fire system.
- Public toilets, urinals, and shower hoses.
- POTABLE WATER, bilge, and pumps that require priming.
- Freshwater or saltwater ballast systems.
- International fire and fire sprinkler water connections. An RP ASSEMBLY is the only allowable device for this connection.
- The POTABLE WATER supply to automatic window washing systems that can be used with chemicals or chemical mix tanks.
- Water softeners for nonpotable fresh water.
- Water softener and mineralizer drain lines including backwash drain lines. The only allowable protections for these lines are an AIR GAP or an RP ASSEMBLY.

- High saline discharge line from evaporators. The only allowable protections for these lines are an AIR GAP or an RP ASSEMBLY.
- Chemical tanks.
- Other connections between the POTABLE WATER system and a nonpotable water system such as the GRAY WATER system, laundry system or TECHNICAL WATER system. The only allowable forms of protection for these connections are an AIR GAP or an RP ASSEMBLY.
- BLACK WATER or combined GRAY WATER/BLACK WATER systems. An AIR GAP is the only allowable protection for these connections.
- Any other connection to the POTABLE WATER system where CONTAMINATION or BACKFLOW can occur.

#### **5.7.1.1.4 Log (08)**

A CROSS-CONNECTION control program must include at a minimum: a complete listing of CROSS-CONNECTIONS and the BACKFLOW prevention method or device for each, so there is a match to the PLUMBING SYSTEM component and location. AIR GAPS must be included in the listing.

**AIR GAPS on faucet taps do not need to be included on the CROSS-CONNECTION control program listing.**

The program must set a schedule for inspection frequency. **Repeat devices such as toilets may be grouped under a single device type.**

A log documenting the inspection and maintenance in written or electronic form must be maintained and be available for review during inspections.

### **5.7.1.2 Device Installation**

#### **5.7.1.2.1 Air Gaps and Backflow Prevention Devices (08)**

AIR GAPS should be used where feasible and where water under pressure is not required.

BACKFLOW PREVENTION DEVICES must be installed when AIR GAPS are impractical or when water under pressure is required.

#### **5.7.1.2.2 2X Diameter (08)**

AIR GAPS must be at least twice the diameter of the delivery fixture opening and a minimum of 25 millimeters (1 inch).

**5.7.1.2.3 Flood-level Rim (08)**

An ATMOSPHERIC VACUUM BREAKER must be installed at least 150 millimeters (6 inches) above the flood-level rim of the fixtures.

**5.7.1.2.4 After Valve (08)**

An ATMOSPHERIC VACUUM BREAKER must be installed only in the supply line on the discharge side of the last control valve.

**5.7.1.2.5 Continuous Pressure (08)**

A continuous pressure-type BACKFLOW PREVENTION DEVICE must be installed when a valve is located downstream from the BACKFLOW PREVENTION DEVICE.

**5.7.1.2.6 Backflow Prevention Devices (08)**

BACKFLOW PREVENTION DEVICES must be provided on all fixtures using POTABLE WATER and that have submerged inlets.

**5.7.1.2.7 Vacuum Toilets (08)**

An ATMOSPHERIC VACUUM BREAKER must be installed on a POTABLE WATER supply that is connected to a vacuum toilet system. An ATMOSPHERIC VACUUM BREAKER must be located on the discharge side of the last control valve (flushing device).

**5.7.1.2.8 Diversion Valves (08)**

Lines to divert POTABLE WATER to other systems by valves or interchangeable pipe fittings must have an AIR GAP after the valve.

**5.7.1.2.9 Location (08)**

BACKFLOW PREVENTION DEVICES and AIR GAPS must be accessible for inspection, service, and maintenance.

**5.7.1.3 Air Supply Connections**

**5.7.1.3.1 Air Supply (08)**

A compressed air system that supplies pressurized air to both nonpotable and POTABLE WATER pneumatic tanks must be connected through a press-on (manual) air valve or hose.

**5.7.1.3.2 Separate Compressor**

**A fixed connection may be used when the air supply is from a separate compressor used exclusively for POTABLE WATER pneumatic tanks.**

## 5.7.2 Backflow Prevention Device Inspection and Testing

### 5.7.2.1 Maintenance

#### 5.7.2.1.1 *Maintained (08)*

BACKFLOW PREVENTION DEVICES must be maintained in good repair.

### 5.7.2.2 Inspection and Service

#### 5.7.2.2.1 *Schedule (08)*

BACKFLOW PREVENTION DEVICES should be periodically inspected and any failed units must be replaced.

#### 5.7.2.2.2 *Test Annually (08)*

BACKFLOW PREVENTION DEVICES requiring testing (e.g., reduced pressure BACKFLOW PREVENTION DEVICES and PRESSURE VACUUM breakers) must be inspected and tested with a test kit after installation and at least annually. Test results showing the pressure differences on both sides of the valves must be maintained for each device.

#### 5.7.2.2.3 *Records (08)*

The inspection and test results for BACKFLOW PREVENTION DEVICES must be retained for at least 12 months and must be available for review during inspections.

## 5.8 Potable Water Knowledge

### 5.8.1 Demonstration of Knowledge (44)

The supervisor or PERSON IN CHARGE of potable water operations on the vessel must demonstrate to VSP—on request during inspections—knowledge of potable water operations. The supervisor or PERSON IN CHARGE must demonstrate this knowledge by compliance with this section of these guidelines or by responding correctly to the inspector's questions as they relate to the specific operation. In addition, the supervisor or PERSON IN CHARGE of potable water operations on the vessel must ensure that employees are properly trained to comply with this section of the guidelines in this manual as it relates to their assigned duties.

## 6.0 Recreational Water Facilities (RWFs)

This section includes the following subsections:

- 6.0 RWFs
- 6.1 Flow-through SEAWATER RWFs
- 6.2 Recirculating RWFs
- 6.3 WHIRLPOOL SPAS and SPA POOLS
- 6.4 Maintenance and Operating Standards for Combined Facilities
- 6.5 Private Cabin Operations
- 6.6 Individual Hydrotherapy Pools
- 6.7 Safety
- 6.8 Restrictions
- 6.9 Knowledge

### 6.0 RWFs

#### 6.0.1 Source

##### 6.0.1.1 Potable Water or Seawater **(09 C)**

The water source for all RWFs must be POTABLE WATER or SEAWATER.

### 6.1 Flow-through Seawater RWFs

#### 6.1.1 Operation

##### 6.1.1.1 At Sea

###### 6.1.1.1.1 *12 miles (10)*

Flow-through SEAWATER supply systems for RWFs must be used only while the vessel is MAKING WAY and at sea beyond 20 kilometers (12 miles) from nearest land.

##### 6.1.1.2 In Port

###### 6.1.1.2.1 *Drained or Switched to Recirculation (10)*

Before arriving to a port or HARBOR, the RWF must be drained before the vessel reaches the 20-kilometer (12-mile) mark or any point of land-based discharge as detailed in section 6.1.1.1.1 and it must remain empty while in port or at anchor.

**OR**

The RWF SEAWATER filling system must be shut off 20 kilometers (12 miles) before reaching the nearest land or land-based discharge point, and a recirculation system must be used with appropriate filtration and halogenation systems.

### 6.1.1.2.2 **Halogen and pH (09 C)**

When switching from flow-through operations to recirculation operations, the RWF must be closed until the free residual HALOGEN and PH levels are within the acceptable limits of this manual. The sample must be taken from the body of the RWF, not from the pump room.

**While the RWF is closed, batch HALOGEN and PH control chemicals may be used to obtain ADEQUATE free HALOGEN residuals and PH levels in a more timely manner. Sufficient time should be allowed before opening the RWF for use to ensure proper mixing of batch chemicals.**

## 6.2 Recirculating RWFs

(See individual sections for additional requirements for whirlpools and SPA POOLS. See Annex 13.7 for requirements for BABY-ONLY WATER FACILITIES.)

### 6.2.1 Operation

#### 6.2.1.1 Fill Level and Turnover Rates (10)

For RWF with skim gutters, the fill level of the RWF must be to the skim gutter level.

TURNOVER rates: Recirculation systems and EQUIPMENT, including chemical control EQUIPMENT, UV DISINFECTION systems, filters, and pumps, must be designed to maintain ADEQUATE water chemistry control while operating at the following TURNOVER rates:

| <b>RECREATIONAL WATER FACILITY</b>                                    | <b>TURNOVER Rate</b> |
|---|----------------------|
| SWIMMING POOL ( <i>VSP 2005 Construction Guidelines</i> or earlier)   | 6 hours              |
| SWIMMING POOL ( <i>VSP 2011 Construction Guidelines</i> or later)     | 4 hours              |
| CHILDREN'S POOL   | 0.5 hours            |
| WADING POOL   | 1 hours              |
| WHIRLPOOL SPA   | 0.5 hours            |
| SPA POOL  | 2 hours              |
| INTERACTIVE RWF or ACTIVITY POOL (< 610 millimeters [24 inches] deep) | 1 hours              |
| INTERACTIVE RWF or ACTIVITY POOL (> 610 millimeters [24 inches] deep) | 2 hours              |
| BABY-ONLY WATER FACILITY  | 0.5 hours            |

**SPA POOLS that were constructed before June 1, 2005, and which were originally considered SWIMMING POOLS may have a TURNOVER rate**

**not to exceed 6 hours in a 24-hour period. This does not apply to SWIMMING POOLS that have been converted to SPA POOLS.**

An RWF slide that is combined with a pool must have a TURNOVER rate that matches the rate for the pool.

## **6.2.1.2 Filtration Systems**

### **6.2.1.2.1 Filtered (10)**

Recirculated RWF water must be filtered.

### **6.2.1.2.2 Filter Backwash and Cleaning (10)**

Filter pressure differentials must be monitored. Granular filter media must be backwashed until the water viewed through a sight glass runs clear and at the following frequency:

- WHIRLPOOL SPA and SPA POOL: every 72 hours, or sooner if the WHIRLPOOL SPA is drained.
- BABY-ONLY WATER FACILITY: daily.
- All other RWFs: at a frequency recommended by the manufacturer.

For automatic backwashing systems, an individual must be present in the filter room to ensure that backwashing is repeated as necessary until the water runs clear.

Cartridge filters must be cleaned according to the manufacturer's recommendations.

A written or electronic record of the filter backwashing and cleaning must be available for review during inspections.

### **6.2.1.2.3 Granular Filter Inspection, Core Sample Test, and Filter Change (10)**

Granular filter media must be examined for channels, mounds, or holes. A core sample of the filter media must be inspected for excessive organic material accumulation using a recommended sedimentation method.

For WHIRLPOOL SPAS and SPA POOLS, inspections and sedimentation tests must be done monthly. For all other RWFs, inspections and sedimentation tests must be conducted quarterly.

#### **Inspection method:**

**Drain the water from the filter housing and inspect the granular filter for channels, mounds, or holes.**

**Core sample method:**

- 1. After inspection, take a sand sample from the filter core and place it in a clear container. A core sample can be taken by inserting a rigid hollow tube or pipe into the filter media.**
- 2. Add clean water to the container, cover, and shake.**
- 3. Allow the container to rest undisturbed for 30 minutes.**
- 4. If, after 30 minutes of settling, a measurable layer of sediment is within or on top of the filter media or fine, colored particles are suspended in the water, the organic loading may be excessive, and media replacement should be considered.**

Granular filter media for WHIRLPOOL SPAS and SPA POOLS must be changed based on the inspection and sedimentation test results or every 12 months, whichever is more frequent. For all other RWFs, granular filter media must be changed based on the inspection and sedimentation results or per the manufacturer’s recommendations, whichever is more frequent.

Results of both the filter inspection and sedimentation test must be recorded.

**6.2.1.2.4 Cartridge Filter Inspection and Filter Change (10)**

Cartridge or canister-type filters must be inspected weekly for WHIRLPOOL SPAS and SPA POOLS. For all other RWFs, cartridge filters must be inspected every 2 weeks, or in accordance with the manufacturer’s recommendation, whichever is more frequent.

The filters must be inspected for cracks, breaks, damaged components, and excessive organic accumulation. Cartridge or canister-type filters must be changed based on the inspection results, or as recommended by the manufacturer, whichever is more frequent.

At least one replacement cartridge or canister-type filter must be available.

**6.2.1.2.5 Other Filter Media (10)**

Inspect and change filters based on the manufacturer’s recommendations.

**6.2.1.2.6 Filter Housing Cleaning and Disinfection (10)**

The filter housing must be cleaned, rinsed, and disinfected before the new filter media is placed in it. DISINFECTION must be accomplished with an appropriate HALOGEN-based DISINFECTANT.

At a minimum, a 50-ppm solution for 1 minute, or equivalent CT VALUE, must be used. Records must be maintained on all inspection and cleaning procedures.

**6.2.1.2.7 Hair and Lint Strainer (10)**

The hair and lint strainer and hair and lint strainer housing on all RWFs must be cleaned, rinsed, and disinfected weekly. DISINFECTION must be accomplished with an appropriate HALOGEN-based DISINFECTANT. At a minimum, a 50-ppm solution for 1 minute, or equivalent CT VALUE, must be used. Records must be maintained on all inspection and cleaning procedures.

**6.2.1.2.8 All Filters (10)**

The manufacturer's maintenance procedures and recommendations for all filters must be maintained on the vessel.

**6.2.1.3 Gauges (10)**

RWF filter pressure gauges, flow meters, and valves must be replaced when they are defective.

**6.2.1.4 Manuals (10)**

The operating manuals for all RWF components such as filters, pumps, halogenation and PH control systems, and UV DISINFECTION systems must be maintained in a location that is accessible to crew members responsible for the operations and maintenance of these facilities.

**6.2.1.5 Bather Loads (10)**

Documentation must be maintained on the maximum bather load for each RWF. The maximum bather load must be based on the following factor: One person per five gallons (19 liters) per minute of recirculation flow.

**6.2.1.6 Water Quality**

**6.2.1.6.1 Water Chemistry (10)**

The RWF's flow rates, free and combined HALOGEN levels, PH, total alkalinity, and clarity must be monitored and adjusted as recommended by the manufacturer and to maintain optimum public health protection and water chemistry.

**Evaluate bather load and make adjustments to water parameters to maintain optimum water quality.**

**6.2.1.6.2 Fecal and Vomit Accident (10)**

A fecal and vomit accident response procedure that meets or exceeds the procedure provided in Annex 13.8 must be available

for review during inspections.

**6.2.1.6.3 Record of Fecal and Vomit Accidents (10)**

A written or electronic record must be made of all accidents involving fecal material or vomit. The record must include the name of the RWF, date and time of the accident, type of accident, response steps taken, and free residual HALOGEN level and contact time reached during DISINFECTION. For a fecal accident, the record must also include whether the fecal material was formed or loose.

**6.2.2 Halogenation**

**6.2.2.1 Residual Halogen: Halogen and pH Dosing Systems (10)**

Automated systems must be installed for HALOGEN-based DISINFECTION and PH control dosing. The amounts injected must be controlled by flow meters or free HALOGEN and PH analyzers.

**When conducting manual tests, consideration should be given to the HALOGEN and PH levels in the RWF over the HALOGEN and PH readings from the pump room.**

**Initial chemistry balance can be achieved by manual dosing methods following events such as fecal or vomit accidents and when changing from flow-through SEAWATER to recirculation mode.**

**6.2.2.1.1 Residual (9 C)**

A free residual HALOGEN in the ranges detailed in the table below must be maintained in recirculated RWFs.

| <b>Recreational Water Facility</b> | <b>Free HALOGEN Residual, MG/L (ppm)</b>                                       |
|------------------------------------|--|
| SWIMMING POOL                      | $\geq 1.0$ and $\leq 5.0$  |
| CHILDREN'S POOL                    | $\geq 1.0$ and $\leq 5.0$  |
| WADING POOL                        | $\geq 1.0$ and $\leq 5.0$  |
| INTERACTIVE RWF (ACTIVITY POOL)    | $\geq 2.0$ and $\leq 5.0$  |
| BABY-ONLY WATER FACILITY           | $\geq 3.0$ and $\leq 10.0$ free chlorine<br>$\geq 4.0$ and $\leq 10.0$ bromine |
| WHIRLPOOL SPA and SPA POOL         | $\geq 3.0$ and $\leq 10.0$ free chlorine<br>$\geq 4.0$ and $\leq 10.0$ bromine |

**6.2.2.1.2 pH (9 C)**

The PH level in all RWFs must be maintained between 7.0 and 7.8.

Facilities not maintained within these HALOGEN and PH ranges must be immediately closed.

### **6.2.2.1.3 Maintenance (10)**

Halogenation and pH control systems must be maintained in good repair and operated in accordance with the manufacturer's recommendations.

## **6.2.2.2 Residual Halogen and pH Monitoring**

### **6.2.2.2.1 Test Kit (10)**

A test kit must be available for testing water quality parameters including free and total HALOGEN levels (chlorine and bromine, where applicable), pH, and total alkalinity.

Test kits must be accurate to within 0.2 MG/L (ppm) for HALOGEN and must have a testing range of free residual HALOGEN normally maintained in the RWF. Test kits for pH must be accurate to within 0.2.

Reagents must not be past their expiration dates.

### **6.2.2.2.2 Test Kit Maintenance and Verification (10)**

Where available, appropriate secondary standards must be onboard for electronic test kits to verify test kit operation.

### **6.2.2.2.3 Automated Free Halogen Residual and pH Testing (10)**

Install chart recorders or electronic data loggers with security features that record pH and HALOGEN measurements for each individual RWF. The sample line for the analyzer probe (monitoring) must be either directly from the RWF or on the return line from each RWF and before the compensation tank. Install appropriate sample taps for analyzer calibration.

In the event of EQUIPMENT failure, free residual HALOGEN and pH must be measured by a manual test kit at the RWF or return line at least hourly for WHIRLPOOL SPAS, SPA POOLS, CHILDREN'S POOLS, and WADING POOLS and every 4 hours for all other RWFs.

Manual readings must be recorded on a chart or log, retained for at least 12 months, and available for review during inspections.

Repairs on malfunctioning HALOGEN analyzer-chart recorders must be completed within 30 days of EQUIPMENT failure.

Provide an audible alarm in a continuously occupied watch station (e.g., the engine control room) to indicate low and high free HALOGEN and pH readings in each RWF.

#### **6.2.2.2.4 Whirlpool and Spa Pool Probes (10)**

For WHIRLPOOL SPAS and SPA POOLS, the analyzer probes for dosing and recording systems must be capable of measuring and recording levels up to 10 MG/L (10 ppm).

#### **6.2.2.2.5 Analyzer-chart Recorder (10)**

The HALOGEN and PH analyzer-chart recorder must be properly maintained and operated in accordance with the manufacturer's instructions.

A manual comparison test must be conducted before opening the RWF to verify calibration for free HALOGEN residual and PH. The analyzer reading must be within 0.2 ppm for free HALOGEN and 0.2 for PH.

For RWFs open longer than 24 hours, a manual comparison test must be conducted every 24 hours.

#### **6.2.2.2.6 Data Logger (10)**

If an electronic data logger is used in lieu of a chart recorder, it must have certified data security features.

Manual comparison tests for free HALOGEN residual and PH must be conducted before opening the RWF to verify calibration. The analyzer reading must be within 0.2 ppm for free HALOGEN and 0.2 for PH.

For RWFs open longer than 24 hours, a manual comparison test must be conducted every 24 hours.

#### **6.2.2.2.7 Charts (10)**

HALOGEN analyzer-chart recorder charts must be initialed, dated, and changed daily.

Strip recorder charts must be initialed and dated daily and 24-hour increments must be indicated.

#### **6.2.2.2.8 Logs (10)**

Logs and charts must contain notations outlining actions taken when the free HALOGEN residual or PH levels are outside of the acceptable ranges in this manual.

Additionally, the records must include any major maintenance work on the filtration and halogenation systems and UV DISINFECTION systems.

A written or electronic log of RWF filter inspection results, granular filter sedimentation test results, backwashing frequency and length of backwashing, and date and time of water dumping must be available for review during inspections.

**6.2.2.2.9 Retention (10)**

Logs and charts must be retained for 12 months and must be available for review during inspections.

## **6.3 Whirlpool Spas and Spa Pools**

### **6.3.1 Public Operations**

#### **6.3.1.1 Filters**

**6.3.1.1.1 Replacement (10)**

At least one replacement cartridge or canister-type filter must be available.

#### **6.3.1.2 Water Quality**

**6.3.1.2.1 Changed (10)**

The WHIRLPOOL SPA water, including compensation tank, filter housing, and associated piping, must be changed every 72 hours, provided that the system is operated continuously and that the correct water chemistry levels are maintained during that period, including daily shock halogenation.

SPA POOL water must be changed as often as necessary to maintain proper water chemistry. The water must be changed at least every 30 days.

The date and time of WHIRLPOOL SPA and SPA POOL water changes must be recorded in the log.

### **6.3.2 Halogenation**

#### **6.3.2.1 Residual Halogen**

**6.3.2.1.1 Prolonged Maintenance (10)**

For facilities undergoing maintenance for longer than 72 hours, the free HALOGEN residual and PH levels must be maintained or the entire system must be drained completely of all water. This includes the WHIRLPOOL SPA and SPA POOL tubs, compensation tanks, filter housings, and all associated piping and blowers. Records must be maintained for the free HALOGEN and PH levels or the complete draining of the system.

#### **6.3.2.1.2 Shock Halogenation (10)**

The free residual HALOGEN must be increased to at least 10.0 MG/L (ppm) and circulated for at least 1 hour every 24 hours.

The free residual HALOGEN must be tested at both the start and completion of shock halogenation.

The water in the entire RWF system must be superhalogenated to 10 ppm to include the WHIRLPOOL SPA/SPA POOL tub, compensation tank, filter housing, and all associated piping before starting the 1-hour timing.

**Batch halogenation of the tub and compensation tank may help in reaching the minimum 10 ppm residual quickly.**

**Facilities filled only with SEAWATER are exempt from this requirement.**

#### **6.3.2.1.3 Records (10)**

A written or electronic record of the date and time of water dumping and shock halogenation (concentration in ppm at the start and completion and time) must be available for review during inspections.

#### **6.3.2.1.4 Retention (10)**

Records must be retained on the vessel for 12 months.

### **6.4. Maintenance and Operating Standards for Combined Facilities**

#### **6.4.1 Pool with Attached Whirlpool Spa (10)**

For any pool with an attached WHIRLPOOL SPA where the water, recirculation system EQUIPMENT, or filters are shared with the spa, all elements of the WHIRLPOOL SPA standards must apply to the pool.

##### **6.4.1.2 Fecal Accidents (10)**

For combined facilities subject to fecal accidents, fecal accident procedures must include all features of these combined facilities.

### **6.5 Private Cabin Operations**

**WHIRLPOOL SPAS that are similar in design and construction to public WHIRLPOOL SPAS but which are located for the sole use of an individual cabin or groups of cabins must comply with the public WHIRLPOOL SPA requirements if the WHIRLPOOL SPA has either of the following features:**

- **Tub capacity of more than 4 individuals; or**
- **Can be accessed without entering the cabin.**

## **6.5.1 Maintenance**

### **6.5.1.1 Cleaning (10)**

Private WHIRLPOOL SPAS located in individual passenger cabins must be cleaned and disinfected, including associated recirculation systems, between occupancies or weekly, whichever is more frequent. DISINFECTION must be accomplished with an appropriate HALOGEN-based DISINFECTANT at 10 ppm for 60 minutes, or an equivalent CT VALUE.

### **6.5.1.2 Maintenance (10)**

Manufacturer's operation and maintenance instructions must be available to personnel who service the units.

### **6.5.1.3 Records (10)**

A record must be maintained outlining the frequency of cleaning and DISINFECTION. The record must include the type, concentration, and contact time of the DISINFECTANT.

Records must be retained on the vessel for 12 months.

## **6.6 Individual Hydrotherapy Pools**

### **6.6.1 Maintenance**

#### **6.6.1.1 Cleaning (10)**

Individual hydrotherapy pools must be cleaned and disinfected, including associated recirculation systems, between customers. DISINFECTION must be accomplished with an appropriate HALOGEN-based DISINFECTANT at 10 ppm for 60 minutes, or an equivalent CT VALUE.

#### **6.6.1.2 Maintenance (10)**

Manufacturer's operation and maintenance instructions must be available to personnel that service the units.

#### **6.6.1.3 Records (10)**

A record must be maintained outlining the frequency of cleaning and DISINFECTION. The record must include the type, concentration and contact time of the DISINFECTANT.

Records must be retained on the vessel for 12 months.

## 6.7 Safety

### 6.7.1 RWFs

#### 6.7.1.1 Signs and Markings

##### 6.7.1.1.1 **General RWF Signs (10)**

Safety signs must be provided for all RWFs, except for BABY-ONLY WATER FACILITIES.

The signs at a minimum must include the following words:

- Do not use these facilities if you are experiencing diarrhea, vomiting, or fever.
- No children in diapers or who are not toilet trained.
- Shower before entering the facility.
- Bather load #.

**Pictograms may replace words, as appropriate or available.**

For children’s RWF signs, include the exact wording “TAKE CHILDREN ON FREQUENT BATHROOM BREAKS” or “TAKE CHILDREN ON FREQUENT TOILET BREAKS.”

**It is advisable to post additional cautions and concerns on signs.**

**See section 6.2.1.5 for bather load calculations.**

##### 6.7.1.1.2 **Depth Markers (10)**

The depth of each RWF that is deeper than 1 meter (3 feet) must be displayed prominently so that it can be seen from the deck and in the pool. Depth markers should be labeled in both feet and meters. Additionally, depth markers must be installed for every 1 meter (3 feet) change in depth.

##### 6.7.1.1.3 **Spas (10)**

In addition to the safety sign requirements in section 6.7.1.1.1, install a sign at each WHIRLPOOL SPA and SPA POOL entrance listing precautions and risks associated with the use of these facilities.

Include, at a minimum, cautions against use by the following:

- Individuals who are immunocompromised.
- Individuals on medication or who have underlying medical conditions such as cardiovascular disease, diabetes, or high or low blood pressure.
- Pregnant women, elderly persons, and children.

Additionally, caution against exceeding 15 minutes of exposure.

**Vessels can submit existing signs for review by VSP.**

**It is advisable to post additional cautions and concerns on signs.**

## 6.7.1.2 Equipment

### 6.7.1.2.1 *Life Saving (10)*

A rescue or shepherd's hook and an APPROVED flotation device must be provided at a prominent location (visible from the full perimeter of the pool) at each RWF that has a depth of 1 meter (3 feet) or greater. These devices must be mounted in a manner that allows for easy access during an emergency.

- The pole of the rescue or shepherd's hook must be long enough to reach the center of the deepest portion of the pool from the side plus 2 feet. It must be a light, strong, nontelelescoping material with rounded, nonsharp ends.
- The APPROVED flotation device must include an attached rope that is at least 2/3 of the maximum pool width.

### 6.7.1.2.2 *Antientrapment Drain (10)*

ANTIENRAPMENT/ANTIENANGLEMENT requirements for drain covers and SUCTION FITTINGS in RWFs are shown in Table 6.7.1.2.2 (below). **This does not apply to facilities with zero depth where the drains are not under direct suction.**

**VSP is aware that the requirements shown in Table 6.7.1.2.2 for existing vessels may not fully meet the letter of the Virginia Graeme Baker Act, but we also recognize the life-safety concerns for rapid dumping of RWFs in conditions of instability at sea. Therefore, it is the owner's decision to meet or exceed the VSP requirements.**

Testing of manufactured drain covers must be by a nationally or internationally recognized testing laboratory.

The information below must be stamped on each manufactured ANTIENRAPMENT drain cover:

- Certification standard and year.
- Type of drain use (single or multiple).
- Maximum flow rate (in gallons or liters per minute).
- Type of fitting (suction outlet).
- Life expectancy of cover.

- Mounting orientation (wall, floor, or both).
- Manufacturer's name or trademark.
- Model designation.

The design of custom/shipyard constructed (field fabricated) drain covers and SUCTION FITTINGS must be fully specified by a REGISTERED DESIGN PROFESSIONAL in accordance with ASME A112.19.8-2007. The specifications must fully address cover/grate loadings, durability, hair, finger and limb entrapment issues, cover/grate secondary layer of protection, related sump design, and features specific to the RWF.

A letter from the shipyard must accompany each custom/shipyard constructed (field fabricated) drain cover fitting. At a minimum the letter must specify the shipyard, name of the vessel, specifications and dimensions of the drain cover, as detailed above, as well as the exact location of the RWF for which it was designed. The name of and contact information for the REGISTERED DESIGN PROFESSIONAL and signature must be on the letter.

**Table 6.7.1.2.2 ANTIENTRAPMENT Requirements for Recreational Water Facilities**

| <b>Option*</b>         | <b>Drainage/Recirculation System</b>  | <b>Cover Design</b>                                 | <b>Secondary ANTIENTRAPMENT Requirement**</b> |
|------------------------|---|---|---|
| <b>GRAVITY ONLY</b>    |   |   |   |
| 1                      | Multiple drains (2 or more drains greater than 3 feet apart)                      | Standard design (not compliant with ASME A112.19.8) | Alarm   |
| 2                      | Multiple drains (2 or more drains greater than 3 feet apart)                      | ASME A112.19.8 compliant cover                      | None  |
| 3                      | Single unblockable drain (per ASME A112.19.8)                                     | Standard design (not compliant with ASME A112.19.8) | Alarm   |
| 4                      | Single unblockable drain (per ASME A112.19.8)                                     | ASME A112.19.8 compliant cover                      | None  |
| 5                      | Single BLOCKABLE drain or multiple drains (less than 3 feet apart)                | ASME A112.19.8 compliant cover                      | GDS   |
| <b>SUCTION FITTING</b> |   |   |   |
| 6                      | Multiple drains (2 or more drains per pump with drains greater than 3 feet apart) | ASME A112.19.8 compliant cover                      | None  |
| 7                      | Single unblockable drain (per ASME A112.19.8-2007)                                | ASME A112.19.8 compliant cover                      | SVRS or APS                                   |
| 8                      | Single BLOCKABLE drain or multiple drains (less than 3 feet apart)                | ASME A112.19.8 compliant cover                      | SVRS or APS                                   |

\*Options 1 through 5 are for fittings that are not under direct suction. These include both fittings to drain the RWF and fittings used to recirculate the water. Options 6 through 8 are for fittings that are under direct suction. These include fittings to drain the RWF and fittings used to recirculate the water.

**\*\*Definitions:**

- Alarm = the audible alarm must sound in a continuously manned space AND at the RWF. This alarm is for all draining: accidental, routine, and emergency.
- GDS (GRAVITY DRAINAGE system) = a drainage system that uses a collector tank from which the pump draws water. Water moves from the RWF to the collector tank due to atmospheric pressure, gravity, and the displacement of water by bathers. There is no direct suction at the RWF.
- SVRS (safety vacuum release system) = a system which stops the operation of the pump, reverses the circulation flow, or otherwise provides a vacuum release at a suction outlet when a blockage is detected. System must be tested by an independent third party and found to conform with ASME/ANSI A112.19.17 or ASTM standard F2387.
- APS (automatic pump shut-off system) = a device that detects a blockage and shuts off the pump system. A manual shut-off near the RWF does not qualify as an APS.

**6.7.1.2.3 Temperature (10)**

A temperature-control mechanism to prevent the temperature from exceeding 40°C (104°F) must be provided on WHIRLPOOL SPAS and SPA POOLS.

**6.8 Restrictions**

**6.8.1 Diapers (10)**

Children in diapers or who are not toilet trained must be prohibited from using any RWF that is not specifically designed and APPROVED for use by children in diapers.

**Specifications and requirements for BABY-ONLY WATER FACILITIES can be found in Annex 13.7.**

**6.9 Recreational Water Facilities Knowledge**

**6.9.1 Demonstration of Knowledge (44)**

The supervisor or PERSON IN CHARGE of recreational water facilities operations on the vessel must demonstrate to VSP—on request during inspections—knowledge of recreational water facilities operations. The supervisor or PERSON IN CHARGE must demonstrate this knowledge by compliance with this section of these guidelines or by responding correctly to the inspector's questions as they relate to the specific operation. In addition, the supervisor or PERSON IN CHARGE of recreational water facilities operations on the vessel must ensure that employees are properly trained to comply with this section of the guidelines in this manual as it relates to their assigned duties.

## 7.0 Food Safety

This section includes the following subsections:

- 7.1 Reserved
- 7.2 Personnel
- 7.3 Food
- 7.4 EQUIPMENT and UTENSILS
- 7.5 WAREWASHING
- 7.6 Poisonous and Toxic Materials
- 7.7 Facilities

### 7.1 Reserved

### 7.2 Personnel

#### 7.2.1 Food-safety Management

##### 7.2.1.1 Food-safety Knowledge

###### 7.2.1.1.1 Knowledge (13 C)

Because of the risks for foodborne illness inherent to the food operation, the supervisor or PERSON IN CHARGE of food operations on the vessel must demonstrate to VSP—on request during inspections—knowledge of foodborne disease prevention, application of the Hazard Analysis Critical Control Point principles, and the food-safety guidelines in this manual. The supervisor or PERSON IN CHARGE must demonstrate this knowledge

- By compliance with these guidelines,
- By being a domestically or foreign certified food protection manager who has shown proficiency of required information through passing a test that is part of an ACCREDITED PROGRAM, or
- By responding correctly to the inspector’s questions as they relate to the specific food operation.

The areas of knowledge must include

- Describing the relation between prevention of foodborne disease and personal hygiene of a FOOD EMPLOYEE.
- Explaining the responsibility of the supervisor or PERSON IN CHARGE to prevent TRANSMISSION of foodborne disease by a FOOD EMPLOYEE who has a disease or medical condition that may cause foodborne disease.
- Describing the symptoms associated with diseases that are transmissible through food.
- Explaining the significance of the relation between

- maintaining the time and temperature of POTENTIALLY HAZARDOUS FOOD and the prevention of foodborne illness.
- Explaining the HAZARDS involved in the consumption of raw or undercooked MEAT, POULTRY, eggs, and FISH.
- Stating the required food temperatures and times for safe cooking of POTENTIALLY HAZARDOUS FOOD, including MEAT, POULTRY, eggs, and FISH.
- Stating the required temperatures and times for the safe refrigerated storage, hot holding, cooling, and reheating of POTENTIALLY HAZARDOUS FOOD.
- Describing the relation between prevention of foodborne illness and management and control of the following: cross-CONTAMINATION, hand contact with READY-TO-EAT FOODS, handwashing, and maintaining food operations in a clean condition and in good repair.
- Explaining the relation between food safety and providing EQUIPMENT that is sufficient in number and capacity as well as properly designed, constructed, located, installed, operated, maintained, and cleaned.
- Explaining correct procedures for cleaning and sanitizing UTENSILS and FOOD-CONTACT SURFACES of EQUIPMENT.
- Identifying POISONOUS OR TOXIC MATERIALS on the vessel and the procedures necessary to ensure they are safely stored, dispensed, used, and disposed of according to LAW.
- Identifying critical-control points in the operation from purchasing through service that when not controlled may contribute to the TRANSMISSION of foodborne illness and explaining steps taken to ensure the points are controlled in accordance with the guidelines in this manual.

### 7.2.1.2 Food-safety Duties

#### 7.2.1.2.1 **Monitoring Duties (13 C)**

The supervisor or PERSON IN CHARGE of food operations on the vessel must ensure that

- Food operations are not conducted in a room used as living or sleeping quarters.
- Persons unnecessary to the food operation are not allowed in the FOOD PREPARATION, FOOD STORAGE, or WAREWASHING areas. **However, brief visits and tours may be authorized if steps are taken to ensure that exposed food; clean EQUIPMENT, UTENSILS, and LINENS; and unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES are protected from CONTAMINATION.**
- Employees and other persons such as delivery and

maintenance persons and pesticide applicators entering the FOOD PREPARATION, FOOD STORAGE, and WAREWASHING areas comply with the guidelines in this manual.

- FOOD EMPLOYEES are effectively cleaning their hands (by routinely monitoring the employees' handwashing).
- Employees are observing foods as they are received to determine that they are from APPROVED sources, delivered at the required temperatures, protected from CONTAMINATION, unadulterated, and accurately presented (by routinely monitoring the employees' observations and periodically evaluating foods as they are received).
- Employees are properly cooking POTENTIALLY HAZARDOUS FOOD, being particularly careful in cooking foods known to cause severe foodborne illness and death, such as eggs and COMMINUTED MEATS (through daily oversight of the employees' routine monitoring of the cooking temperatures using appropriate TEMPERATURE-MEASURING DEVICES that are properly scaled and calibrated).
- Employees are using proper methods to rapidly cool POTENTIALLY HAZARDOUS FOODS that are not held hot or are not for consumption within 4 hours (through daily oversight of the employees' routine monitoring of food temperatures during cooling).
- CONSUMERS who order raw or partially cooked READY-TO-EAT FOODS of animal origin are informed that the food is not cooked sufficiently to ensure its safety.
- Employees are properly sanitizing cleaned multiuse EQUIPMENT and UTENSILS before they are reused (through routine monitoring of solution temperature and exposure time for hot water sanitizing, and chemical concentration, PH, temperature, and exposure time for chemical sanitizing).
- CONSUMERS are notified that clean TABLEWARE is to be used when they return to self-service areas such as salad bars and buffets.
- Employees are preventing cross-CONTAMINATION of READY-TO-EAT FOOD with bare hands by properly using suitable UTENSILS such as deli tissue, spatulas, tongs, single-use gloves, or dispensing EQUIPMENT.
- Employees are properly trained in food safety, including food allergy awareness, as it relates to their assigned duties.
- FOOD EMPLOYEES are informed of their responsibility to report to the supervisor or PERSON IN CHARGE information about their health and activities as they relate to diseases that are transmissible through food.

## 7.2.2 Employee Health

### 7.2.2.1 Communicable Diseases and Symptoms

#### 7.2.2.1.1 **Communicable Diseases (11 C)**

FOOD EMPLOYEES suspected of, diagnosed with, or exposed to any communicable disease caused by *Salmonella typhi*, *Shigella* spp., *E. coli* O157:H7, hepatitis A virus, norovirus, or other communicable diseases that can be transmitted by food, must be excluded from working in any food or food related areas or operations, including working with exposed food, WAREWASHING, EQUIPMENT, UTENSILS, LINENS, SINGLE-SERVICE ARTICLES, and SINGLE-USE ARTICLES. The excluded individual must not be allowed to return to the above duties until they are symptom free for a minimum of 48 hours.

#### 7.2.2.1.2 **Other Symptoms (11 C)**

FOOD EMPLOYEES who have conditions or symptoms of boils, open sores, infected wounds, diarrhea, jaundice, fever, vomiting, sore throat with fever, or discharges from the nose or mouth must report these conditions or symptoms to the vessel's medical staff and must be restricted from working with exposed food, WAREWASHING, clean EQUIPMENT, UTENSILS, LINENS, and unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES.

#### 7.2.2.1.3 **Sneeze/Cough (11 C)**

FOOD EMPLOYEES experiencing persistent sneezing, coughing, or a runny nose that causes discharges from the eyes, nose, or mouth must not work with exposed food; WAREWASHING; clean EQUIPMENT, UTENSILS, and LINENS; or unwrapped SINGLE-SERVICE or SINGLE-USE ARTICLES.

#### 7.2.2.1.4 **Restrictions Removal (11 C)**

The restriction must not be removed until the supervisor or PERSON IN CHARGE of the food operation obtains written approval from the vessel's physician or equivalent medical staff.

#### 7.2.2.1.5 **Record of Restriction and Release (02)**

A written or electronic record of both the work restriction and release from restriction must be maintained onboard the vessel for 12 months for inspection review.

## 7.2.3 Employee Cleanliness

### 7.2.3.1 Hands and Arms

#### 7.2.3.1.1 ***Hands and Arms Clean (12 C)***

FOOD EMPLOYEES must keep their hands and exposed portions of their arms clean.

#### 7.2.3.1.2 ***Cleaning Procedures (12 C)***

FOOD EMPLOYEES must clean their hands and exposed portions of their arms with a cleaning compound in a handwashing sink by vigorously rubbing together the surfaces of their lathered hands and arms for at least 20 seconds and thoroughly rinsing with clean water. Employees must pay particular attention to the areas underneath the fingernails and between the fingers.

#### 7.2.3.1.3 ***When to Wash Hands (12 C)***

FOOD EMPLOYEES must clean their hands and exposed portions of their arms immediately before engaging in food preparation, including working with exposed food, clean EQUIPMENT and UTENSILS, and unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES **and**

- After touching bare human body parts other than clean hands and clean, exposed portions of arms.
- After using the toilet room.
- After coughing, sneezing, using a handkerchief or disposable tissue, using tobacco, eating, or drinking.
- After handling soiled EQUIPMENT or UTENSILS.
- During food preparation (as often as necessary to remove soil and CONTAMINATION and to prevent cross-CONTAMINATION when changing tasks).
- When switching between working with raw food and working with READY-TO-EAT FOOD.
- Before putting on gloves for working with food or clean EQUIPMENT and between glove changes.
- After engaging in other activities that contaminate the hands.

#### 7.2.3.1.4 ***Hand Antiseptic (14)***

A HAND ANTISEPTIC, a HAND ANTISEPTIC used as a hand dip, or a HAND ANTISEPTIC soap must comply with applicable formulation and use LAWS under FDA 21 CFR 170.39, 178, 182, 184, or 186.

#### 7.2.3.1.5 ***Apply to Clean Hands (12 C)***

HAND ANTISEPTIC, HAND ANTISEPTIC used as a hand dip, or HAND ANTISEPTIC soap must only be applied to hands that are cleaned as

described in section 7.2.3.1.2.

### 7.2.3.2 Fingernails

#### 7.2.3.2.1 *Fingernails (14)*

FOOD EMPLOYEES must keep their fingernails trimmed, filed, and maintained so the edges and surfaces are cleanable and not rough.

#### 7.2.3.2.2 *Fingernail Polish/Artificial Nails (14)*

A FOOD EMPLOYEE must not wear fingernail polish or artificial fingernails when preparing exposed food.

### 7.2.3.3 Jewelry

#### 7.2.3.3.1 *Jewelry (14)*

While preparing food, FOOD EMPLOYEES, including bartenders, must not wear jewelry on their arms and hands. **FOOD EMPLOYEES may wear a plain ring such as a SMOOTH simple wedding band.**

### 7.2.3.4 Food Service Uniform or Apron

#### 7.2.3.4.1 *Uniform or Apron (14)*

FOOD EMPLOYEES must wear a clean uniform or apron to prevent CONTAMINATION of food, EQUIPMENT, UTENSILS, LINENS, and SINGLE-SERVICE and SINGLE-USE ARTICLES.

## 7.2.4 Hygienic Practices

### 7.2.4.1 Eating, Drinking, or Using Tobacco

#### 7.2.4.1.1 *Eating, Drinking, and Using Tobacco (12 C)*

An employee must eat, drink, or use any form of tobacco only in designated areas where the CONTAMINATION of exposed food; clean EQUIPMENT, UTENSILS, and LINENS; unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES; or other items needing protection cannot occur.

### 7.2.4.2 Hair Restraints

#### 7.2.4.2.1 *Hair Restraints (14)*

FOOD EMPLOYEES must wear hair restraints—such as hats, hair coverings or nets, beard restraints—and clothing that covers body hair. These items must be designed and worn to effectively keep their hair from contacting exposed food; clean EQUIPMENT, UTENSILS, and LINENS; and unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES.

**This section does not apply to FOOD EMPLOYEES such as counter staff who serve only BEVERAGES and wrapped or PACKAGED foods, hostesses, and wait staff if they present a minimal risk for contaminating exposed food; clean EQUIPMENT, UTENSILS, and LINENS; and unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES.**

## 7.3 Food

### 7.3.1 Food Condition

#### 7.3.1.1 Safe and Unadulterated

##### **7.3.1.1.1 Sound Condition (15 C)**

Food must be safe and unadulterated.

### 7.3.2 Food Sources

#### 7.3.2.1 Lawful Sourcing

##### **7.3.2.1.1 Comply with Law (15 C)**

Food must be obtained from sources that comply with applicable local, state, federal, or country of origin's statutes, regulations, and ordinances.

##### **7.3.2.1.2 Food from Private Home (15 C)**

Food prepared in a private home must not be used or offered for human consumption on a vessel.

##### **7.3.2.1.3 Fish for Undercooked Consumption**

**FISH—other than MOLLUSCAN SHELLFISH—that are intended for consumption in their raw form may be served if they are obtained from a supplier that freezes the FISH to destroy parasites, or if they are frozen on the vessel and records are retained.**

##### **7.3.2.1.4 Steaks (15 C)**

WHOLE-MUSCLE, INTACT BEEF steaks that are intended for consumption in an undercooked form without a CONSUMER advisory must be

- Obtained from a FOOD-PROCESSING PLANT that packages the steaks and labels them to indicate they meet the definition of WHOLE-MUSCLE, INTACT BEEF; **or**
- If individually cut on a vessel, cut from WHOLE-MUSCLE, INTACT BEEF that is labeled by a FOOD-PROCESSING PLANT to indicate the beef meets the definition of WHOLE-MUSCLE,

INTACT BEEF, and prepared so they remain intact.

**7.3.2.1.5 *Hermetically Sealed Container (15 C)***

Food in a HERMETICALLY SEALED CONTAINER must be obtained from a FOOD-PROCESSING PLANT that is regulated by the food regulatory agency that has jurisdiction over the plant.

**7.3.2.1.6 *Milk (15 C)***

Fluid milk and milk products by U.S. suppliers must be obtained from sources that comply with GRADE A STANDARDS as specified in LAW. Milk received in interstate commerce must be from sources listed in the FDA Interstate Milk Shippers List. Non-U.S. sourced fluid milk and milk products must be obtained from sources that meet or exceed the standards of the health authorities from the source country.

**7.3.2.1.7 *Fish and Molluscan Shellfish Sources (15 C)***

FISH that are received for service must be commercially and legally caught or harvested or otherwise APPROVED for service by VSP through an APPROVED VARIANCE.

MOLLUSCAN SHELLFISH that are recreationally caught must not be received for service.

MOLLUSCAN SHELLFISH must be obtained from sources according to LAW and the requirements specified in the FDA National Shellfish Sanitation Program *Guide for the Control of MOLLUSCAN SHELLFISH*, or equivalent standards. MOLLUSCAN SHELLFISH received in interstate commerce must be from sources listed in the FDA Interstate Certified Shellfish Shippers List or equivalent foreign certified shellfish listing.

**7.3.2.1.8 *Wild Mushrooms (15 C)***

Mushroom species picked in the wild must be obtained from sources where each mushroom is individually inspected and found to be safe by an APPROVED mushroom identification expert.

This requirement does not apply to

- Cultivated wild mushroom species that are grown, harvested, and processed in an operation that is regulated by the food regulatory agency that has jurisdiction over the operation.
- Wild mushroom species if they are in PACKAGED form and are the product of a FOOD-PROCESSING PLANT that is regulated by the food regulatory agency that has jurisdiction over the plant.

### **7.3.2.1.9 Game Animals (15 C)**

If GAME ANIMALS are received for sale or service, they must be

- Commercially raised for food and raised, slaughtered, and processed under LAW; or
- Under a voluntary inspection program administered by the USDA for GAME ANIMALS such as exotic animals (reindeer, elk, deer, antelope, water buffalo, or bison) that are inspected and APPROVED in accordance with 9 CFR 352 (Voluntary Exotic Animal Program) or rabbits that are inspected and certified in accordance with 9 CFR 354 (Rabbit Inspection Program); or
- Under an equivalent regulatory program specifically for GAME ANIMALS. The packaging must also be stamped/labeled by the REGULATORY AUTHORITY.

A GAME ANIMAL must not be received for service if it is a species of wildlife listed in 50 CFR 17 Endangered and Threatened Wildlife and Plants.

## **7.3.2.2 Receiving Condition**

### **7.3.2.2.1 Receiving Temperatures (16 C)**

Receiving temperatures must be as follows:

- Refrigerated, POTENTIALLY HAZARDOUS FOOD must be at a temperature of 5°C (41°F) or below when received.
- **If a temperature other than 5°C (41°F) for a POTENTIALLY HAZARDOUS FOOD is specified in LAW governing its distribution, such as LAWS governing milk, MOLLUSCAN SHELLFISH, and shell eggs, the food may be received at the specified temperature.**
- POTENTIALLY HAZARDOUS FOOD that is cooked and received hot must be at a temperature of 57°C (135°F) or above.
- A food that is labeled frozen and shipped frozen by a FOOD-PROCESSING PLANT must be received frozen.
- Upon receipt, POTENTIALLY HAZARDOUS FOOD must be free of evidence of previous temperature abuse.

### **7.3.2.2.2 Food Additives (15 C)**

Food must not contain unapproved food ADDITIVES or ADDITIVES that exceed amounts specified in LAW, as specified in the current version of the FDA *Food Code*, including annexes.

### **7.3.2.2.3 Shell Eggs (15 C)**

Shell eggs must be received clean and sound and must not exceed the restricted egg tolerances specified in LAW, as specified in the

current version of the FDA *Food Code*, including annexes.

**7.3.2.2.4 Egg and Milk Products (15 C)**

Eggs and milk products must be received as follows:

- Liquid, frozen, and dry eggs and egg products must be obtained pasteurized.
- Fluid and dry milk and milk products complying with GRADE A STANDARDS as specified in LAW must be obtained pasteurized.
- Frozen milk products, such as ice cream, must be obtained pasteurized as specified in 21 CFR 135 Frozen Desserts.
- Cheese must be obtained pasteurized unless alternative procedures to pasteurization are specified in the CFR, such as 21 CFR 133 Cheeses and Related Cheese Products, for curing certain cheese varieties.

**7.3.2.2.5 Package Integrity (15 C)**

Food packages must be in good condition and protect the integrity of the contents so that the food is not exposed to adulteration or potential contaminants. Canned goods with dents on end or side SEAMS must not be used.

**7.3.2.2.6 Ice (15 C)**

Ice for use as a food or a cooling medium must be made from DRINKING WATER.

**7.3.2.2.7 Shucked Shellfish (15 C)**

Raw SHUCKED SHELLFISH must be obtained in nonreturnable packages that bear a legible label as specified in the FDA National Shellfish Sanitation Program *Guide for the Control of MOLLUSCAN SHELLFISH*.

**7.3.2.2.8 Shellstock Shellfish (15 C)**

SHELLSTOCK must be obtained in containers bearing legible source identification tags or labels that are affixed by the harvester and each dealer that depurates (cleanses), ships, or reships the SHELLSTOCK, as specified in the National Shellfish Sanitation Program *Guide for the Control of MOLLUSCAN SHELLFISH*.

**7.3.2.2.9 Shellstock Condition (19)**

SHELLSTOCK must be reasonably free of mud, dead shellfish, and shellfish with broken shells when received by a vessel. Dead shellfish or SHELLSTOCK with badly broken shells must be discarded.

### 7.3.2.3 Maintaining Molluscan Shellfish Identification

#### 7.3.2.3.1 **Shucked Identification (15 C)**

Shucked MOLLUSCAN SHELLFISH must not be removed from the container in which they are received other than immediately before preparation for service.

#### 7.3.2.3.2 **Shellstock Identification (15 C)**

SHELLSTOCK shellfish tags must

- Remain attached to the container in which the SHELLSTOCK are received until the container is empty.
- Be maintained by retaining SHELLSTOCK tags or labels for 90 calendar days from the date the container is emptied by using an APPROVED record-keeping system that keeps the tags or labels in chronologic order correlated to the date when the SHELLSTOCK are served. The date when the last SHELLSTOCK from the container is served must be recorded on the tag or label.

### 7.3.3 Food Protection

#### 7.3.3.1 Employee Contamination

##### 7.3.3.1.1 **Wash Hands (12 C)**

FOOD EMPLOYEES must wash their hands.

##### 7.3.3.1.2 **RTE Food – Hand Contact Prohibited (12 C)**

Except when washing fruits and vegetables or when otherwise APPROVED, FOOD EMPLOYEES must not contact exposed, READY-TO-EAT FOOD with their bare hands and they must use suitable UTENSILS such as deli tissue, spatulas, tongs, single-use gloves, or dispensing EQUIPMENT.

##### 7.3.3.1.3 **Not RTE Food – Minimize Contact (19 )**

FOOD EMPLOYEES must minimize bare hand and arm contact with exposed food that is not in a READY-TO-EAT form.

##### 7.3.3.1.4 **Tasting (12 C)**

A FOOD EMPLOYEE must not use the same UTENSIL more than once to taste food that is to be served.

#### 7.3.3.2 Food and Ingredient Contamination

##### 7.3.3.2.1 **Cross-contamination (18 C)**

Food must be protected from cross-CONTAMINATION or other sources of CONTAMINATION by the following methods:

- Physically separating raw animal foods during storage, preparation, holding, and display from raw READY-TO-EAT FOOD (including other raw animal food such as FISH for sushi or MOLLUSCAN SHELLFISH, or other raw READY-TO-EAT FOOD such as vegetables, and cooked READY-TO-EAT FOOD) so that products do not physically touch and so that one product does not drip into another.
- Separating types of raw animal foods from each other such as beef, FISH, lamb, pork, and POULTRY—except when combined as ingredients—during storage, preparation, holding, and display by using separate EQUIPMENT for each type, or by arranging each type of food in EQUIPMENT so that cross-CONTAMINATION of one type with another is prevented, or by preparing each type of food at different times or in separate areas.

**Frozen, commercially processed and PACKAGED raw animal food may be stored or displayed with or above frozen, commercially processed and PACKAGED, READY-TO-EAT FOOD.**

- Cleaning and sanitizing EQUIPMENT and UTENSILS.
- Storing the food in packages, covered containers, or wrappings.
- Cleaning visible soil on HERMETICALLY SEALED CONTAINERS of food before opening.
- Protecting food containers that are received PACKAGED together in a case or overwrap from cuts when the case or overwrap is opened.
- Separating damaged, spoiled, or recalled food being held on the vessel.
- Separating unwashed fruits and vegetables from READY-TO-EAT FOOD.

**Storage exceptions: storing the food in packages, covered containers, or wrappings does not apply to**

- **Whole, uncut, raw fruits and vegetables and nuts in the shell that require peeling or hulling before consumption.**

- **PRIMAL CUTS, quarters, or sides of raw MEAT or slab bacon that are hung on clean, sanitized hooks or placed on clean, sanitized racks.**
- **Whole, uncut, processed MEATS such as country hams, and smoked or cured sausages that are placed on clean, sanitized racks.**
- **Food being cooled.**
- **SHELLSTOCK.**

#### **7.3.3.2.2 Container Identity (19)**

Containers holding food or food ingredients that are removed from their original packages for use on the vessel, such as cooking oils, flour, herbs, potato flakes, salt, spices, and sugar must be identified with the common name of the food.

**Containers holding food that can be readily and unmistakably recognized such as dry pasta need not be identified. Ingredients located at active cooking or preparation stations need not be identified.**

#### **7.3.3.2.3 Pasteurized Eggs (18 C)**

Pasteurized eggs or egg products must be substituted for raw shell eggs in the preparation of foods such as Caesar salad, hollandaise or béarnaise sauce mayonnaise, eggnog, ice cream, and egg-fortified BEVERAGES or dessert items that are not cooked.

#### **7.3.3.2.4 Wash Fruits/Vegetables (19)**

Raw fruits and vegetables must be thoroughly rinsed in water to remove soil and other contaminants before being cut, combined with other ingredients, cooked, served, or offered for human consumption in READY-TO-EAT form.

#### **7.3.3.2.5 Vegetable Washes**

**Fruits and vegetables may be washed by using chemicals specified under 21 CFR 173.315 (Annex 13.10).**

### **7.3.3.3 Ice as Coolant**

#### **7.3.3.3.1 Ice Used as a Coolant (19)**

After use as a medium for cooling the exterior surfaces of food such as melons or FISH, PACKAGED foods such as canned BEVERAGES, or cooling coils and tubes of EQUIPMENT, ice must not be used as food.

#### **7.3.3.3.2 Coolant (19)**

PACKAGED food must not be stored in direct contact with ice or

water if the food is subject to the entry of water because of the nature of its packaging, wrapping, or container, or its positioning in the ice or water.

**7.3.3.3.3 Undrained Ice (19)**

Except as specified in 7.3.3.3.4-7.3.3.3.6, unpackaged food must not be stored in direct contact with undrained ice.

**7.3.3.3.4 Raw Fruit/Vegetables**

**Whole, raw fruits or vegetables; cut, raw vegetables such as celery, carrot sticks, or cut potatoes; and tofu may be immersed in ice or water.**

**7.3.3.3.5 Raw Chicken/Fish**

**Raw chicken and raw FISH that are received immersed in ice in shipping containers may remain in that condition while in storage awaiting preparation, display, or service.**

**7.3.3.3.6 Ongoing Meal Service**

**Other unpackaged foods in a raw, cooked, or partially cooked state may be immersed in ice as part of an ongoing meal service process, such as liquid egg product, individual eggs, pasta, and reconstituted powdered mixes.**

**7.3.3.4 Equipment, Utensils, and Linens**

**7.3.3.4.1 Cleaned/Sanitized (26 C)**

Food must only contact surfaces of EQUIPMENT and UTENSILS that are cleaned and sanitized.

**7.3.3.4.2 Storage During Use (19)**

During pauses in food preparation or dispensing, food preparation and dispensing UTENSILS must be stored as follows:

- In the food with their handles above the top of the food and the container;
- In food that is not POTENTIALLY HAZARDOUS with their handles above the top of the food within containers or EQUIPMENT that can be closed, such as bins of sugar, flour, or cinnamon;
- On a clean portion of the FOOD PREPARATION table or cooking EQUIPMENT only if the in-use UTENSIL and the FOOD-CONTACT SURFACE of the FOOD PREPARATION table or cooking EQUIPMENT are cleaned and sanitized at least every 4 hours;
- In running water of sufficient velocity to flush particulates to the drain (if used with moist food such as ice cream or

- mashed potatoes);
- In a clean, protected location (if the UTENSILS, such as ice scoops, are used only with a food that is not POTENTIALLY HAZARDOUS); or
- In a container of water (if the water is maintained at a temperature of at least 57°C [135°F] and the container is frequently cleaned and sanitized).

#### **7.3.3.4.3 Linen/Napkins (19)**

LINENS and napkins must not be used in contact with food unless they are used to line a container for the service of foods and the LINENS and napkins are replaced each time the container is refilled for a new CONSUMER.

#### **7.3.3.4.4 Wiping Cloths (25)**

Wiping cloths must be restricted to the following:

- Cloths used for wiping food spills must be used for no other purpose.
- Cloths used for wiping food spills must be dry and used for wiping food spills from TABLEWARE and SINGLE-SERVICE ARTICLES OR wet and cleaned, stored in a chemical SANITIZER, and used for wiping spills from food-contact and NONFOOD-CONTACT SURFACES of EQUIPMENT.
- Dry or wet cloths used with raw animal foods must be kept separate from cloths used for other purposes. Wet cloths used with raw animal foods must be kept in a separate sanitizing solution.
- Wet wiping cloths used with a freshly made sanitizing solution and dry wiping cloths must be free of food debris and visible soil.

#### **7.3.3.4.5 Glove Use (19)**

Gloves must be used as follows:

- Single-use gloves must be used for only one task such as working with READY-TO-EAT FOOD or with raw animal food, used for no other purpose, and discarded when damaged or soiled or when interruptions occur in the operation.
- Slash-resistant gloves used to protect hands during operations requiring cutting must be used in direct contact only with food that is subsequently cooked (such as frozen food or a PRIMAL CUT of MEAT).
- **Slash-resistant gloves may be used with READY-TO-EAT FOOD that will not be subsequently cooked if the slash-resistant gloves have a SMOOTH, durable, and nonabsorbent outer surface OR if the slash-resistant**

**gloves are covered with a SMOOTH, durable, nonabsorbent glove or a single-use glove.**

- Cloth gloves must not be used in direct contact with food unless the food is subsequently cooked (such as frozen food or a PRIMAL CUT of MEAT).

#### **7.3.3.4.6 Second Portions and Refills (19)**

Procedures for second portions and refills must be as follows:

- Except for refilling a CONSUMER'S drinking cup or container without contact between the pouring UTENSIL and the lip-contact area of the drinking cup or container, FOOD EMPLOYEES must not use TABLEWARE soiled by the CONSUMER—including SINGLE-SERVICE ARTICLES—to provide second portions or refills.
- Except as specified in the bullet below, self-service CONSUMERS must not be allowed to use soiled TABLEWARE—including SINGLE-SERVICE ARTICLES—to obtain additional food from the display and serving EQUIPMENT.
- **Drinking cups and containers may be reused by self-service CONSUMERS if refilling is a CONTAMINATION-free process.**

### **7.3.3.5 Food Storage and Preparation**

#### **7.3.3.5.1 Storage Protection (19)**

Food must be protected from CONTAMINATION by storing the food as follows:

- Covered or otherwise protected;
- In a clean, dry location;
- Where it is not exposed to splash, dust, or other CONTAMINATION; and
- At least 15 centimeters (6 inches) above the deck.

#### **7.3.3.5.2 Prohibited Storage (19)**

Food must not be stored as follows:

- In locker rooms.
- In toilet rooms.
- In dressing rooms.
- In garbage rooms;
- In mechanical rooms;
- Under sewer lines that are not continuously sleeve welded.
- Under leaking water lines, including leaking automatic fire sprinkler heads, or under lines on which water has condensed.

- Under open stairwells.
- Under other sources of CONTAMINATION from nonfood items such as ice blocks, ice carvings, and flowers.
- In areas not finished in accordance with 7.7.4 and 7.7.5 for FOOD STORAGE AREAS.

#### **7.3.3.5.3 PHF Packages in Vending Machines (19)**

POTENTIALLY HAZARDOUS FOOD dispensed through a vending machine must be in the package in which it was placed in the galley or FOOD-PROCESSING PLANT at which it was prepared.

#### **7.3.3.5.4 Preparation (19)**

During preparation, unpackaged food must be protected from environmental sources of CONTAMINATION such as rain.

### **7.3.3.6 Food Display and Service**

#### **7.3.3.6.1 Display Preparation (19)**

Food on display must be protected from CONTAMINATION by the use of packaging; counter, service line, or salad bar food guards; display cases; self-closing hinged lids; or other effective means. Install side protection for sneeze guards if the distance between exposed food and where CONSUMERS are expected to stand is less than 1 meter (40 inches).

#### **7.3.3.6.2 Condiments (19)**

Condiments must be protected from CONTAMINATION by being kept in one of the following:

- Dispensers designed to provide protection.
- Protected food displays provided with the proper UTENSILS.
- Original containers designed for dispensing.
- Individual packages or portions.

Condiments at a vending machine location must be in individual packages or provided in dispensers that are filled at an APPROVED location, such as the galley that provides food to the vending machine location, a FOOD-PROCESSING PLANT, or a properly equipped facility located on the site of the vending machine location.

#### **7.3.3.6.3 Self Service (19)**

CONSUMER self-service operations, such as salad bars and buffets, for unpackaged READY-TO-EAT FOODS must be

- Provided with suitable UTENSILS or effective dispensing methods that protect the food from CONTAMINATION.
- Monitored by FOOD EMPLOYEES trained in safe operating

procedures.

Where there is self service of scooped frozen dessert, service must be out of shallow pans no deeper than 4 inches (100 millimeters) and no longer than 12 inches (300 millimeters).

#### **7.3.3.6.4 *Utensils, Consumer Self-service***

##### **7.3.3.6.4.1 *Dispensing Utensil (19)***

A food-dispensing UTENSIL must be available for each container of food displayed at a CONSUMER self-service unit such as a buffet or salad bar.

##### **7.3.3.6.4.2 *Utensil Protected (19)***

The food contact portion of each self-service food dispensing UTENSIL must be covered or located beneath shielding during service.

Dishware, glassware, and UTENSILS out for service must be inverted or covered.

#### **7.3.3.6.5 *Food Reservice (15 C)***

After being served and in the possession of a CONSUMER or being placed on a buffet service line, food that is unused or returned by the CONSUMER must not be offered as food for human consumption.

##### **Exceptions:**

- **A container of food that is not POTENTIALLY HAZARDOUS may be transferred from one CONSUMER to another if the food is dispensed so that it is protected from CONTAMINATION and the container is closed between uses (such as a narrow-neck bottle containing catsup, steak sauce, or wine) OR the food (such as crackers, salt, or pepper) is in an unopened original package and is maintained in sound condition.**
- **Reservice for foods served to passengers from a fully enclosed display case and under strict employee monitoring, strict temperature control of hot/cold POTENTIALLY HAZARDOUS FOODS, proper cooling and reheating of hot-held POTENTIALLY HAZARDOUS FOODS, and complete protection from any other CONTAMINATION sources, including pests.**

#### **7.3.3.7 *Other Contamination***

##### **7.3.3.7.1 *Other Contaminants (19)***

Food must be protected from CONTAMINATION that may result from a physical, chemical, biological origin.

### 7.3.4 Pathogen Destruction

#### 7.3.4.1 Cooking Temperatures/Times

##### 7.3.4.1.1 **Cooking (16 C)**

Raw animal foods such as eggs, FISH, MEAT, and POULTRY—and foods containing these raw animal foods—must be cooked to heat all parts of the food to a temperature and for a time that complies with one of the following methods based on the food being cooked:

- **63°C (145°F) or above** for 15 seconds for raw shell eggs that are broken and prepared in response to CONSUMERS' orders and for immediate service; and for FISH, MEAT, and pork, including GAME ANIMALS commercially raised for food and GAME ANIMALS under a voluntary inspection program.
- **68°C (155°F) or above** for 15 seconds or equivalent temperature-time combination for RATITES, MECHANICALLY TENDERIZED and INJECTED MEATS, and raw eggs that are not prepared for immediate service; and for the following if they are COMMINUTED: FISH, MEAT, GAME ANIMALS commercially raised for food, and GAME ANIMALS under a voluntary inspection program.
- **74°C (165°F) or above** for 15 seconds for POULTRY, wild GAME ANIMALS not specified in above bullet for 68°C (155°F); stuffed FISH, MEAT, pasta, POULTRY, or RATITES; or stuffing containing FISH, MEAT, POULTRY, or RATITES.
- Whole beef roasts, corned beef roasts, pork roasts, and cured pork roasts such as ham, must be cooked as detailed in sections a and b below.

a. In an oven preheated to the temperature specified for the roast's weight and oven type (see table below) AND

| Oven Type | Roast Weight Less Than 4.5 kg (10 lbs) | Roast Weight 4.5 kg (10 lbs) or More |
|-----------|--|--------------------------------------|
| Still dry | Preheat to 177°C (350°F) or more       | Preheat to 121°C (250°F) or more     |

| Oven Type         | Roast Weight<br>Less Than 4.5 kg<br>(10 lbs) | Roast Weight<br>4.5 kg (10 lbs) or<br>More |
|-------------------|--|--|
| Convection        | Preheat to 163°C<br>(325°F) or more          | Preheat to 121°C<br>(250°F) or more        |
| High<br>humidity* | Preheat to 121°C<br>(250°F)                  | Preheat to 121°C<br>(250°F)                |

\*Relative humidity greater than 90% for at least 1 hour as measured in the cooking chamber or exit of the oven; or in a moisture-impermeable bag that provides 100% humidity.

- b. All parts of the food heated to a temperature and for the holding time which corresponds to that temperature (see chart below):

| Temperature    | Time*       |
|----------------|-------------|
| 54.4°C (130°F) | 112 minutes |
| 55.0°C (131°F) | 89 minutes  |
| 56.1°C (133°F) | 56 minutes  |
| 57.2°C (135°F) | 36 minutes  |
| 57.8°C (136°F) | 28 minutes  |
| 58.9°C (138°F) | 18 minutes  |
| 60.0°C (140°F) | 12 minutes  |
| 61.1°C (142°F) | 8 minutes   |
| 62.2°C (144°F) | 5 minutes   |
| 62.8°C (145°F) | 4 minutes   |
| 63.9°C (147°F) | 134 seconds |
| 65.0°C (149°F) | 85 seconds  |
| 66.1°C (151°F) | 54 seconds  |
| 67.2°C (153°F) | 34 seconds  |
| 68.3°C (155°F) | 22 seconds  |
| 69.4°C (157°F) | 14 seconds  |
| 70.0°C (158°F) | 0 seconds   |

\*Holding time may include postoven heat rise.  
Extracted from *Food Code*, Recommendations of the United States Public Health Service, 2009.

- **A raw or undercooked WHOLE-MUSCLE, INTACT BEEF steak may be served or offered for sale in a READY-TO-EAT form if the steak is labeled to indicate that it meets the definition of “WHOLE-MUSCLE, INTACT BEEF” and the steak is cooked on both the top and bottom to a surface temperature of 63°C (145°F) or above and a cooked color change is achieved on all external surfaces.**
- **A raw animal food (such as raw FISH, raw-marinated FISH, raw MOLLUSCAN SHELLFISH, or steak tartare) or a partially cooked food (such as lightly cooked FISH, soft-**

**cooked eggs, or rare MEAT other than WHOLE-MUSCLE, INTACT BEEF steaks) may be served or offered for sale in a READY-TO-EAT form if the CONSUMER is informed by the written CONSUMER advisory or if VSP grants a VARIANCE from the cooking recommendations based on a HACCP PLAN submitted by the vessel.** The HACCP PLAN must document scientific data or other information showing that a lesser time and temperature regimen results in a safe food. The HACCP PLAN must verify that EQUIPMENT and procedures for food preparation and training of FOOD EMPLOYEES meet the conditions of the VARIANCE.

#### **7.3.4.1.2 Microwave (16 C)**

Raw animal foods cooked in a microwave oven must be

- Rotated or stirred throughout or midway during cooking to compensate for uneven distribution of heat.
- Covered to retain surface moisture.
- Heated to a temperature of at least 74°C (165°F) in all parts of the food.
- Allowed to stand covered for 2 minutes after cooking to obtain temperature equilibrium.

#### **7.3.4.1.3 Fruits/Vegetables (17)**

Fruits and vegetables cooked for hot holding must be cooked to a temperature of 57°C (135°F).

### **7.3.4.2 Parasite Destruction**

#### **7.3.4.2.1 Parasite Destruction (16 C)**

Before service in READY-TO-EAT form, raw, raw-marinated, partially cooked, or marinated-partially cooked FISH and fishery products other than MOLLUSCAN SHELLFISH must be frozen throughout to a temperature of -20°C (-4°F) or below for 168 hours (7 days) in a freezer or to -35°C (-31°F) or below for 15 hours in a BLAST CHILLER.

**These FISH may be served in a raw, raw-marinated, or partially cooked READY-TO-EAT form without freezing if the**

- **FISH are tuna of the species *Thunnus alalunga*, *T. albacares* (yellowfin tuna), *T. atlanticus*, *T. maccoyii* (bluefin tuna, southern), *T. obesus* (bigeye tuna), or *T. thynnus* (bluefin tuna, northern) OR**
- **Aquacultured FISH, such as salmon, are**
  - **raised in open water, net-pens, or land-based operations such as ponds or tanks and**

- **fed formulated feed (such as pellets) that contains no live parasites infective to the aquacultured FISH, or FISH eggs that have been removed from the skein and rinsed.**

**If foods, such as gravlax, ceviche/seviche, FISH carpaccio, or sashimi, are prepared in a FOOD-PROCESSING PLANT and certified as parasite free, they may be served raw, raw-marinated, or partially cooked READY-TO-EAT without freezing the product onboard the vessel.**

#### **7.3.4.2.2 Records (17)**

If raw, raw-marinated, partially cooked, or marinated partially cooked FISH are served in READY-TO-EAT form,

- The supervisor or PERSON IN CHARGE must record the freezing temperature and time to which the FISH are subjected and must retain the records on the vessel for 90 calendar days beyond the time of service or sale of the FISH; OR
- If the FISH are frozen by a supplier, a written letter from the supplier must specify the FISH species involved and both the temperature to which the FISH was frozen and the total time period at that temperature. If the supplier provides any of the same FISH species to the vessel in a fresh state, the outer packaging must designate which is the parasite-free FISH.

FISH that are exempt from freezing requirements based on section 7.3.4.2.1 must have a letter stating both the species of FISH and the conditions in which they were raised and fed.

#### **7.3.4.3 Reheating**

##### **7.3.4.3.1 Immediate Service**

**Cooked and refrigerated food prepared for immediate service in response to an individual CONSUMER order (such as a roast beef sandwich au jus) may be served at any temperature.**

##### **7.3.4.3.2 74°C/165°F (16 C)**

POTENTIALLY HAZARDOUS FOOD that is cooked, cooled, and reheated for hot holding must be reheated so that all parts of the food reach a temperature of at least 74°C (165°F) for 15 seconds.

#### **7.3.4.3.3 *Microwave Heating (16 C)***

If reheated in a microwave oven for hot holding, POTENTIALLY HAZARDOUS FOOD must be reheated so that all parts of the food reach a temperature of at least 74°C (165°F) and the food is rotated or stirred, covered, and allowed to stand covered for 2 minutes after reheating.

#### **7.3.4.3.4 *Commercial Products (17)***

READY-TO-EAT POTENTIALLY HAZARDOUS FOOD taken from a commercially processed, HERMETICALLY SEALED CONTAINER, or from an intact package from a food processing plant that is inspected by the food REGULATORY AUTHORITY that has jurisdiction over the plant, must be heated to a temperature of at least 57°C (135°F) for hot holding.

#### **7.3.4.3.5 *Rapid Reheat (16 C)***

Reheating for hot holding must be done rapidly. The time the food is between 5°C (41°F) and 74°C (165°F) must not exceed 2 hours.

#### **7.3.4.3.6 *Reheat Roast Beef***

**Remaining unsliced portions of roasts of beef cooked on the vessel may be reheated for hot holding using the oven parameters and minimum time and temperature conditions used in the original cooking process.**

### **7.3.5 Food Holding Temperatures and Times**

#### **7.3.5.1 Frozen, Slacking, and Thawing Procedures**

##### **7.3.5.1.1 *Store Frozen Food Frozen (17)***

Stored frozen foods must be maintained frozen.

##### **7.3.5.1.2 *Slacking (17)***

Frozen POTENTIALLY HAZARDOUS FOOD that is SLACKED to moderate the temperature must be held

- Under refrigeration that maintains the food temperature at 5°C (41°F) or less; or
- At any temperature if the food remains frozen.

##### **7.3.5.1.3 *Thawing (17)***

POTENTIALLY HAZARDOUS FOOD must be thawed by one of the following:

- Under refrigeration that maintains the food temperature at 5°C (41°F) or less.

- Completely submerged under running water at a water temperature of 21°C (70°F) or below, with sufficient water velocity to agitate and float off loose particles in an overflow, and for a period of time that does not allow thawed portions of READY-TO-EAT FOOD to rise above 5°C (41°F).
- Completely submerged under running water at a water temperature of 21°C (70°F) or below, with sufficient water velocity to agitate and float off loose particles in an overflow, and for a period of time that does not allow thawed portions of a raw animal food requiring cooking to be above 5°C (41°F) for more than 4 hours, including
  - The time the food is exposed to the running water and the time needed for preparation for cooking, OR
  - The time it takes under refrigeration to lower the food temperature to 5°C (41°F).
- As part of a cooking process if the frozen food is cooked or thawed in a microwave oven.
- Using any procedure if a portion of frozen READY-TO-EAT FOOD is thawed and prepared for immediate service in response to an individual CONSUMER'S order.

### 7.3.5.2 Food Cooling

#### 7.3.5.2.1 **Cooling Times/Temperatures (16 C)**

Cooked POTENTIALLY HAZARDOUS FOOD must be cooled

- From 57°C (135°F) to 21°C (70°F) within 2 hours and
- From 21°C (70°F) to 5°C (41°F) or less within 4 hours.

#### 7.3.5.2.2 **Cooling Prepared Food (16 C)**

POTENTIALLY HAZARDOUS FOOD must be cooled within 4 hours to 5°C (41°F) or less if prepared from ingredients at ambient temperature (such as reconstituted foods and canned tuna).

#### 7.3.5.2.3 **Cooling Received Food (16 C)**

A POTENTIALLY HAZARDOUS FOOD received in compliance with LAWS allowing a temperature above 5°C (41°F) during shipment from the supplier must be cooled within 4 hours to 5°C (41°F) or less.

#### 7.3.5.2.4 **Shell Eggs**

**Shell eggs need not comply with the cooling time if, on receipt,**

**they are placed immediately into refrigerated EQUIPMENT capable of maintaining food at 5°C (41°F) or less.**

#### **7.3.5.2.5 Cooling Methods (17)**

Cooling must be accomplished using one or more of the following methods based on the type of food being cooled:

- Placing the food in shallow pans.
- Separating the food into smaller or thinner portions.
- Using BLAST CHILLERS, freezers, or other rapid cooling EQUIPMENT.
- Stirring the food in a container placed in an ice water bath.
- Using containers that facilitate heat transfer.
- Adding ice as an ingredient.
- Other effective methods.

When placed in cooling or cold-holding EQUIPMENT, food containers in which food is being cooled must be arranged in the EQUIPMENT to provide maximum heat transfer through the container walls and must be loosely covered—or uncovered if protected from overhead CONTAMINATION—during the cooling period to facilitate heat transfer from the surface of the food.

#### **7.3.5.2.6 Cooling Logs (17)**

Logs documenting cooked POTENTIALLY HAZARDOUS FOOD cooling temperatures and times from the starting points designated in 7.3.5.2.1 through the control points at 2 and 6 hours must be maintained onboard the vessel for a period of 30 days from the date the food was placed in a cooling process. Logs documenting cooling of POTENTIALLY HAZARDOUS FOODS prepared from ingredients at ambient temperatures, with the start time to the time when 5°C (41°F) is reached, must also be maintained for a 30-day period, beginning with the day of preparation.

### **7.3.5.3 Food Holding Temperatures and Times**

#### **7.3.5.3.1 Holding Temperature/Time (16 C)**

Except during preparation, cooking, or cooling, or when time is used as the public health control, POTENTIALLY HAZARDOUS FOOD must be maintained at

- 57°C (135°F) or above, except that roasts may be held at a temperature of 54°C (130°F); or
- 5°C (41°F) or less.

#### **7.3.5.3.2 RTE PHF Shelf-life: Date Marking (16 C)**

Refrigerated, READY-TO-EAT, POTENTIALLY HAZARDOUS FOOD

- Prepared on a vessel and held refrigerated for more than 24 hours must be clearly marked at the time of preparation to indicate the date or day by which the food must be consumed (7 calendar days or fewer from the day the food is prepared). The day of preparation is counted as day 1.
- Prepared and PACKAGED by a FOOD-PROCESSING PLANT and held on the vessel after opening for more than 24 hours must be clearly marked at the time the original container is opened to indicate the date by which the food must be consumed (7 calendar days or fewer after the original container is opened). The day of opening is counted as day 1.

The date marking requirement can be accomplished with a calendar date, day of the week, color-code, or other system, provided it is effective.

The date marking requirement does not apply to the following foods prepared and PACKAGED by a food processing plant inspected by a REGULATORY AUTHORITY:

- Deli salads (such as ham salad, seafood salad, chicken salad, egg salad, pasta salad, potato salad, and macaroni salad) manufactured in accordance with 21 CFR 110.
- Hard cheeses containing not more than 39% moisture as defined in 21 CFR 133 (such as cheddar, gruyere, parmesan and reggiano, and romano).
- Semisoft cheeses containing more than 39% moisture, but not more than 50% moisture, as defined in 21 CFR 133 (such as blue, edam, gorgonzola, gouda, and monterey jack).
- Cultured dairy products as defined in 21 CFR 131 (such as yogurt, sour cream, and buttermilk).
- Preserved FISH products (such as pickled herring and dried or salted cod) and other acidified FISH products defined in 21 CFR 114.
- Shelf stable, dry fermented sausages (such as pepperoni and Genoa salami) that are not labeled “keep refrigerated” as specified in 9 CFR 317 [retain the original casing on the product].
- Shelf stable salt-cured products (such as prosciutto and Parma [ham]) that are not labeled “keep refrigerated” as specified in 9 CFR 317.

These products are exempted from date marking even after being opened, cut, shredded, etc.

**7.3.5.3.3 *Discarding RTE PHF (16 C)***

Refrigerated, READY-TO-EAT, POTENTIALLY HAZARDOUS FOOD must be discarded if not consumed within 7 calendar days from the date of preparation or opening.

**7.3.5.3.4 *Retain Date (16 C)***

A refrigerated, potentially hazardous, READY-TO-EAT food ingredient or a portion of a refrigerated, potentially hazardous, READY-TO-EAT food that is subsequently combined with additional ingredients or portions of food must retain the date marking of the earliest or first-prepared ingredient.

**7.3.5.3.5 *Time as a Public Health Control (16 C)***

If time only—rather than time in conjunction with temperature—is used as the public health control for a working supply of POTENTIALLY HAZARDOUS FOOD before cooking, or for READY-TO-EAT POTENTIALLY HAZARDOUS FOOD that is displayed or held for service for immediate consumption, the food

- Must have an initial temperature of 5°C (41°F) or less or 57°C (135°F) or greater before placement on time control.
- Must not be placed on temperature control again.
- Must be marked or otherwise identified to indicate the time 4 hours past the point in time when the food is removed from temperature control (if the time between service set-up and closing is greater than 4 hours).
- Must be discarded within 4 hours of placement on time control.

**7.3.5.3.6 *Time Control Plan (16 C)***

A written time control plan(s) that ensures compliance with these guidelines must be maintained on the vessel and made available for review during inspections (Annex 13.11). A time control plan must be posted at each outlet where time control is used. The plan(s) must

- Include set-up and discard times for each outlet.
- List refrigeration and hot holding units (compartments and cabinets) on time control (the physical units must also be labeled as such).
- Describe or show the flow of POTENTIALLY HAZARDOUS FOOD from when last in temperature control to placement in time control and discard.

## 7.3.6 Consumer Information

### 7.3.6.1 Advisory

#### **7.3.6.1.1 Consumer Advisory (16 C)**

If an animal food such as beef, eggs, FISH, lamb, milk, pork, POULTRY, or shellfish that is raw, undercooked, or not otherwise processed to eliminate pathogens is offered in a READY-TO-EAT form or as a raw ingredient in another READY-TO-EAT FOOD, the CONSUMER must be informed by way of disclosure as specified below using menu advisories, placards, or other easily visible written means of the significantly increased risk to certain especially vulnerable CONSUMERS eating such foods in raw or undercooked form. The advisory must be located at the outlets where these types of food are served.

Raw shell egg preparations are prohibited in uncooked products as described in 7.3.3.2.3.

Disclosure must be made by one of the two following methods:

- On a sign describing the animal-derived foods (e.g., “oysters on the half-shell,” “hamburgers,” “steaks,” or “eggs”); AND that they can be cooked to order and may be served raw or undercooked; AND a statement indicating that consuming raw or undercooked MEATS, seafood, shellfish, eggs, milk, or POULTRY may increase your risk for foodborne illness, especially if you have certain medical conditions. The advisory must be posted at the specific station where the food is served raw, undercooked, or cooked to order.

**OR**

- On a menu using an asterisk at the animal-derived foods requiring disclosure and a footnote with a statement indicating that consuming raw or undercooked MEATS, seafood, shellfish, eggs, milk, or POULTRY may increase your risk for foodborne illness, especially if you have certain medical conditions.

**It is acceptable to limit the list of animal-derived foods in the CONSUMER advisory to only the type(s) of animal-derived food served raw, undercooked, or cooked to order at a specific location. For example, at a sushi counter, the CONSUMER advisory might only refer to seafood.**

**A CONSUMER advisory is not required for raw or undercooked WHOLE-MUSCLE, INTACT BEEF steak as specified under 7.3.2.1.**

## **7.3.7 Contaminated Food**

### **7.3.7.1 Discarding Food**

#### **7.3.7.1.1 *Unsafe/Adulterated (18 C)***

A food that is unsafe or ADULTERATED must be discarded.

#### **7.3.7.1.2 *Unapproved Source (18 C)***

Food that is not from an APPROVED source must be discarded.

#### **7.3.7.1.3 *Restricted or Excluded Employee (18 C)***

READY-TO-EAT FOOD that may have been contaminated by an employee who has been restricted or excluded for FOOD EMPLOYEE health issues must be discarded.

#### **7.3.7.1.4 *Contaminated by Others (18 C)***

Food that is contaminated by FOOD EMPLOYEES, CONSUMERS, or other persons through contact with their hands, bodily discharges (such as nasal or oral discharges), or other means must be discarded.

## **7.4 Equipment and Utensils**

### **7.4.1 Materials**

#### **7.4.1.1 Multiuse Characteristics and Use Limitations**

##### **7.4.1.1.1 *Safe Food-contact Materials (26 C)***

Materials used in the construction of multiuse UTENSILS and FOOD-CONTACT SURFACES of EQUIPMENT must not allow the migration of deleterious substances or impart colors, odors, or tastes to food and must be safe under normal use conditions.

##### **7.4.1.1.2 *Food-contact Surfaces (20)***

Materials used in the construction of multiuse UTENSILS and FOOD-CONTACT SURFACES of EQUIPMENT must be as follows:

- Durable, corrosion-resistant, and nonabsorbent.
- Sufficient in weight and thickness to withstand repeated WAREWASHING.
- Finished to have a SMOOTH, EASILY CLEANABLE surface.
- Resistant to pitting, chipping, crazing, scratching, scoring,

distortion, and decomposition.

**7.4.1.1.3 Cast Iron (20)**

Cast iron must not be used for UTENSILS or FOOD-CONTACT SURFACES of EQUIPMENT. **Cast iron may be used as a surface for cooking. Cast iron may be used in UTENSILS for serving food if the UTENSILS are used only as part of an uninterrupted process from cooking through service.**

**Cast iron food display dishes heated to a temperature of 74°C (165°F) for 15 seconds may be used for the immediate service of food.**

**7.4.1.1.4 Lead (20)**

Limitation of lead use must be as follows:

- Ceramic, china, crystal UTENSILS, and decorative UTENSILS such as hand-painted ceramic or china that are used in contact with food must be lead-free or contain levels of lead not exceeding the limits for specific UTENSIL categories as allowed by LAW.
- Pewter alloys containing lead in excess of 0.05% must not be used as a FOOD-CONTACT SURFACE.
- Solder and flux containing lead in excess of 0.2% must not be used as a FOOD-CONTACT SURFACE.

**7.4.1.1.5 Copper/Brass (26 C)**

Copper and copper alloys such as brass must not be used in contact with a food that has a PH below 6 (such as vinegar, fruit juice, or wine) or for a fitting or tubing installed between a BACKFLOW PREVENTION DEVICE and a carbonator.

**Copper and copper alloys may be used in contact with beer brewing ingredients that have a PH below 6 in the prefermentation and fermentation steps of a beer brewing operation such as a brewpub or microbrewery.**

**7.4.1.1.6 Galvanized (26 C)**

Galvanized metal must not be used for UTENSILS or FOOD-CONTACT SURFACES of EQUIPMENT.

**7.4.1.1.7 Wood (20)**

Wood use must be limited as follows:

- Wood and wood wicker must not be used as a FOOD-CONTACT SURFACE.
- **Hard maple or an equivalently hard, close-grained wood may be used for cutting boards; cutting blocks;**

**bakers' tables; and UTENSILS such as rolling pins, doughnut dowels, serving dishes, and chopsticks; and wooden paddles used in confectionery operations for pressure scraping kettles when manually preparing confections at a temperature of 110°C (230°F) or above.**

- **Whole, uncut, raw fruits and vegetables, and nuts in the shell, may be kept in the wood shipping container in which they were received until the fruits, vegetables, or nuts are used.**
- **If the nature of the food requires removal of rinds, peels, husks, or shells before consumption, the whole, uncut, raw food may be kept in untreated wood containers or in treated wood containers if the containers are treated with a preservative that meets the requirements specified in 21 CFR 178.3800 Preservatives for Wood.**

#### **7.4.1.1.8 Coatings (20)**

Multiuse KITCHENWARE such as frying pans, griddles, sauce pans, cookie sheets, and waffle bakers that have a perfluorocarbon resin coating must be used with nonscoring or nonscratching UTENSILS and cleaning aids.

#### **7.4.1.1.9 Nonfood-contact Surfaces (21)**

NONFOOD-CONTACT SURFACES of EQUIPMENT that are exposed to splash, spillage, or other food soiling or that require frequent cleaning must be constructed of a corrosion-resistant, nonabsorbent, and SMOOTH material.

### **7.4.1.2 Single-service and Single-use Characteristics**

#### **7.4.1.2.1 Single-service Materials Safe (26 C)**

Materials used to make SINGLE-SERVICE and SINGLE-USE ARTICLES must not allow the migration of deleterious substances and must be safe.

#### **7.4.1.2.2 No Colors/Odors/Taste (20)**

Materials used to make SINGLE-SERVICE and SINGLE-USE ARTICLES must not impart colors, odors, or tastes to food and must be clean.

## **7.4.2 Design and Construction**

### **7.4.2.1 Durability and Strength**

#### **7.4.2.1.1 Food-contact Durability/Strength (20)**

FOOD-CONTACT SURFACES of EQUIPMENT and UTENSILS must be

designed and constructed to be durable and to retain their characteristic qualities under normal use conditions.

#### **7.4.2.1.2 Nonfood-contact Durability/Strength (21)**

NONFOOD-CONTACT SURFACES of EQUIPMENT and UTENSILS must be designed and constructed to be durable and to retain their characteristic qualities under normal use conditions.

#### **7.4.2.1.3 Glass TMDs (26 C)**

Food TEMPERATURE-MEASURING DEVICES must not have sensors or stems constructed of glass, except for thermometers with glass sensors or stems encased in a shatterproof coating (such as candy thermometers).

### **7.4.2.2 Cleanability**

#### **7.4.2.2.1 Multiuse Food-contact Surfaces (20)**

Multiuse FOOD-CONTACT SURFACES must be

- SMOOTH.
- Free of breaks, open SEAMS > 0.8 millimeters (1/32 inch), cracks, chips, inclusions, pits, and similar imperfections.
- Free of sharp internal angles, corners, and crevices.
- Finished to have SMOOTH welds and joints.
- ACCESSIBLE for cleaning and inspection by one of the following methods without being disassembled, by disassembling without the use of tools, or by easy disassembling with the use of handheld tools commonly available to maintenance and cleaning personnel (such as screwdrivers, pliers, open-end wrenches, and Allen wrenches). This section does not apply to cooking oil storage tanks, distribution lines for cooking oils, or BEVERAGE syrup lines or tubes.

Use low profile, nonslotted, NONCORRODING, and easy-to-clean fasteners on FOOD-CONTACT SURFACES and in splash zones. The use of exposed slotted screws, Phillips head screws, or pop rivets in these areas is prohibited.

#### **7.4.2.2.2 CIP Equipment Design/Construction (20)**

Clean-in-place EQUIPMENT must be designed and constructed so that cleaning and sanitizing solutions circulate throughout a fixed system and contact all interior FOOD-CONTACT SURFACES and so that the system self drains or can be completely drained of cleaning and sanitizing solutions.

Clean-in-place EQUIPMENT that is not designed to be disassembled

for cleaning must be designed with inspection access points to ensure that all interior FOOD-CONTACT SURFACES throughout the fixed system are being effectively cleaned.

**7.4.2.2.3 “V” Type Threads (20)**

Except for hot oil cooking or filtering EQUIPMENT, “V” type threads must not be used on FOOD-CONTACT SURFACES.

**7.4.2.2.4 Oil Filtering Equipment (20)**

Hot oil filtering EQUIPMENT must be READILY ACCESSIBLE for filter replacement and filter cleaning.

**7.4.2.2.5 Can Openers (20)**

Cutting or piercing parts of can openers must be READILY REMOVABLE for cleaning and replacement.

**7.4.2.2.6 Nonfood-contact Design (21)**

NONFOOD-CONTACT SURFACES must be free of unnecessary ledges, projections, and crevices, and must be designed and constructed to allow easy cleaning and facilitate maintenance.

**7.4.2.2.7 Kick Plates (21)**

Kick plates must be designed so that the areas behind them are ACCESSIBLE for inspection and cleaning by being easily REMOVABLE or capable of being rotated open without unlocking EQUIPMENT doors.

**7.4.2.2.8 Grease Filters (21)**

Filters or other grease-extracting EQUIPMENT must be designed to be READILY REMOVABLE for cleaning and replacement if not designed to be CLEANED IN PLACE.

**7.4.2.3 Food TMDs (20)**

Food TEMPERATURE-MEASURING DEVICES must be provided and READILY ACCESSIBLE for use in ensuring attainment and maintenance of food temperatures. Tip-sensitive TEMPERATURE-MEASURING DEVICES, such as a thermocouple or thermistor, must be used for measuring thin food products.

**7.4.2.3.1 Food TMD Accuracy (20)**

Food TEMPERATURE-MEASURING DEVICES

- That are scaled only in Celsius or dually scaled in Celsius and Fahrenheit must be accurate to  $\pm 1^{\circ}\text{C}$  ( $\pm 2^{\circ}\text{F}$ ) in the intended range of use.
- That are scaled only in Fahrenheit must be accurate to  $\pm 2^{\circ}\text{F}$  in the intended range of use.

Food TEMPERATURE-MEASURING DEVICES must have a numerical scale, printed record, or digital readout in increments no greater than 1°C (2°F) in the intended range of use.

#### **7.4.2.3.2 Ambient Air TMD Accuracy (21)**

Ambient air TEMPERATURE-MEASURING DEVICES

- That are scaled in Celsius or dually scaled in Celsius and Fahrenheit must be designed to be easily readable and accurate to  $\pm 1.5^{\circ}\text{C}$  ( $\pm 3^{\circ}\text{F}$ ) in the intended range of use.
- That are scaled only in Fahrenheit must be accurate to  $\pm 3^{\circ}\text{F}$  in the intended range of use.

### **7.4.2.4 Functionality**

#### **7.4.2.4.1 Ventilation Hood Design (37)**

Exhaust ventilation hood systems in FOOD PREPARATION and WAREWASHING areas—including components such as hoods, fans, guards, and ducting—must be designed to prevent grease or condensation from draining or dripping onto food, EQUIPMENT, UTENSILS, LINENS, and SINGLE-SERVICE and SINGLE-USE ARTICLES.

#### **7.4.2.4.2 Equipment Openings, Closures, and Deflectors (20)**

EQUIPMENT openings, closures, and deflectors must conform to the following:

- A cover or lid for EQUIPMENT must overlap the opening and be sloped to drain.
- An opening located in the top of a unit of EQUIPMENT that is designed for use with a cover or lid must be flanged upward at least 5 millimeters (2/10 of an inch).
- Fixed piping, TEMPERATURE-MEASURING DEVICES, rotary shafts, and other parts extending into EQUIPMENT must be provided with a watertight joint at the point where the item enters the EQUIPMENT.
- If a watertight joint is not provided, the piping, TEMPERATURE-MEASURING DEVICES, rotary shafts, and other parts extending through the openings must be equipped with an apron designed to deflect condensation, drips, and dust from openings into the food; the opening must be flanged at least 5 millimeters (2/10 of an inch).

#### **7.4.2.4.3 Beverage/Ice Dispensing (20)**

In EQUIPMENT that dispenses liquid food or ice in unpackaged form,

- The delivery tube, chute, orifice, and splash surfaces

directly above the container receiving the food must be designed in a manner (such as with barriers, baffles, or drip aprons) so that drips from condensation and splash are diverted from the opening of the container receiving the food.

- The delivery tube, chute, and orifice must be protected from manual contact (such as by being recessed).
- The delivery tube or chute and orifice of EQUIPMENT used to vend liquid food or ice in unpackaged form to self-service CONSUMERS must be designed so that the delivery tube or chute and orifice are protected from dust, insects, rodents, and other CONTAMINATION by a self-closing door if the EQUIPMENT is located in an outside area that does not otherwise afford the protection of an enclosure against the rain, windblown debris, insects, rodents, and other contaminants present in the environment, or if it is available for self service during hours when it is not under the full-time supervision of a FOOD EMPLOYEE.
- The dispensing EQUIPMENT actuating lever or mechanism and filling device of CONSUMER self-service BEVERAGE dispensing EQUIPMENT must be designed to prevent contact with the lip-contact surface of glasses or cups that are refilled.

#### **7.4.2.4.4 Bearings/Gears (21)**

EQUIPMENT containing bearings and gears that require lubricants must be designed and constructed so that the lubricant cannot leak, drip, or be forced into food or onto FOOD-CONTACT SURFACES.

#### **7.4.2.4.5 Beverage Line Cooling (20)**

BEVERAGE tubing and cold-plate BEVERAGE cooling devices must not be installed in contact with stored ice. **This guideline does not apply to cold plates that are constructed integrally without SEAMS in an ice storage bin.**

#### **7.4.2.4.6 Equipment Drainage (21)**

EQUIPMENT compartments subject to accumulation of moisture because of conditions such as condensation, food or BEVERAGE drip, or water from melting ice must be sloped to an outlet that allows complete draining.

#### **7.4.2.4.7 Drain Lines (20)**

Liquid waste drain lines must not pass through an ice machine or

ice storage bin.

#### **7.4.2.4.8 Condenser Unit (21)**

If a condenser unit is an integral component of EQUIPMENT, the condenser unit must be separated from the food and FOOD STORAGE space by a dustproof barrier.

#### **7.4.2.4.9 Ambient Air TMDs (21)**

TEMPERATURE-MEASURING DEVICES must conform to the following guidelines:

- In a mechanically refrigerated or hot-food storage unit, the sensor of a TEMPERATURE-MEASURING DEVICE must be located to measure the air temperature in the warmest part of a mechanically refrigerated unit and in the coolest part of a hot-food storage unit.
- Cold or hot holding EQUIPMENT used for POTENTIALLY HAZARDOUS FOOD must be designed to include and must be equipped with at least one integral or affixed TEMPERATURE-MEASURING DEVICE that is located to allow easy viewing of the device's temperature display.
- The above bullets do not apply to EQUIPMENT for which the placement of a TEMPERATURE-MEASURING DEVICE is not a practical means for measuring the ambient air surrounding the food because of the design, type, and use of the EQUIPMENT (such as calrod units, heat lamps, cold plates, bains-marie, steam tables, insulated food transport containers, and salad bars).
- TEMPERATURE-MEASURING DEVICES must be easily readable.

### **7.4.2.5 Food Equipment, Standards and Classification**

#### **7.4.2.5.1 Food-contact Equipment Standards (20)**

FOOD-CONTACT SURFACES of food EQUIPMENT must comply with American National Standards Institute (ANSI), National Sanitation Foundation International (NSF International), or other internationally accredited food EQUIPMENT sanitation standards for materials, design, and construction.

#### **7.4.2.5.2 Nonfood-contact Equipment Standards (21)**

NONFOOD-CONTACT SURFACES of food EQUIPMENT must comply with American National Standards Institute (ANSI), National

Sanitation Foundation International (NSF International), or other internationally accredited food-EQUIPMENT sanitation standards for materials, design, and construction.

### **7.4.3 Numbers and Capacities**

#### **7.4.3.1 Cooling, Heating, and Holding Capacities**

##### **7.4.3.1.1 Cold/Hot Holding Capacity (20)**

EQUIPMENT for cooling and heating food, and for holding cold and hot food, must be sufficient in number and capacity to maintain POTENTIALLY HAZARDOUS FOOD temperatures.

#### **7.4.3.2 Ventilation Hood Systems**

##### **7.4.3.2.1 Ventilation Hood (37)**

Ventilation hood systems and devices must be sufficient in number and capacity to prevent grease or condensation from collecting on bulkheads and deckheads.

### **7.4.4 Equipment Location and Installation**

#### **7.4.4.1 Fixed Equipment, Spacing or Sealing**

##### **7.4.4.1.1 Fixed Equipment Installation (21)**

EQUIPMENT that is fixed because it is not EASILY MOVABLE must be installed so that it is

- Spaced to allow access for cleaning along the sides, behind, under, and above the EQUIPMENT;
- Spaced from adjoining EQUIPMENT, bulkhead, and deckhead at a distance of not more than 0.8 millimeter or 1/32 inch; or
- Sealed to adjoining EQUIPMENT or bulkhead (if the equipment is exposed to spillage or seepage).

##### **7.4.4.1.2 Table-mounted Sealed or Elevated (21)**

TABLE-MOUNTED EQUIPMENT that is not EASILY MOVABLE must be installed to allow cleaning of the EQUIPMENT and areas underneath and around the EQUIPMENT by being

- Sealed to the table or
- Elevated on legs.

#### **7.4.4.2 Fixed Equipment, Elevation or Sealing**

##### **7.4.4.2.1 Deck-mounted Sealed or Elevated (21)**

Deck-mounted EQUIPMENT that is not EASILY MOVABLE must be

sealed to the deck or elevated on legs that provide at least a 150-millimeter (6-inch) clearance between the deck and the EQUIPMENT.

**7.4.4.2.2 Deck-mounted Clearance**

**If no part of the deck under the deck-mounted EQUIPMENT is more than 150 millimeters (6 inches) from the point of cleaning access, the clearance space may be only 100 millimeters (4 inches).**

**7.4.4.2.3 Table-mounted Elevated (21)**

TABLE-MOUNTED EQUIPMENT that is not EASILY MOVABLE must be elevated on legs that provide at least a 100-millimeter (4-inch) clearance between the table and the EQUIPMENT.

**7.4.4.2.4 Table-mounted Clearance**

**The clearance space between the table and TABLE-MOUNTED EQUIPMENT may be either**

- **75 millimeters (3 inches) if the horizontal distance of the table top under the EQUIPMENT is no more than 500 millimeters (20 inches) from the point of access for cleaning; or**
- **50 millimeters (2 inches) if the horizontal distance of the table top under the EQUIPMENT is no more than 75 millimeters (3 inches) from the point of access for cleaning.**

**7.4.5 Maintenance and Operation**

**7.4.5.1 Equipment**

**7.4.5.1.1 Food-contact Equipment in Good Repair (20)**

Food-contact EQUIPMENT must be maintained in good repair and proper adjustment, including the following:

- EQUIPMENT must be maintained in a state of repair and condition that meets the materials, design, construction, and operation specifications of these guidelines.
- Cutting or piercing parts of can openers must be kept sharp to minimize the creation of metal fragments that can contaminate food when the container is opened.

**7.4.5.1.2 Nonfood-contact Equipment in Good Repair (21)**

NONFOOD-CONTACT EQUIPMENT must be maintained in good repair and proper adjustment, including the following:

- EQUIPMENT must be maintained in a state of repair and condition that meets the materials, design, construction, and

operation specifications of these guidelines.

- EQUIPMENT components such as doors, seals, hinges, fasteners, and kick plates must be kept intact and tight and adjusted in accordance with manufacturer's specifications.

#### **7.4.5.1.3 Cutting Boards (20)**

Surfaces such as cutting blocks and boards that are subject to scratching and scoring must be resurfaced if they can no longer be effectively cleaned and sanitized or must be discarded if they cannot be resurfaced.

#### **7.4.5.1.4 Microwave Ovens (20)**

Microwave ovens must meet the safety standards specified in 21 CFR 1030.10 Microwave Ovens, or equivalent.

### **7.4.5.2 Good Repair and Calibration**

#### **7.4.5.2.1 Utensils and TMDs in Good Repair and Calibration (20)**

UTENSILS and TEMPERATURE-MEASURING DEVICES must be maintained in good repair and proper adjustment, including the following:

- UTENSILS must be maintained in a state of repair or condition that meets the materials, design, and construction specifications of these guidelines or must be discarded.
- Food TEMPERATURE-MEASURING DEVICES must be calibrated in accordance with manufacturer's specifications as necessary to ensure their accuracy.

#### **7.4.5.2.2 Ambient Air TMDs Good Repair and Calibration (21)**

Ambient air TEMPERATURE-MEASURING DEVICES must be maintained in good repair and be accurate within the intended range of use.

### **7.4.5.3 Single-service and Single-use Articles**

#### **7.4.5.3.1 No Reuse (28)**

SINGLE-SERVICE and SINGLE-USE ARTICLES must not be reused.

#### **7.4.5.3.2 Bulk Milk Tubes (20)**

The bulk milk container dispensing tube must be cut on the diagonal, leaving no more than 25 millimeters (1 inch) protruding from the chilled dispensing head.

#### **7.4.5.3.3 Shell Reuse (28)**

Mollusk and crustacean shells must not be used more than once as serving containers.

## 7.5 Warewashing

### 7.5.1 Warewashing Design and Construction

#### 7.5.1.1 Warewashing Measuring Device Accuracy (22)

Provide a maximum registering TEMPERATURE-MEASURING DEVICE to verify the temperature in the warewash machines and the three-compartment sink.

##### 7.5.1.1.1 Water TMD Accuracy (22)

Water TEMPERATURE-MEASURING DEVICES that are scaled

- In Celsius or dually scaled in Celsius and Fahrenheit must be designed to be accurate to  $\pm 1.5^{\circ}\text{C}$  ( $\pm 3^{\circ}\text{F}$ ) in the intended range of use.
- Only in Fahrenheit must be designed to be accurate to  $\pm 3^{\circ}\text{F}$  in the intended range of use.

##### 7.5.1.1.2 Pressure Gauge Accuracy (22)

Pressure measuring devices that display pressures in the water supply line for the fresh hot water sanitizing rinse must have increments of 7 kilopascals (1 pound per square inch or 0.07 bar) or smaller and must be accurate to  $\pm 14$  kilopascals ( $\pm 2$  pounds per square inch or  $\pm 0.14$  bar) in the 100-170 kilopascals (15-25 pounds per square inch or 1.03-1.72 bars) range.

#### 7.5.1.2 Warewashing Functionality

##### 7.5.1.2.1 Water TMDs Readable (22)

Water TEMPERATURE-MEASURING DEVICES must be designed to be easily readable.

##### 7.5.1.2.2 Water TMD Scale (22)

Water TEMPERATURE-MEASURING DEVICES on WAREWASHING machines must have a numerical scale, printed record, or digital readout in increments no greater than  $1^{\circ}\text{C}$  ( $2^{\circ}\text{F}$ ) in the intended range of use.

##### 7.5.1.2.3 Warewasher Data Plate (22)

A WAREWASHING machine must be provided with an easily ACCESSIBLE and readable data plate affixed to or posted adjacent to the machine that indicates the machine's design and operating specifications including the

- Wash tank, rinse tank(s) if present, and final sanitizing rinse temperatures.
- Pressure required for the fresh water sanitizing rinse unless the machine is designed to use only a pumped sanitizing

rinse.

- Conveyor speed in feet per minute or minimum transit time for belt conveyor machines, minimum transit time for rack conveyor machines, and wash and final sanitizing rinse times as specified by the manufacturer for stationary rack machines.

#### **7.5.1.2.4 Baffles/Curtains (22)**

WAREWASHING machine wash and rinse tanks must be equipped with baffles, curtains, or other means to minimize internal cross-CONTAMINATION of the solutions in wash and rinse tanks.

#### **7.5.1.2.5 Warewash TMDs (22)**

A WAREWASHING machine must be equipped with a TEMPERATURE-MEASURING DEVICE that indicates the temperature of the water in each wash tank, and rinse tank(s) if present, and the final sanitizing rinse manifold.

#### **7.5.1.2.6 Pressure Gauge (22)**

WAREWASHING machines that provide a fresh hot water sanitizing rinse must be equipped with a pressure gauge or similar device such as a transducer that measures and displays the water pressure in the supply line immediately before entering the WAREWASHING machine.

If the flow pressure measuring device is upstream of the fresh hot water sanitizing rinse control valve, the device must be mounted in a 6.4-millimeter (1/4-inch) iron pipe size (IPS) valve.

**These guidelines do not apply to a machine that uses only a pumped or recirculated sanitizing rinse.**

#### **7.5.1.2.7 Manual Sanitizing Booster Heater (22)**

If hot water is used for SANITIZATION in manual WAREWASHING operations, the sanitizing compartment of the sink must be designed with an integral heating device that is capable of maintaining water at a temperature not less than 77°C (171°F).

#### **7.5.1.2.8 Self Draining (22)**

Sinks and drainboards of WAREWASHING sinks and machines must be self draining.

## 7.5.2 Warewashing Numbers and Capacities

### 7.5.2.1 Three-compartment Sinks

#### 7.5.2.1.1 *Three-compartment Sink (22)*

A sink with at least three compartments must be provided for manually washing, rinsing, and sanitizing EQUIPMENT and UTENSILS.

#### 7.5.2.1.2 *Size (22)*

Sink compartments must be large enough to accommodate immersion of the largest EQUIPMENT and UTENSILS. If EQUIPMENT or UTENSILS are too large for the WAREWASHING sink, a WAREWASHING machine or alternative EQUIPMENT, such as a three-bucket system, must be used.

#### 7.5.2.1.3 *Manual Warewashing Alternatives*

**Alternative manual WAREWASHING EQUIPMENT may be used when there are special cleaning needs or constraints and its use is APPROVED. Alternative manual WAREWASHING EQUIPMENT may include the following:**

- **High-pressure detergent sprayers.**
- **Low- or line-pressure spray detergent foamers.**
- **Other task-specific cleaning EQUIPMENT.**
- **Brushes or other implements.**
- **Receptacles such as a three-bucket system that substitute for the compartments of a three-compartment sink.**

### 7.5.2.2 Drainboards

#### 7.5.2.2.1 *Soiled/Clean Storage (22)*

Drainboards, UTENSIL racks, or tables large enough to accommodate all soiled and cleaned items that may accumulate during hours of operation must be provided for necessary UTENSIL holding before cleaning and after sanitizing.

### 7.5.2.3 Sanitizing Solutions, Testing Devices

#### 7.5.2.3.1 *Test Kit (22)*

A test kit or other device that accurately measures the concentration in milligrams per liter (parts per million) of sanitizing solutions must be provided.

## 7.5.3 Warewashing Equipment Maintenance and Operation

### 7.5.3.1 Good Repair and Proper Adjustment

#### 7.5.3.1.1 *Warewash Equipment Repair (22)*

WAREWASHING EQUIPMENT must be maintained in good repair and proper adjustment, including the following:

- WAREWASHING EQUIPMENT must be maintained in a state of repair and condition that meets the standards of the materials, design, and construction of these guidelines.
- Water pressure and water TEMPERATURE-MEASURING DEVICES must be maintained in good repair and be accurate within the intended range of use.

#### 7.5.3.1.2 *Warewash Equipment Cleaning (22)*

WAREWASHING machines, drainboards, and the compartments of sinks, basins, or other receptacles used for washing and rinsing EQUIPMENT, UTENSILS, or raw foods, or laundering wiping cloths must be cleaned as follows:

- Before use.
- Throughout the day at a frequency necessary to prevent RECONTAMINATION of EQUIPMENT and UTENSILS and to ensure that the EQUIPMENT performs its intended function.
- At least every 24 hours (if used).

#### 7.5.3.1.3 *Warewash Equipment Operation (22)*

A WAREWASHING machine and its auxiliary components must be operated in accordance with the machine's data plate and other manufacturer's instructions.

A WAREWASHING machine's conveyor speed or automatic cycle times must be maintained accurately timed in accordance with manufacturer's specifications.

#### 7.5.3.1.4 *Cleaners (22)*

When used for WAREWASHING, the wash compartment of a sink, mechanical warewasher, or wash receptacle of alternative manual WAREWASHING EQUIPMENT must contain a wash solution of soap, detergent, acid cleaner, alkaline cleaner, degreaser, abrasive cleaner, or other cleaning agent according to the cleaning agent manufacturer's label instructions.

#### 7.5.3.1.5 *Solution Clean (22)*

The wash, rinse, and sanitize solutions must be maintained clean.

### 7.5.3.2 Wash Temperatures

#### 7.5.3.2.1 **Manual Wash Temperature (23)**

The temperature of the wash solution in manual WAREWASHING EQUIPMENT must be maintained at not less than the temperature specified on the cleaning agent manufacturer's label instructions.

#### 7.5.3.2.2 **Warewash Wash Temperatures (23)**

The temperature of the wash solution in spray type warewashers that use hot water to sanitize must not be less than

- 74°C (165°F) for a stationary-rack, single-temperature machine.
- 66°C (150°F) for a stationary-rack, dual-temperature machine.
- 71°C (160°F) for a single-tank, conveyor, dual-temperature machine.
- 66°C (150°F) for a multi-tank, conveyor, multitemperature machine.

**High wash tank temperatures do not compensate for low auxiliary rinse and/or hot water final rinse sanitizing temperatures.**

#### 7.5.3.2.3 **Wash Temperatures for Chemical Machines (23)**

The temperature of the wash solution in spray-type warewashers that use chemicals to sanitize must not be less than 49°C (120°F).

#### 7.5.3.2.4 **Alarm (22)**

For vessels built to *VSP 2005 Construction Guidelines* or later or any warewash machines installed/replaced on existing vessels after July 2005, warewash machines must be equipped with an audible or visual alarm that indicates when the sanitizing temperature or chemical SANITIZER level has dropped below the levels stated on the machine data plate.

### 7.5.4 Cleaning Equipment and Utensils

#### 7.5.4.1 Cleaning Frequency

##### 7.5.4.1.1 **Food-contact Surfaces Clean (26 C)**

FOOD-CONTACT SURFACES of EQUIPMENT and UTENSILS must be clean to sight and touch.

##### 7.5.4.1.2 **Encrusted (26 C)**

FOOD-CONTACT SURFACES of cooking EQUIPMENT and pans must be kept free of encrusted grease deposits and other soil

accumulations.

#### **7.5.4.1.3 Nonfood-contact Surfaces (27)**

NONFOOD-CONTACT SURFACES of EQUIPMENT must be kept free of an accumulation of dust, dirt, food residue, and other debris.

#### **7.5.4.1.4 Food-contact Cleaning Frequency (26 C)**

FOOD-CONTACT SURFACES of EQUIPMENT and UTENSILS must be washed, rinsed, and sanitized as follows:

- Before each use with a different type of raw animal food such as beef, FISH, lamb, pork, or POULTRY.
- Each time there is a change from working with raw foods to working with READY-TO-EAT FOODS.
- Between uses with raw fruits and vegetables and with POTENTIALLY HAZARDOUS FOOD.
- Before using or storing a food TEMPERATURE-MEASURING DEVICE.
- Any time during the operation when CONTAMINATION might have occurred.

#### **7.5.4.1.5 In-use Food-contact Equipment (28)**

If used with POTENTIALLY HAZARDOUS FOOD, FOOD-CONTACT SURFACES of EQUIPMENT and UTENSILS used on a continuing basis must be washed, rinsed, and sanitized at least every 4 hours.

#### **7.5.4.1.6 Dispensing Equipment Cleaning (28)**

Cleaning of EQUIPMENT such as ice bins; BEVERAGE dispensing nozzles; and enclosed components of EQUIPMENT such as ice makers, cooking oil storage tanks, and distribution lines, BEVERAGE dispensing lines, and syrup dispensing lines or tubes; and coffee bean grinders must be conducted

- At a frequency specified by the manufacturer, or
- In the absence of manufacturer specifications, at a frequency necessary to preclude accumulation of soil or mold.

#### **7.5.4.1.7 Cooking/Baking Equipment Cleaning (28)**

Cooking and baking EQUIPMENT must be cleaned as follows:

- FOOD-CONTACT SURFACES of cooking and baking EQUIPMENT must be cleaned at least every 24 hours.
- Cavities and door seals of microwave ovens must be cleaned at least every 24 hours by using the manufacturer's recommended cleaning procedure.

## 7.5.4.2 Dry Cleaning Methods

### 7.5.4.2.1 *Dry Cleaning (28)*

If dry cleaning is used, it must be conducted as follows:

- Methods such as brushing, scraping, and vacuuming must contact only surfaces soiled with dry food residues that are not potentially hazardous.
- Cleaning EQUIPMENT used in dry cleaning FOOD-CONTACT SURFACES must not be used for any other purpose.

## 7.5.4.3 Precleaning and Racking

### 7.5.4.3.1 *Precleaning/Scrapping (23)*

Food debris on EQUIPMENT and UTENSILS must be scrapped over a waste disposal unit, pulper, or garbage receptacle or must be removed in a WAREWASHING machine with a prewash cycle.

### 7.5.4.3.2 *Presoak/Scrubbed (23)*

If necessary for effective cleaning, EQUIPMENT and UTENSILS must be preflushed, presoaked, or scrubbed with abrasives.

### 7.5.4.3.3 *Racking (22)*

Soiled items to be cleaned in a WAREWASHING machine must be loaded into racks, trays, or baskets or onto conveyors in a position that

- Exposes the items to the unobstructed spray from all cycles and
- Allows the items to drain.

## 7.5.4.4 Wet Cleaning

### 7.5.4.4.1 *Washing (23)*

FOOD-CONTACT SURFACES of EQUIPMENT and UTENSILS must be effectively washed to remove or completely loosen soils by using whatever manual or mechanical means is necessary (such as the application of detergents containing wetting agents and emulsifiers; acid, alkaline, or abrasive cleaners; hot water; brushes; scouring pads; high-pressure sprays; or ultrasonic devices).

### 7.5.4.4.2 *Soil-specific (22)*

The washing procedures selected must be based on the type and purpose of the EQUIPMENT or UTENSIL and on the type of soil to be removed.

## 7.5.4.5 Alternative Manual Warewashing Procedures

### 7.5.4.5.1 *Alternative Warewashing Procedures (23)*

If washing in sink compartments or a WAREWASHING machine is impractical (such as when the EQUIPMENT is fixed or the UTENSILS are too large), washing must be done by using alternative manual WAREWASHING EQUIPMENT in accordance with the following procedures:

- EQUIPMENT must be disassembled as necessary to allow access of the detergent solution to all parts.
- EQUIPMENT components and UTENSILS must be scrapped or rough-cleaned to remove food particle accumulation.
- EQUIPMENT and UTENSILS must be washed.

### 7.5.4.5.2 *Sponges Limited (22)*

Sponges must not be used in contact with cleaned and sanitized or in-use FOOD-CONTACT SURFACES.

## 7.5.4.6 Rinsing Procedures

### 7.5.4.6.1 *Rinsing (23)*

Washed EQUIPMENT and UTENSILS must be rinsed so that abrasives are removed and cleaning chemicals are removed or diluted with water by using one of the following procedures:

- Use of a distinct, separate water rinse after washing and before sanitizing if using a three-compartment sink, alternative manual WAREWASHING EQUIPMENT equivalent to a three-compartment sink, or a three-step washing, rinsing, and sanitizing procedure in a WAREWASHING system for CIP EQUIPMENT.
- Use of a nondistinct water rinse integrated in the application of the sanitizing solution and wasted immediately after each application (if using a WAREWASHING machine that does not recycle the sanitizing solution, or if using alternative manual WAREWASHING EQUIPMENT such as sprayers).
- Use of a nondistinct water rinse integrated in the application of the sanitizing solution if using a WAREWASHING machine that recycles the sanitizing solution for use in the next wash cycle.

## 7.5.5 Sanitizing

### 7.5.5.1 Food-contact Surfaces (24 C)

FOOD-CONTACT SURFACES of EQUIPMENT and UTENSILS must be sanitized.

### 7.5.5.2 Sanitizing Temperatures

#### 7.5.5.2.1 Manual Hot-water Sanitizing (24 C)

In a manual operation, if immersion in hot water is used for sanitizing,

- The temperature of the water must be maintained at 77°C (171°F) or above and
- The FOOD-CONTACT SURFACE must be immersed for at least 30 seconds.

#### 7.5.5.2.2 Warewasher Hot-water Sanitizing (24 C)

In a mechanical operation, the temperature of the fresh hot water sanitizing rinse as it enters the manifold must not be more than 90°C (194°F) or less than

- 74°C (165°F) for a stationary rack, single-temperature machine.
- 82°C (180°F) for all other machines.

The UTENSIL surface temperature must not be less than 71°C (160°F) as measured by an irreversible registering temperature indicator.

**The maximum temperature of 90°C (194°F) does not apply to the high pressure and temperature systems with wand-type, hand-held spraying devices used for the in-place cleaning and sanitizing of EQUIPMENT such as MEAT saws.**

#### 7.5.5.2.3 Warewasher Hot-water Sanitizing Pressure (22)

The flow pressure of the fresh hot water sanitizing rinse in a WAREWASHING machine must not be less than 34.5 kilopascals (5 pounds per square inch or 0.34 bars) or more than 207 kilopascals (30 pounds per square inch or 2.07 bars) as measured in the water line immediately downstream or upstream from the fresh hot water sanitizing rinse control valve.

### 7.5.5.3 Sanitizing Concentrations

#### 7.5.5.3.1 Chemical Sanitizing Solutions (24 C)

A chemical SANITIZER used in a sanitizing solution for a manual or mechanical operation must be listed in 40 CFR 180.940 Sanitizing Solutions.

### **7.5.5.3.2 Chemical Sanitizing Exposure (24 C)**

A chemical SANITIZER must be used in accordance with the EPA-APPROVED manufacturer's label use instructions at a minimum temperature of 24°C (75°F) with an exposure time of 7 seconds for a chlorine solution and 30 seconds for other chemical SANITIZERS.

### **7.5.5.3.3 Chemical Sanitizing Concentration (24 C)**

Sanitizing solutions must be used with the following concentrations:

- A chlorine solution must have a concentration between 50 MG/L (ppm) and 200 MG/L (ppm).
- An iodine solution must have a PH of 5.0 or less or a PH no higher than the level for which the manufacturer specifies the solution is effective AND a concentration between 12.5 MG/L (ppm) and 25 MG/L (ppm).
- A quaternary ammonium compound solution must have a concentration as specified in 40 CFR 180.940 Sanitizing Solutions AND as indicated by the manufacturer's use directions included in the labeling.

If another solution concentration or PH of a chlorine, iodine, or quaternary ammonium compound is used, the vessel must demonstrate to VSP that the solution achieves SANITIZATION and the use of the solution must be APPROVED.

If a chemical SANITIZER other than a chlorine, iodine, or quaternary ammonium compound is used, it must be applied in accordance with the manufacturer's use directions included in the labeling.

### **7.5.5.3.4 Sanitizer Concentration Testing (22)**

Concentration of the sanitizing solution must be accurately determined by using a test kit or other device.

## **7.5.6 Protection of Clean Items**

### **7.5.6.1 Drying**

#### **7.5.6.1.1 Air Dried/Drained (28)**

After cleaning and sanitizing, EQUIPMENT and UTENSILS must be air dried or ADEQUATELY drained before contact with food. Cleaned, sanitized, and air-dried dishware, glassware, and **UTENSILS may be polished with a clean, dry, lint-free cloth that is maintained clean and dry.**

## 7.5.6.2 Lubricating and Reassembling

### 7.5.6.2.1 *Lubricating (28)*

Lubricants must be applied to FOOD-CONTACT SURFACES that require lubrication in a manner that does not contaminate FOOD-CONTACT SURFACES.

### 7.5.6.2.2 *Assembling (28)*

EQUIPMENT must be reassembled so that FOOD-CONTACT SURFACES are not contaminated.

## 7.5.6.3 Storing Equipment, Utensils, Linens, and Single-service and Single-use Articles

### 7.5.6.3.1 *Storing Protected (28)*

Cleaned EQUIPMENT and UTENSILS, laundered LINENS, and SINGLE-SERVICE and SINGLE-USE ARTICLES must be stored

- In a clean, dry location.
- In a location where they are not exposed to splash, dust, or other CONTAMINATION.
- At least 150 millimeters (6 inches) above the deck.

### 7.5.6.3.2 *Storing Inverted (28)*

Clean EQUIPMENT and UTENSILS must be stored

- In a self-draining position that allows air drying.
- Covered or inverted.

### 7.5.6.3.3 *Preset Tableware (28)*

TABLEWARE that is preset longer than 4 hours before the beginning of service must be protected from CONTAMINATION by being wrapped, covered, or inverted.

When TABLEWARE is preset, exposed unused settings must be

- removed at the time a CONSUMER is seated or
- washed, rinsed, and sanitized before further use if the settings are not removed when a CONSUMER is seated.

### 7.5.6.3.4 *Original Package (28)*

SINGLE-SERVICE and SINGLE-USE ARTICLES must be kept in the original protective package or stored by using other means that afford protection from CONTAMINATION until used.

### 7.5.6.3.5 *Utensil Dispensing (28)*

Eating UTENSILS dispensed at a CONSUMER self-service unit such as a buffet or salad bar must be protected from CONTAMINATION.

## 7.5.7 Laundering

### 7.5.7.1 Laundry Facilities

#### 7.5.7.1.1 **Laundry Equipment (28)**

If LINENS used in the FOOD AREAS are laundered on the vessel, a mechanical clothes washer and dryer must be provided and used.

#### 7.5.7.1.2 **Laundry Operations Location (28)**

Laundry operations must be located so that the operations are protected from CONTAMINATION and only where there are none of the following: exposed food; clean EQUIPMENT, UTENSILS, and LINENS; or unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES.

### 7.5.7.2 Laundry Procedures

#### 7.5.7.2.1 **Laundry Frequency (28)**

LINENS that do not come in direct contact with food must be laundered between operations if they become wet, sticky, or visibly soiled.

#### 7.5.7.2.2 **Cloth Gloves (28)**

Cloth gloves must be laundered before being used with a different type of raw animal food such as beef, lamb, pork, and FISH.

#### 7.5.7.2.3 **Linens/Napkins (28)**

LINENS and napkins used to line food-service containers and cloth napkins must be laundered between each use.

#### 7.5.7.2.4 **Wet Wiping Cloths (28)**

Wet wiping cloths must be laundered daily.

#### 7.5.7.2.5 **Dry Wiping Cloths (28)**

Dry wiping cloths must be laundered as necessary to prevent CONTAMINATION of food and clean serving UTENSILS.

#### 7.5.7.2.6 **Laundry Procedures (28)**

Soiled LINENS must be kept in clean, nonabsorbent receptacles or clean, washable laundry bags and stored and transported to prevent CONTAMINATION of food, clean EQUIPMENT, clean UTENSILS, and SINGLE-SERVICE and SINGLE-USE ARTICLES.

#### 7.5.7.2.7 **Washing (28)**

LINENS must be mechanically washed.

## 7.6 Poisonous and Toxic Materials

### 7.6.1 Identification

#### 7.6.1.1 Labeling

##### **7.6.1.1.1 *Manufacturer Label* (31 C)**

Original containers of POISONOUS OR TOXIC MATERIALS and PERSONAL-CARE ITEMS must bear a legible manufacturer's label.

##### **7.6.1.1.2 *Working Containers* (31 C)**

Working containers used for storing POISONOUS OR TOXIC MATERIALS such as cleaners and SANITIZERS taken from bulk supplies must be clearly and individually identified with the common name of the material.

### 7.6.2 Operational Supplies and Applications

#### 7.6.2.1 Storage

##### **7.6.2.1.1 *Pesticide/Rodenticide Locker* (31 C)**

PESTICIDES, insecticides, and rodenticides must be stored in a locked area of the vessel that is not in a FOOD AREA.

##### **7.6.2.1.2 *Cleaning Materials Locker* (31 C)**

POISONOUS OR TOXIC MATERIALS used in the cleaning and maintenance of FOOD AREAS must be stored in a cleaning materials locker so they cannot contaminate food, EQUIPMENT, UTENSILS, LINENS, and SINGLE-SERVICE and SINGLE-USE ARTICLES.

##### **7.6.2.1.3 *Exemptions***

**This guideline does not apply to EQUIPMENT and UTENSIL cleaners and SANITIZERS that are stored in WAREWASHING areas for availability and convenience if the materials are stored to prevent CONTAMINATION of food, EQUIPMENT, UTENSILS, LINENS, and SINGLE-SERVICE and SINGLE-USE ARTICLES.**

#### 7.6.2.2 Use

##### **7.6.2.2.1 *Necessary Materials* (31 C)**

Only POISONOUS OR TOXIC MATERIALS required for the operation and maintenance of a FOOD AREA of the vessel—such as for the cleaning and sanitizing of EQUIPMENT and UTENSILS and the control of insects and rodents—are allowed in the FOOD AREAS of the vessel.

#### **7.6.2.2.2 Use Conditions (31 C)**

POISONOUS OR TOXIC MATERIALS must be used according to the following:

- LAW and these guidelines.
- Manufacturer's use directions included in labeling (and, for a PESTICIDE, manufacturer's label instructions stating that use is allowed in a FOOD AREA).
- Conditions of certification (if certification is required) for use of the pest-control materials.

#### **7.6.2.2.3 Application (31 C)**

POISONOUS OR TOXIC MATERIALS must be applied so that

- A HAZARD to employees or other persons is not constituted.
- CONTAMINATION including toxic residues resulting from drip, drain, fog, splash, or spray on food; EQUIPMENT; UTENSILS; LINENS; and SINGLE-SERVICE and SINGLE-USE ARTICLES is prevented.

#### **7.6.2.2.4 Restricted-use Applications (31 C)**

When a RESTRICTED-USE PESTICIDE is applied, food, EQUIPMENT, UTENSILS, LINENS, and SINGLE-SERVICE and SINGLE-USE ARTICLES must be removed; covered with impermeable covers; or other precautions taken.

#### **7.6.2.2.5 Restricted-use Applicator (31 C)**

A RESTRICTED-USE PESTICIDE must be applied only by an applicator certified as defined in 7 USC 136(e) Certified Applicator of the Federal Insecticide, Fungicide and Rodenticide Act or a person under the direct supervision of a certified applicator.

#### **7.6.2.2.6 Equipment Cleaning and Sanitizing (31 C)**

Food EQUIPMENT and UTENSILS in the area treated must be cleaned and sanitized after the application.

#### **7.6.2.2.7 Containers (31 C)**

A container previously used to store cleanser, chemicals, or POISONOUS OR TOXIC MATERIALS must not be used to store, transport, or dispense food. Additionally, food containers must not be used to store, transport, or dispense cleanser, chemicals, or POISONOUS OR TOXIC MATERIALS.

### **7.6.2.3 Sanitizers and Other Food Area Chemicals**

#### **7.6.2.3.1 Sanitizers (31 C)**

Chemical SANITIZERS and other chemical antimicrobials applied to

FOOD-CONTACT SURFACES must meet the requirements specified in 21 CFR 178.1010 Sanitizing Solutions.

**7.6.2.3.2 *Fruit/Vegetable Wash* (31 C)**

Chemicals used to wash or peel raw whole fruits and vegetables must meet the requirements specified in 21 CFR 173.315 Chemicals Used in Washing or to Assist in the Lye Peeling of Fruits and Vegetables (Annex 13.10).

**7.6.2.3.3 *Boiler Water Additives* (31 C)**

Chemicals used as boiler water ADDITIVES for culinary steam or other FOOD AREA purposes must meet the requirements specified in 21 CFR 173.310 Boiler Water ADDITIVES.

**7.6.2.3.4 *Drying Agents* (31 C)**

Drying agents used in conjunction with SANITIZATION must contain only components that are listed as one of the following:

- Generally recognized as safe for use in food as specified in 21 CFR 182 Substances Generally Recognized as Safe or 21 CFR 184 Direct Food Substances Affirmed as Generally Recognized as Safe.
- Generally recognized as safe for the intended use as specified in 21 CFR 186 Indirect Food Substances Affirmed as Generally Recognized as Safe.
- APPROVED for use as a drying agent under a prior sanction specified in 21 CFR 181 Prior-Sanctioned Food Ingredients.
- Specifically regulated as an indirect food ADDITIVE for use as a drying agent as specified in 21 CFR Parts 175-178.
- APPROVED for use as a drying agent under the threshold of regulation process established by 21 CFR 170.39 Threshold of Regulation for Substances Used in Food-Contact Articles.

**7.6.2.3.5 *Approved for Use with Chemical Sanitizers* (31 C)**

Drying agents, when used with chemical SANITIZATION, must be specifically APPROVED for use with chemical sanitizing solutions.

**7.6.2.3.6 *Lubricants* (31 C)**

Lubricants must meet the requirements specified in 21 CFR 178.3570 Lubricants with Incidental Food-Contact if they are used

on FOOD-CONTACT SURFACES; on bearings and gears located on or within FOOD-CONTACT SURFACES; or on bearings and gears that are located so that lubricants may leak, drip, or be forced into food or onto FOOD-CONTACT SURFACES.

#### **7.6.2.4 Pesticides and Rodenticides**

##### **7.6.2.4.1 *Restricted-use Pesticides* (31 C)**

RESTRICTED-USE PESTICIDES used in FOOD AREAS must meet the requirements specified in 40 CFR 152 Subpart I Classification of Pesticides.

##### **7.6.2.4.2 *Rodent Bait* (31 C)**

Rodent bait used in FOOD AREAS must be contained in a covered, tamper-resistant bait station.

##### **7.6.2.4.3 *Tracking Powder Pesticides* (31 C)**

A tracking powder PESTICIDE must not be used in a FOOD AREA.

##### **7.6.2.4.4 *Nontoxic Tracking Powders* (19)**

A nontoxic tracking powder such as talcum or flour, if used, must not contaminate food.

##### **7.6.2.4.5 *Prevent Contamination* (28)**

If a nontoxic tracking powder such as talcum or flour is used, it must not contaminate EQUIPMENT, UTENSILS, LINENS, or SINGLE-SERVICE and SINGLE-USE ARTICLES.

#### **7.6.3 Medicines**

##### **7.6.3.1 Restriction and Storage**

##### **7.6.3.1.1 *Necessary Medicines* (31 C)**

Only medicines necessary for the health of the FOOD EMPLOYEES are allowed in a FOOD AREA.

##### **7.6.3.1.2 *Medicines Labeling/Separation* (31 C)**

Medicines in a FOOD AREA for FOOD EMPLOYEES' use must be labeled and be located in an area such as the chef's office to prevent the CONTAMINATION of food, EQUIPMENT, UTENSILS, LINENS, or SINGLE-SERVICE and SINGLE-USE ARTICLES.

##### **7.6.3.1.3 *First Aid Supplies* (31 C)**

First aid supplies in a FOOD AREA for FOOD EMPLOYEES' use must be labeled and stored in a kit or a container in a location that prevents the CONTAMINATION of food, EQUIPMENT, UTENSILS,

## 7.7 Facilities

### 7.7.1 Handwashing and Toilet Facilities

**This applies to toilet facilities for galley personnel even if ACCESSIBLE to other crew members.**

#### 7.7.1.1 Handwashing Facility Installation

##### **7.7.1.1.1 Convenient (29 C)**

Each FOOD PREPARATION AREA, bar, WAREWASHING area, and garbage-processing area must have at least one handwashing facility in it.

##### **7.7.1.1.2 8 Meters/26 Feet (29 C)**

The handwashing facility must be within 8 meters (26 feet) of all parts of the area and should not be located in an adjacent area that requires passage through a closed door where the user makes hand contact with the door.

Handwash sinks must be at least 750 millimeters (30 inches) above the deck so that employees do not have to reach excessively to wash their hands.

##### **7.7.1.1.3 Tempered Water (29 C)**

A handwashing sink must be equipped to provide water at a temperature of at least 38°C (100°F) through a mixing valve or combination faucet. For handwash sinks with electronic sensors, and other types of handwash sinks where the user cannot make temperature adjustments, the temperature provided to the user after the mixing valve must not exceed 49°C (120°F).

##### **7.7.1.1.4 Metered Faucet (30)**

A self-closing, slow-closing, or metering faucet must provide a flow of water for at least 15 seconds without the need to reactivate the faucet.

##### **7.7.1.1.5 Automatic Systems (30)**

An automatic handwashing facility must be installed in accordance with manufacturer's instructions.

##### **7.7.1.1.6 Dispenser/Receptacle (30)**

A handwashing facility must include a sink, soap dispenser, single-use towel dispenser, and waste receptacle.

**7.7.1.1.7 Sign (30)**

A sign stating “wash hands often,” “wash hands frequently,” or similar wording in a language that the FOOD EMPLOYEES understand must be posted over handwashing sinks.

**7.7.1.2 Toilet Facility Installation**

**7.7.1.2.1 Convenient (29 C)**

Toilet rooms must be provided and conveniently located.

**7.7.1.2.2 Handwashing Facilities (29 C)**

Handwashing facilities must be in or immediately adjacent to toilet rooms or vestibules.

**7.7.1.2.3 Sign (30)**

A sign must be conspicuously posted on the bulkhead adjacent to the door of the toilet or on the back of the door. The sign must state “WASH HANDS AFTER USING TOILET” in a language that the FOOD EMPLOYEES understand.

**7.7.1.2.4 Enclosed/Doors (30)**

Toilet rooms must be completely enclosed and must have tight-fitting, self-closing doors that must be kept closed except during cleaning or maintenance.

**7.7.1.2.5 Waste Receptacle (30)**

EASILY CLEANABLE receptacles must be provided for waste materials.

**7.7.1.2.6 Unlocked (29 C)**

Toilet facilities intended for use by galley personnel must not be locked when the galley is in service.

**7.7.1.3 Handwashing and Toilet Facility Maintenance**

**7.7.1.3.1 Accessible (29 C)**

Handwashing facilities must be used for no other purpose and must be ACCESSIBLE at all times.

**7.7.1.3.2 Facilities Clean/Good Repair (30)**

Handwashing facilities must be kept clean and in good repair.

**7.7.1.3.3 Soap/Towels (30)**

Each handwashing facility must have a supply of hand-cleansing soap or detergent and a supply of single-service paper towels available.

**7.7.1.3.4 Toilets Clean/Good Repair (30)**

Toilet fixtures must be kept clean and in good repair.

**7.7.1.3.5 Toilet Tissue (30)**

A supply of toilet tissue must be provided at each toilet at all times.

**7.7.2 Solid Waste**

**7.7.2.1 Receptacles and Containers**

**7.7.2.1.1 Containers (32)**

Receptacles and waste-handling containers for REFUSE and recyclables and for use with materials containing food residue must be durable, nonabsorbent, EASILY CLEANABLE, and leakproof.

**7.7.2.1.2 Insect/Rodent Resistant (32)**

Receptacles and waste-handling containers for REFUSE and recyclables and for use with materials containing food residue must be insect and rodent resistant and must have tight-fitting lids.

**7.7.2.1.3 Covered/Provided (32)**

Receptacles and waste-handling containers must be kept covered when not in continuous use and after they are filled.

**7.7.2.1.4 Location (32)**

A receptacle or waste-handling container must be provided in each area of the vessel or premise where REFUSE is generated or commonly discarded or where recyclables are placed.

**7.7.2.1.5 Wash Facilities (32)**

Facilities suitable for washing receptacles and waste-handling containers must be provided separate from food EQUIPMENT and UTENSIL storage areas or FOOD PREPARATION AREAS.

**7.7.2.1.6 Design/Supplies (32)**

The designated container wash area must be EASILY CLEANABLE and must have tempered water, access to detergent, and suitable drainage.

**7.7.2.1.7 Cleaned (32)**

Receptacles and waste-handling containers must be cleaned when emptied.

## **7.7.2.2 Garbage and Refuse Storage Room**

### **7.7.2.2.1 Easily Cleanable/Durable (32)**

The dry and refrigerated garbage and REFUSE storage room must be constructed of EASILY CLEANABLE, corrosion-resistant, nonabsorbent, and durable materials.

### **7.7.2.2.2 Size (32)**

The garbage and REFUSE storage room must be large enough to store and process the garbage and REFUSE.

### **7.7.2.2.3 Prevent Contamination (32)**

The garbage and REFUSE storage room must be located so as to prevent CONTAMINATION in FOOD PREPARATION, storage, and UTENSIL washing areas.

### **7.7.2.2.4 Good Repair/Clean (32)**

The garbage and REFUSE storage room must be maintained in good repair and kept clean.

## **7.7.3 Liquid Waste Disposal and Plumbing**

### **7.7.3.1 Drain Lines**

#### **7.7.3.1.1 Drain Lines (19)**

Drain lines from all fixtures; sinks; appliances; compartments; refrigeration units; or devices that are used, designed for, or intended to be used in the a) preparation, b) processing, c) storage, or d) handling of food, ice, or drinks must be indirectly connected to appropriate waste systems by means of an AIR GAP or AIR-BREAK.

**Drain lines from handwashing and mop sinks may be directly connected to the appropriate waste system.**

#### **7.7.3.1.2 Overhead (19)**

Drain lines carrying SEWAGE or other liquid waste must not pass directly overhead or horizontally through spaces used for the preparation, serving, or storage of food or for the washing or storage of UTENSILS and EQUIPMENT. Drain lines that are unavoidable in these FOOD AREAS must be sleeve-welded and must not have mechanical couplings.

#### **7.7.3.1.3 Warewash Sink/Machine Drains (28)**

All drain lines from WAREWASHING sinks or machines must drain through an AIR GAP or AIR-BREAK to a drain or SCUPPER.

### 7.7.3.2 Liquid Waste Disposal

#### 7.7.3.2.1 *Discharge (35)*

BLACK and GRAY WATER must be discharged to the vessel's wastewater disposal system and must not pool on the deck.

#### 7.7.3.2.2 *Leakage (35)*

Leakage of SEWAGE tanks or discharge of SEWAGE into the bilge or other areas on the vessel is prohibited.

### 7.7.3.3 Plumbing

#### 7.7.3.3.1 *Good Repair (34)*

A PLUMBING SYSTEM in a FOOD AREA must be maintained in good repair.

## 7.7.4 Decks, Bulkheads, and Deckheads

### 7.7.4.1 Design and Construction

#### 7.7.4.1.1 *Cleanable (33)*

Decks, bulkheads, and deckheads in FOOD PREPARATION, WAREWASHING, pantries, bars, and food and EQUIPMENT storage areas must be constructed and maintained for easy cleaning.

**Decks may be of nonskid construction provided they are EASILY CLEANABLE.**

**Carpet is not considered EASILY CLEANABLE and should not be used in these areas.**

#### 7.7.4.1.2 *Coving (33)*

Bulkhead/deck, EQUIPMENT/deck, cabinet/deck, and DECK SINK coaming/deck junctures must have COVING (including galleys, pantries, buffets, bars, waiter stations, dining room work counters, provisions, FOOD STORAGE ROOMS, EQUIPMENT/UTENSIL storage rooms, and toilet rooms intended for use by galley personnel).

#### 7.7.4.1.3 *Finishes (33)*

Bulkheads and deckheads must have SMOOTH, hard finishes and light colored surfaces. **Exception: bars may have decorative surfaces provided that they are EASILY CLEANABLE.**

#### 7.7.4.1.4 *Corrosion Resistant (33)*

Decks, bulkheads, and deckheads in FOOD PREPARATION, WAREWASHING, pantries, and storage areas must be corrosion

resistant.

**7.7.4.1.5 Attached Equipment (33)**

Light fixtures, vent covers, and similar EQUIPMENT attached to the bulkheads or deckheads must be EASILY CLEANABLE.

**7.7.4.1.6 Exposed Lines (33)**

Exposed utility service lines and pipes, including lines for fire detection and protection systems, must be installed so they do not obstruct or prevent cleaning.

**7.7.4.1.7 Cleanable Surfaces (33)**

Surfaces subject to routine splashes, spillage, or other soiling during normal use must have EASILY CLEANABLE features.

**7.7.4.1.8 Deck Mats (33)**

Mats must be designed to be REMOVABLE and EASILY CLEANABLE.

**7.7.4.2 Maintenance**

**7.7.4.2.1 Clean (33)**

Decks, bulkheads, deckheads, and attached EQUIPMENT in FOOD PREPARATION, WAREWASHING, pantries, and storage areas must be cleaned as often as necessary.

**7.7.4.2.2 Timing (33)**

Cleaning must be done during periods when the least amount of food is exposed.

**7.7.4.2.3 Good Repair (33)**

Decks, bulkheads, and deckheads in FOOD PREPARATION, WAREWASHING, pantries, and storage areas must be maintained in good repair.

**7.7.5 Lighting**

**7.7.5.1 Intensity**

**7.7.5.1.1 220 Lux/20 Foot Candles (36)**

The light intensity must be at least 220 lux (20 foot candles) on food preparation surfaces and must be 75 centimeters (30 inches) above the deck in FOOD PREPARATION AREAS, handwashing facilities, WAREWASHING areas, EQUIPMENT, and UTENSIL storage, pantries, toilet rooms, and CONSUMER self-service areas.

#### **7.7.5.1.2 110 Lux/10 Foot Candles (36)**

The light intensity must be at least 110 lux (10 foot candles) at a distance of 75 centimeters (30 inches) above the deck when in use, in walk-in refrigerator units and DRY STORAGE AREAS, and in other areas and rooms during periods of cleaning.

The light intensity must be at least 110 lux (10 foot candles) behind and around mounted EQUIPMENT, including counter-mounted EQUIPMENT.

#### **7.7.5.1.3 Bars and Waiter Stations (36)**

The light intensity must be at least 110 lux (10 foot candles) at handwashing stations in bars. In bars and dining room waiter stations, provide 220 lux (20 foot candles) light intensity during cleaning operations.

### **7.7.5.2 Protected**

#### **7.7.5.2.1 Shielded/Shatter Resistant (36)**

Light bulbs must be shielded, coated, or otherwise shatter resistant in areas where there is exposed food; clean EQUIPMENT, UTENSILS, and LINENS; or unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES.

#### **7.7.5.2.2 Heat Lamps (36)**

An infrared or other heat lamp must be protected against breakage by a shield surrounding and extending beyond the bulb so that only the face of the bulb is exposed.

### **7.7.6 Ventilation**

#### **7.7.6.1 Design and Operation**

##### **7.7.6.1.1 Sufficient (37)**

All FOOD PREPARATION, WAREWASHING, and toilet rooms must have sufficient ventilation to keep them free of excessive heat, steam, condensation, vapors, obnoxious odors, smoke, and fumes.

##### **7.7.6.1.2 Effective (37)**

Ventilation hood systems and devices must operate effectively to prevent grease and condensate from collecting on the bulkheads and deckheads and to remove contaminants generated by EQUIPMENT located under them.

##### **7.7.6.1.3 No Contamination (37)**

Heating, ventilating, and air conditioning systems must be

designed and installed so that make-up air intake and exhaust vents do not cause CONTAMINATION of food, FOOD-CONTACT SURFACES, EQUIPMENT, or UTENSILS.

## **7.7.6.2 Maintenance**

### **7.7.6.2.1 Filters (37)**

Filters and other grease-extracting EQUIPMENT must be designed to be READILY REMOVABLE for cleaning and replacement if not designed to be CLEANED IN PLACE. Intake and exhaust air ducts must be cleaned and filters changed so they are not a source of CONTAMINATION by dust, dirt, and other materials.

## **7.7.7 Cleaning Equipment and Unnecessary Articles**

### **7.7.7.1 Storage**

#### **7.7.7.1.1 Necessary Articles (38)**

Only articles necessary for the food service operation must be stored in FOOD PREPARATION, FOOD STORAGE, and WAREWASHING areas.

#### **7.7.7.1.2 Cleaning Locker (38)**

Maintenance tools such as mops, brooms, and similar items must be stored in a designated locker so they do not contaminate food, FOOD-CONTACT SURFACES of UTENSILS and EQUIPMENT, LINENS, or SINGLE-SERVICE and SINGLE-USE ARTICLES.

#### **7.7.7.1.3 Labeled (38)**

The locker must be labeled “CLEANING MATERIALS ONLY.”

#### **7.7.7.1.4 Orderly Manner (38)**

Maintenance tools such as mops, brooms, and similar items must be stored in an orderly manner that facilitates cleaning of the area used for storing the maintenance tools.

#### **7.7.7.1.5 Mop Drying (38)**

After use, mops must be placed in a position that allows them to air dry without soiling walls, EQUIPMENT, or supplies.

#### **7.7.7.1.6 Bucket Storage (38)**

Wash, rinse, and sanitize buckets or other containers may be stored with maintenance tools provided they are stored inverted and nested.

## 8.0 Integrated Pest Management (IPM)

This section has two subsections:

- 8.1 Plan Development, Evaluation, and Use of Pesticides
- 8.2 Pest Control
- 8.3 Knowledge

### 8.1 Plan Development, Evaluation, and Use of Pesticides

#### 8.1.1 IPM Plans

##### 8.1.1.1 IPM Plan (40)

Each vessel must have an IPM plan to implement effective monitoring and control strategies for pests aboard the vessel.

##### 8.1.1.2 Monitoring (40)

The IPM plan must set a schedule for periodic active monitoring inspections, including some at night or during periods of no or minimal activity.

##### 8.1.1.3 Logs (40)

The IPM plan must include provisions for logs for active monitoring of pest sightings in operational areas of the vessel. The IPM plan also must include provisions for training of crew members in charge of log completion. The time of the active monitoring inspections must be recorded in the log.

##### 8.1.1.4 Passive Surveillance (40)

The IPM plan must include passive surveillance procedures such as glue traps or other passive monitoring devices and must include the location of each. A passive device monitoring log must be maintained.

##### 8.1.1.5 Action and Follow Up (40)

When pests are observed during an inspection, the log must include action taken as well as follow-up inspection results.

#### 8.1.2 Plan Evaluation

##### 8.1.2.1 *Evaluation (40)*

The vessel's IPM plan must be evaluated for effectiveness periodically or whenever there is a significant change in the vessel's operation or structure (e.g., renovation).

**The evaluation may be required more frequently in areas where pest infestations exist but cannot be controlled.**

### **8.1.2.2      *Reviews (40)***

IPM plan evaluations and changes must be documented in the IPM plan.

### **8.1.2.3      *Inspections (40)***

The IPM plan, monitoring records, and other documentation must be available for review during inspections.

## **8.1.3 IPM and Pesticide Use**

### **8.1.3.1 Pesticide Application**

#### **8.1.3.1.1      *Pesticide Record (40)***

The IPM plan must include a record of PESTICIDES used to control pests and vectors. The record must include all PESTICIDES currently onboard the vessel and those used in the previous 12 months.

#### **8.1.3.1.2      *Restricted Use (39 C)***

A RESTRICTED-USE PESTICIDE must be applied only by a certified applicator or a person with training and testing equivalent to that of a certified applicator.

#### **8.1.3.1.3      *Applicator Training (40)***

Training of the pest-control personnel must be documented.

#### **8.1.3.1.4      *Safety (40)***

The IPM plan must establish health and safety procedures to protect the passengers and crew.

## **8.2 Pest Control**

### **8.2.1 Exclusion**

#### **8.2.1.1 Food Areas**

##### **8.2.1.1.1      *Effective Control (39 C)***

The presence of insects, rodents, and other pests must be effectively controlled to minimize their presence in the FOOD STORAGE, preparation, and service areas and WAREWASHING and UTENSIL storage areas aboard a vessel.

##### **8.2.1.1.2      *Exclusion (40)***

Entry points where pests may enter the FOOD AREAS must be protected.

#### **8.2.1.1.3 *Incoming Food and Other Supplies (40)***

Incoming shipments of food and all other supplies must be routinely inspected for evidence of insects, rodents, and other pests. A record of these inspections must be maintained onboard the vessel and must be available for review during inspections.

#### **8.2.1.1.4 *IPM Inspections (40)***

All FOOD AREAS must be inspected at a frequency that can quickly detect the evidence of pests, harborage conditions, cleanliness, and protection of outer openings.

##### **Nonfood Areas**

Reasonable care must be given to conduct inspections in nonFOOD AREAS for the presence of insects, rodents, and other pests.

The garbage handling areas of the vessel must be inspected at least weekly for the presence of insects, rodents, and other pests. The results of these inspections must be maintained in a log. **The inspection results may be included in the log of the FOOD AREA inspections.**

### **8.2.2 Control Measures**

#### **8.2.2.1 Chemical**

##### **8.2.2.1.1 *Chemical Controls (39 C)***

Chemical control measures must conform to products and application procedures specifically allowed in the food safety section of these guidelines and the vessel's IPM plan.

#### **8.2.2.2 Physical**

##### **8.2.2.2.1 *Insect-control Devices (40)***

Insect-control devices that electrocute or stun flying insects are not permitted in FOOD AREAS.

##### **8.2.2.2.2 *Food Protection (19)***

Insect control devices such as insect light traps must not be located over FOOD STORAGE, FOOD PREPARATION AREAS, FOOD SERVICE stations, or clean EQUIPMENT. Dead insects and insect fragments must be prevented from falling on exposed food.

##### **8.2.2.2.3 *Utensil Protection (28)***

Insect-control devices must not be located over WAREWASHING, UTENSIL storage areas, EQUIPMENT, UTENSILS, LINENS, or unwrapped SINGLE-SERVICE or SINGLE-USE ARTICLES. Dead insects

and insect fragments must be prevented from falling on clean items.

#### **8.2.2.2.4    *Cleaning (40)***

Dead or trapped insects, rodents, and other pests must be removed from control devices and the vessel at a frequency that prevents their accumulation or decomposition or the attraction of other pests.

### **8.3    Integrated Pest Management Knowledge**

#### **8.3.1    Demonstration of Knowledge (44)**

The supervisor or PERSON IN CHARGE of IPM operations on the vessel must demonstrate to VSP—on request during inspections—knowledge of IPM operations. The supervisor or PERSON IN CHARGE must demonstrate this knowledge by compliance with this section of these guidelines or by responding correctly to the inspector’s questions as they relate to the specific operation. In addition, the supervisor or PERSON IN CHARGE of IPM operations on the vessel must ensure that employees are properly trained to comply with this section of the guidelines in this manual as it relates to their assigned duties.

## 9.0 Housekeeping

This section has one subsection:

- 9.1 Outbreak Prevention and Management Procedures
- 9.2 Knowledge

### 9.1 Outbreak Prevention and Management Procedures

#### 9.1.1 Disinfection

##### 9.1.1.1 Public Areas

###### 9.1.1.1.1 **Continuous Disinfection (41)**

When the cumulative proportion of cases of AGE among passengers or crew members is  $\geq 2\%$ , the outbreak management response must include cleaning and disinfecting all public areas, including handrails and restrooms, on a continuous basis.

###### 9.1.1.1.2 **Cabin Cleaning (41)**

Cabins that house passengers or crew with AGE must be cleaned and disinfected daily while the occupants are ill.

###### 9.1.1.1.3 **Precautionary Measures (41)**

Precautionary measures by housekeeping personnel must be taken in consultation with the vessel's medical staff to prevent the spread of AGE from cabin to cabin.

###### 9.1.1.1.4 **Example**

**Precautionary measures by the housekeeping personnel may include using disposable personal protection EQUIPMENT, including gloves that are changed after each cabin; cleaning cabins with ill passengers or crew after all other cabins; or having specific crew members only clean cabins of ill passengers or crew.**

###### 9.1.1.1.5 **Written OPRP (41)**

Each vessel must have a written Outbreak Prevention and Response Plan (OPRP) that details standard procedures and policies to specifically address AGE onboard. The written OPRP must include the following at a minimum:

- Duties and responsibilities of each department and their staff for all the passenger and crew public areas.
- Steps in outbreak management and control and the trigger

for required action at each step.

At a minimum, triggers must address a graduated approach to outbreak management in response to increasing case counts. **Additionally, triggers may be based on events, such as reports of public vomiting/diarrhea, increased room service requests, meal or excursion cancellations, missed events, or others.**

**Cruise ship AGE surveillance data has shown that a 0.45% daily ATTACK RATE is indicative of a pending outbreak.**

- DISINFECTANT products or systems used, including the surfaces or items the DISINFECTANTS will be applied to, concentrations, and required contact times. The DISINFECTANT products or systems must be effective against human norovirus or an acceptable surrogate (e.g., caliciviruses).
- Procedures for informing passengers and crew members of the outbreak. This section should address the procedures for notification of passengers embarking the vessel following an outbreak voyage. In the case of an extended voyage separated into segments, such as a world cruise, this requirement applies to passengers embarking for the segment after an outbreak segment.
- Procedures for returning the vessel to normal operating conditions after an outbreak.
- Procedures to protect the passengers and crew from exposure to DISINFECTANTS, if not already included in the vessel's safety management system. At a minimum, this must include
  - Material safety data sheets (MSDSs).
  - Personal protective EQUIPMENT for crew.
  - Health and safety procedures to minimize respiratory and dermal exposures to both passengers and crew.

Additional information, guidance, and supporting documents are in Annex 13.2 and on the VSP Web site (<http://www.cdc.gov/nceh/vsp>).

#### **9.1.1.1.6 Public Toilet Facilities (41)**

Passenger and crew public toilets (not including food-area toilets) must be provided with a handwashing station that includes the following:

- Hot and cold running water.
- Soap.
- A method to dry hands (e.g., sanitary hand-drying device, paper towels).
- A sign advising users to wash hands (pictograms are acceptable).

#### **9.1.1.1.7 Hands-free Exit (41)**

Passenger and crew public toilet facilities must be equipped so that persons exiting the toilet room are not required to touch the door handle with bare hands.

Where toilet stalls include handwashing facilities, the bare-hands-free contact must begin in the toilet stall. Toilet facilities with multiple exits, such as spa dressing rooms, must have bare-hands-free contact at each exit.

**This may be accomplished by methods such as locating paper towel dispensers at sinks and waste containers near the room door, installing mechanically operated doors, removing doors, or using other effective means.**

#### **9.1.1.1.8 Sign (41)**

A sign must be posted advising users of toilet facilities to use hand towel, paper towel, or tissue to open the door unless the exit is hands free.

**A pictogram that illustrates the correct use and disposal of paper towels as written in section 9.1.1.1.7 may be used in lieu of a sign.**

## **9.2 Housekeeping Knowledge**

### **9.2.1 Demonstration of Knowledge (44)**

The supervisor or PERSON IN CHARGE of housekeeping operations on the vessel must demonstrate to VSP—on request during inspections—knowledge of housekeeping operations. The supervisor or PERSON IN CHARGE must demonstrate this knowledge by compliance with this section of these guidelines or by responding correctly to the inspector's questions as they relate to the specific operation. In addition, the supervisor or PERSON IN CHARGE of housekeeping operations on the vessel must ensure that employees are properly trained to comply with this section of the guidelines in this manual as it relates to their assigned duties.

## 10.0 Child Activity Centers

This section includes the following subsections:

- 10.1 Diaper Changing
- 10.2 Toilets and Handwashing
- 10.3 Cleaning and DISINFECTION
- 10.4 Exclusions
- 10.5 Knowledge

### 10.1 Diaper Changing

#### 10.1.1 Diaper-changing Facilities

##### 10.1.1.1 Design

###### 10.1.1.1.1 *Diaper Changing (42)*

If children who wear diapers are accepted in the CHILD ACTIVITY CENTER, diaper-changing stations and disposal facilities must be provided.

###### 10.1.1.1.2 *Diaper-changing Stations (42)*

Each station must include the following:

- A changing table that is nonabsorbent, nontoxic, SMOOTH, durable, EASILY CLEANABLE, and designed for diaper changing.
- A supply of disposable diapers, gloves, wipes, table cleanser, and DISINFECTANT.
- An airtight soiled-diaper receptacle.
- An adjacent handwashing station.

###### 10.1.1.1.3 *Signs (42)*

Signs must be posted in the diaper changing area advising handwashing after each diaper change.

### 10.2 Toilets and Handwashing

#### 10.2.1 Employee Handwashing (42)

Vessels constructed to the *VSP 2005 Construction Guidelines* or later must have at least one handwashing station separate from the toilet room(s). The handwashing station must be maintained clean and available at all times.

## 10.2.2 Facilities

### 10.2.2.1 Design

#### 10.2.2.1.1 **Child-size Toilet (42)**

If toilet rooms are located in a CHILD ACTIVITY CENTER, child-size toilet(s) or child-accessible toilet(s) (child-size seat and step stool) and handwashing facilities must be provided.

Child-size toilets (to include the toilet seat) must have a maximum height of 280 millimeters (11 inches) and a toilet seat opening no greater than 203 millimeters (8 inches).

Handwashing sinks must have a maximum height of 560 millimeters (22 inches) above the deck or a step stool must be provided.

#### 10.2.2.1.2 **Toilet Supplies (42)**

Each child's toilet facility must be provided with a supply of toilet tissue, disposable gloves, and sanitary wipes.

#### 10.2.2.1.3 **Waste Receptacle (42)**

An airtight, washable waste receptacle must be conveniently located to dispose of excrement, soiled sanitary wipes, and soiled gloves. Waste materials must be removed from the CHILD ACTIVITY CENTER each day.

#### 10.2.2.1.4 **Handwashing Supplies (42)**

Soap, paper towels or air dryers, and a waste towel receptacle must be located at handwashing stations.

#### 10.2.2.1.5 **Signs (42)**

Signs must be posted in children's toilet room advising the providers to wash their hands and the children's hands after assisting children with using the toilet.

#### 10.2.2.1.6 **Assistance (42)**

Children under 6 years old must be assisted in washing their hands in the CHILD ACTIVITY CENTER after using the toilet room, before eating, and after otherwise contaminating their hands.

#### 10.2.2.1.7 **Separate (42)**

Separate toilet facilities must be provided for CHILD ACTIVITY CENTER staff. CHILD ACTIVITY CENTER staff must not use the children's toilet facilities. Public toilet facilities are acceptable.

**10.2.2.1.8 *Exiting (41)***

Toilet rooms must be equipped so that persons exiting the toilet room are not required to handle the door with bare hands.

**10.2.2.1.9 *Temperature (42)***

The maximum water temperature for a handwashing station must not exceed 43°C (110°F).

**10.3 Cleaning and Disinfection**

**10.3.1 Employee Handwashing**

**10.3.1.1 When to Wash Hands (12 C)**

Child care providers must wash their hands before giving food or BEVERAGES to children.

**10.3.2 Furnishings and Toys**

**10.3.2.1 Construction**

**10.3.2.1.1 *Cleanable (42)***

Surfaces of tables, chairs, and other furnishings that children touch with their hands must be cleanable.

**10.3.2.1.2 *Condition (42)***

Toys used in the CHILD ACTIVITY CENTER must be maintained in a clean condition.

**10.3.2.2 Procedures**

**10.3.2.2.1 *Hard Surfaces (42)***

Surfaces that children touch with their hands must be cleaned and disinfected daily with products labeled by the manufacturer for that purpose.

**10.3.2.2.2 *Toy Cleaning/Ball Pits (42)***

Toys used in the CHILD ACTIVITY CENTER must be cleaned and disinfected daily.

Balls used in ball pits/pens must be cleaned when contaminated or at least once per week.

If a CHEMICAL DISINFECTANT is used, toys must be air dried before use.

**10.3.2.2.3 Tables/High Chairs (42)**

Tables and high chair trays must be cleaned and disinfected before and after they are used for eating.

**10.3.2.2.4 Decks (42)**

Carpeting must be vacuumed daily and must be periodically cleaned when it becomes visibly soiled. Decks must be washed and disinfected when soiled or at least daily.

**10.3.2.2.5 Facility Cleaning/Disinfecting (42)**

Diaper changing stations, handwashing facilities, and toilet rooms must be cleaned and disinfected daily and when soiled during use.

**10.3.2.2.6 Linens Laundered (42)**

LINENS such as blankets, sheets, and pillow cases must be laundered between each use.

**10.4 Exclusions**

**10.4.1 Children with Infectious Illness**

**10.4.1.1 Procedures**

**10.4.1.1.1 Written Guidance (42)**

Written guidance on symptoms of common childhood infectious illnesses must be posted at the entrance of the CHILD ACTIVITY CENTER.

**10.4.1.1.2 Exclusion Policy (42)**

The CHILD ACTIVITY CENTER must have a written exclusion policy on procedures to be followed when a child develops symptoms of an infectious illness while at the center.

The policy must include a requirement for written clearance from the medical staff before a child with symptoms of infectious illness can be allowed in the CHILD ACTIVITY CENTER.

This policy must be posted at the entrance of the CHILD ACTIVITY CENTER.

**10.4.1.1.3 Infectious Illness (42)**

Children with infectious illness must not be allowed in the CHILD ACTIVITY CENTER without written permission from the vessel's medical staff.

## **10.5 Child Activity Center Knowledge**

### **10.5.1 Demonstration of Knowledge (44)**

The supervisor or PERSON IN CHARGE of child activity center operations on the vessel must demonstrate to VSP—on request during inspections—knowledge of child activity center operations. The supervisor or PERSON IN CHARGE must demonstrate this knowledge by compliance with this section of these guidelines or by responding correctly to the inspector’s questions as they relate to the specific operation. In addition, the supervisor or PERSON IN CHARGE of child activity center operations on the vessel must ensure that employees are properly trained to comply with this section of the guidelines in this manual as it relates to their assigned duties.

## **11.0 Heating, Ventilation, and Air Conditioning (HVAC) Systems, Fountains, Misting Systems, Humidifiers, and Showers**

This section includes the following subsections:

- 11.1 HVAC Construction and Maintenance
- 11.2 Fountains, Humidifiers, Misting Systems, and Showers
- 11.3 Knowledge

### **11.1 HVAC Construction and Maintenance**

#### **11.1.1 Construction**

##### **11.1.1.1 Condensate Pans (43)**

Air handling unit condensate drain pans and collection systems must be able to be accessed for inspection, maintenance, and cleaning. Installation of sight windows or other effective methods for full inspection of condensate collection pans must be used when original EQUIPMENT access makes evaluation during operational inspections impractical.

##### **11.1.1.2 Self Draining (43)**

Condensation collection pans must be self draining.

##### **11.1.1.3 Potable Water (43)**

Only POTABLE WATER can be used for cleaning the HVAC distribution system.

#### **11.1.2 Maintenance**

##### **11.1.2.1 Air Handling Units (43)**

Air handling units must be kept clean.

##### **11.1.2.2 Condensers (43)**

Evaporative condensers must be inspected at least annually and cleaned as necessary to remove scale and sediment. Cooling coils and condensate pans must be cleaned as necessary to remove dirt and organic material.

##### **11.1.2.3 Inspection and Maintenance Plan (43)**

Vessels must have a plan to inspect and maintain HVAC systems in accordance with the manufacturer's recommendations and industry standards. The written inspection, cleaning, and maintenance plan for the HVAC system must be maintained on the vessel and available for review during inspections.

Documentation of the inspection, cleaning, and maintenance plan must be available for review during inspections.

An electronic maintenance tracking system is acceptable for both the plan and the documentation if the work description and action completed are available.

## 11.2 Fountains, Humidifiers, Misting Systems, and Showers

### 11.2.1 Fountains, Humidifiers, and Misting Systems

#### 11.2.1.1 Water Source

##### 11.2.1.1.1 Sprays (43)

Only POTABLE WATER can be used for water sprays, decorative fountains, humidifiers, and misting systems. The water must be further treated to avoid microbial buildup in the operation of water sprays, fountains, humidifiers, and misting systems.

#### 11.2.1.2 Fountains and Misting Systems

##### 11.2.1.2.1 Clean (43)

Decorative fountains and misting systems must be maintained free of *Mycobacterium*, *Legionella*, algae, and mold growth.

For systems installed after the adoption of the *VSP 2011 Operations Manual*,

- Provide an automated treatment system (halogenation, UV, or other effective DISINFECTANT) to prevent the growth of *Mycobacterium* and *Legionella* in any decorative fountain, misting system, or similar facility.
- Ensure that nozzles are REMOVABLE for cleaning and DISINFECTION.
- Ensure that pipes and reservoirs can be drained when the fountain/system is not in use.

PORTABLE units must be maintained clean.

##### 11.2.1.2.2 Shock Treatment (43)

For misting systems and similar facilities,

- Ensure that these systems can also be manually disinfected (halogenation, heat, etc.).
- If heat is used as a DISINFECTANT, ensure that the water temperature, as measured at the misting nozzle, can be maintained at 65°C (149°F) for a minimum of 10 minutes.

## 11.2.2 Hot-water System and Showers

### 11.2.2.1 Maintenance

#### 11.2.2.1.1 *Hot-water System (43)*

The potable hot-water system—including shower heads—must be maintained to preclude growth of *Mycobacterium* or *Legionella*.

#### 11.2.2.1.2 *Showers (43)*

Shower heads must be cleaned and disinfected every 6 months. DISINFECTION must be accomplished with an appropriate HALOGEN-based DISINFECTANT at 10 ppm for 60 minutes, or an equivalent CT VALUE.

## 11.3 HVAC Systems, Fountains, Misting Systems, Humidifiers, and Showers Knowledge

### 11.3.1 Demonstration of Knowledge (44)

The supervisor or PERSON IN CHARGE of HVAC operations on the vessel must demonstrate to VSP—on request during inspections—knowledge of HVAC systems, fountains, misting systems, humidifiers, and showers operations. The supervisor or PERSON IN CHARGE must demonstrate this knowledge by compliance with this section of these guidelines or by responding correctly to the inspector's questions as they relate to the specific operation. In addition, the supervisor or PERSON IN CHARGE of HVAC systems, fountains, misting systems, humidifiers, and showers operations on the vessel must ensure that employees are properly trained to comply with this section of the guidelines in this manual as it relates to their assigned duties.

## **12.0 Administrative Guidelines**

This section includes the following subsections:

- 12.1 Inspections
- 12.2 Inspection Report
- 12.3 Risk-based Scoring and Correction Priority
- 12.4 Closing Conference
- 12.5 Inspection Review
- 12.6 Corrective Action Statement
- 12.7 Correction Affidavit
- 12.8 Inspection Publication
- 12.9 Recommendation That the Vessel Not Sail
- 12.10 Reinspections and Follow-up Inspections
- 12.11 Construction/Renovation Inspections
- 12.12 Other Environmental Investigations
- 12.13 VARIANCES

### **12.1 Inspections**

#### **12.1.1 Inspection Procedures**

##### **12.1.1.1 Routine Inspections**

An unannounced, complete sanitation inspection by VSP Environmental Health Officers (EHOs) will be done twice each federal fiscal year if the vessel is available.

##### **12.1.1.2 IHR Ship Sanitation Inspections**

The Vessel Sanitation Program will conduct International Health Regulations (IHR) ship sanitation inspections during unannounced routine operational inspections of cruise ships using the final APPROVED IHR inspection manual from the World Health Organization (WHO). The IHR inspection will only be conducted if there is sufficient time to do both inspections while the ship is in port. There will be no additional fee charged for a dual inspection. The IHR inspection will not be conducted if the cruise line involved has invoices from other ship inspections unpaid for more than 60 days from receipt of those invoices.

VSP will also provide extensions to existing ship sanitation control exemption certificates. As the standard for the IHR inspections is set by WHO, the ship will be issued the certificate appropriate to the findings of the inspection. The findings specific to the IHR will be so designated in the inspection report narrative.

### **12.1.1.3 Inspectors**

VSP EHOs will be trained in the interpretation and application of the current *VSP Operations Manual*.

### **12.1.1.4 Boarding**

The VSP EHO will board the vessel and immediately inform the master of the vessel or a designated agent that a vessel sanitation inspection is to be conducted.

### **12.1.1.5 Sequence**

The VSP EHO will then conduct the inspection in a logical sequence until the EHO has completed the inspection of all areas identified in this manual.

### **12.1.1.6 Imminent Health Hazard Detection**

The VSP EHO will contact the master of the vessel or a designated agent and the VSP Chief immediately during an inspection about a possible recommendation that the vessel not sail, if an IMMEDIATE HEALTH HAZARD as specified in section 12.9.1 is found to exist on the vessel, and if these deficiencies possibly cannot be corrected before the inspection is completed.

### **12.1.1.7 Incomplete Inspections**

Once an inspection has begun, it will be completed in that same visit. If the inspection cannot be completed, the results of an incomplete inspection will be discussed with the vessel's staff. A complete inspection will be conducted at a later date.

## **12.2 Inspection Report**

### **12.2.1 Draft Report**

#### **12.2.1.1 Provided**

The VSP EHO will provide a draft inspection report to the master of the vessel, or a designated agent, at the conclusion of the inspection.

#### **12.2.1.2 Information**

The draft inspection report will provide administrative information, AGE log review details, and inspection score.

#### **12.2.1.3 Deficiency Descriptions**

The draft inspection report will provide a written description of the items found deficient and where the deficiency was observed.

## **12.2.2 Final Report**

### **12.2.2.1 Report Form**

The VSP EHO will use the Vessel Sanitation Inspection Report (Annex 13.15) to summarize the inspection score. The inspection report will contain the elements in 12.2.2.2 through 12.2.2.5.

### **12.2.2.2 Administrative**

The inspection report includes administrative information that identifies the vessel and its master or designee. It also includes the inspection report score, which is calculated by subtracting credit point values for all observed deficiencies from 100.

### **12.2.2.3 Deviations**

The item number and the credit point value for that item number will be indicated if the vessel does not meet the current *VSP Operations Manual* standard for that item.

### **12.2.2.4 Medical Review**

The medical documentation (e.g., GI logs, medical logs, special reports, etc.) will be available for review by VSP for accuracy and timeliness of reporting.

### **12.2.2.5 Report Detail**

A written description of the items found deficient will be included. The deficiencies will be itemized with references to the section of the current *VSP Operations Manual*. The description will include the deficiency location and citation of the appropriate *VSP Operations Manual* section.

## **12.3 Risk-based Scoring and Correction Priority**

### **12.3.1 Scoring System**

#### **12.3.1.1 Weighted Items**

The inspection report scoring system is based on inspection items with a total value of 100 points.

#### **12.3.1.2 Risk Based**

Inspection items are weighted according to their probability of increasing the risk for an AGE OUTBREAK.

#### **12.3.1.3 Critical Items**

CRITICAL ITEMS are those with a weight of 3 to 5 credit point values on the inspection report.

#### **12.3.1.4 Critical Designation**

CRITICAL ITEMS are designated in this *VSP Operations Manual* in bold red underlined text. In addition, the text **CRITICAL ITEM** appears in parentheses after the section number and keywords; for example, **7.5.5.1 Food-contact Surfaces (24 C)**. The section numbers of the CRITICAL ITEMS in this manual are also provided in red text.

#### **12.3.1.5 Noncritical Items**

Noncritical items are those with a weight of 1 to 2 credit point values on the inspection report.

#### **12.3.1.6 Scoring**

Each weighted deficiency found on an inspection will be deducted from 100 possible credit points.

### **12.3.2 Risk-based Correction Priority**

#### **12.3.2.1 Critical Correction Time Frame**

At the time of inspection, a vessel will correct a critical deficiency as defined in the current *VSP Operations Manual* and implement a corrective-action plan for monitoring the CRITICAL ITEM for continued compliance.

#### **12.3.2.2 Extension**

Considering the nature of the potential HAZARD involved and the complexity of the corrective action needed, VSP may agree to, or specify, a longer time frame (not to exceed 10 calendar days after the inspection) for the vessel to correct critical deficiencies.

## **12.4 Closing Conference**

### **12.4.1 Procedures**

#### **12.4.1.1 Closing Conference**

The results of the inspection will be explained to the master or a designee before the VSP EHO leaves the vessel.

#### **12.4.1.2 Report Copy**

The VSP EHO will leave a copy of the draft inspection report with the master or designee. The report will be reviewed in detail and opportunity provided for discussions of the findings. The draft report is provided so that the vessel personnel can begin correcting deficiencies immediately.

#### **12.4.1.3 Invoice**

The VSP EHO will provide the master or a designee with a payment invoice for signature. The VSP EHO will provide one copy of the signed

invoice to the master or designee and will forward one copy to the vessel's company office along with the final inspection report.

#### **12.4.1.4 Fee Schedule**

The fee for inspections is based on the existing fee schedule for routine inspections of passenger cruise vessels. The schedule is published annually in the *Federal Register*.

## **12.5 Inspection Review**

### **12.5.1 Inspection Report Review Requests**

#### **12.5.1.1 Contested Results**

If the master disagrees with the findings, the master can notify the VSP EHO during the closing conference of the intent to request a review of the specific items being contested and the substantive reasons for disagreement.

If a designated corporate official disagrees with the findings, the corporate official may submit a request to review the inspection. This request must be submitted to VSP within 48 hours of the closing conference.

#### **12.5.1.2 Interim Report**

At the request of the owner or operator, the VSP EHO will complete an interim report if an inspection is under review. The interim report will indicate the item(s) under review. VSP will modify the final inspection report, as necessary, after the review by the VSP Chief.

#### **12.5.1.3 Report Remarks**

After receiving a request for review, the VSP EHO will mark the vessel's inspection report as under review at the request of the vessel owner or operator.

#### **12.5.1.4 Written Request**

The vessel owner or operator must make a written request for review within 2 weeks of the inspection with specific reference and facts concerning the contested deficiencies that the VSP EHO documented during the inspection.

#### **12.5.1.5 Address**

Send written requests to the following:  
Chief, Vessel Sanitation Program Branch  
National Center for Environmental Health  
Centers for Disease Control and Prevention  
4770 Buford Hwy NE, Mailstop F59  
Atlanta, GA 30341-3717 USA

## **12.5.2 Inspection Report Review Procedures**

### **12.5.2.1 Review**

The VSP Chief will review the matter and respond within 2 weeks of receiving the request for a review. In the response, the VSP Chief will state whether the inspection report will be changed.

### **12.5.2.2 No Score**

No numerical score will be published before the VSP Chief makes a final determination on the review. Publication of inspection results will indicate the vessel's status as under review at the request of the vessel owner or operator.

### **12.5.2.3 Report Copies**

Copies of the contested inspection results that are released before the VSP Chief makes a final determination on the review will have each contested deficiency clearly marked as under review at the request of the vessel owner or operator.

### **12.5.2.4 Final Report**

The interim report will be issued as a final report if the written request for review is not received within 2 weeks of the inspection.

### **12.5.2.5 Appeal**

If the ship owner does not agree with the review and decision of the VSP Chief, he or she may appeal the decision to the Director, Division of Emergency and Environmental Health Services, National Center for Environmental Health.

## **12.5.3 Other Recommendations Review**

### **12.5.3.1 Review**

A vessel owner or operator has the right to request a review of recommendations made during a technical consultation or inspection if the owner or operator believes that VSP officials have imposed requirements inconsistent with or beyond the scope of this manual.

### **12.5.3.2 Written Request**

The owner or operator must send a written statement explaining the problem in detail to the VSP Chief within 30 days of the date the recommendation was made.

### **12.5.3.3 Review**

The VSP Chief will review the issue and respond within 2 weeks of receiving the statement, advising whether the recommendation will be revised.

#### **12.5.3.4 Appeal**

If the ship owner does not agree with the review and decision of the VSP Chief, he or she may appeal the decision to the Director, Division of Emergency and Environmental Health Services, National Center for Environmental Health.

## **12.6 Corrective Action Statement**

### **12.6.1 Procedures**

#### **12.6.1.1 Corrective Actions**

Signed corrective-action statements (Annex 13.16) must be submitted to the VSP Chief by the master, owner, or operator. Corrective-action statements must detail each deficiency identified during the inspection and the corrective action taken.

#### **12.6.1.2 Critical-item Corrective Actions**

Critical-item deficiencies must also include standard operating procedures and monitoring procedures implemented to prevent the recurrence of the critical deficiency.

#### **12.6.1.3 Clarification Requests**

The corrective-action statement may contain requests for clarification of items noted on the inspection report. The request for clarification must be included in the cover letter from the vessel's master, owner, or operator. Clarification of these items will be provided in writing to the requestor by the VSP Chief or the EHO who conducted the inspection in question.

#### **12.6.1.4 Public Distribution**

The corrective-action statement will be appended to the final inspection report for future reference and, if requested, made available for public distribution.

#### **12.6.1.5 Same Score**

A corrective-action statement will not affect the inspection score.

## **12.7 Correction Affidavit**

### **12.7.1 Procedures**

#### **12.7.1.1 Procedures**

An affidavit of correction from the owner or operator, certifying that corrective action has been completed, may be submitted to the VSP Chief. The procedure may be used only one time for an item. The item must be structure- or EQUIPMENT-related and must be corrected within a reasonable period.

### **12.7.1.2 Conditions**

At least one of the following conditions must apply for an item to qualify for an affidavit of correction:

- It must be a longstanding deficiency that has not been identified during previous inspections.
- It must be a deficiency in which the function of the EQUIPMENT is being accomplished by an alternative method.

### **12.7.1.3 Requested at Inspection**

After the inspection, but before the VSP EHO leaves the vessel, the vessel's master or a representative must provide notification of the intent to submit an affidavit of correction. This notice must specify the deficiency or deficiencies to be corrected and the corrective action to be taken. The draft inspection report will include a notation of the items to be corrected.

### **12.7.1.4 Final Inspection Score**

After acceptance of the affidavit, the final inspection score will be recalculated to include credit for the items corrected.

## **12.8 Inspection Publication**

### **12.8.1 Methods**

#### **12.8.1.1 Report Availability on Web Site**

CDC publishes inspection reports and scores (the Green Sheet report) on the VSP Web site (<http://www.cdc.gov/nceh/vsp>).

#### **12.8.1.2 Data**

The announcement will include, at a minimum, the names of the vessels in the inspection program, the dates of their most recent inspections, and the numerical score achieved by each vessel.

#### **12.8.1.3 Public Record**

Reports, including corrective-action statements, are available on the VSP Web site. Paper copies are available to the public on request.

## **12.9 Recommendation That the Vessel Not Sail**

### **12.9.1 Imminent Health Hazards**

#### **12.9.1.1 Imminent Health Hazard**

An IMMINENT HEALTH HAZARD will be determined to be, but not limited to, one of the following situations:

- Free HALOGEN residual in the POTABLE WATER distribution system

is less than 0.2 MG/L (ppm) and this deficiency is not corrected before the inspection ends.

- Inadequate facilities for maintaining safe temperatures for POTENTIALLY HAZARDOUS FOOD.
- Inadequate facilities for cleaning and sanitizing EQUIPMENT.
- Continuous problems with liquid and solid waste disposal, such as inoperative or overflowing toilets or shower stalls in passenger and crew member cabins.
- Infectious disease outbreak among passengers or crew, and where it is suspected that continuing normal operations may subject newly arriving passengers to disease.

## **12.9.2 Procedures**

### **12.9.2.1 Notify VSP Chief**

The VSP EHO will immediately notify the VSP Chief when any of these IMMEDIATE HEALTH HAZARDS or similar imminent threats to public health are found aboard a vessel.

### **12.9.2.2 No Sail**

CDC will recommend or direct the master of a vessel not to sail when an IMMEDIATE HEALTH HAZARD is identified and cannot be immediately corrected. Such a recommendation will be signed by the VSP Chief, with concurrence of the Director, National Center for Environmental Health, or the Director's designee.

## **12.10 Reinspection and Follow-up Inspections**

### **12.10.1 Reinspection Procedures**

#### **12.10.1.1 Failing Vessels Reinspections**

A reinspection is a complete sanitation inspection performed on vessels that did not score at least 86 on the previous inspection.

#### **12.10.1.2 Reasonable Time**

Vessels that fail a routine inspection will be reinspected within a reasonable time, depending on vessel schedules and receipt of the corrective-action statement from the vessel's management.

#### **12.10.1.3 Unannounced**

Reinspections will be unannounced.

#### **12.10.1.4 No-sail Reinspections**

If a no-sail recommendation is made, a follow-up inspection will be conducted as soon as requested.

#### **12.10.1.5 Scheduling Priority**

In scheduling inspections, VSP will give priority to the reinspection of vessels that failed routine inspections.

#### **12.10.1.6 One Reinspection**

Vessels that fail a routine inspection will undergo only one reinspection.

#### **12.10.1.7 Written Requests**

Exceptions may be made when the owner or operator submits a written request for an additional reinspection to the VSP Chief stating the reasons why the additional reinspection is warranted.

#### **12.10.1.8 Unannounced/Inspection Fee**

Additional reinspections are unannounced and the vessel will be charged the standard inspection fee.

### **12.10.2 Follow-up Inspection Procedures**

#### **12.10.2.1 Follow Up**

A follow-up inspection is a partial inspection to review the status of deficiencies identified during the previous periodic inspection or reinspection.

#### **12.10.2.2 Not Periodic or Reinspection**

A follow-up inspection cannot be a substitute for a periodic inspection or reinspection.

#### **12.10.2.3 Follow-up Reasons**

Follow-up inspections may be conducted to resolve a contested inspection or to inspect IMMEDIATE HEALTH HAZARDS that resulted in a recommendation to prohibit the vessel from sailing.

#### **12.10.2.4 Next Arrival**

These inspections will be conducted as soon as possible after the routine inspection or reinspection, preferably the next time the vessel arrives at a U.S. port.

#### **12.10.2.5 Limited**

Follow-up inspections will be limited to inspection of deficiencies in question. For example, if an item under the refrigerator section of the inspection was a deficiency and was the only item contested, only refrigeration would be checked during the follow-up inspection.

#### **12.10.2.6 Other Items**

Any other problems noted during the follow-up inspection will be brought to the attention of the vessel's master or designee so that the deficiencies can be corrected.

#### **12.10.2.7 No Score**

No inspection score will be provided and no fee will be charged for these follow-up inspections.

### **12.11 Construction/Renovation Inspections**

#### **12.11.1 Procedures**

##### **12.11.1.1 Construction**

Whenever possible, the VSP staff will conduct inspections of vessels being constructed or undergoing major retrofits on request of the vessel owner or operator.

##### **12.11.1.2 Requesting Inspection**

An official written request will be submitted to the VSP Chief requesting a voluntary construction renovation inspection. CDC's ability to honor these requests will be based on the availability of the VSP staff.

##### **12.11.1.3 Time Frame**

Construction/renovation inspections are normally be conducted at the shipyard 4 to 6 weeks before completion. An additional inspection may also be conducted on completion of the work and before the vessel enters operational status.

##### **12.11.1.4 Construction Compliance**

Construction/renovation inspections will document the vessel's compliance with CDC's *VSP Construction Guidelines*, which provide a framework for consistency in the sanitary design, construction, and construction inspections of cruise vessels.

##### **12.11.1.5 New Vessels**

The CDC *VSP 2011 Construction Guidelines* will apply to all new vessels in which the keel is laid after September 15, 2011.

##### **12.11.1.6 Major Renovations**

The construction guidelines will also apply to major renovations planned after September 15, 2011. A major renovation is a renovation where a new FOOD AREA (e.g., galley, bar, buffet) is installed, a new facility (e.g., recreational water, CHILD ACTIVITY CENTER) is installed, or an existing FOOD AREA or facility is changed by size or EQUIPMENT by 30% or more from the original. It also includes the addition of or change to an

area/facility or a technical system (e.g., POTABLE WATER, wastewater, air systems) through the introduction of new technology.

#### **12.11.1.7 Minor Renovations**

These guidelines will not apply to minor renovations.

#### **12.11.1.8 Fee Schedule**

The fee for construction/renovation inspections is based on the existing fee schedule for routine inspections.

### **12.11.2 Construction/Renovation Inspection Reports**

#### **12.11.2.1 Report**

A written report will be issued by VSP after a construction/renovation inspection. These reports will summarize any changes recommended to ensure conformity with CDC guidelines.

#### **12.11.2.2 Guides**

The reports prepared by VSP personnel in the shipyards during construction will be used as guides if VSP conducts a final construction/renovation inspection on the vessel before the vessel enters operational service.

#### **12.11.2.3 No Score**

There is no score for construction/renovation inspections.

## **12.12 Other Environmental Investigations**

### **12.12.1 Procedures**

#### **12.12.1.1 Environmental Investigations**

VSP may conduct or coordinate other activities such as investigating disease outbreaks, checking a specific condition such as HALOGEN residual in the POTABLE WATER distribution system, or investigating complaints of unsanitary conditions on a vessel.

#### **12.12.1.2 Problems Noted**

Public health problems noted during other environmental investigations will be brought to the attention of the vessel's master or designee when these investigations are performed.

#### **12.12.1.3 No Score**

No inspection score will be provided and no fee will be charged for other environmental investigations.

## 12.13 Variances

### 12.13.1 Procedures

#### 12.13.1.1 Variance Procedures

VSP may grant a VARIANCE by modifying or waiving the requirements of this *VSP 2011 Operations Manual* if VSP determines that a health HAZARD or nuisance will not result from the VARIANCE.

#### 12.13.1.2 VSP Records

If a VARIANCE is granted, VSP will retain the information in its records for the vessel or, if applicable, multiple vessels.

#### 12.13.1.3 Vessel Records

If a VARIANCE is granted, the vessel using the VARIANCE must retain the information in its records for ready reference.

#### 12.13.1.4 Existing Variances

If changes are submitted for an existing APPROVED VARIANCE or a new vessel is added to an existing APPROVED VARIANCE, the entire VARIANCE will be reviewed.

If new technology or science has been developed since the approval of a VARIANCE, that section of the VARIANCE where the new technology or science was developed will be reviewed.

### 12.13.2 Documentation

#### 12.13.2.1 Detailed Justification

Before a VARIANCE from a requirement of the *VSP 2011 Operations Manual* is APPROVED, the person requesting the VARIANCE must provide the following, which will be retained in VSP's file on the vessel or vessels:

- A statement of the proposed VARIANCE of the *VSP 2011 Operations Manual* requirement including relevant section number citations.
- An analysis of the rationale for how the potential public health HAZARDS and nuisances addressed by the relevant *VSP 2011 Operations Manual* requirement will be alternatively addressed by the proposed variance.
- If required, a HACCP PLAN, standard operating procedures, training plan, and monitoring plan that includes all the information as it is relevant to the VARIANCE requested.

- Additional scientific data or other information as required to support the determination that public health will not be compromised by the proposal.

### **12.13.3 Conformance**

#### **12.13.3.1 Conformance**

If VSP grants a VARIANCE, the vessel must

- Comply with the HACCP PLANS, standard operating procedures, training plan, and monitoring plan that are submitted and APPROVED as a basis for the modification or waiver.
- Maintain and provide to VSP, on request, records to demonstrate that procedures monitoring critical-control points are effective, monitoring of the critical-control points are routinely used, necessary corrective actions are taken if there is failure at a critical-control point, and periodic verification of the effectiveness of the operation or process in protecting public health.

#### **12.13.3.2 Rescinding Variance**

VARIANCE approval may be rescinded at any time for noncompliance with these conditions or if it is determined that public health could be compromised.

#### **12.13.3.3 Areas Not Identified (44)**

Procedures, systems, equipment, technology, processes, or activities that are not identified in the scope of this manual must not be tested or introduced operationally onboard any vessel until the concept is submitted in writing to the VSP Chief for review. If the review determines the concept is within the scope of the *VSP Operations Manual*, written procedures, control measures, or a complete variance submission may be required.

## 13.0 Annexes

This section includes the following subsections:

- 13.1 Authority
- 13.2 ACUTE GASTROENTERITIS Surveillance System
- 13.3 ACUTE GASTROENTERITIS Surveillance System Reporting
- 13.4 ACUTE GASTROENTERITIS Outbreak Investigation
- 13.5 DISINFECTION Calculations for Water and EQUIPMENT
- 13.6 Sample Cross-connection Control Program Guideline
- 13.7 BABY-ONLY WATER FACILITY
- 13.8 Fecal, Vomit, and Blood Accident Response for RWFs
- 13.9 Food Cooking Temperature Alternatives
- 13.10 Chemicals Used in Washing or to Assist in the Peeling of Fruits and Vegetables
- 13.11 TIME-CONTROL Plan Examples
- 13.12 List of Some Hard and Semisoft Cheeses Exempt from Datemarking
- 13.13 Consumer Advisory Examples
- 13.14 WAREWASHING Evaluation
- 13.15 Inspection Report
- 13.16 Corrective-Action Statement
- 13.17 Summary of Sanitation Inspections of International Cruise Ships

### 13.1 Authority

#### 13.1.1 Public Health Service Act

##### CHAPTER 6A--PUBLIC HEALTH SERVICE

##### SUBCHAPTER II--GENERAL POWERS AND DUTIES

##### Part G--Quarantine and Inspection

##### Sec. 264. Regulations to control communicable diseases

##### (a) Promulgation and enforcement by Surgeon General

The Surgeon General, with the approval of the Secretary, is authorized to make and enforce such regulations as in his judgment are necessary to prevent the introduction, transmission, or spread of communicable diseases from foreign countries into the States or possessions, or from one State or possession into any other State or possession. For purposes of carrying out and enforcing such regulations, the Surgeon General may provide for such inspection, fumigation, disinfection, sanitation, pest extermination, destruction of animals or articles found to be so infected or contaminated as to be sources of dangerous infection to human beings, and other measures, as in his judgment may be necessary.

##### (b) Apprehension, detention, or conditional release of individuals

Regulations prescribed under this section shall not provide for the apprehension,

detention, or conditional release of individuals except for the purpose of preventing the introduction, transmission, or spread of such communicable diseases as may be specified from time to time in Executive orders of the President upon the recommendation of the National Advisory Health Council and the Surgeon General.

**(c) Application of regulations to persons entering from foreign countries**

Except as provided in subsection (d) of this section, regulations prescribed under this section, insofar as they provide for the apprehension, detention, examination, or conditional release of individuals, shall be applicable only to individuals coming into a State or possession from a foreign country or a possession.

**(d) Apprehension and examination of persons reasonably believed to be infected**

On recommendation of the National Advisory Health Council, regulations prescribed under this section may provide for the apprehension and examination of any individual reasonably believed to be infected with a communicable disease in a communicable stage and (1) to be moving or about to move from a State to another State; or (2) to be a probable source of infection to individuals who, while infected with such disease in a communicable stage, will be moving from a State to another State. Such regulations may provide that if upon examination any such individual is found to be infected, he may be detained for such time and in such manner as may be reasonably necessary. For purposes of this subsection, the term "State" includes, in addition to the several States, only the District of Columbia.

(July 1, 1944, ch. 373, title III, Sec. 361, 58 Stat. 703; 1953 Reorg. Plan No. 1, Secs. 5, 8, eff. Apr. 11, 1953, 18 F.R. 2053, 67 Stat. 631; July 12, 1960, Pub. L. 86-624, Sec. 29(c), 74 Stat. 419; June 23, 1976, Pub. L. 94-317, title III, Sec. 301(b)(1), 90 Stat. 707.)

**Sec. 269. Bills of Health**

**(a) Detail of medical officer; conditions precedent to issuance; consular officer to receive fees**

Except as otherwise prescribed in regulations, any vessel at any foreign port or place clearing or departing for any port or place in a State or possession shall be required to obtain from the consular officer of the United States or from the Public Health Service officer, or other medical officer of the United States designated by the Surgeon General, at the port or place of departure, a bill of health in duplicate, in the form prescribed by the Surgeon General. The President, from time to time, shall specify the ports at which a medical officer shall be stationed for this purpose. Such bill of health shall set forth the sanitary history and condition of said vessel, and shall state that it has in all respects complied with the regulations prescribed pursuant to subsection (c) of this section. Before granting such duplicate bill of health, such consular or medical officer shall be satisfied that the matters and things therein stated are true. The consular officer shall be entitled to demand and receive the fees for bills of health and such fees shall be established by regulation.

**(b) Collectors of customs to receive originals; duplicate copies as part of ship's papers**

Original bills of health shall be delivered to the collectors of customs at the port of entry. Duplicate copies of such bills of health shall be delivered at the time of inspection to quarantine officers at such port. The bills of health herein prescribed shall be considered as part of the ship's papers, and when duly certified to by the proper consular or other officer of the United States, over his official signature and seal, shall be accepted as evidence of the statements therein contained in any court of the United States.

**(c) Regulations to secure sanitary conditions of vessels**

The Surgeon General shall from time to time prescribe regulations, applicable to vessels referred to in subsection (a) of this section for the purpose of preventing the introduction into the States or possessions of the United States of any communicable disease by securing the best sanitary condition of such vessels, their cargoes, passengers, and crews. Such regulations shall be observed by such vessels prior to departure, during the course of the voyage, and also during inspection, disinfection, or other quarantine procedure upon arrival at any United States quarantine station.

**(d) Vessels from ports near frontier**

The provisions of subsections (a) and (b) of this section shall not apply to vessels plying between such foreign ports on or near the frontiers of the United States and ports of the United States as are designated by treaty.

**(e) Compliance with regulations**

It shall be unlawful for any vessel to enter any port in any State or possession of the United States to discharge its cargo, or land its passengers, except upon a certificate of the quarantine officer that regulations prescribed under subsection (c) of this section have in all respects been complied with by such officer, the vessel, and its master. The master of every such vessel shall deliver such certificate to the collector of customs at the port of entry, together with the original bill of health and other papers of the vessel. The certificate required by this subsection shall be procurable from the quarantine officer, upon arrival of the vessel at the quarantine station and satisfactory inspection thereof, at any time within which quarantine services are performed at such station.

(July 1, 1944, ch. 373, title III, Sec. 366, 58 Stat. 705.)

**Sec. 271. Penalties for violation of quarantine laws**

**(a) Penalties for persons violating quarantine laws**

Any person who violates any regulation prescribed under sections 264 to 266 of this title, or any provision of section 269 of this title or any regulation prescribed thereunder, or who enters or departs from the limits of any quarantine station, ground, or anchorage in disregard of quarantine rules and regulations or without permission of the quarantine officer in charge, shall be punished by a fine of not more than \$1,000 or by imprisonment for not more than one year, or both.

**(b) Penalties for vessels violating quarantine laws**

Any vessel which violates section 269 of this title, or any regulations thereunder or under section 267 of this title, or which enters within or departs from the limits of any quarantine station, ground, or anchorage in disregard of the quarantine rules and regulations or without permission of the officer in charge, shall forfeit to the United States not more than \$5,000, the amount to be determined by the court, which shall be a lien on such vessel, to be recovered by proceedings in the proper district court of the United States. In all such proceedings the United States attorney shall appear on behalf of the United States; and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

**(c) Remittance or mitigation of forfeitures**

With the approval of the Secretary, the Surgeon General may, upon application therefore, remit or mitigate any forfeiture provided for under subsection (b) of this section, and he shall have authority to ascertain the facts upon all such applications.

(July 1, 1944, ch. 373, title III, Sec. 368, 58 Stat. 706; June 25, 1948, ch. 646, Sec. 1, 62 Stat. 909; 1953 Reorg. Plan No. 1, Secs. 5, 8, eff. Apr. 11, 1953, 18 F.R. 2053, 67 Stat. 631.)

**13.1.2 Title 42 Code of Federal Regulations**

**TITLE 42--PUBLIC HEALTH**

**CHAPTER I--PUBLIC HEALTH SERVICE, DEPARTMENT OF HEALTH AND HUMAN SERVICES**

**PART 71--FOREIGN QUARANTINE**

**Subpart C--Notice of Communicable Disease Prior to Arrival**

**71.21 Radio report of death or illness.**

(a) The master of a ship destined for a U.S. port shall report immediately to the quarantine station at or nearest the port at which the ship will arrive, the occurrence, on board, of any death or any ill person among passengers or crew (including those who have disembarked or have been removed) during the 15-day period preceding the date of expected arrival or during the period since departure from a U.S. port (whichever period of time is shorter).

(b) The commander of an aircraft destined for a U.S. airport shall report immediately to the quarantine station at or nearest the airport at which the aircraft will arrive, the occurrence, on board, of any death or ill person among passengers or crew.

(c) In addition to paragraph (a) of this section, the master of a ship carrying 13 or more passengers must report by radio 24 hours before arrival the number of cases (including zero) of diarrhea in passengers and crew recorded in the ship's medical log during the current cruise. All cases of diarrhea that occur after the 24 hour report must also be reported not less than 4 hours before arrival.

(Approved by the Office of Management and Budget under control number 0920-0134)

**Subpart D--Health Measures at U.S. Ports: Communicable Diseases**

**Sec. 71.31 General provisions.**

(a) Upon arrival at a U.S. port, a carrier will not undergo inspection unless the Director determines that a failure to inspect will present a threat of introduction of communicable diseases into the United States, as may exist when the carrier has on board individual(s) reportable in accordance with Sec. 71.21 or meets the circumstances described in Sec. 71.42. Carriers not subject to inspection under this section will be subject to sanitary inspection under Sec. 71.41 of this part.

(b) The Director may require detention of a carrier until the completion of the measures outlined in this part that are necessary to prevent the introduction or spread of a communicable disease. The Director may issue a controlled free pratique to the carrier stipulating what measures are to be met, but such issuance does not prevent the periodic boarding of a carrier and the inspection of persons and records to verify that the conditions have been met for granting the pratique.

**Sec. 71.32 Persons, carriers, and things.**

(a) Whenever the Director has reason to believe that any arriving person is infected with or has been exposed to any of the communicable diseases listed in paragraph (b) of this section, he/she may detain, isolate, or place the person under surveillance and may order disinfection or disinfestation as he/she considers necessary to prevent the introduction, transmission, or spread of the listed communicable diseases.

(b) The communicable diseases authorizing the application of sanitary, detention, and/or isolation measures under paragraph (a) of this section are: cholera or suspected cholera, diphtheria, infectious tuberculosis, plague, suspected smallpox, yellow fever, or suspected viral hemorrhagic fevers (Lassa, Marburg, Ebola, Congo-Crimean, and others not yet isolated or named).

(c) Whenever the Director has reason to believe that any arriving carrier or article or thing on board the carrier is or may be infected or contaminated with a communicable disease, he/she may require detention, disinsection, disinfection, disinfestation, fumigation, or other related measures respecting the carrier or article or thing as he/she considers necessary to prevent the introduction, transmission, or spread of communicable diseases.

**Sec. 71.33 Persons: Isolation and surveillance.**

(a) Persons held in isolation under this subpart may be held in facilities suitable for isolation and treatment.

(b) The Director may require isolation where surveillance is authorized in this subpart whenever the Director considers the risk of transmission of infection to be exceptionally serious.

(c) Every person who is placed under surveillance by authority of this subpart shall, during the period of surveillance:

(1) Give information relative to his/her health and his/her intended destination and report, in person or by telephone, to the local health officer having jurisdiction over the areas to be visited, and report for medical examinations as may be required;

(2) Upon arrival at any address other than that stated as the intended destination when placed under surveillance, or prior to departure from the United States, inform, in person or by telephone, the health officer serving the health jurisdiction from which he/she is departing.

(d) From time to time the Director may, in accordance with section 322 of the Public Health Service Act, enter into agreements with public or private medical or hospital facilities for providing care and treatment for persons detained under this part.

(Approved by the Office of Management and Budget under control number 0920-0134)

[50 FR 1519, Jan. 11, 1985; 50 FR 3910, Jan. 29, 1985]

#### **Sec. 71.34 Carriers of U.S. military services.**

(a) Carriers belonging to or operated by the military services of the United States may be exempted from inspection if the Director is satisfied that they have complied with regulations of the military services which also meet the requirements of the regulations in this part. (For applicable regulations of the military services, see Army Regulation No. 40-12, Air Force Regulation No. 161-4, Secretary of the Navy Instruction 6210.2, and Coast Guard Commandant Instruction 6210.2).

(b) Notwithstanding exemption from inspection of carriers under this section, animals or articles on board shall be required to comply with the applicable requirements of subpart F of this part.

Sec. 71.35 Report of death or illness on carrier during stay in port.

The master of any carrier at a U.S. port shall report immediately to the quarantine station at or nearest the port the occurrence, on board, of any death or any ill person among passengers or crew.

(Approved by the Office of Management and Budget under control number 0920-0134)

#### **Subpart E--Requirements Upon Arrival at U.S. Ports: Sanitary Inspection** **Sec. 71.41 General provisions.**

Carriers arriving at a U.S. port from a foreign area shall be subject to a sanitary inspection to determine whether there exists rodent, insect, or other vermin infestation, contaminated food or water, or other insanitary conditions requiring measures for the prevention of the introduction, transmission, or spread of communicable disease.

**Sec. 71.45 Food, potable water, and waste: U.S. seaports and airports.**

(a) Every seaport and airport shall be provided with a supply of potable water from a watering point approved by the Commissioner of Food and Drugs, Food and Drug Administration, in accordance with standards established in title 21, Code of Federal Regulations, parts 1240 and 1250.

(b) All food and potable water taken on board a ship or aircraft at any seaport or airport intended for human consumption thereon shall be obtained from sources approved in accordance with regulations cited in paragraph (a) of this section.

(c) Aircraft inbound or outbound on an international voyage shall not discharge over the United States any excrement, or waste water or other polluting materials. Arriving aircraft shall discharge such matter only at servicing areas approved under regulations cited in paragraph (a) of this section.

**Sec. 71.48 Carriers in intercoastal and interstate traffic.**

Carriers, on an international voyage, which are in traffic between U.S. ports, shall be subject to inspection as described in Secs. 71.31 and 71.41 when there occurs on board, among passengers or crew, any death, or any ill person, or when illness is suspected to be caused by insanitary conditions.

## **13.2 Acute Gastroenteritis Surveillance System**

### **13.2.1 Introduction**

The following three forms are provided as guides to standardize the collection of information required to assess the patterns of AGE and monitor for outbreaks aboard vessels. These forms are downloadable from the VSP Web site (<http://www.cdc.gov/nceh/vsp>):

- Vessel Sanitation Program - ACUTE GASTROENTERITIS (AGE) Surveillance Log
- AGE Surveillance System Questionnaire
- Meals and Activities Aboard Vessel Prior to Illness

### **13.2.2 Forms**





## Acute Gastroenteritis Surveillance System Questionnaire



(To be completed if you experienced acute gastroenteritis)

|   |                       |                                  |             |           |
|---|-----------------------|----------------------------------|-------------|-----------|
| Vessel Name:  |                       | Voyage No. :                     |             | Date:     |
| Last Name:  |                       | First Name:                      |             |           |
| Date of Birth:  | (mm/dd/yyyy)          | Age:                             | (in years)  | Sex M / F |
| Cabin Number:   |                       | Total Number of People in Cabin: |             |           |
| Dining Seating:   |                       | Dining Table Number:             |             |           |
| Symptoms Started Date:  | (mm/dd/yyyy)          | Time:                            | (hh:mm)     | AM / PM   |
| Do you know other people ill with the same symptoms?  |                       |                                  |             | Yes / No  |
| If yes, please list their names:  |                       |                                  |             |           |
| Did you stay overnight or longer in a boarding city before you joined the vessel?                 |                       |                                  |             | Yes / No  |
| If yes, where?  |                       | City:                            | State:      | Country:  |
| Was the overnight stay in a hotel/motel/commercial residence?                                     |                       |                                  |             | Yes / No  |
| If yes, what was the name and address of the hotel, motel/commercial residence                    |                       |                                  |             |           |
| Name:   |                       |                                  |             |           |
| Address:  |                       |                                  |             |           |
| City:   |                       | State:                           | Country:    |           |
| How did you travel to the city where you boarded the ship for this cruise? Select all that apply. |                       |                                  |             |           |
| <input type="checkbox"/>  | Airplane              | Airlines:                        | Flight No.: |           |
| <input type="checkbox"/>  | Automobile            |                                  |             |           |
| <input type="checkbox"/>  | Bus/Motorcoach        |                                  |             |           |
| <input type="checkbox"/>  | Train                 |                                  |             |           |
| <input type="checkbox"/>  | Other Please specify: |                                  |             |           |
| Are you a member of a tour group?   |                       |                                  |             | Yes / No  |
| Prior to boarding the ship, did you participate in a pre-embarkation tour/package?                |                       |                                  |             | Yes / No  |
| If yes, which tour(s)/package(s) did you participate in? (list all)                               |                       |                                  |             |           |
| Prior you your illness, did you go ashore at any of the ports of call?                            |                       |                                  |             | Yes / No  |
| If yes, please list the ports of call where you went ashore                                       |                       |                                  |             |           |
| Did participate in any shore excursions at any port of call?                                      |                       |                                  |             | Yes / No  |
| If yes, which shore excursions did you participate in? (list all)                                 |                       |                                  |             |           |
| Did you eat anything while you were ashore at any port of call?                                   |                       |                                  |             | Yes / No  |
| Did you drink anything (including drinks with ice) while ashore at any port of call?              |                       |                                  |             | Yes / No  |
| What did you think is the cause of your illness?:   |                       |                                  |             |           |

**PLEASE TURN THIS FORM OVER TO PROVIDE FOOD AND SHIPBOARD ACTIVITIES HISTORY**



Last Name \_\_\_\_\_ First Name \_\_\_\_\_

### Meals and Activities Aboard Vessel Prior to Illness

Please list the *specific* vessel locations of the meals you consumed and the vessel activities you participated in before you became ill

| Day of illness onset<br>Give Date: |       | Day before illness onset |       | Two days before illness onset |       | Three days before illness onset |       |
|------------------------------------|-------|--------------------------|-------|-------------------------------|-------|---------------------------------|-------|
| <b>Breakfast</b>                   |       | <b>Breakfast</b>         |       | <b>Breakfast</b>              |       | <b>Breakfast</b>                |       |
| Place: _____                       |       | Place: _____             |       | Place: _____                  |       | Place: _____                    |       |
| Time: _____                        |       | Time: _____              |       | Time: _____                   |       | Time: _____                     |       |
| Items eaten/drunk                  |       | Items eaten/drunk        |       | Items eaten/drunk             |       | Items eaten/drunk               |       |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| <b>Lunch</b>                       |       | <b>Lunch</b>             |       | <b>Lunch</b>                  |       | <b>Lunch</b>                    |       |
| Place: _____                       |       | Place: _____             |       | Place: _____                  |       | Place: _____                    |       |
| Time: _____                        |       | Time: _____              |       | Time: _____                   |       | Time: _____                     |       |
| Items eaten/drunk                  |       | Items eaten/drunk        |       | Items eaten/drunk             |       | Items eaten/drunk               |       |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| <b>Dinner</b>                      |       | <b>Dinner</b>            |       | <b>Dinner</b>                 |       | <b>Dinner</b>                   |       |
| Place: _____                       |       | Place: _____             |       | Place: _____                  |       | Place: _____                    |       |
| Time: _____                        |       | Time: _____              |       | Time: _____                   |       | Time: _____                     |       |
| Items eaten/drunk                  |       | Items eaten/drunk        |       | Items eaten/drunk             |       | Items eaten/drunk               |       |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| <b>Snack</b>                       |       | <b>Snack</b>             |       | <b>Snack</b>                  |       | <b>Snack</b>                    |       |
| Place: _____                       |       | Place: _____             |       | Place: _____                  |       | Place: _____                    |       |
| Time: _____                        |       | Time: _____              |       | Time: _____                   |       | Time: _____                     |       |
| Items eaten/drunk                  |       | Items eaten/drunk        |       | Items eaten/drunk             |       | Items eaten/drunk               |       |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| <b>Activities</b>                  |       | <b>Activities</b>        |       | <b>Activities</b>             |       | <b>Activities</b>               |       |
| AM                                 | PM    | AM                       | PM    | AM                            | PM    | AM                              | PM    |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |
| _____                              | _____ | _____                    | _____ | _____                         | _____ | _____                           | _____ |

## 13.3 Acute Gastroenteritis Surveillance System Reporting

### 13.3.1 Introduction

#### 13.3.1.1 Operations Manual

Details of the AGE surveillance data collection and notification system are contained in Chapter 4 of this manual (ACUTE GASTROENTERITIS Surveillance).

Following are some sample itineraries of vessels that may call upon a U.S. port. The ports where the routine AGE surveillance report is required at least 24 hours before arrival, but not more than 36 hours, are marked with an ←.

#### 13.3.1.2 Sample Itineraries

##### Itinerary A

Port Everglades, FL  
at Sea  
at Sea  
St. Thomas, U.S. VI  
Philipsburg, St. Maarten  
at Sea  
Nassau, Bahamas  
**Port Everglades, FL ←**

##### Itinerary B

Vancouver, BC  
at Sea  
**Juneau, AK ←**  
Ketchikan, AK  
Sitka, AK  
at Sea  
Seward, AK  
Vancouver, BC

##### Itinerary C\*

Barcelona, Spain  
at Sea  
at Sea  
at Sea  
**St. Thomas, U.S. VI ←**  
at Sea  
Port Everglades, FL

##### Itinerary D

Miami, FL  
at Sea  
St. Barthélemy, French W.I.  
**San Juan, PR ←**  
St. Thomas, U.S. VI  
at Sea  
Freeport, Bahamas  
**Miami, FL ←**

\*Note: The report in Itinerary C includes passengers and crew members during the 15 days before arrival in St. Thomas, U.S. VI.

### 13.3.2 Submission Procedures

#### 13.3.2.1 Mechanism

Routine AGE surveillance reports may be submitted as follows:

- Telephone: 800-323-2132 or 954-356-6650,
- Fax: 954-356-6671,
- E-mail: [vsp-report@cdc.gov](mailto:vsp-report@cdc.gov), or
- Web site (user ID and password)

required): <http://wwwn.cdc.gov/vsp>.

### **13.3.2.2 Telephone Call Required**

A telephone notification to VSP at the telephone numbers listed above must accompany a special 2% report required when the vessel is within 15 days of expected arrival at a U.S. port, even when the special 2% report is submitted via fax, electronic mail or Web site.

## **13.4 Acute Gastroenteritis Outbreak Investigation**

### **13.4.1 Introduction**

#### **13.4.1.1 Introduction**

Outbreaks of AGE aboard cruise ships are relatively infrequent occurrences. Since implementation of the cooperative program between the cruise industry and VSP, the outbreak rate on vessels has steadily declined each year.

#### **13.4.1.2 Vigilance**

Ongoing vigilance and rapid outbreak detection and response are still warranted. Because so many people share the same environment, meals, and water, disease can often spread quickly to passengers and crew members on the vessel and overwhelm the vessel's medical system. The infection can also continue unabated between cruises if proper interventions are not instituted.

#### **13.4.1.3 Consultation**

An outbreak of AGE occurs aboard a vessel when the number of cases is in excess of expected levels for a given time period. When the cumulative proportion of reportable cases of AGE reaches 2% among passengers or 2% among crew and the vessel is within 15 days of arrival at a U.S. port, the vessel must submit a special report to VSP. This provides an early opportunity for consultation to potentially avert more illness among passengers and crew members.

#### **13.4.1.4 Monitoring**

In most instances, a 2% proportion of illness will not lead to an investigation aboard the vessel but will provide the opportunity to discuss and monitor illness patterns and collaboratively develop intervention strategies. Members of the VSP staff are always available to discuss disease transmission and intervention questions.

#### **13.4.1.5 Investigation**

Outbreaks of AGE aboard cruise ships are relatively infrequent occurrences. Since implementation of the cooperative program between the cruise industry and VSP, the outbreak rate on vessels each year has steadily declined.

#### **13.4.1.6 Special Circumstances**

Under special circumstances, when an unusual AGE pattern or disease characteristic is found, an investigation may be conducted when the proportion of cases is less than 3%. These special circumstances may include a high incidence of illness in successive cruises, unusual severity

of illnesses or complications, or a large number of persons reporting the illness over a brief period of time.

#### **13.4.1.7 Rapid Response**

Conducting an outbreak investigation aboard a vessel demands a rapid, organized, and comprehensive response. Because of the **TURNOVER** of passengers, and sometimes crew members, the investigation must be rapid to be able to collect data needed to identify the cause.

#### **13.4.1.8 Collaboration**

The investigation is a collaborative effort of the cruise line, passengers and crew members aboard the vessel, and VSP. Therefore, an organized plan drafted between the organizations and individuals involved is crucial in conducting a successful investigation—a comprehensive effort that includes epidemiologic, environmental, and laboratory studies.

Recommendations based on the success of the investigation can then be implemented to prevent a recurrence on the following cruise.

### **13.4.2 Objectives**

The objectives of an investigation are to

- Determine the extent of the AGE among passengers and crew.
- Identify the agent causing the illness.
- Identify risk factors associated with the illness.
- Formulate control measures to prevent the spread of the illness.

### **13.4.3 Outbreak Investigation Procedures**

#### **13.4.3.1 Contingency Plan**

The early stages of an investigation are usually coordinated aboard the vessel by the vessel's medical staff in cooperation with engineering and hotel staff. It is important to have a coordinated contingency plan in place on board the vessel before implementation is needed. All staff with a potential for involvement in an investigation should be familiar with the contingency plan.

#### **13.4.3.2 Periodic Review**

This preliminary preparation will assist the vessel with the necessary rapid implementation of investigation and response measures before the arrival of the VSP team. The outbreak contingency plan should be periodically reviewed to ensure it will still meet the vessel's needs in dealing with an outbreak.

#### **13.4.3.3 Specimens and Samples**

Timely collection of medical specimens and food and water samples is important in the disease investigative process. The proper materials and techniques for collection and preservation are a part of the planning. It is

important to periodically review these to make sure they are on hand and ready to use in the event they are needed.

#### **13.4.3.4 Ready to Use**

A list of recommended medical specimen and food sample collection supplies for investigating AGE OUTBREAKS can be found in sections 13.4.5 and 13.4.6 of this annex. Vessels with no medical staff aboard may choose to stock only the starred items in 13.4.5.1 unless there is a qualified staff member aboard who is capable of performing venipuncture for collection of serum specimens.

#### **13.4.3.5 Useful Information**

To assist in the rapid evaluation of the extent of illness among passengers and crew and identify the causative pathogen and associated risk factors, VSP may request the following items:

- The AGE surveillance log for the duration of the current cruise.
- Self-administered 72-hour food and activity questionnaires completed by cases.
- Daily newsletters distributed to passengers.
- A complete list of food items and menus served to both crew and passengers for the 72-hour period before the peak onset of illness of most cases.
- A complete list of ship and shore activities of passengers for the cruise.

#### **13.4.3.6 Survey**

VSP may also request distribution of a survey to all passengers and crew members. VSP will provide this survey to the vessel. Completed surveys should be held in the infirmary until collection by the VSP staff for epidemiologic analysis.

#### **13.4.3.7 Interviews**

Interviews with cases may also be useful for identifying the etiology and associated risk factors of an outbreak. When distributing the surveys, the medical staff should advise the cases that interviews may be requested when VSP arrives at the vessel.

### **13.4.4 Report**

#### **13.4.4.1 Preliminary Report**

After an outbreak investigation, a preliminary report of findings based on available clinical and epidemiologic information, environmental inspection reports of the investigation, and interim recommendations will be presented to the master of the vessel. Based on preliminary findings, additional materials (including additional passenger and crew information) may be requested from the cruise line or the vessel and follow-up studies

may be undertaken to address specific suspicions or concerns.

#### **13.4.4.2 Final Report**

The report presented to the master of the vessel will remain preliminary until completion of more-extensive epidemiologic and laboratory studies and distribution of a final report containing summary recommendations.

### **13.4.5 AGE Specimens**

#### **13.4.5.1 AGE Specimen Supplies**

Supplies recommended for specimen collection include the following:

- \*20-50 wide-mouth plastic jars or specimen cups with screw caps for stool specimens.
- \*20 plastic bags for storing specimen cups.
- \*Disposable medical gloves.
- \*Plastic disposable spoons for collecting stool.
- \*20 sterile bottles or tubes containing bacterial preservative and transport medium (e.g., Cary-Blair).
- \*Sterile swabs.
- \*Rectal swabs.
- \*Stool preservative medium for parasites.
- \*A large commercial roll of plastic wrap.
- Sterile phlebotomy supplies for obtaining serum specimens (needles, syringes, swabs).
- Sterile pipettes.
- 20 serum separator tubes (containing no anticoagulant [red tops]).
- 20 nunc tubes for serum separation.
- Shipping containers (for diagnostic specimens).
- Shipping container labels and markings (as required by current shipping regulations for diagnostic specimens).

As noted in Annex 13.4.3.4, vessels with no medical staff aboard may choose to stock only the starred items unless there is a qualified staff member aboard who is capable of performing venipuncture for collection of serum specimens

#### **13.4.5.2 Specimen Collection**

##### **13.4.5.2.1 Request Procedures**

It may be advisable to collect clinical specimens of stool, vomitus, or serum from passengers and crew members with reportable cases of AGE. Timely notification of the vessel as to what samples and information will be required is essential. Collection of specimens for analysis for viruses, bacteria, or parasites may be recommended depending on the likely etiology of illness.

It is recommended that specimens be requested from patients during clinical evaluation in the infirmary or after infirmary visits by direct contact with or a letter from medical staff. Individuals asked to provide specimens should each be provided with disposable gloves, two specimen cups, a disposable spoon, and plastic wrap. The following is suggested language for a letter to passengers for request of stool specimens as well as instructions to passengers and crew for collection of stool:

### **Request to Passengers for Stool Specimens**

The [U.S. Public Health Service/Name of Cruise Line/Medical Department] is requesting stool specimens from some people who became ill with AGE on this cruise. Please give one cup to a friend who has recently become ill and use the other cup for yourself. Put your next bowel movement into the cup and return the cup to the vessel's medical center as soon possible so it can be refrigerated.

#### **Patient Instructions**

- 1) Urinate into the toilet (if you feel the need).
- 2) Wash and dry your hands.
- 3) Lift the toilet seat. Place sheets of plastic wrap over the toilet bowl, leaving a slight dip in the center. Place the toilet seat down. Pass some stool onto the plastic wrap. Do not let urine or water touch the stool specimen, if possible.
- 4) Using the spoon given to you, place bloody, slimy, or whitish areas of the stool into the container first. Fill the cup at least 2/3 full, if possible.
- 5) Tighten the cap.
- 6) Wash your hands.
- 7) Label the specimen jar with your name, the date, and your cabin number.

#### **13.4.5.2.2 Medical Staff Instructions**

##### **Specimen Labeling**

Please ensure that each specimen is properly labeled with the following:

- Date of collection.
- Passenger or crew member name and date of birth (or a unique identifying number with a separate log linked to name and date of birth).
- Notation on use of antidiarrheal or antibiotic medication.

##### **Collection, Storage, and Transport**

Complete guidelines for collection and storage of specimens for viral, bacterial, and parasite analysis are listed below, although it may not be necessary to implement all procedures during each

investigation. Transport of specimens will be arranged in collaboration with VSP.

### **13.4.5.3 Guidelines for Collecting Fecal Specimens for Viral Diagnosis**

(Modified from *MMWR*, 1990; 39[RR-5];19.)

#### **13.4.5.3.1 Stool for Viral Diagnosis**

- 1) Collect stool specimens in the first 48 hours. Specimen collection should not await the results of epidemiologic and other investigations because delay will almost certainly preclude a viral diagnosis. If information gathered subsequently indicates that a viral etiology is unlikely, the specimens can be discarded.
- 2) Collect 10 diarrhea bulk specimens, if possible. Bulk specimens, enough to fill a large stool cup, are preferred. Serial specimens from persons with acute, frequent, high-volume diarrhea are particularly useful. The smaller the specimen and the more formed the stool, the lower the diagnostic yield. Rectal swabs are of little or no value in viral detection. Specimens from at least 10 ill persons should be collected to maximize the chance that a diagnosis can be made. The diagnostic yield is low when specimens from fewer than 10 persons are submitted.
- 3) Store specimens at 4°C (40°F). Freezing may destroy the characteristic viral morphology that permits a diagnosis by electron microscopy.
- 4) Take special care to prevent cross-CONTAMINATION of specimens during collection and transport because new amplification techniques are exquisitely sensitive.

#### **13.4.5.3.2 Paired Serum Specimens for Viral Diagnosis**

- 1) Collect acute-period serum specimens during the first 5 days of symptoms. The convalescent-period serum specimen should be collected during the third to sixth week after illness.
- 2) Collect 10 pairs from ill persons (the same persons submitting stool specimens) and 10 pairs from well persons. Serum specimens from adults should be 10 mL and serum specimens from children should be 3 mL.
- 3) Use storage tubes containing no anticoagulant (tubes with red tops) for collection.

- 4) If a centrifuge is available, centrifuge the specimen for 10 minutes and remove the serum using a pipette. If no centrifuge is available, the blood specimens can sit in a refrigerator until a clot has formed; remove the serum using pipettes, as above.
- 5) Place the serum into an empty nunc tube, label, then refrigerate. Do not freeze.

#### **13.4.5.3.3 Other Specimens for Viral Diagnosis**

##### **Water, Food, and Environmental Samples**

Viruses causing gastroenteritis cannot routinely be detected in water, food, or environmental samples. Viruses have been successfully detected in vomitus specimens. These should be collected and sent using same methodology as for stool specimens.

#### **13.4.5.4 Guidelines for Collecting Fecal Specimens for Bacteriologic Diagnosis**

Before use, the transport media should be stored in a refrigerator or at room temperature. If the transport media is stored at room temperature, it should normally be chilled for 1 to 2 hours by refrigeration before use.

At least two rectal swabs or swabs of fresh stools should normally be collected for bacterial analysis and placed in refrigerated Cary-Blair transport media.

It is recommended that the swabs be inserted initially into the transport media to moisten, then inserted about 1 to 1-1/2 inches into the rectum, gently rotated, and removed for insertion individually into the same tube of transport media.

If possible, there should be visible fecal material on the swabs.

Both swabs should be inserted into the same tube of media and the swabs pushed completely to the bottom of the tube.

The top portion of the stick touching the fingers should be broken off and discarded.

Refrigeration during transport may be accomplished by shipping in an insulated box with frozen refrigerant packs. The specimens must never be frozen during storage or transport.

### **13.4.5.5 Guidelines for Collecting Fecal Specimens for Parasite Diagnosis**

#### **13.4.5.5.1 Parasite Specimens**

In the event a disease of parasitic etiology is suspected, arrangements will be made for shipment of appropriate specimen containers containing 10% formalin and PVA (polyvinyl alcohol).

A summary table with instructions for collecting clinical specimens during outbreaks to test for bacteria, viruses, and parasites is available at [http://www.cdc.gov/outbreaknet/references\\_resources/guide\\_specimen\\_collection.html](http://www.cdc.gov/outbreaknet/references_resources/guide_specimen_collection.html).

### **13.4.6 Food and Water Samples**

#### **13.4.6.1 Food and Water Sample Collection Kit**

A recommended food and water sampling kit includes the following:

- Sterile sampling containers (15 or more sealable plastic bags and wide-mouth screw top jars; 15 water sample bottles with sodium thiosulfate solution to provide concentration of 100 mg per mL of sample volume; foil or heavy wrapping paper).
- Sterile specimen collection devices (spoons, tongs, scoop, knife, scissors, swabs, and pipettes).
- DISINFECTION agents (sanitizing solution, 95% ethyl alcohol, and propane torch).
- Support EQUIPMENT (plastic gloves, plastic container liners for iced samples, waterproof marking pen for sample identification, roll of adhesive or masking tape, labels, waterproof cardboard tags with ties, insulated ice chests, and frozen refrigerant packs).

#### **13.4.6.2 Food and Water Sampling Procedures**

##### **13.4.6.2.1 Sample Plan**

Environmental sampling should be directed toward suspect food and sources identified by the preliminary epidemiologic investigation.

##### **13.4.6.2.2 Aseptic Techniques**

Food and water samples should be collected using aseptic techniques. Washed and gloved hands and sterile sampling UTENSILS and containers protect the integrity of the sample during collection. Water taps used for collection of water should be sterilized with heat or chemicals and then sample should be collected after 1 minute of flow time.

#### **13.4.6.2.3 Sample Amount**

Approximately 200 grams or 200 mL of sample will usually suffice for the laboratory analytical requirements. Carefully squeeze most of the air out of the bag before sealing food samples.

#### **13.4.6.2.4 Sample Identification**

Sample numbers should be assigned on each collection container and recorded on a sample log that will accompany samples to the laboratory. Information that identifies the date, time, and location of collection, product information; codes; storage conditions and temperatures for each sample should be recorded on the sample log. Include contact information for the PERSON IN CHARGE of collecting the samples on the vessel.

#### **13.4.6.2.5 Sample Temperatures**

Food and water samples should be held below 5°C (41°F), but not frozen. Sufficient frozen refrigerant packs should be used to maintain cold sample temperatures during transport to the laboratory.

## 13.5 Disinfection Calculations for Water and Equipment

### 13.5.1 Introduction

POTABLE WATER systems and EQUIPMENT, SWIMMING POOLS, and WHIRLPOOL SPAS on a vessel may need to be disinfected when there is a possibility of CONTAMINATION and as a routine part of maintenance. This annex provides tables for calculating the amount of chlorine to be used in emergency chlorination of POTABLE WATER and for the routine DISINFECTION of POTABLE WATER systems and EQUIPMENT, SWIMMING POOLS, and WHIRLPOOL SPAS.

### 13.5.2 Water Chlorination

Tables 1 and 2 (Annex 13.5.4) are for calculating the amount of chlorine to be used in the DISINFECTION of POTABLE WATER systems, SWIMMING POOLS, and EQUIPMENT.

**Amounts of chlorine compound shown in Table 1 are in GRAMS.**  
**Amounts of chlorine compound shown in Table 2 are in KILOGRAMS.**

The chlorine compound column in Tables 1 and 2 refers to the amount of available chlorine in the compound as stated on the product label. Requirements varying from those shown in the table—for example: metric tons of water, available chlorine compounds, or final chlorine concentrations—may be extrapolated.

For example, POTABLE WATER TANKS or fresh water tanks must be superchlorinated to at least 50 MG/L (ppm) available chlorine when samples taken from these tanks indicate potential CONTAMINATION with fecal coliform bacteria.

The total amount of 70% chlorine compound required to obtain 50 MG/L (ppm) in 166 metric tons of water is calculated in Example 1, which illustrates how to use the tables.

Example 1. The capacity of a potable tank from which a coliform-positive sample was obtained is 166 metric tons. The vessel has a compound on board containing 70% available chlorine.

The amount of chlorine required for 50 ppm is determined as follows:

- Use the 70% chlorine compound columns in Table 1.
- Find the 70% row that corresponds to 100 metric tons of water.
- Follow this 70%/100 ton row across until you reach the “50 ppm” column (7,150 grams).
- Do the same using the 50, 10, 5, and 1 metric ton columns to determine the totals for 166 metric tons.
- Now total each column as shown in the calculation table below.

### Calculation Table for Example 1

| Metric Tons of Water             | Grams Required, 70% Available Chlorine Solution |
|----------------------------------|---|
| 100                              | 7,150.0   |
| 50                               | 3,575.0   |
| 10                               | 715.0   |
| 5                                | 357.5   |
| 1                                | 71.5  |
| <b>166 Total Weight of Water</b> | <b>11,869.0 grams or 11.87 kilograms</b>        |

In this example, the amount of 70% chlorine compound required for 166 tons of water at 50 parts per million is 11,869.0 grams or 11.87 kilograms.

### 13.5.3 Equipment Disinfection

Figure 1 lists the various chlorine compounds and the amount of the compound required in grams per liter of water to produce a solution containing 100 ppm of chlorine. The 100-ppm chlorine solution should be applied as outlined in this manual.

**Figure 1. Available Chlorine in Compounds**

| Grams per Liter of Available Chlorine | Grams per Liter for 100 ppm |
|---------------------------------------|-----------------------------|
| 70%                                   | 0.143                       |
| 65%                                   | 0.154                       |
| 25%                                   | 0.4                         |
| 15%                                   | 0.7                         |
| 10%                                   | 1.0                         |
| 5%                                    | 2.0                         |

### 13.5.4 Tables

**Table 1. Amount of Chlorine Required in GRAMS to Produce Desired Parts per Million (ppm) (MG/L)**

| Chlorine Compound | Metric Tons of Water | 1 ppm  | 2 ppm  | 5 ppm  | 10 ppm   | 50 ppm   | 100 ppm   |
|-------------------|----------------------|--------|--------|--------|----------|----------|-----------|
| 70%               | 1                    | 1.43   | 2.86   | 7.15   | 14.30    | 71.50    | 143.00    |
| 70%               | 5                    | 7.15   | 14.30  | 35.75  | 71.50    | 357.50   | 715.00    |
| 70%               | 10                   | 14.30  | 28.60  | 71.50  | 143.00   | 715.00   | 1,430.00  |
| 70%               | 50                   | 71.50  | 143.00 | 357.50 | 715.00   | 3,575.00 | 7,150.00  |
| 70%               | 100                  | 143.00 | 286.00 | 715.00 | 1,430.00 | 7,150.00 | 14,300.00 |
|                   |                      |        |        |        |          |          |           |
| 65%               | 1                    | 1.54   | 3.08   | 7.70   | 15.40    | 77.00    | 154.00    |
| 65%               | 5                    | 7.70   | 15.40  | 38.50  | 77.00    | 385.00   | 770.00    |
| 65%               | 10                   | 15.40  | 30.80  | 77.00  | 154.00   | 770.00   | 1,540.00  |
| 65%               | 50                   | 77.00  | 154.00 | 385.00 | 770.00   | 3,850.00 | 7,700.00  |

| <b>Chlorine Compound</b> | <b>Metric Tons of Water</b> | <b>1 ppm</b> | <b>2 ppm</b> | <b>5 ppm</b> | <b>10 ppm</b> | <b>50 ppm</b> | <b>100 ppm</b> |
|--------------------------|-----------------------------|--------------|--------------|--------------|---------------|---------------|----------------|
| 65%                      | 100                         | 154.00       | 308.00       | 770.00       | 1,540.00      | 7,700.00      | 15,400.00      |
|                          |                             |              |              |              |               |               |                |
| 25%                      | 1                           | 4.00         | 8.00         | 20.00        | 40.00         | 200.00        | 400.00         |
| 25%                      | 5                           | 20.00        | 40.00        | 100.00       | 200.00        | 1,000.00      | 2,000.00       |
| 25%                      | 10                          | 40.00        | 80.00        | 200.00       | 400.00        | 2,000.00      | 4,000.00       |
| 25%                      | 50                          | 200.00       | 400.00       | 1,000.00     | 2,000.00      | 10,000.00     | 20,000.00      |
| 25%                      | 100                         | 400.00       | 800.00       | 2,000.00     | 4,000.00      | 20,000.00     | 40,000.00      |

**Table 2. Amount of Chlorine Required in KILOGRAMS to Produce Desired Parts per Million (ppm) (MG/L)**

| <b>Chlorine Compound</b> | <b>Metric Tons of Water</b> | <b>1 ppm</b> | <b>2 ppm</b> | <b>5 ppm</b> | <b>10 ppm</b> | <b>50 ppm</b> | <b>100 ppm</b> |
|--------------------------|-----------------------------|--------------|--------------|--------------|---------------|---------------|----------------|
| 15%                      | 1                           | 0.007        | 0.01         | 0.03         | 0.07          | 0.34          | 0.70           |
| 15%                      | 5                           | 0.035        | 0.07         | 0.17         | 0.35          | 1.70          | 3.50           |
| 15%                      | 10                          | 0.070        | 0.13         | 0.34         | 0.70          | 3.40          | 7.00           |
| 15%                      | 50                          | 0.350        | 0.65         | 1.70         | 3.50          | 17.00         | 35.00          |
| 15%                      | 100                         | 0.70         | 1.30         | 3.40         | 7.00          | 34.00         | 70.00          |
|                          |                             |              |              |              |               |               |                |
| 10%                      | 1                           | 0.01         | 0.02         | 0.05         | 0.10          | 0.50          | 1.00           |
| 10%                      | 5                           | 0.05         | 0.10         | 0.25         | 0.50          | 2.50          | 5.00           |
| 10%                      | 10                          | 0.10         | 0.20         | 0.50         | 1.00          | 5.00          | 10.00          |
| 10%                      | 50                          | 0.50         | 1.00         | 2.50         | 5.00          | 25.00         | 50.00          |
| 10%                      | 100                         | 1.00         | 2.00         | 5.00         | 10.00         | 50.00         | 100.00         |
|                          |                             |              |              |              |               |               |                |
| 5%                       | 1                           | 0.02         | 0.04         | 0.10         | 0.20          | 1.00          | 2.00           |
| 5%                       | 5                           | 0.10         | 0.20         | 0.50         | 1.00          | 5.00          | 10.00          |
| 5%                       | 10                          | 0.20         | 0.40         | 1.00         | 2.00          | 10.00         | 20.00          |
| 5%                       | 50                          | 1.00         | 2.00         | 5.00         | 10.00         | 50.00         | 100.00         |
| 5%                       | 100                         | 2.00         | 4.00         | 10.00        | 20.00         | 100.00        | 200.00         |

## 13.6 Sample Cross-connection Control Program Guideline

### 13.6.1 Background

Unprotected CROSS-CONNECTIONS to the POTABLE WATER system can result in mild changes to the aesthetic quality of the water affecting taste, odor, and color or severe changes that can result in illness or death. The purpose of a CROSS-CONNECTION control program is to identify these connections and provide appropriate protection.

### 13.6.2 Introduction

Use this outline to either develop a comprehensive CROSS-CONNECTION control program or update and maintain an existing program.

### 13.6.3 Cross-connection Survey

One of the first steps in developing a CROSS-CONNECTION control program is to conduct a thorough survey of the POTABLE WATER system to identify all actual or potential CROSS-CONNECTIONS. Although an initial survey of the vessel can be time consuming, it is essential to ensure that all connections are identified so that appropriate protection can be decided on.

Protection of POTABLE WATER can take two forms: containment or complete protection. Although the former may be the objective for a water supplier and requires less time and detail, the latter is our objective for this guidance.

*Example: A surveyor enters a structure and identifies numerous connections to the POTABLE WATER—both nonhealth-HAZARD and health-HAZARD connections. For containment purposes, an RP ASSEMBLY on the exterior supply line downstream of the water meter would contain all of the HAZARDS within the structure but would do nothing to protect the individual connections within the facility. If complete protection is the goal, each CROSS-CONNECTION in the structure must be identified and a decision made as to the appropriate BACKFLOW PREVENTION METHOD to be used. For vessels under VSP, complete protection is the goal.*

Surveyors should be

- knowledgeable in basic plumbing;
- knowledgeable in the principles of BACKFLOW, including BACKSIPHONAGE and BACKPRESSURE;
- Able to identify both potential and actual CROSS-CONNECTIONS; and
- Familiar with the level of HAZARD posed by each connection.

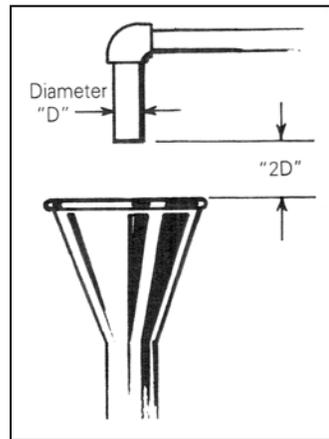
Surveyors should physically inspect all areas of the vessel that are supplied with POTABLE WATER. The best approach for this may be to go deck by deck, starting with the decks with connections that pose the greatest risk to health. This may require starting with the engine room deck. As each connection is identified, it is added to a listing. All information related to this connection should also be added

to the listing. An example of required information can be found later in this outline. Connections that unprotected or inadequately protected must be addressed as quickly as possible, especially if the connection is a health HAZARD.

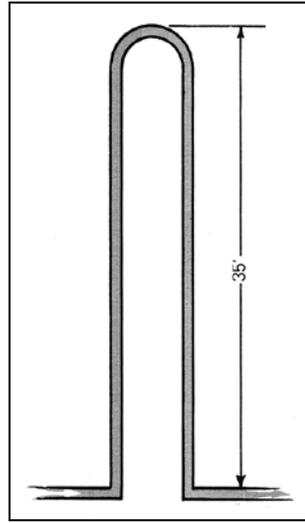
### 13.6.4 Backflow Protection Methods

All graphics in this section are provided courtesy of the U.S. Environmental Protection Agency (EPA).

#### 13.6.4.1 Nonmechanical Backflow Protection

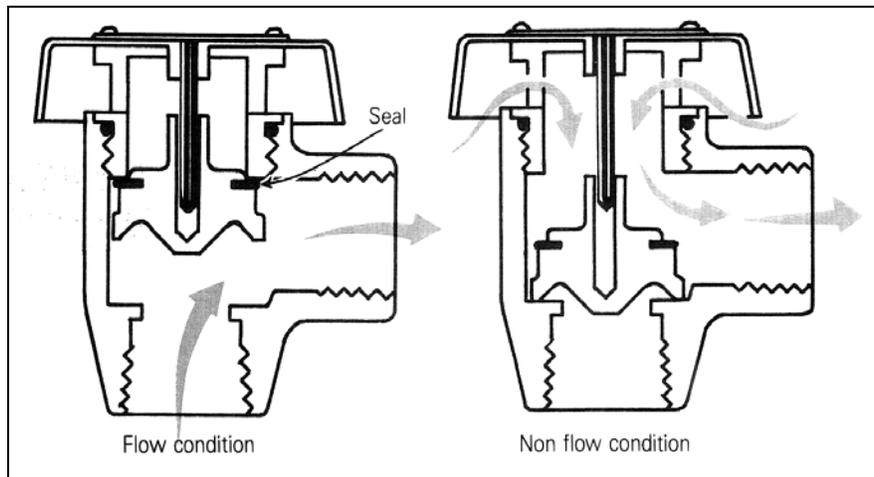


**AIR GAP**

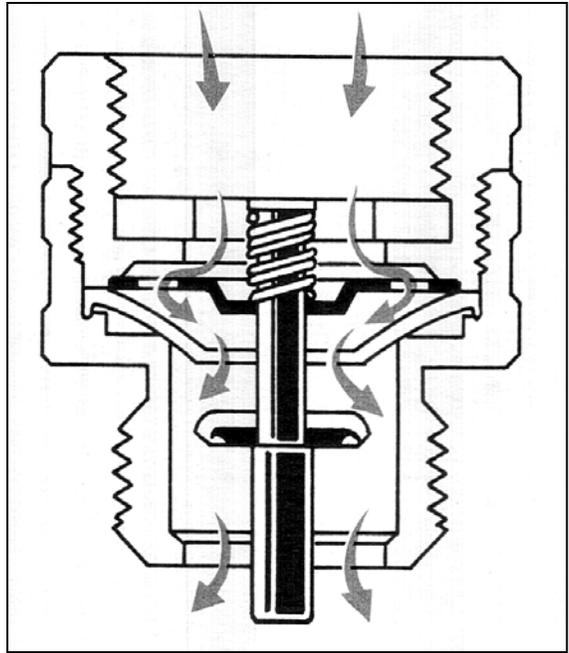


**Antisiphon loop**

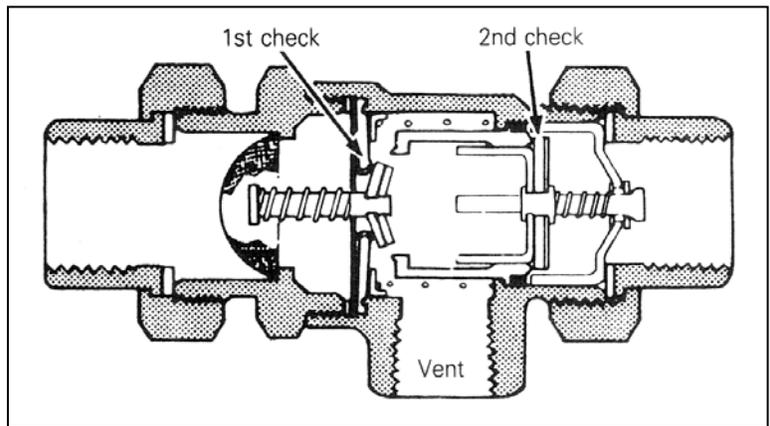
#### 13.6.4.2 Mechanical Backflow Protection



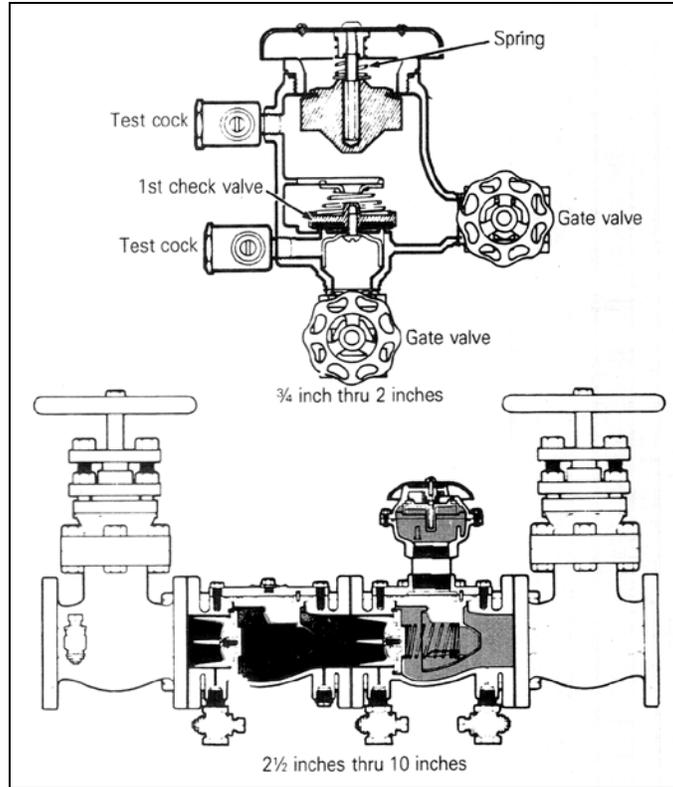
**ATMOSPHERIC VACUUM BREAKER**



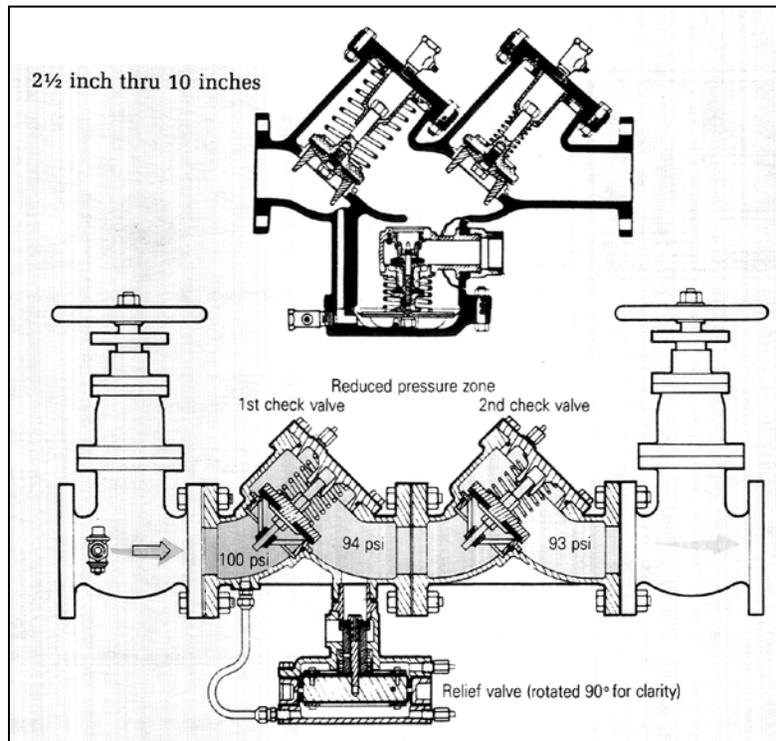
**HOSE-BIB VACUUM BREAKER**



**DOUBLE CHECK with atmospheric vent**



**PRESSURE VACUUM BREAKER**



**REDUCED PRESSURE PRINCIPLE ASSEMBLY**

## 13.6.5 Cross-connections on Vessel

### 13.6.5.1 List of Connections Requiring Backflow Prevention on Vessel

A log listing of all CROSS-CONNECTIONS on the vessel must be developed. At a minimum the log should contain the data elements listed in numbers 2, 3, 6, 7, and 8. The inclusion of the additional data listed in numbers 1, 4, and 5 is recommended.

1. Deck (A, B, C, 1, 2, 3...).
2. Location (of connection and of device, if different).
3. Connection description (e.g., hose, chemical tank, coffee machine, detergent dispenser).
4. Connection subjected to CONTINUOUS PRESSURE (CP) or noncontinuous pressure (NCP).
5. Connection subjected to [*BACKSIPHONAGE only* or *BACKSIPHONAGE and BACKPRESSURE*].
6. Protection used (AIR GAP or manufacturer name and designation for device).
7. Inspection date.
8. Inspection results (passed, replaced, psi results).

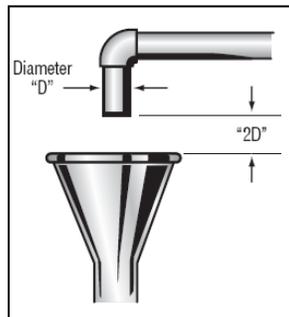
### 13.6.5.2 Specific Backflow Protection Choices on Vessel: Air Gaps and Backflow Prevention Devices

Use this section to provide information to vessel staff on the specific BACKFLOW PREVENTION DEVICES used on the vessel. For each device, a copy of the specification sheets or technical sheets as well as the manufacturer's installation recommendations should be included in the program documentation file. Generally these documents are available online from the Web sites of each device manufacturer.

#### **Air Gaps**

##### **Vessel-designed AIR GAPS**

- See definitions



##### **Manufactured AIR GAPS**

- Manufacturer's specification sheets
- Manufacturer's installation recommendations

### ***Noncontinuous pressure devices***

#### **ATMOSPHERIC VACUUM BREAKER**

- Manufacturer's specification sheets
- Manufacturer's installation recommendations

#### **Hose Vacuum Breaker**

- Manufacturer's specification sheets
- Manufacturer's installation recommendations

#### **Select double-check devices with intermediate vents (such as Watts NLF9)**

- Manufacturer's specification sheets
- Manufacturer's installation recommendations

### ***Continuous pressure devices***

#### **Select DOUBLE CHECK VALVE with intermediate vent (such as Watts N9)**

- Manufacturer's specification sheets
- Manufacturer's installation recommendations

#### **PRESSURE VACUUM BREAKER**

- Manufacturer's specification sheets
- Manufacturer's installation recommendations
- Test kit and instructions

#### **REDUCED PRESSURE PRINCIPLE ASSEMBLY**

- Manufacturer's specification sheets
- Manufacturer's installation recommendations
- Test kit and instructions

### ***References***

- EPA CROSS-CONNECTION Control Manual
- Device manufacturer list (based on devices used on vessel)
- Manual of CROSS-CONNECTION Control, 9th edition (University of Southern California)

## 13.7 Baby-only Water Facility

**For use by children who are in diapers or who are not completely toilet trained.**

### 13.7.1 Introduction

VSP recognizes the increased desire of passengers to allow children who are in diapers or who are not completely toilet trained to use RWFs. With that in mind, the following are requirements for operating a RWF for the sole use by children who are in diapers or who are not completely toilet trained. Each cruise line is required to submit a VARIANCE request to operate this type of facility.

**Administrative Note:** This section does not apply to vessels that have an approved VARIANCE from section 6.8.1 at the time of issuance of the *VSP 2011 Operations Manual*. Those vessels must continue to comply with all of the requirements of the VARIANCE.

### 13.7.2 Design and Construction

Facilities must be designed and constructed in accordance with the latest version of the *VSP Construction Guidelines*, regardless of the date the keel was laid. Before new construction or remodeling of an existing RWF, all plans must be submitted for review and approval by VSP. Once approved, no parts of the system or its operation may be changed without prior written approval from VSP. For maintenance purposes, system components of at least equal performance specifications may be changed without prior approval.

### 13.7.3 Water Source

#### 13.7.3.1 Recirculation

The water source for this facility must only be POTABLE WATER for recirculation systems.

#### 13.7.3.2 Flow-through

SEAWATER or POTABLE WATER may be used for a flow-through system.

#### 13.7.3.3 Operation

The system must be designed to operate in flow-through only or recirculation only.

##### 13.7.3.3.1 *Flow-through*

###### **At Sea**

Flow-through SEAWATER supply system must be used only while the vessel is MAKING WAY and at sea beyond 20 kilometers (12 miles) from nearest land or any point of land discharge.

###### **In Port**

Before arriving to a port or HARBOR, the SEAWATER supply system

must be shut down and the facility closed for use before the vessel reaches the 20-kilometer (12-mile) mark or any point of land-based discharge. The system must remain empty while in port or at anchor or the flow-through supply must be switched to POTABLE WATER.

#### **Recirculation**

Fill water must be provided only to the compensation tank and not directly to the BABY-ONLY WATER FACILITY.

#### **TURNOVER Rate**

The entire volume of water must pass through all parts of the system to include filtration, secondary UV DISINFECTION, and halogenation at least once per half hour.

The filtration, UV DISINFECTION, and HALOGEN and PH control systems must be operated 24 hours a day. This is required even when the facilities are not in use. The systems may only be shut down for required maintenance or cleaning of system components.

### **13.7.3.4 Filtration**

BABY-ONLY WATER FACILITY water must be filtered.

At least one replacement cartridge or canister-type filter must be available.

Cartridge or canister-type filters must be inspected weekly for cracks, breaks, damaged components, and accumulation of excessive organic material.

Granular filters must be backwashed daily. Backwashing must be repeated until the water viewed through the sight glass or discharge point is clean flowing.

The granular filters must be opened monthly and examined for channeling, mounds, or holes in the filter media. **Inspection method: Drain the water from the filter housing and inspect the granular filter for cracks, mounds, or holes.**

A core sample must be examined monthly for accumulation of excessive organic material. **Core sample method:**

- 1) After inspection, take a sand sample from the filter core and place it in a clear container. A core sample can be taken by inserting a rigid hollow tube or pipe in to the filter media.**
- 2) Add clean water to the clear container, cover, and shake.**
- 3) Allow the container to rest undisturbed for 30 minutes.**
- 4) Evaluate sample: if, after 30 minutes of settling, a measurable**

**layer of sediment is within or on top of the filter media or fine, colored particles are suspended in the water, the organic loading may be excessive and media replacement should be considered.**

**5) Record results of filter inspection and sedimentation test in a log.**

Cartridge filters must be replaced based on inspection results or manufacturer's recommendations, whichever is sooner.

The granular filter media must be replaced at least every 6 months. The filter housing must be scrubbed with an appropriate cleanser, rinsed, and disinfected before the new filter media is placed in it. DISINFECTION must be accomplished with an appropriate HALOGEN-based DISINFECTANT at 1 ppm for 50 minutes, or an equivalent CT VALUE. Record the filter replacement date and cleaning and DISINFECTION of the filter housing in a log. The log must include the DISINFECTANT residual and contact time or CT VALUE.

Filter pressure gauges and valves must be replaced when they are defective.

The operating manuals for all components such as filters, pumps, HALOGEN and PH control EQUIPMENT, and UV DISINFECTION systems must be maintained aboard the vessel in a location that is accessible to crew members who are responsible for the operation and maintenance of these facilities.

### **13.7.3.5 Halogen and Ph Control**

Automated HALOGEN dosing and PH control systems must be installed and maintained.

Halogenation must be by use of chlorine or bromine. A free residual of HALOGEN must be maintained between 3.0-10.0 ppm for chlorine and 4.0-10.0 ppm for bromine.

The PH levels must be maintained between 7.2 and 7.6.

### **13.7.3.6 UV Disinfection**

A UV DISINFECTION system must be installed after filtration and before HALOGEN-based DISINFECTION.

The UV DISINFECTION system must be maintained at an intensity that inactivates *Cryptosporidium parvum* and *Giardia*.

The UV DISINFECTION system must be maintained and operated in

accordance with the manufacturer's recommendation.

At least one spare UV lamp must be available.

#### **13.7.3.7 System Shutdown**

An automatic shutdown must be maintained whereby any failure in maintaining the required free residual HALOGEN level, PH level, or UV lamp intensity must cause the water to completely divert from the BABY-ONLY WATER FACILITY and instead loop back to the compensation tank. Additionally, this system must be equipped with an audible alarm that sounds in a continuously manned space, such as the bridge or engine control room.

#### **13.7.3.8 Shutdown and Alarm Testing**

The emergency shutdown and alarms systems must be tested monthly. Testing procedures and results must be recorded.

### **13.7.4 System Cleaning and Disinfection**

#### **13.7.4.1 Daily Cleaning of Spray Pad Surface**

Every 24 hours, the SPRAY PAD surface and any associated features must be cleaned with an appropriate cleaner. The surface must be rinsed and disinfected at 50 ppm free residual HALOGEN for 1 minute, or the equivalent CT VALUE. Ensure that the liquid waste from this process is not directed to the compensation tank.

At least every 72 hours, the facility must be shut down and these procedures must be followed:

- The entire volume of water within the system must be discharged. This includes the BABY-ONLY WATER FACILITY, compensation tank, filter housing, and all associated piping.
- The BABY-ONLY WATER FACILITY, compensation tank, and filter housing (cartridge filter) must be cleaned with an appropriate cleanser, rinsed, and disinfected (chlorine or bromine). DISINFECTION must be accomplished with a solution of at least 50 MG/L (ppm) free residual HALOGEN for 1 minute, or the equivalent CT VALUE.

#### **13.7.5 Monitoring and Record Keeping**

An automated analyzer-chart recorder capable of recording free residual HALOGEN levels in MG/L (ppm) and PH levels must be installed.

The system must be checked for calibration before opening the facility for use, and then every 3 hours thereafter with a test kit accurate to within 0.2 MG/L (ppm) free residual HALOGEN and 0.2 PH.

- Charts must be reviewed and signed daily by trained supervisory staff.

- Charts must be dated and changed daily.
- Records must be retained for 12 months.

In the event of a failure in the automated analyzer-chart recorder, manual tests must be conducted and recorded for each required parameter on an hourly basis. A maximum of 72 hours will be allowed for manual tests while repairs are under way. If more than 72 hours pass, the facilities must be shut down from operation until repairs are completed.

A log must be kept to detail all maintenance activities, including the following:

- Filter changes including filter housing cleaning and DISINFECTION (including ppm and contact time).
- Backwashing time.
- Fecal accidents.
- Injury accidents.
- Facility opening and closing times.

One test must be conducted at the end of each day for the presence of *Escherichia coli* (*E. coli*) using a test in accordance with the latest edition of *Standard Methods for the Examination of Water and Wastewater*. Test kits, incubators, and associated EQUIPMENT must be operated and maintained in accordance with the manufacturers' specifications.

For positive *E. coli* tests, follow this procedure:

- The entire volume of water within the system must be discharged. This includes the BABY-ONLY WATER FACILITY, compensation tank, filter housing, and all associated piping.
- The BABY-ONLY WATER FACILITY, compensation tank, and filter housing (cartridge filter) must be cleaned with an appropriate cleanser, rinsed, and disinfected (chlorine or bromine). DISINFECTION must be accomplished with a solution of at least 50 MG/L (ppm) for 1 minute, or the equivalent CT VALUE.
- Follow-up testing must be performed. The facility must not be put back in operation unless follow-up test results are negative for the presence of *E. coli*.

A record of the test results must be maintained onboard the vessel and must be available for review during inspections. Retain records for 12 months.

The maintenance logs, records, and charts must be kept for 12 months.

### **13.7.6 Training**

At least one person who is trained in the maintenance and operation of RWFs must be on the vessel and available at all times the facility is open for use. Such training includes the requirements of this manual, prevention of recreational water illnesses and injuries, HALOGEN and PH control chemicals, UV DISINFECTION

systems, recreational water safety, and using test kits for HALOGEN-based DISINFECTANTS and PH. A record must be kept with the names of all trained individuals.

### **13.7.7 Monitor**

At least one individual must be available in the immediate area of the facility when it is open for use. This individual must monitor the area to ensure all of the following:

- Children are wearing swim diapers.
- Diapers are changed at suitable diaper-changing stations and not at the facility.
- All children are under adult supervision.
- Food, BEVERAGES, and glass are not used near the facility.
- There is no running or boisterous play near the facility.
- Children who are ill are prohibited from using the facility.

### **13.7.8 Safety**

#### **13.7.8.1 Ocular Damage**

Ensure that water sprays are designed with pressures and directional flow controls to prevent ocular damage to users.

#### **13.7.8.2 Safety Sign**

A safety sign must be posted by the facility with letters at least 26 millimeters (1 inch) high at each entrance to the BABY-ONLY WATER FACILITY feature that states, at a minimum, the following:

- This facility is only for use by children in diapers or who are not completely toilet trained.
- Children who have a medical condition which may put them at increased risk for illness should not use these facilities.
- Children who are experiencing symptoms such as vomiting, fever, or diarrhea are prohibited from using these facilities.
- Children must be accompanied by an adult at all times.
- Children must wear a clean swim diaper before using these facilities. Frequent swim diaper changes are recommended.
- Do not change diapers in the area of the BABY-ONLY WATER FACILITY. A diaper changing station has been provided (exact location) for your convenience.

**Pictograms may replace words as appropriate or available.**

**This information may be included on multiple signs, as long as they are posted at the entrances to the facility.**

### **13.7.9 Swim Diapers**

Swim diapers must be available in a variety of sizes in close proximity to this facility.

## 13.8 Fecal, Vomit, and Blood Accident Response for RWFs

### 13.8.1 Fecal and Vomit Accident Response for RWFs

This annex includes a sample fecal accident plan and sample fecal accident log required data elements. The sample fecal accident plan is based in part on recommendations found on CDC's Healthy Swimming Web site (<http://www.cdc.gov/healthywater/swimming/>).

In the sample plan (13.8.1.1), two tables address chlorine residuals and contact times to be used for DISINFECTION after an accident involving fecal material or vomitus. Each table has chlorine residuals and contact times that reduce the risk for recreational water illness based on the pathogenic organisms that might be present as a result of a fecal or vomit accident.

- The Residual and Contact Time for Loose Stool table has chlorine residuals and contact times to address loose stools. The primary pathogenic organism of concern in loose stool is *Cryptosporidium*. This organism is highly chlorine resistant; to destroy it, a CT VALUE of 15,300 is required. This means that when the chlorine residual in ppm is multiplied by the contact time in minutes, a minimum of 15,300 is required.
  - Concentration (ppm) X Contact Time (minutes)  $\geq$  15,300
- The Residual and Contact Time for Formed Stool or Vomitus table has chlorine residuals and contact times to address accidents involving formed stools or vomitus. The disease-causing organisms of primary concern are *Giardia*, *E. coli* 0157:H7, and *Shigella*. To destroy the more highly chlorine resistant of these organisms (*Giardia*), a CT VALUE of 45 is required. This means that when the chlorine residual in ppm is multiplied by the contact time in minutes, a minimum of 45 is required.
  - Concentration (ppm) X Contact Time (minutes)  $\geq$  45

To determine the appropriate chlorine residual and contact time, operators should observe the nature of the accident. If the fecal accident is loose (diarrhea), then that table should be used for DISINFECTION. If the fecal material is solid or formed or if the accident involves vomitus, then that table should be used for DISINFECTION.

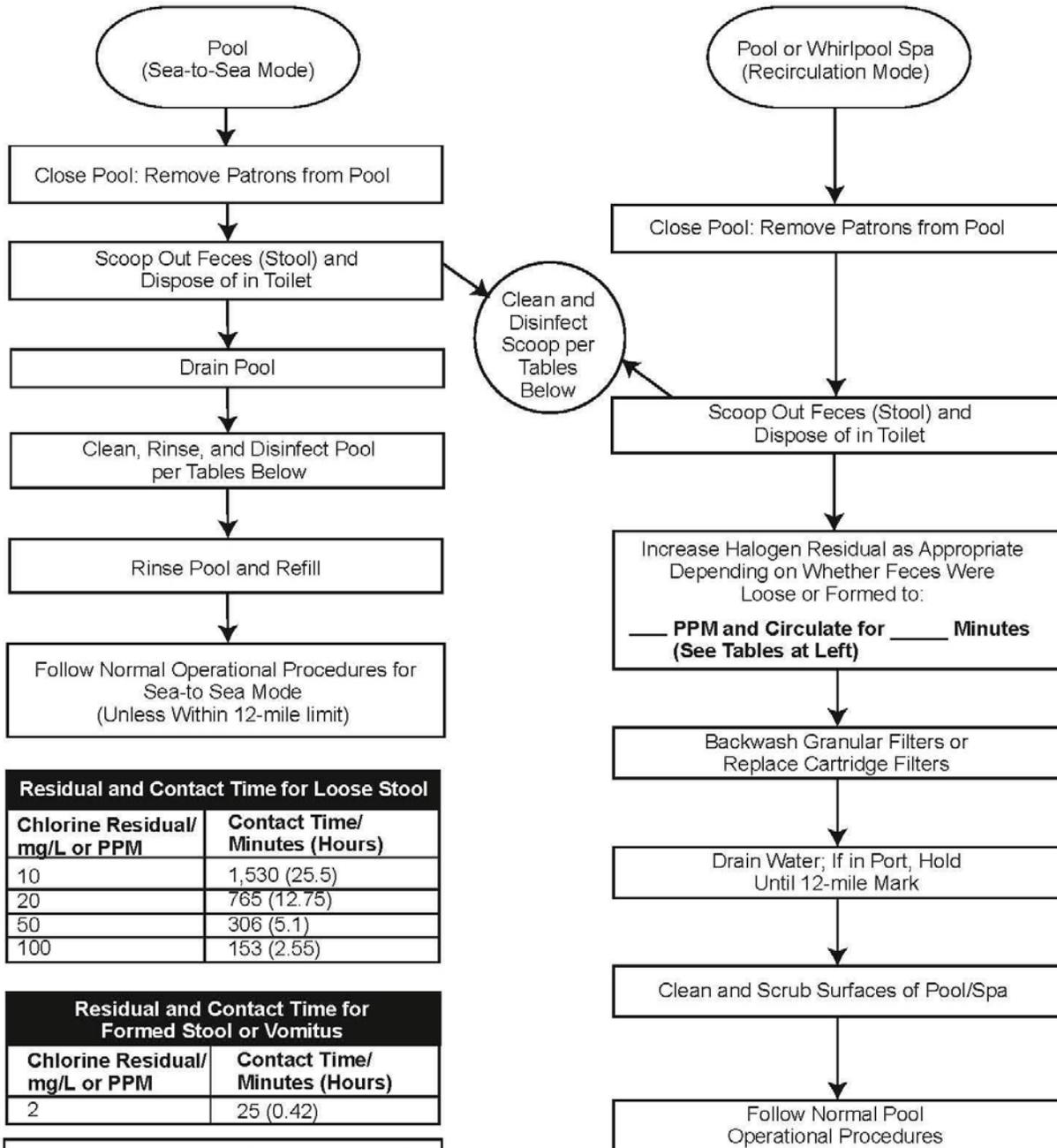
It is important to remember that the DISINFECTION capabilities of chlorine diminish as PH increases. Operators should ensure that PH levels are maintained between 7.2 and 7.5 during this DISINFECTION process.

Record all fecal/vomit accidents in a log with all of the following information:

- Name of RWF.
- Date of event.
- Time of event.
- Number of bathers.
- Formed stool, loose stool, or vomitus.
- Chlorine residual for DISINFECTION.
- Contact time for DISINFECTION.
- PH level for DISINFECTION.
- Chlorine residual for reopening.
- PH for reopening.

### 13.8.1.1 Fecal/Vomit Accident Plan

#### Sample Fecal/Vomit Accident Procedure



| Residual and Contact Time for Loose Stool |                                  |
|---|----------------------------------|
| Chlorine Residual/<br>mg/L or PPM         | Contact Time/<br>Minutes (Hours) |
| 10  | 1,530 (25.5)                     |
| 20  | 765 (12.75)                      |
| 50  | 306 (5.1)                        |
| 100                                       | 153 (2.55)                       |

| Residual and Contact Time for Formed Stool or Vomitus |                                  |
|---|----------------------------------|
| Chlorine Residual/<br>mg/L or PPM                     | Contact Time/<br>Minutes (Hours) |
| 2   | 25 (0.42)                        |

**NOTE:** Maintain pH of 7.0-7.8 during contact time. Take samples from inside pool/spa at three locations to ensure proper mixing.

*Record fecal accidents in a log.*

## 13.8.2 Blood Response Q and A

Excerpt from <http://www.cdc.gov/healthywater/swimming/pools/vomit-blood-contamination.html>.

### 13.8.2.1 Blood in Pool Water

Germ (e.g., Hepatitis B virus or HIV) found in blood are spread when infected blood or certain body fluids get into the body and bloodstream (e.g., by sharing needles and by sexual contact). CDC is not aware of any of these germs being transmitted to swimmers from a blood spill in a pool.

Q: Does chlorine kill the germs in blood?

A: Yes. These germs do not survive long when diluted into properly chlorinated pool water.

Q: Swimmers want something to be done after a blood spill. Should the pool be closed for a short period of time?

A: There is no public health reason to recommend closing the pool after a blood spill. However, some pool staff choose to do so temporarily to satisfy patrons.

## 13.9 Food Cooking Temperature Alternatives

### 13.9.1 Introduction

To be effective in eliminating pathogens, cooking must be adjusted to a number of factors. These include the anticipated level of pathogenic bacteria in the raw product, the initial temperature of the food, and the food's bulk, which affects the time to achieve the needed internal product temperature. Other factors to be considered include postcooking heat rise and the time the food must be held at a specified internal temperature.

To kill microorganisms, food must be held at a sufficient temperature for the specified time. Cooking is a scheduled process in which each of a series of continuous TIME/TEMPERATURE combinations can be equally effective. For example, in cooking a beef roast, the microbial lethality achieved at 112 minutes after it has reached 54°C (130°F) is the same lethality attained as if it were cooked for 4 minutes after it has reached 63°C (145°F).

Cooking requirements are based in part on the biology of pathogens. The thermal destruction of a microorganism is determined by its ability to survive heat. Different species of microorganisms have different susceptibilities to heat. Also, the growing stage of a species (such as the vegetative cell of bacteria, the trophozoite of protozoa, or the larval form of worms) is less resistant than the same organism's survival form (the bacterial spore, protozoan cyst, or worm egg).

Food characteristics also affect the lethality of cooking temperatures. Heat penetrates into different foods at different rates. High fat content in food reduces the effective lethality of heat. High humidity within the cooking vessel and the moisture content of food aids thermal destruction.

Heating a large roast too quickly with a high oven temperature may char or dry the outside, creating a layer of insulation that shields the inside from efficient heat penetration. To kill all pathogens in food, cooking must bring *all* parts of the food up to the required temperatures for the correct length of time.

The TEMPERATURE AND TIME COMBINATION CRITERIA specified in Annex 13.9.2 is based on the destruction of *Salmonellae*. This section includes temperature and time parameters that provide "D" values (decimal log reduction values) that may surpass 7D. For example, at 63°C (145°F), a time span of 15 seconds will provide a 3D reduction of *Salmonella* enteritidis in eggs. This organism, if present in raw shell eggs, is generally found in relatively low numbers.

Other foods, FISH, and MEATS that have not been ground or minced—including commercially raised GAME ANIMAL MEAT specified as acceptable for cooking at this temperature and time parameter—are expected to have a low level of internal CONTAMINATION. The parameters are expected to provide destruction of the surface contaminants on these foods.

### 13.9.2 Temperature-time Alternatives

**Chart 1. Alternative Temperature Times for 68°C (155°F)**

| Minimum Temperature | Time                       |
|---------------------|----------------------------|
| 63°C (145°F)        | 3 minutes                  |
| 66°C (150°F)        | 1 minute                   |
| 70°C (158°F)        | < 1 second (instantaneous) |

**Chart 2. Cooking Exemptions**

| Food   | Provisions  |
|--|---|
| Beef steak: WHOLE-MUSCLE, INTACT                 | Steak is cooked on top and bottom to a surface temperature of 63°C (145°F) or above and color change is achieved on all surfaces.                                     |
| Eggs, FISH, MOLLUSCAN SHELLFISH, and other MEATS | CONSUMER information is provided as specified in section 7.3.6.1.1; or a VARIANCE is granted as specified in section 12.13 of the <i>VSP 2011 Operations Manual</i> . |

Extracted from *Food Code*, Recommendations of the United States Public Health Service, 1999.

## 13.10 Chemicals Used in Washing or to Assist in the Peeling of Fruits and Vegetables

[Excerpted from 21 CFR 173.315]

### TITLE 21--FOOD AND DRUGS

#### CHAPTER I--FOOD AND DRUG ADMINISTRATION, DEPARTMENT OF HEALTH AND HUMAN SERVICES (CONTINUED)

#### PART 173--SECONDARY DIRECT FOOD ADDITIVES PERMITTED IN FOOD FOR HUMAN CONSUMPTION--Table of Contents

##### Subpart D--Specific Usage ADDITIVES

Sec. 173.315 Chemicals used in washing or to assist in the peeling of fruits and vegetables.

Chemicals may be safely used to wash or to assist in the peeling of fruits and vegetables in accordance with the following conditions:

(a) The chemicals consist of one or more of the following:

(1) Substances generally recognized as safe in food or covered by prior sanctions for use in washing fruits and vegetables.

(2) Substances identified in this subparagraph and subject to such limitations as are provided:

##### **Adduct Mixture**

**Substance:** A mixture of alkylene oxide adducts of alkyl alcohols and phosphate esters of alkylene oxide adducts of alkyl alcohols consisting of: [alpha]-alkyl (C<sub>12</sub>-C<sub>18</sub>)-omega-hydroxy-poly (oxyethylene) (7.5-8.5 moles)/poly (oxypropylene) block copolymer having an average molecular weight of 810; [alpha]-alkyl (C<sub>12</sub>-C<sub>18</sub>)-omega-hydroxy- poly (oxyethylene) (3.3-3.7 moles) polymer having an average molecular weight of 380, and subsequently esterified with 1.25 moles phosphoric anhydride; and [alpha]-alkyl (C<sub>10</sub>-C<sub>12</sub>)- omega-hydroxypoly (oxyethylene) (11.9-12.9 moles)/poly (oxypropylene) copolymer, having an average molecular weight of 810, and subsequently esterified with 1.25 moles phosphoric anhydride.

**Limitations:** May be used at a level not to exceed 0.2 percent in lye-peeling solution to assist in the lye peeling of fruit and vegetables.

**Aliphatic Acid Mixture**

Substance: Aliphatic acid mixture consisting of valeric, caproic, enanthic, caprylic, and pelargonic acids.

Limitations: May be used at a level not to exceed 1 percent in lye peeling solution to assist in the lye peeling of fruits and vegetables.

**Polyacrylamide**

Substance: Polyacrylamide

Limitations: Not to exceed 10 parts per million in wash water. Contains not more than 0.2 percent acrylamide monomer. May be used in the washing of fruits and vegetables.

**Potassium Bromide**

Substance: Potassium bromide

Limitations: May be used in the washing or to assist in the lye peeling of fruits and vegetables.

**Sodium n-alkylbenzene-sulfonate**

Substance: Sodium n-alkylbenzene-sulfonate (alkyl group predominantly C<sub>12</sub> and C<sub>13</sub> and not less than 95 percent C<sub>10</sub> to C<sub>16</sub>).

Limitations: Not to exceed 0.2 percent in wash water. May be used in washing or to assist in the lye peeling of fruits and vegetables.

**Sodium Dodecylbenzene-sulfonate**

Substance: Sodium dodecylbenzene-sulfonate (alkyl predominantly C<sub>12</sub> and not less than 95 percent C<sub>10</sub> to C<sub>16</sub>).

Limitations: Not to exceed 0.2 percent in wash water. May be used in washing or to assist in the lye peeling of fruits and vegetables.

**Sodium 2 Ethyl-hexyl Sulfate**

Substance: Sodium 2 ethyl-hexyl sulfate

Limitations: Not to exceed 0.2 percent in wash water. May be used in washing or to assist in the lye peeling of fruits and vegetables.

**Sodium Hypochlorite**

Substance: Sodium hypochlorite

Limitations: May be used in the washing or to assist in the lye peeling of fruits and vegetables.

**Sodium Mono- and Dimethyl Naphthalene Sulfonates**

Substance: Sodium mono- and dimethyl naphthalene sulfonates (mol. wt. 245-260)

Limitations: Not to exceed 0.2 percent in wash water. May be used in the washing or to assist in the lye peeling of fruits and vegetables.

(3) Sodium mono- and dimethyl naphthalene sulfonates (mol. wt. 245-260) may be used in the steam/scald vacuum peeling of tomatoes at a level not to exceed 0.2 percent in the condensate or scald water.

(4) Substances identified in this paragraph (a)(4) for use in flume water for washing sugar beets prior to the slicing operation and subject to the limitations as are provided for the level of the substances in the flume water:

**[alpha]-Alkyl-omega-hydroxypoly-(oxyethylene)**

Substance: [alpha]-Alkyl-omega-hydroxypoly-(oxyethylene) produced by condensation of 1 mole of C<sub>11</sub>-C<sub>48</sub>63<sub>15</sub> straight chain randomly substituted secondary alcohols with an average of 9 moles of ethylene oxide.

Limitations: Not to exceed 3 ppm.

**Linear Undecylbenzenesulfonic Acid**

Substance: Linear undecylbenzenesulfonic acid

Limitations: Not to exceed 3 ppm.

**Dialkanolamide**

Substance: Dialkanolamide produced by condensing 1 mole of methyl laurate with 1.05 moles of diethanolamine.

Limitations: Not to exceed 2 ppm.

**Triethanolamine**

Substance: Triethanolamine

Limitations: Not to exceed 2 ppm.

**Ethylene Glycol Monobutyl Ether**

Substance: Ethylene glycol monobutyl ether

Limitations: Not to exceed 1 ppm.

**Oleic Acid**

Substance: Oleic acid conforming with Sec. 172.860 of this chapter.

Limitations: Not to exceed 1 ppm.

**Tetrapotassium Pyrophosphate**

Substance: Tetrapotassium pyrophosphate

Limitations: Not to exceed 0.3 ppm.

**Monoethanolamine**

Substance: Monoethanolamine

Limitations: Not to exceed 0.3 ppm.

**Ethylene Dichloride**

Substance: Ethylene dichloride

Limitations: Not to exceed 0.2 ppm.

**Tetrasodium ethylenediaminetetraacetate**

Substance: Tetrasodium ethylenediaminetetraacetate

Limitations: Not to exceed 0.1 ppm.

(5) Substances identified in this paragraph (a)(5) for use on fruits and vegetables that are not raw agricultural commodities and subject to the limitations provided:

**Hydrogen Peroxide**

Substance: Hydrogen peroxide

Limitations: Used in combination with acetic acid to form peroxyacetic acid. Not to exceed 59 ppm in wash water.

**1-Hydroxyethylidene-1,1-diphosphonic Acid**

Substance: 1-Hydroxyethylidene-1,1-diphosphonic acid

Limitations: May be used only with peroxyacetic acid. Not to exceed 4.8 ppm in wash water.

**Peroxyacetic Acid**

Substance: Peroxyacetic acid

Limitations: Prepared by reacting acetic acid with hydrogen peroxide. Not to exceed 80 ppm in wash water.

(b) The chemicals are used in amounts not in excess of the minimum required to accomplish their intended effect.

(c) The use of the chemicals listed under paragraphs (a)(1), (a)(2), and (a)(4) is followed by rinsing with POTABLE WATER to remove, to the extent possible, residues of the chemicals.

(d) To assure safe use of the ADDITIVE:

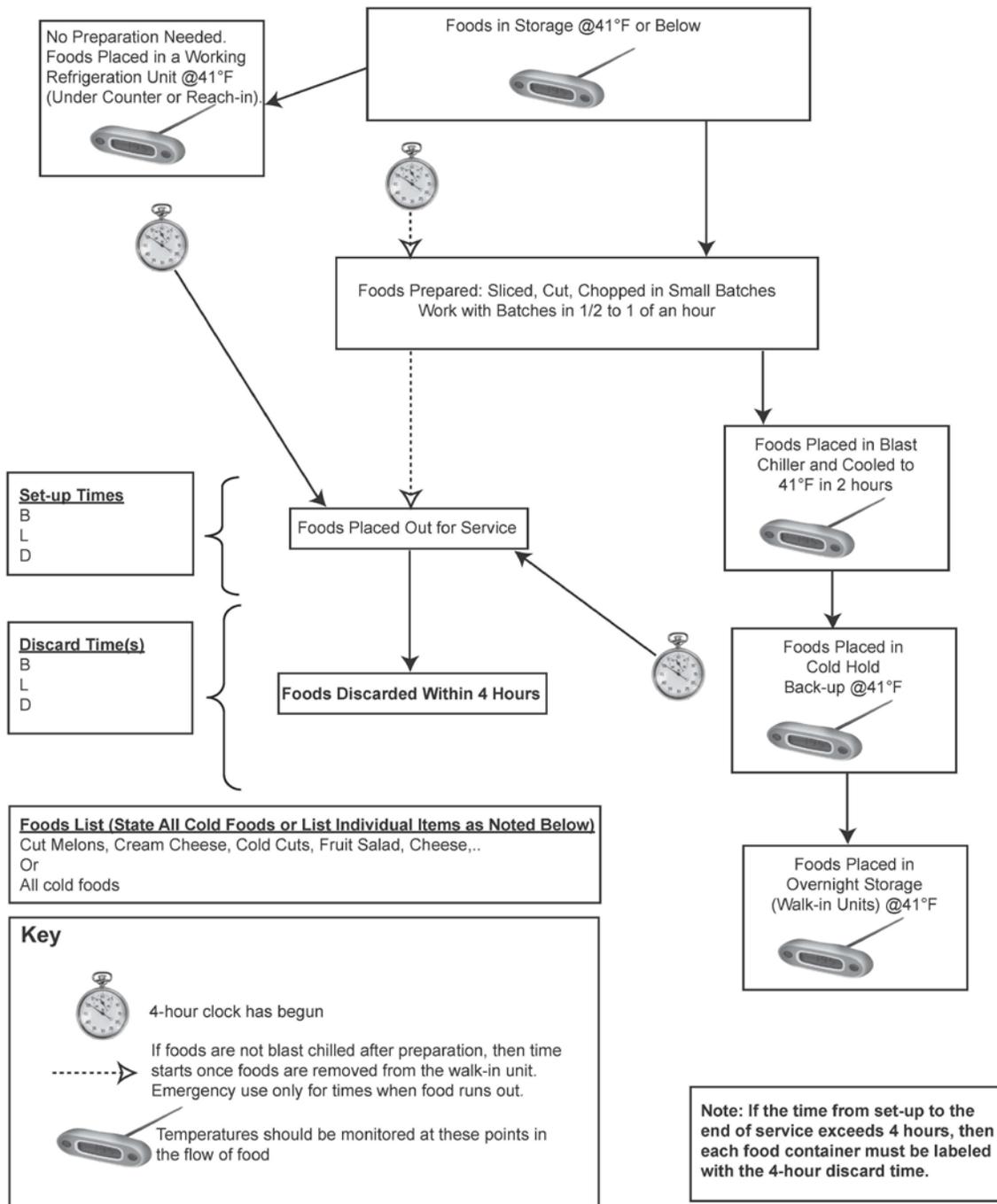
(1) The label and labeling of the ADDITIVE container shall bear, in addition to the other information required by the act, the name of the ADDITIVE or a statement of its composition.

(2) The label or labeling of the ADDITIVE container shall bear ADEQUATE use directions to assure use in compliance with all provisions of this section.

## 13.11 Time-control Plan Examples

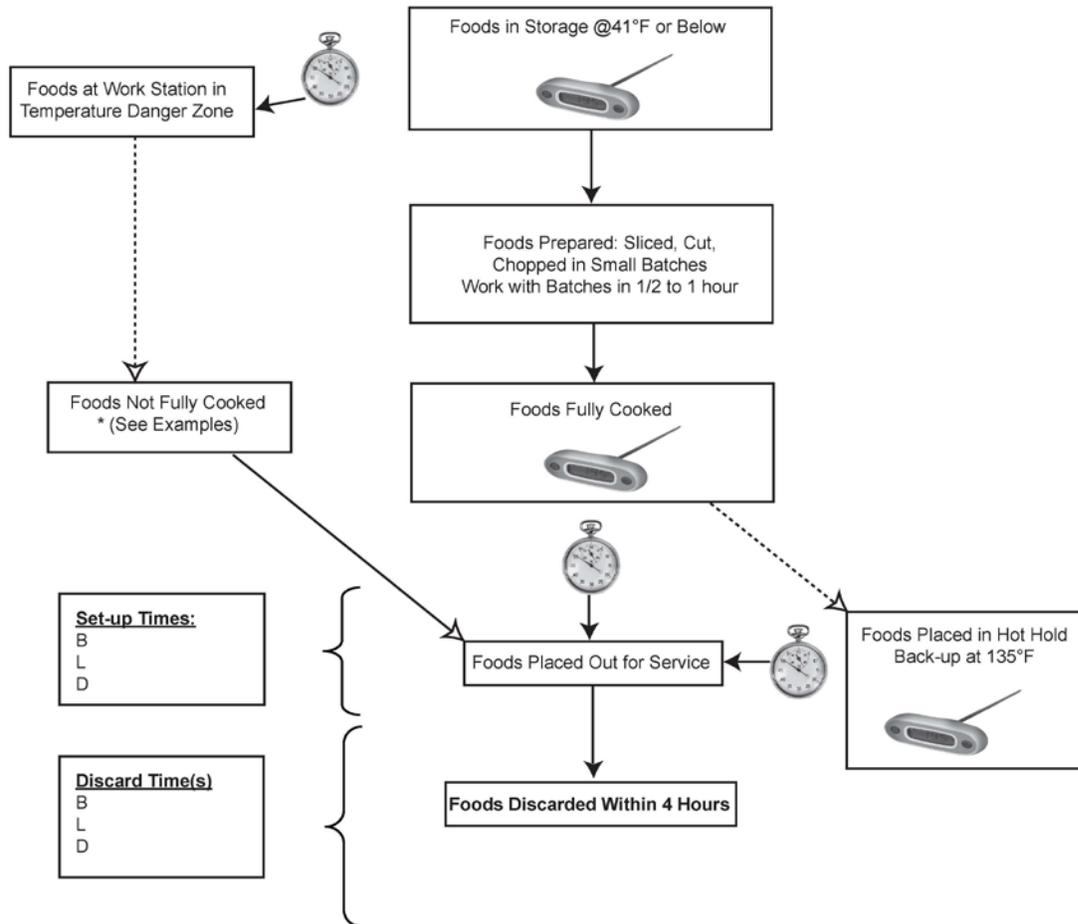
### 13.11.1 Sample Plan for Cold Foods

#### Time as a Control (Sample Plan for Cold Foods)



## 13.11.2 Sample Plan for Hot Foods

### Time as a Control (Sample Plan for Hot Foods)



**Foods List (State All Hot Foods or List Individual Items as Noted Below)**  
 Sausage, \*Hollandaise Sauce, \*Poached Eggs, Fried Chicken,  
 \*Sunny-side-up Eggs, Mashed Potatoes,...  
 Or  
 All Hot Potentially Hazardous Foods.

**Key**

 4-hour clock has begun

 If foods are not fully cooked (e.g., Hollandaise sauce, poached eggs, sunny-side-up eggs) when they are placed out for service, then time starts as soon as the foods are at the work station in the temperature danger zone

 Temperatures should be monitored at these points in the flow of food

**Note:** If the time from set-up to the end of service exceeds 4 hours, then each food container must be labeled with the 4-hour discard time.

## 13.12 List of Some Hard and Semisoft Cheeses Exempt from Datemarking

The cheeses listed below are exempted from 7-day datemarking:

|                          |                            |
|--------------------------|----------------------------|
| Abertam                  | Limburger                  |
| Appenzeller              | Lorraine                   |
| Asadero                  | Manchego                   |
| Asiago medium or old     | Milano                     |
| Asiago soft              | Monterey                   |
| Battelmatt               | Muenster                   |
| Bellelay (blue veined)   | Oaxaca                     |
| Blue                     | Oka                        |
| Bra                      | Parmesan                   |
| Brick                    | Pecorino                   |
| Camosum                  | Port du Salut              |
| Chantelle                | Provolone                  |
| Cheddar                  | Queso Anejo                |
| Christalinna             | Queso Chihuahua            |
| Colby                    | Queso de Bola              |
| Coon                     | Queso de la Tierra         |
| Cotija                   | Queso de Prensa            |
| Cotija Anejo             | Reggiano                   |
| Derby                    | Robbiole                   |
| Edam                     | Romanello                  |
| Emmentaler               | Romano                     |
| English Dairy            | Roquefort (blue veined)    |
| Fontina                  | Samsøe                     |
| Gex (blue veined)        | Sapsago                    |
| Gjetost                  | Sassenage (blue veined)    |
| Gloucester               | Stilton (blue veined)      |
| Gorgonzola (blue veined) | Swiss                      |
| Gouda                    | Tignard (blue veined)      |
| Gruyere                  | Tilsiter                   |
| Havarti                  | Trappist                   |
| Herve                    | Vize                       |
| Konigskase               | Wenssleydale (blue veined) |
| Lapland                  |                            |

## 13.13 Consumer Advisory Examples

### 13.13.1 Menu Example

\*Hamburgers  
Chicken  
Potato Salad  
\*Seared Tuna  
French Fries  
House Salad  
\*These foods can be cooked to order.

Public Health Advisory: Consuming raw or undercooked MEATS, POULTRY, seafood, shellfish, or eggs may increase your risk for foodborne illness, especially if you have certain medical conditions.

### 13.13.2 Point-of-service Examples

#### 13.13.2.1 *At an Omelet Station*

Eggs can be cooked to order.

Public Health Advisory: Consuming raw or undercooked eggs may increase your risk for foodborne illness, especially if you have certain medical conditions.

#### 13.13.2.2 *At a Hamburger Grill*

Hamburgers and cheeseburgers can be cooked to order.

Public Health Advisory: Consuming raw or undercooked MEATS may increase your risk for foodborne illness, especially if you have certain medical conditions.

## 13.14 Warewashing Evaluation

### 13.14.1 Introduction

#### 13.14.1.1 Methodology Source

The following WAREWASHING machine evaluation procedure was compiled from the NSF International (NSF) brochure *Food Service: Recommended Field Evaluation Procedures for Spray-type Dishwashing Machines* (1991), and *Food Code* (1999). ANSI/NSF 3-1996, *Commercial Spray-type Dishwashing and Glasswashing Machines*, and the *VSP 2011 Operations Manual* should be consulted for recommended construction and operational parameters.

#### 13.14.1.2 Recommended Evaluation Equipment

The following EQUIPMENT to conduct WAREWASHING evaluations is recommended:

- Thermocouple or thermistor TEMPERATURE-MEASURING DEVICE for warewasher operational temperatures.
- Maximum registering TEMPERATURE-MEASURING DEVICE or temperature-sensitive tapes for verifying hot water warewasher final rinse temperature, 73°C (160°).
- Optional: Calibrated melting temperature wax crayons with melt points set at 82°C (180°F) and another at 91°C (195°F).
- Pressure gauge, as applicable, for determining in-line pressure of hot water at injection point of warewasher in the 100-170 kilopascals (15-25 pounds per square inch) range.
- Chemical test kits for different chemical SANITIZER types used on the vessel.
- Flashlight.
- Tape measure.
- Watch or stopwatch.

##### 13.14.1.2.1 Calibration

Calibrate TEMPERATURE-MEASURING DEVICES and pressure gauges against standards to ensure reliable warewasher evaluations. Maintain chemical test kits and temperature sensitive tapes as specified by their manufacturers to ensure accuracy.

##### 13.14.1.2.2 Mercury Spills

Use mercury-filled maximum registering TEMPERATURE-MEASURING DEVICES carefully during the evaluations; these devices are subject to breakage. If they break, clean up thoroughly before WAREWASHING operations resume.

## **13.14.2 Machines Data Plates**

### **13.14.2.1 Data Plate Required**

Review the required manufacturer's data plate for correct operating parameters. If the data plate indicates a flow pressure, the machine must have a gauge or a gauge valve to measure it. If the data plate does not state a flow pressure, the machine is not required to have a gauge or a gauge valve.

### **13.14.2.2 Temperature Requirements**

Temperatures stated on the warewash machine data plate are considered minimums unless a specified range is given.

### **13.14.2.3 Conform to ANSI/NSF 3-1996**

The warewash machine temperatures must conform to those specified in these guidelines for the specific type of machine. For those manufactured to different temperature standards, evidence must be furnished that they at least conform to the minimum equivalent standards of ANSI/NSF 3-2008, *Commercial Spray-type Dishwashing and Glasswashing Machines*.

## **13.14.3 Evaluation Procedures**

### **13.14.3.1 Operational Evaluation**

The VSP EHO will evaluate the WAREWASHING as follows:

- Dishes properly prescraped and racked.
- Machine prewash scrap trays clear of excessive soil and debris.
- Curtains and baffles on conveyor type machines intact and in their proper position.
- Conveyor speed and cycle times set according to manufacturer's specifications.
- Overflow standpipe installed and not blocked or leaking.
- Wash and rinse nozzles properly aligned and providing a uniform spray pattern.
- Wash and rinse nozzles clear of obstructions.
- Wash and rinse manifolds in good repair, properly installed in the machine, and end caps installed.
- Heating elements used in tanks free of mineral or other deposits.
- Rinse supply line strainer clear of debris.
- Wash and rinse tanks and final rinse manifold TEMPERATURE-MEASURING DEVICES accurate to  $\pm 1.5$  °C ( $\pm 3$  °F).
- Pressure regulator functioning properly.
- Flow pressure within the range specified on the data plate and between 34.5-207 kilopascals (5-30 pounds per square inch).

### 13.14.3.2 Temperature Evaluation

#### 13.14.3.2.1 *Manufacturer's Instructions*

Install and operate the machine in accordance to the manufacturer's instructions.

#### 13.14.3.2.2 *Warm-up*

Run the machine through at least two complete cycles before testing unless it has been operating just before the evaluation. On conveyor machines, run at least two racks through the machine.

#### 13.14.3.2.3 *Additional Warm-up*

When minimum temperatures are not indicated on machine-mounted TEMPERATURE-MEASURING DEVICES, additional pre-evaluation cycles may be run to determine if higher temperatures are possible.

#### 13.14.3.2.4 *Tank Thermometer Calibration*

Take temperatures of the wash water and pumped rinse directly from the tanks of the machines and compare them against the machine-mounted TEMPERATURE-MEASURING DEVICES. If possible, place the evaluation TEMPERATURE-MEASURING DEVICE probe in the tank near the machine-mounted TEMPERATURE-MEASURING DEVICE probe.

#### 13.14.3.2.5 *Sanitizing Rinse TMDs*

Use a maximum registering TEMPERATURE-MEASURING DEVICE, remote sensing thermocouple, or nonreversible thermolabels such as paper TEMPERATURE-MEASURING DEVICES that turn from silver to black or similar device to confirm the effectiveness of heat SANITIZATION.

#### 13.14.3.2.6 *Rinse Exposure*

Attach the maximum registering TEMPERATURE-MEASURING DEVICE in a vertical position in a rack that is exposed to the final sanitizing rinse spray at the approximate level of a plate. Attach nonreversible thermolabels to the center of a dry ceramic plate.

#### 13.14.3.2.7 *High Wash/Rinse Temperature Factor*

Factor the effect of the temperatures of the wash water and pumped rinse into the evaluation if tank thermometers indicate they are above 71°C (160°F). If the wash and or rinse tank temperatures are greater than or equal to 71°C (160°F), verify the final sanitizing rinse temperature using one of the methods in the Indirect Methods section below or another ISOLATION method where a rapid response TEMPERATURE-MEASURING DEVICE is held

at plate level in the final sanitizing rinse spray for at least 8 seconds. The maximum-registering TEMPERATURE-MEASURING DEVICE may also be checked at the end of each part of the cycle to verify that the wash and rinse temperatures have not been in excess of 71°C (160°F).

#### **13.14.3.2.8 Effective Sanitation**

Evaluate effective SANITIZATION by noting that in a mechanical operation, the temperature of the fresh hot water sanitizing rinse as it enters the manifold must not be more than 90°C (194°F) or less than

- 74°C (165°F) for a stationary rack, single-temperature machine.
- 82°C (180°F) for all other machines.
- 71°C (160°F) at the UTENSIL surface, as measured by an irreversible registering temperature indicator.

#### **13.14.3.2.9 Indirect Methods**

The final rinse spray temperature may be indirectly evaluated by using a nonreversible thermolabel attached to the manifold or final rinse spray arm near hub or by using calibrated melting temperature wax crayons. Make a mark on a dry portion of the final sanitizing rinse manifold or supply line with a crayon that melts at 82°C (180°F) and another that melts at 91°C (195°F).

Another acceptable test to establish the final sanitizing rinse temperature (manifold) is to dry the final sanitizing rinse spray arm as near to the manifold entry into the machine as possible and affix a 82°C (180°F) thermolabel. The thermolabel should be left in place through one full warewash cycle. There may be slight temperature decreases at positions distant from the manifold entry into the machine.

A third method is to attach a maximum registering thermometer to the end of a rod and hold the thermometer in the final rinse spray at plate level for 8 seconds.

Following the any of the three of the indirect method tests above, make an assessment of the spray pattern from the final rinse spray arm to ensure that the spray pattern is effective.

For a stationary rack machine, the final rinse temperature can be evaluated by running the machine with a maximum registering thermometer at plate level. Stop the machine at the end of the wash cycle to check the temperature, and again at the end of the final rinse cycle.

### **13.14.3.3 Chemical Sanitizing Evaluation**

Obtain sample at the end of the final chemical sanitizing rinse cycle and use a SANITIZER test kit to confirm SANITIZER level is at minimum specified on machine data plate and in these guidelines.

## **13.14.4 Routine Monitoring**

### **13.14.4.1 Periodic Detailed Evaluations**

Proper WAREWASHING is critical to protecting the health of a vessel's passengers. The procedures provided in this annex may assist the vessel crew in periodically verifying the proper operation of its WAREWASHING machines. Following the manufacturer's recommendations for maintenance and operation will ensure the WAREWASHING machines continue to meet the criteria of these guidelines and standards of ANSI/NSF 3-1996, *Commercial Spray-type Dishwashing and Glasswashing Machines*.

### **13.14.4.2 Start-up Evaluations**

During each WAREWASHING machine's startup, the proper setup and operation of the EQUIPMENT should be verified with basic checks. These would include checks of the tank, manifold, and curtain assemblies to ensure they are properly installed. Proper operating temperatures should be verified to meet the minimum required temperatures during the start-up.

### **13.14.4.3 Routine Operation Evaluations**

Periodic operation and temperature checks by the WAREWASHING crew during the WAREWASHING time should detect problems soon after they occur. The person removing the clean and sanitized ware must examine each piece to determine if it is clean. Periodic management checks of the WAREWASHING process during operation verify that the machines are operating properly and the UTENSILS processed are indeed clean and sanitized.

### **13.14.4.4 Simple Records**

Simple records can assist in the warewash machine monitoring process. A review of these records can ensure proper monitoring is being conducted and assist in determining a gradual or severe malfunction of the machine.

## **13.15 Inspection Report**

### **13.15.1 Report Form**

A copy of the VSP Inspection Report form follows on the next page.

During the implementation of the *VSP 2011 Operations Manual*, an electronic version of this form will also be used. Copies of the electronic version will be returned to the cruise line by e-mail.



**VESSEL SANITATION INSPECTION REPORT**

|             |          |                 |                 |              |                      |        |
|-------------|----------|-----------------|-----------------|--------------|----------------------|--------|
| Vessel Name |          | Inspection Date |                 | Port         | Results Presented to | Score: |
| Cruise Line | No. Pax. | No. Crew        | Inspection Type | Inspected by |                      |        |
|             |          |                 |                 |              |                      |        |

Item No. / Point Value / Description **Bold** = Critical Item

**DISEASE REPORTING**

|    |   |                          |
|----|---|--------------------------|
| 01 | 4 | <b>Disease reporting</b> |
| 02 | 1 | Medical logs maintenance |

**POTABLE WATER**

|    |   |  |
|----|---|--|
| 03 | 5 | <b>Bunker / production source; Halogen residual</b>  |
| 04 | 5 | <b>Distribution system halogen residual</b>  |
| 05 | 2 | Distribution system halogen analyzer calibrated  |
| 06 | 2 | Halogen analyzer chart recorder maintenance, operation, records; Micro sampling, records               |
| 07 | 3 | <b>System protection cross-connections, backflow; Disinfection</b>                                     |
| 08 | 1 | Filling hoses, caps, connections, procedures; Sample records, valves; System construction, maintenance |

**RECREATIONAL WATER FACILITIES**

|    |   |                                   |
|----|---|-----------------------------------|
| 09 | 3 | <b>RWF halogen residuals</b>      |
| 10 | 2 | RWF maintenance, safety equipment |

**FOOD SAFETY**

**PERSONNEL**

|    |   |  |
|----|---|--|
| 11 | 5 | <b>Food handlers infections, communicable diseases</b> |
| 12 | 4 | <b>Hands washed; Hygienic practices</b>                |
| 13 | 3 | <b>Management, knowledge, monitoring</b>               |
| 14 | 1 | Outer clothing clean; Jewelry, hair, hand sanitizers   |

**FOOD**

|    |   |  |
|----|---|--|
| 15 | 5 | <b>Food source, sound condition; Food reservice</b>  |
| 16 | 5 | <b>Potentially hazardous food temperatures</b>   |
| 17 | 2 | Temperature practices; Thawing   |
| 18 | 3 | <b>Cross-contamination</b>   |
| 19 | 2 | Food protection; Original containers; labeling; In-use food dispensing, preparation utensils |

**MEDICAL LOG REVIEW**

Cruise - Start / End / Port / PAX / ILL / CREW / ILL

- 
- 
- 
- 
- 

CCS-19-1-1208

Item No. / Point Value / Description **Bold** = Critical Item

**EQUIPMENT**

|    |   |  |
|----|---|--|
| 20 | 2 | PHF temperature maintenance facilities; Food-contact surfaces; Food TMDs                       |
| 21 | 1 | Nonfood-contact surfaces; Ambient TMDs   |
| 22 | 2 | Warewashing facilities; TMDs; Test kits  |
| 23 | 2 | Prewash; Wash and rinse solutions  |
| 24 | 3 | <b>Sanitizing rinse</b>  |
| 25 | 1 | Wiping cloths / chef's towels  |
| 26 | 3 | <b>Food-contact surfaces equipment / utensils clean; Safe materials</b>                        |
| 27 | 1 | Nonfood-contact surfaces equipment / utensils clean  |
| 28 | 2 | Equipment / utensil / linen / single / service storage handling dispensing; Cleaning frequency |

**TOILET AND HANDWASHING FACILITIES**

|    |   |   |
|----|---|---|
| 29 | 3 | <b>Facilities convenient, accessible, design, installation</b>                    |
| 30 | 1 | Hand cleanser, sanitary towels, waste receptacles; Handwashing signs; Maintenance |

**TOXIC SUBSTANCES**

|    |   |                    |
|----|---|--------------------|
| 31 | 3 | <b>Toxic Items</b> |
|----|---|--------------------|

**FACILITIES**

|    |   |  |
|----|---|--|
| 32 | 1 | Solid waste containers   |
| 33 | 1 | Decks / bulkheads / deckheads                                    |
| 34 | 1 | Plumbing fixtures / supply lines / drain lines / drains          |
| 35 | 2 | Liquid waste disposal  |
| 36 | 1 | Lighting   |
| 37 | 1 | Rooms / equipment venting  |
| 38 | 1 | Unnecessary articles, cleaning equipment; Unauthorized personnel |

**ENVIRONMENTAL HEALTH**

|    |   |  |
|----|---|--|
| 39 | 3 | <b>IPM program effective; Approved pesticide application</b> |
| 40 | 1 | IPM procedures; Outer openings protection                    |
| 41 | 2 | Housekeeping   |
| 42 | 1 | Child activity centers                                       |
| 43 | 1 | Ventilation  |

**KNOWLEDGE**

|    |   |                             |
|----|---|-----------------------------|
| 44 | 2 | Person in charge, Knowledge |
|----|---|-----------------------------|

## **13.16 Corrective-action Statement**

### **13.16.1 Introduction**

#### **13.16.1.1 Purpose**

VSP has established a procedure for postinspection reporting of corrective actions to encourage the correction of deficiencies noted during an inspection. A signed corrective action statement will not affect the inspection score.

#### **13.16.1.2 Critical Item Monitoring**

The corrective-action statement, particularly for CRITICAL ITEMS, should include a management monitoring plan to ensure that the procedure or process that was out of control will be monitored and controlled in the future. The public health goal of the inspection is to prevent the recurrence of the critical deficiency in the specific instance where it was found and generally in future similar operations aboard the vessel.

#### **13.16.1.3 Publicly Available**

The corrective-action statement will be appended to the final inspection report for future reference and public distribution via the VSP Web site.

#### **13.16.1.4 E-mail Submission**

The corrective action statement may be submitted to VSP by electronic mail. Please send it to [vsp@cdc.gov](mailto:vsp@cdc.gov) and include the vessel name, corrective-action statement, and inspection date on the message subject line. It is preferable that the corrective-action statement be submitted as an attached word processing format file.

#### **13.16.1.5 Mail Submission**

The corrective-action statement may also be mailed to the following:

CDC/Vessel Sanitation Program  
1850 Eller Drive, Suite 101  
Ft. Lauderdale, FL 33316  
USA

**13.16.2 Format**

**Example Statement**

Date  
CDC/Vessel Sanitation Program  
1850 Eller Drive, Suite 101  
Ft. Lauderdale, FL 33316  
USA

Dear Sir:

The following actions have been taken to correct each of the deficiencies noted during the inspection of (Name of Vessel) on (Date) at (Port).

| Item Number | Deficiency/Corrective Action |
|-------------|------------------------------|
| 1.          |                              |
| 2.          |                              |
| 3.          |                              |

(Continue list until all violations have been listed.)

Sincerely,

(Signature)

Name  
Title  
Company

## 13.17 Summary of Sanitation Inspections of International Cruise Ships

### 13.17.1 Introduction

Every vessel that has a foreign itinerary and that carries 13 or more passengers is subject to twice-yearly inspections and, when necessary, to reinspection by the Centers for Disease Control and Prevention's VSP. To ensure a clean and healthful environment, cruise ships must meet the criteria established by VSP.

The score and the complete inspection report for each inspection are published on the VSP Web site (<http://www.cdc.gov/nceh/vsp>).

The ship's level of sanitation is acceptable to VSP if its score on the inspection is 86 or higher.

### 13.17.2 Online Information

The VSP Web site has a searchable database of inspection report summaries and lists. The complete inspection report information is also retrievable.

Lists available on the VSP Web site include the following:

- Advanced Cruise Ship Inspection Search.
- Green Sheet Report.
- Cruise Ship Inspection Score 100.
- VARIANCES by Section.

These lists show the data by

- Ship name.
- Cruise line.
- Inspection date.
- Score (all scores, scores of 86 or higher [satisfactory scores], and scores of 85 or lower [unsatisfactory scores]).

Further information can be obtained on a particular ship, including all scores for that ship and an inspection report preview.

The VSP Web site also provides the Inspection Detail Report for each ship inspection. This report provides a categorical review of the deficiencies noted along with the number of points deducted for that category and the numerical score for the inspection of a particular ship. Details of the inspection with the specific deficiencies and recommendations are also available from this page.

Inspection report data are also searchable from the VSP database for the following search categories:

- Ship name.
- Cruise line.
- Inspection date.
- Most recent date.
- All dates.
- Range of dates.
- Score (all scores, scores of 86 or higher [satisfactory scores], and scores of 85 or lower [unsatisfactory scores]).

### **13.17.3 Contact Information**

Further information on VSP, inspection results, and vessels' corrective action statements may be obtained on the VSP Web site (<http://www.cdc.gov/nceh/vsp>), through e-mail at ([vsp@cdc.gov](mailto:vsp@cdc.gov)), by telephone (800-323-2132), and by fax (770-488-4127).

## 14.0 Bibliography

This section includes the following subsections:

- 14.1 Introduction
- 14.2 Authority
- 14.3 Definitions
- 14.4 ACUTE GASTROENTERITIS Surveillance
- 14.5 POTABLE WATER
- 14.6 RECREATIONAL WATER FACILITIES
- 14.7 Food Safety
- 14.8 INTEGRATED PEST MANAGEMENT
- 14.9 Housekeeping
- 14.10 Child Activity Centers
- 14.11 Administrative Guidelines

### 14.1 Introduction

Centers for Disease Control and Prevention, NCEH. 1999. Vessel Sanitation Program: Charting a Healthier Course.

Centers for Disease Control and Prevention, NCEH. 1999. <http://www.cdc.gov/nceh/vsp>.

Centers for Disease Control and Prevention, NCEH. 1989. Vessel Sanitation Program Operations Manual.

### 14.2 Authority

Code of Federal Regulations 42 CFR 71.31. Health Measures at U.S. Ports: Communicable Diseases. General provisions.

Code of Federal Regulations 42 CFR 71.32. Health Measures at U.S. Ports: Communicable Diseases. Persons, carriers, and things.

Code of Federal Regulations 42 CFR Section 71.41. General Provisions. Foreign Quarantine - Requirements Upon Arrival at U.S. Ports: Sanitary Inspection.

The Public Health Service Act, 42 U.S.C. Section 264. Quarantine and Inspection—Regulations to control communicable diseases.

The Public Health Service Act, 42 U.S.C. Section 269. Quarantine and Inspection—Bills of health.

### 14.3 Definitions

Food and Drug Administration. 1999. Food Code, Recommendations of the United States Public Health Service.

### 14.4 Acute Gastroenteritis Surveillance

Addiss DG, Yashuk JC, Clapp DE, Blake PA. 1989. Outbreaks of diarrhoeal illness on passenger cruise ships, 1975–85. *Epidemiol Infect.* 103(1):63–72.

Centers for Disease Control and Prevention. 1990. Recommendations for collection of laboratory specimens associated with outbreaks of gastroenteritis. *MMWR.* 39RR-14.

- Centers for Disease Control and Prevention, NCEH. 1999. Disease Surveillance and Outbreak Investigation. <http://www.cdc.gov/nceh/programs/sanit/vsp/surv/surv.htm>
- Dalton C, Mintz ED, Wells JG, Bopp CA, Tauxe RV. 1999. Outbreaks of enterotoxigenic *Escherichia coli* infection in American adults: a clinical and epidemiologic profile. *Epidemiol Infect.* 123:9–16.
- Daniels NA, Neimann J, Karpati A, Parashar UD, Greene KD, Wells JG, et al. 2000. Traveler's diarrhea at sea: three outbreaks of waterborne enterotoxigenic *Escherichia coli* on cruise ships. *J Infect Dis.* 181:1491–5.
- Dannenberg AL, Yashuk JC, Feldman RA. 1982. Gastrointestinal illness on passenger cruise ships, 1975–1978. *Am J Publ Health.* 72:484–8.
- Davies JW, Cox KG, Simon WR, Bowmer EJ, Mallory A. 1972. Typhoid at sea: epidemic aboard an ocean liner. *Can Med Assoc J.* 106:877–83.
- Freedom of Information Act. 5 U.S.C. Section 552. Administrative Procedure—Public information; agency rules, opinions, orders, records, and proceedings.
- Freedom of Information Act. 5 U.S.C. Section 552a. Privacy Act—Records maintained on individuals.
- Gunn RA, Terranova WA, Greenberg HB, Yashuk J, Gary GW, Wells JG, et al. 1980. Norwalk virus gastroenteritis aboard a cruise ship: an outbreak of five consecutive cruises. *Am J Epidemiol.* 1122:820–7.
- Herwaldt BL, Lew JF, Moe CL, Lewis DC, Humphrey CD, Monroe SS, et al. 1994. Characterization of a variant strain of Norwalk virus from a food-borne outbreak of gastroenteritis on a cruise ship in Hawaii. *J Clin Microbiol.* 4:861–6.
- Ho MS, Glass RI, Monroe SS, Madore HP, Stine S, Pinsky PF, et al. 1989. Viral gastroenteritis aboard a cruise ship. *Lancet.* 2(8669):961–5.
- IAMFES. 1996. Procedures to Investigate Waterborne Illness, 2nd Edition. Des Moines, IA.
- IAMFES. 1999. Procedures to Investigate Foodborne Illness, 5th Edition. Des Moines, IA.
- Khan AS, Moe CL, Glass RI, Monroe SS, Estes MK, Chapman LK, et al. 1994. Norwalk virus-associated gastroenteritis traced to ice consumption aboard a cruise ship in Hawaii: comparison and application of molecular method-based assays. *J Clin Microbiol.* 2:318–22.
- Koo D, Maloney K, Tauxe R. 1996. Epidemiology of diarrheal disease outbreaks on cruise ships, 1986 through 1993. *JAMA.* 7:545–7.
- Lew JF, Swerdlow DL, Dance ME, Griffin PM, Bopp CA, Gillenwater MJ, et al. 1991. An outbreak of shigellosis aboard a cruise ship caused by a multiple-antibiotic-resistant strain of *Shigella flexneri*. *Am J Epidemiol.* 134(4):413–20.
- Merson MH, Hughes JM, Lawrence DN, Wells JG, D'Agnes JJ, Yashuk JC. 1976. Food- and waterborne disease outbreaks on passenger cruise vessels and aircraft. *J Milk Food Technol.* 39:285–8.
- Merson MH, Hughes JM, Wood BT, Yashuk JC, Wells JG. 1987. Gastrointestinal illness on passenger cruise ships. *JAMA.* 231:723–7.

Merson MH, Tenney JH, Meyers JD, Wood BT, Wells JG, Rymzo W, et al., 1975. Shigellosis at sea: an outbreak aboard a passenger cruise ship. *Am J Epidemiol.* 101:165–75.

Nguyen CH, Qualls NL, O'Toole TE, 1989. A cost-effectiveness analysis of the Vessel Sanitation Program. Centers for Disease Control and Prevention, U.S. Public Health Service; Atlanta, GA.

Sawyer LA, Murphy JJ, Kaplan JE, Pinsky PF, Chacon D, Walmsley S, et al. 1988. 25- to 30-nm virus particle associated with a hospital outbreak of acute gastroenteritis with evidence for airborne transmission. *Am J Epidemiol.* 127:1261–71.

## 14.5 Potable Water

American Public Health Association. 2005. Standard methods for the examination of water and wastewater. 21st ed. Washington, DC.

American Society of Sanitary Engineering. 1980. ASSE #1032—1980, Dual check valve type backflow preventers. Westlake, OH.

American Society of Sanitary Engineering. 1990. ANSI/ASSE #1004—1990, Commercial dishwashing machines. Westlake, OH.

American Society of Sanitary Engineering. 1990. ASSE #1014—1990, Hand-held showers. Westlake, OH.

American Society of Sanitary Engineering. 1993. ASSE #1013—1993, Reduced pressure principle backflow preventers. Westlake, OH.

American Society of Sanitary Engineering. 1993. ASSE #1015—1993, Double check backflow prevention assembly. Westlake, OH.

American Society of Sanitary Engineering. 1994. ANSI/ASSE #1052—1994, Hose connection backflow preventers. Westlake, OH.

American Society of Sanitary Engineering. 1995. ANSI/ASSE #1009—1990, Commercial food waste grinder units. Westlake, OH.

American Society of Sanitary Engineering. 1995. ANSI/ASSE #1047—1995, Reduced pressure detector backflow preventer. Westlake, OH.

American Society of Sanitary Engineering. 1995. ANSI/ASSE #1048—1995, Double check detector assembly backflow preventer. Westlake, OH.

American Society of Sanitary Engineering. 1995. ANSI/ASSE #1056—1995, Back siphonage vacuum breakers. Westlake, OH.

American Society of Sanitary Engineering. 1997. ASSE#1055—1997, Chemical dispensing systems. Westlake, OH.

American Society of Sanitary Engineering. 1998. ANSI/ASSE #1024—1998, Dual check valve type backflow preventers, Westlake, OH.

American Society of Sanitary Engineering. 1998. ASSE #1020—1998, Pressure vacuum breaker assembly. Westlake, OH.

American Society of Sanitary Engineering. 2004. ANSI/ASSE #1011—2004, Hose connection vacuum breakers. Westlake, OH. American Society of Sanitary Engineering, 1995.

- American Society of Sanitary Engineering. 2008. ANSI/ASSE #1001—2008, Atmospheric type vacuum breakers. Westlake, OH.
- American Water Works Association. 1973. Water chlorination principles and practices. Denver, CO.
- American Water Works Association. 1990. Recommended practice for backflow prevention and cross-connection control. Denver, CO.
- American Water Works Association. 1992. ANSI/AWWA C651-92: Disinfecting water mains. Denver, CO.
- American Water Works Association. 1992. ANSI/AWWA C652-92: Disinfection of water-storage facilities. Denver, CO.
- American Water Works Association. 1994. Emergency planning for water utility management. Denver, CO.
- American Water Works Association. 1995. Electrodialysis and electrodialysis reversal. Denver, CO.
- American Water Works Association. 1997. ANSI/AWWA C653-97: Disinfection of water treatment plants. Denver, CO.
- American Water Works Association. 1997. Simplified procedures for water examination. Denver, CO.
- American Water Works Association. 1998. Reverse osmosis and nanofiltration. Denver, CO.
- American Water Works Association. 2000. Water distribution operator training handbook, 2nd edition. Denver, CO.
- ANSI/ASSE. 1995. #1012—1995, Backflow preventers with intermediate atmospheric vent. Westlake, OH.
- ANSI/ASSE. 1998. #1022—1998, Backflow preventer for carbonated beverage machines. Westlake, OH.
- Clesceri LS, Greenberg AE, Eaton AD, eds. 1998. Standard methods for the examination of water and wastewater. 20th edition. American Public Health Association, American Water Works Association and Water Environment Federation, Washington, DC.
- Code of Federal Regulations, Title 40 Section 141 National Primary Drinking Water Regulations.
- NSF International. 1999. ANSI/NSF Standard 60-1999 drinking water treatment chemicals—health effects. Ann Arbor, MI.
- NSF International. 1999. ANSI/NSF Standard 61-1999a drinking water system components—health effects. Ann Arbor, MI.
- U.S. Environmental Protection Agency. 1989. Cross-connection control manual.
- World Health Organization. 1993. Guidelines for drinking-water quality, volume 1: recommendations. 2nd edition. Geneva, Switzerland.
- World Health Organization. 1996. Guidelines for drinking-water quality, volume 2: health criteria and other supporting information. 2nd edition. Geneva, Switzerland.

World Health Organization. 1997. Guidelines for Drinking-water quality, world health organization, volume 3: surveillance and control of community water supplies. 2nd edition. Geneva, Switzerland.

World Health Organization. 1998. Guidelines for drinking-water quality, second edition, addendum to volume 1: recommendations. Geneva, Switzerland.

World Health Organization. 1998. Guidelines for drinking-water quality, second edition, addendum to volume 2: health criteria and other supporting information. Geneva, Switzerland.

## 14.6 Recreational Water Facilities

ASME International. 1987. ASME/ANSI A112.19.8M Suction fittings for use in swimming pools, wading pools, spas, hot tubs, and whirlpool bathtub appliances (Reaffirmed 1996). New York.

Centers for Disease Control and Prevention. 2001. Notice to Readers: Responding to fecal accidents in disinfected swimming venues. *MMWR*. 50(20):416–7.

Centers for Disease Control and Prevention. 1997. Final recommendations to minimize transmission of Legionnaires' disease from whirlpool spas on cruise ships.

Centers for Disease Control and Prevention, Division of Parasitic Diseases. 1999. Information for swimming pool operators: prevention of cryptosporidiosis.

Environmental Protection Agency. 2003. Ultraviolet disinfection manual. EPA-D-03-007.

Environmental Protection Agency. 1986. Disinfection with ultra violet light—design, construct and operate for success. Cincinnati, OH.

Environmental Protection Agency. 1988. Ultra violet disinfection: special evaluation project. EPA Region 5, Chicago, IL.

Gallagher TE. 1996. Comprehensive water quality testing of high-use public spas. *J Environ Health*. 58;7:11.

Kebabjian R. 1995. Disinfection of public pools and management of fecal accidents. *J Environ Health*. 58;1:8.

Lemmon JM, McAnulty JM, Bawden-Smith J. 1996. Outbreak of cryptosporidiosis linked to an indoor swimming pool. *Med J Australia*. 165:613.

National Pool and Spa Institute. 1991. ANSI/NSPI-1 1991 standard for public swimming pools. Alexandria, VA.

National Pool and Spa Institute. 1996. Symposium on water chemistry and disinfection 1996. Alexandria, VA.

National Pool and Spa Institute. 1997. Chemical dynamics within the pool and spa environment 1997. Alexandria, VA.

National Pool and Spa Institute. 1999. ANSI/NSPI-2 1999 standard for public spas. Alexandria, VA.

NSF International. 1996. ANSI/NSF Standard 50-1996 circulation system components and related materials for swimming pools, spas/hot tubs. Ann Arbor, MI.

- NSF International. 1999. ANSI/NSF Standard 14-1999 plastics piping system components and related materials. Ann Arbor, MI.
- NSF International. 1999. ANSI/NSF Standard 60-1999 drinking water treatment chemicals—health effects. Ann Arbor, MI.
- NSF International. 1999. ANSI/NSF Standard 61-1999a drinking water system components—health effects. Ann Arbor, MI.
- Ormecci B, Ishida GA, Linden KG, 2005. UV disinfection of chlorinated water: impact on chlorine concentration and UV dose delivery. *J Water Suppl Res Technol.* 54(3):189–99.
- Rennell DS, ed. 1989. Basic pool and spa technology. National Spa & Pool Institute. Alexandria, VA.
- Rowley W. Entrapment and evisceration study. National Swimming Pool Foundation. Merrick, NY.
- Shin GA, Linden KG, Arrowood MJ, Sobsey MD. 2001. Low-pressure UV inactivation and DNA repair potential of cryptosporidium parvum oocysts. *Appl Environ Microbiol.* 67(7):3029–32.
- U.S. Army, CHPPM. 1996. Controlling contamination from fecal accidents in swimming pools.
- Vogt RL, Hudson PJ, Orciari L, Heun EM, Woods TC. 1987. Legionnaires' disease and a whirlpool spa (Letter). *Ann Intern Med.* 107:596.

## 14.7 Food Safety

Food and Drug Administration. 2009. Food code, recommendations of the United States Public Health Service.

FDA used the following references for the 2009 *Food Code*, which was the basis of CDC's *VSP Operations Manual*, Chapter 7, Food Safety. The *Food Code* makes frequent reference to federal statutes contained in the United States Code (USC) and the Code of Federal Regulations (CFR). Copies of the USC and CFR can be viewed and copied at government depository libraries or may be purchased as follows.

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### **Preface**

1. Archer DL, Kvenberg JE. 1985. Incidence and cost of foodborne diarrheal disease in the United States. *J. Food Prot.* 48:887–94.
2. Committee on Salmonella. 1969. An evaluation of the Salmonella problem. NRC Pub. 1683, National Academy of Sciences, Washington, DC.
3. Council for Agricultural Science and Technology. 1994. Foodborne pathogens: risks and consequences. Task force report No. 122, CAST, Ames, IA.
4. Federal Food, Drug, and Cosmetic Act, 21 U.S.C. 374. Inspection.
5. Food and Drug Administration, January 24, 1994. Preliminary regulatory impact analysis of the proposed regulations to establish procedures for the safe processing and importing of fish and fishery products.
6. Food and Drug Administration. Directory of State and Local Officials. FDA/ORR Division of Federal-State Relations, Rockville, MD. <http://www.afdo.org>.
7. Garthright WE, Archer DL, Kvenberg JE. 1988. Estimates of incidence and costs of intestinal infectious disease in the United States. *Public Health Rep.* 103:107–15.
8. Hirsch D. 1989. Drafting federal law. 2nd edition. Office of the Legislative Counsel, U.S. House of Representatives, Washington, DC.
9. Kvenberg JE, Archer DL. 1987. Economic impact of colonization control on foodborne disease. *Food Technol.* 41:77–98.
10. Martineau RJ. 1991. Drafting legislation and rules in plain English. University of Cincinnati, Cincinnati, OH.
11. Maryland Office of the Secretary of State, 1991. Style manual for Maryland regulations. Div. of State Documents, Annapolis, MD.
12. McCracken JB, Carver GP. 1992. Recommended agency procedures for implementing federal metric policy. NISTIR 4855. U.S. Department of Commerce, National Institute of Standards and Technology, Technology Administration, Metric Program, Technology Services, Gaithersburg MD.
13. Mead PS, Slutsker L, Dietz V, McCraig LF, Bresee JS, Shapiro C, et al. 1999. Food-related illness and death in the United States. *Emerg Infect. Dis.* 5(5).

14. Metric Conversion Act of 1975, P.L. 94–168 Amended, 89 Stat. 1007; 15 U.S.C. § 205a et seq.
15. Omnibus Trade and Competitiveness Act of 1988, P.L. 100–418.
16. Research Triangle Institute. 1988. Estimating the value of consumer’s loss from foods violating the FD&C Act, FDA Contract No. 233-86-2098.
17. The Public Health Service Act, 42 U.S.C. Section 243. General Grant of Authority for Cooperation.
18. Metric Systems of Measurement; Interpretation of the International System of Units for the United States. Notice published July 28, 1998, 63 FR 40334-40340. This Federal Register notice supercedes the previous interpretation published on December 20, 1990, 55 FR 52242–5.

## **Chapter 1 Purpose and Definitions**

### **1-201.10 Statement of Application and Listing of Terms**

1. Americans with Disabilities Act of 1990, as Amended. 42 U.S.C. 12111 et seq.
2. Abdul-Raouf UM, Beuchat LR, Ammar MS, 1993. Survival and growth of *Escherichia coli* O157:H7 on salad vegetables. *Appl Environ Microbiol.* 59:1999–2006.
3. Aruscavage D, Lee K, Miller S, LeJeune JT. 2006. Interventions affecting the proliferation and control of human pathogens on edible plants. *J Food Sci.* 71(8):R89–99.
4. Code of Federal Regulations, Title 9, Section 362.1 Voluntary Poultry Inspection Regulations, Definitions.
5. Code of Federal Regulations, Title 9, Section 354.1 Voluntary Inspection of Rabbits and Edible Products Thereof, Definitions.
6. Code of Federal Regulations, Title 9, Part 301-2 Terminology; Adulteration and Misbranding Standards Definitions, Livestock.
7. Code of Federal Regulations, Title 9, Section 590.5 Egg Products Inspection Act, Terms Defined.
8. Code of Federal Regulations, Title 50, Part 17 Endangered and Threatened Wildlife and Plants.
9. Code of Federal Regulations, Title 9, Part 381 Poultry Products Inspection Regulations.
10. Code of Federal Regulations, Title 40, Part 141 National Primary Drinking Water Regulations.
11. Code of Federal Regulations, Title 40, Part 152.175 Pesticides classified for restricted use.
12. Corby R, Lanni V, Kistler V, Dato V, Yozviak C, Waller K, et al. 2005. Outbreaks of *Salmonella* infections associated with eating Roma tomatoes—United States and Canada, 2004. *MMWR.* 54(13):325–28.
13. Delaquis P, Steward S, Cazaux S, Toivonen P. 2002. Survival and growth of *Listeria monocytogenes* and *Escherichia coli* O157:H7 in ready-to-eat iceberg lettuce washed in warm chlorinated water. *J Food Protect.* 65(3):459–64.
14. Doerry WT. 1996. Shelf-stable pumpkin pies. A research report. American Institute of Baking, Manhattan, KS.

15. Federal Food, Drug and Cosmetic Act, 21 U.S.C. 321 Definitions (s) Food Additive, and Code of Federal Regulations, and Title 21 Part 170 Food Additives.
16. Federal Food, Drug and Cosmetic Act, 21 U.S.C. 321 Definitions (t) Color Additive, and Code of Federal Regulations, and Title 21 Part 70 Color Additives.
17. Federal Food, Drug and Cosmetic Act, 21 U.S.C. 342 Adulterated Food.
18. Federal Food, Drug and Cosmetic Act, 21 U.S.C. 379e (a) Unsafe Color Additives.
19. Federal Register: May 7, 2001 (Volume 66, Number 88), Rules and Regulations, Pages 22899-22907, Department of Agriculture, Food Safety and Inspection Service, 9 CFR Parts 362 and 381, Docket No. 01-045IF, RIN 0583-AC84, [Mandatory Inspection Ratites and Squabs](#).
20. [Food Allergen Labeling and Consumer Protection Act of 2004](#). Public Law 108–282
21. Food and Drug Administration/U.S. Public Health Service. 2007. [National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish](#).
22. Food and Drug Administration/U.S. Public Health Service. 2007. [Grade “A” Pasteurized Milk Ordinance](#). Publication no. 229.
23. Guo X, Chen J, Brackett RE, Beuchat LR. 2001. Survival of salmonellae on and in tomato plants from the time of inoculation at flowering and early stages of fruit development through fruit ripening. *Appl and Environ Microbiol.* 67(10):4760–4.
24. Institute of Food Technologists (IFT). 2001. [Evaluation and Definition of Potentially Hazardous Foods](#). Food and Drug Administration contract no. 223-98-2333, task order no. 4.
25. Koseki S, Isobe S. 2005. Prediction of pathogen growth on iceberg lettuce under real temperature history during distribution from farm to table. *Int J Food Microbiol.* (104):239–48.
26. Laine ES, Scheftel JM, Boxrud DJ, Vought KJ, Danila RN, Elfering KM, et al. 2005. Outbreak of *Escherichia coli* O157:H7 infections associated with nonintact blade-tenderized frozen steaks sold by door-to-door vendors. *J Food Protect.* 68(6):1198–1202.
27. Li Y, Brackett RE, Chen J, Beuchat LR. 2001. Survival and growth of *Escherichia coli* O157:H7 inoculated onto cut lettuce before or after heating in chlorinated water, followed by storage at 5 or 15°C. *J Food Protect.* 64(3):304–9.
28. Marsden JL, Phebus RK, Thippareddi H, Kastner CL, Bosch JB. 1999. *Salmonella* spp. and *Listeria monocytogenes* risk assessment for production and cooking of blade tenderized beef steaks (available in [PDF](#)). Kansas State University.
29. National Advisory Committee on Microbiological Criteria for Foods. 1992. Hazard analysis and critical control point system. *Int J Food Microbiol.* 16:1–23.
30. Program Information Manual. 2007. [Retail food protection: storage and handling of tomatoes](#).
31. Wachtel MR, Charkowski AO. 2002. Cross-contamination of lettuce with *Escherichia coli* O157:H7. *J. Food Protect.* 65(3):465–70.
32. Yaguang L, He Q, McEvoy JL, Conway WS. 2009. Fate of *Escherichia coli* O157:H7 in the presence of indigenous microorganisms on commercially packaged baby spinach as impacted by storage temperature and time. *J Food Protect* 72(10):2038–45.

33. Zhuang RY, Beuchat LR, Angulo FJ. 1995. Fate of *Salmonella montevideo* on and in raw tomatoes as affected by temperature and treatment with chlorine. *Appl Environ Microbiol.* 61(6):2127–31.

## **Chapter 2 Management and Personnel**

### **2-102.11 Demonstration**

1. Bean NH, Griffin PM. 1990. Foodborne disease outbreaks in the United States, 1973–1987: pathogens, vehicles, and trends. *J Food Prot.* 53:804–17.
2. Bryan FL. 1979. Prevention of foodborne diseases in food service establishments. *J Environ Health.* 41:198–206.
3. Bryan FL. 1988a. Risks associated with vehicles of foodborne pathogens and toxins. *J Food Prot.* 51(6):498–508.
4. Bryan FL. 1988b. Risks of practices, procedures and processes that lead to outbreaks of foodborne diseases. *J Food Prot.* 51(8):663–73.
5. Doyle MP. 1991. *Escherichia coli* O157:H7 and its significance in foods. *Int J Food Microbiol.* 12:289–302.
6. Liston J. 1990. Microbial hazards of seafood consumption. *Food Technol.* 44(12):56, 58–62.
7. World Health Organization. 1989. Health surveillance and management procedures for food-handling personnel. Technical report series 785. WHO, Geneva, Switzerland.

### **2-201.11 Responsibility of the Person in Charge, Food Employees, and Conditional Employees**

### **2-201.12 Exclusions and Restrictions**

1. Americans with Disabilities Act of 1990, as Amended. 42 U.S.C. 12111 et seq.
2. Anderson AD, Garrett VD, Sobel J, Monroe SS, Fankhauser RL, Schwab KJ, et al. 2001. Multistate outbreak of Norwalk-like virus gastroenteritis associated with a common caterer. *Am J Epidemiol.* 154:1013–1019.
3. Ando T, Noel JS, Fankhauser RL. 2000. Genetic classification of “Norwalk-like viruses.” *J Infect Dis.* 181(2):S336–S348.
4. Atmar RL, Estes MK. 2001. Diagnosis of noncultivable gastroenteritis viruses, the human caliciviruses. *Clin Microb Rev.* 14(1):15–37.
5. Black RE, Graun GF, Blake PA. 1978. Epidemiology of common-source outbreaks of shigellosis in the United States, 1961-1975. *Am J Epidemiol.* 108:47–52.
6. Brown T. 2003. Norovirus activity—United States, 2002. *Ann Emerg Med.* 42(3):417–20.
7. Caul EO. 1994. Small round structured viruses: airborne transmission and hospital control. *Lancet.* 343 (8908):1240–2.
8. Caul EO. 1996a. Viral gastroenteritis: small round structured viruses, caliciviruses and astroviruses. Part I: the clinical and diagnostic perspective. *J Clin Pathol* 49:874–80.
9. Caul EO. 1996b. Viral gastroenteritis: small round structured viruses, caliciviruses and astroviruses. Part II: the epidemiological perspective. *J Clin Pathol.* 49:959–64.

10. Centers for Disease Control and Prevention. 2008. Annual update of list of infectious and communicable diseases (available in [PDF](#)). Fed Reg. 73(222):67871–2.
11. Centers for Disease Control and Prevention. 2010. [Health Information for International Travel](#) (The “Yellow Book”). CDC Division of Global Migration and Quarantine, National Center for Infectious Diseases, Atlanta, GA.
12. Chadwick PR, McCann R. 1994. Transmission of a small round structured virus by vomiting during a hospital outbreak of gastroenteritis. *J Hosp Infect.* 26:251–9.
13. Code of Federal Regulations, Title 29, Part 1630 Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act.
14. Colorado Department of Health. 1993. Public health handbook for management of acute Hepatitis A. Division of Disease Control and Environmental Epidemiology, Denver, CO.
15. de Wit MAS, Koopmans MPG, van Duynhoven YTHP. 2003. Risk factors for norovirus, sapporo-like virus, and group A rotavirus gastroenteritis. *Emerg Infect Dis.* 9 (12):1563–70.
16. Doyle MP, ed. 1989. Foodborne bacterial pathogens. Marcel Dekker, Inc., New York.
17. Doyle MP, Zhao T, Meng J, Zhao S. 1997. Escherichia coli O157:H7. In: Doyle MP, Beuchat LR, Montville TJ, eds. Food microbiology fundamentals and frontiers. ASM Press, Washington, DC; 183–186.
18. Equal Employment Opportunity Commission. 2004. [How to Comply with the Americans With Disabilities Act: A Guide for Restaurants And Other Food Service Employers](#).
19. Fankhauser RL, Noel JS, Monroe SS, Ando T, Glass RI. 1998. Molecular epidemiology of “Norwalk-like viruses” in outbreaks of gastroenteritis in the United States. *J Infect Dis.* 178:1571–88.
20. Food and Drug Administration, Center for Food Safety & Applied Nutrition. 2009. [Foodborne Pathogenic Microorganisms and Natural Toxins Handbook](#) (The Bad Bug Book).
21. Graham DY, Jiang X, Tanaka T, Opekun AR, Madore AR, Estes MK. 1994. Norwalk virus infection of volunteers: new insights based on improved assays. *J Infect Diseases.* 170:34–43.
22. Greenberg HB, Wyatt RG, Kapikian AZ. 1979. Norwalk virus in vomitus. *Lancet.* i:55.
23. Griffin PM, Tauxe RV. 1991. The epidemiology of infections caused by Escherichia coli O157:H7, other enterohemorrhagic E. coli, and the associated hemolytic uremic syndrome. *Epidemiol Rev.* 13:60–98.
24. Heymann DL, ed. 2004. Control of communicable diseases manual. 18th edition. American Public Health Association, Washington DC.
25. Lopman BA, Reacher MH, van Duynhoven Y, Hanon FX, Brown D, Koopmans M. 2003. Viral gastroenteritis outbreaks in Europe, 1995–2000. *Emerg Infect Dis.* 9(1).
26. Lopman BA, Brown DW, Koopmans M. 2002. Human caliciviruses in Europe. *J Clin Virol.* 24(3):137–60.
27. Matsui SM, Greenberg HB. 2000. Immunity to calicivirus infection. *J Infect Dis.* 181(Suppl 2):S331.
28. Meade PS, Griffin PM, 1998. Escherichia coli O157:H7. *Lancet* 1998;352:1207–12.
29. Meade PS, Slutsker L, Dietz V, McCraig LF, Bresee JS, Shapiro C, et al. 1999. [Food-Related Illness and Death in the United States](#). *Emerg Infect Dis.* 5(5).

30. Monroe SS, Ando T, Glass RI. 2000. Introduction: human enteric caliciviruses—an emerging pathogen whose time has come. *J Infect Dis.* 181(Suppl 2):S249.
31. Reid JA. 1988. Role of infected food handler in hotel outbreak of Norwalk-like viral gastroenteritis: implications for control. *Lancet.* 2(8606):321–3.
32. Ryder RW, Blake PA. 1979. Typhoid fever in the United States, 1975 and 1976. *J Infect Dis.* 139(1):124–6.
33. Shapiro CN, Shaw FE, Mandel EJ, Hadler SC. 1991. Epidemiology of hepatitis A in the United States. In: Hollinger FB, Lemon SM, Margolis G, eds. *Viral hepatitis and liver disease.* Williams & Wilkins, Baltimore, MD;71–6.
34. Soper GA. 1939. The curious career of Typhoid Mary. *Bull. N.Y. Acad Med.* 15:698–712.
35. Tauxe RV, Johnson KE, Boase JC, Helgerson SD, Blake PA. 1986. Control of day care shigellosis: A trial of convalescent day care in isolation. *Am J Public Health* 76(6):627–30.
36. Tauxe RV, Puhr ND, Wells JG, Hargrett-Bean N, Blake PA. 1990. Antimicrobial resistance of *Shigella* isolates in the USA: the importance of international travelers. *J Infect Dis.* 162:1107–11.
37. U.S. Department of Health and Human Services. [Healthy People 2010: Understanding and Improving Health](#). Volumes 1 and 2, 2nd ed. Washington, DC: U.S. Government Printing Office, November 2000.
38. Widdowson M-A, Sulka A, Bulens SN, Beard RS, Chaves SS, Hammond R, et al. [Norovirus and Foodborne Disease, United States, 1991–2000](#). *Emerg Infect Dis.* 2005;11(1):95–102.

### **2-201.13 Removal, Adjustment, or Retention of Exclusions and Restrictions**

1. Code of Federal Regulations, Title 21, Section 110.10 Personnel. (a) Disease Control. “Any person who, by medical examination or supervisory observation is shown to have, or appears to have, an illness, ... shall be excluded from any operations which may be expected to result in contamination, ... Personnel shall be instructed to report such health conditions to their supervisors.”
2. Equal Employment Opportunity Commission. 2004. [How to comply with the Americans With Disabilities Act: a guide for restaurants and other food service employers](#).
3. Heymann DL, ed. 2004. *Control of communicable diseases manual.* 18th edition. American Public Health Association, Washington DC.
4. Lee LA, Shapiro CN, Hargrett-Bean N, Tauxe RV. 1991. Hyperendemic Shigellosis in the United States: a review of surveillance data for 1967–1988. *J Infect Dis.* 164:894–900.
5. Ryder RW, Blake PA. 1979. Typhoid fever in the United States, 1975 and 1976. *J Infect Dis.* 139:124–26.

### **2-301.12 Cleaning Procedure (Handwashing)**

1. Ansari SA, Springthorpe VS, Sattar SA, Tostowaryk W, Wells GA. 1991. Comparison of cloth, paper, and warm air drying in eliminating viruses and bacteria from washed hands. *Am J Infect Cont.* 19 (5):24–9.
2. Ansari SA, Sattar SA, Springthorpe VS, Wells GA, Tostowaryk W. 1989. In vivo protocol for testing efficacy of hand-washing agents against viruses and bacteria: experiments with rotavirus and *Escherichia coli*. *Appl Environ Microbiol.* 55(12):3113–8.

3. Ansari SA, Sattar SA, Springthorpe VS, Wells GA, Tostowaryk W. 1988. Rotavirus survival on human hands and transfer of infectious virus to animate and nonpourous inanimate surfaces. *J Clin Microbiol.* 26(8):1513–8.
4. Ayliffe GAJ, Babb JR, Davies JG, Lilly HA. 1988. Hand disinfection: a comparison of various agents in laboratory and ward studies. *J Hosp Infect.* 11:226–43.
5. Ayliffe GAJ, Babb JR, Quoraishi AH. 1978. A test for “hygienic” hand disinfection. *J Clin Pathol.* 31:923–8.
6. Bellamy K, Alcock R, Babb JR, Davies JG, Ayliffe GAJ. 1993. A test for the assessment of “hygienic” hand disinfection using rotavirus. *J Hosp Infect.* 24:201–10.
7. Casewell M, Phillips I. 1977. Hands as route of transmission for Klebsiella species. *Brit Med J.* 2(19):1315–7.
8. Cliver DO, Kostenbader KD. 1984. Disinfection of virus on hands for prevention of food-borne disease. *Intern J Food Microbiol.* 1:75–87.
9. De Witt JC. 1985. The importance of hand hygiene in contamination of foods. Netherlands Society for Microbiology, section for food microbiology meeting at Ede on 24 May, 1984. *Antonie von Leeuwenhoek.* 51:523–7.
10. Eckert DG, Ehrenkranz NJ, Alfonso BC. 1989. Indications for alcohol or bland soap in removal of aerobic gram-negative skin bacteria: assessment by a novel method. *Infect Control Hosp Epidemiol.* 10:306–11.
11. The National Restaurant Association Educational Foundation (NRAEF). 2004. The safe foodhandler, In: *ServSafe essentials*. 3rd edition. NRAEF, Chicago, IL;4-1-4-25.
12. Eggers HJ. 1990. Experiments on antiviral activity of hand disinfectants. some theoretical and practical considerations. *Zbl. Bakt.* 273:36–51.
13. Ehrenkranz NJ. 1992. Bland soap handwash or hand antisepsis? The pressing need for clarity. *Infect Control Hosp Epidemiol.* 13(5):299–301.
14. Ehrenkranz NJ, Alfonso B. 1991. Failure of bland soap handwash to prevent hand transfer of patient bacteria to urethral catheters. *Infect Control Hosp Epidemiol.* 12(11):654–62.
15. Garner JS, Favero MS. 1985. Guidelines for handwashing and hospital environmental control. Hospital Infections Program, Center for Infectious Diseases, CDC, Atlanta;7–9.
16. Kjolen H, Andersen BM. 1992. Handwashing and disinfection of heavily contaminated hands—effective or ineffective? *J Hosp Infect.* 21:61–71.
17. Lane CG, Blank IH. 1942. Cutaneous detergents. *JAMA.* 118(10):804–16.
18. Larson EL. 1995. APIC guideline for handwashing and hand antisepsis in health care settings, *Am J Infect Control.* 23(4):251–69.
19. Lilly HA, Lowbury EJJ. 1978. Transient skin flora. Their removal by cleansing or disinfection in relation to their mode of deposition. *J Clin Pathol.* 31:919–22.
20. Mbithi JN, Springthorpe S, Sattar S. 1993. Comparative in vivo efficiencies of hand-washing agents against Hepatitis A virus (HM-175) and Poliovirus Type 1 (Sabin). *Appl Environ Microbiol.* 59(10):3463–69.
21. McGinley KJ, Larson EL, Leyden JJ. 1988. Composition and density of microflora in the subungual space of the hand. *J Clin Microbiol.* 26(5):950–3.

22. Minnesota Department of Health. 1990. Guidelines for the prevention of the transmission of viral hepatitis type A in the food service area. Minnesota Department of Health, Div. Environ. Health, Minneapolis, MN.
23. Paulson DS. 1992. Evaluation of three handwashing modalities commonly employed in the food processing industry. *Dairy Food Environ Sanitation*. 12(10):615–8.
24. Pether JVS, Gilbert RJ. 1971. The survival of salmonellas on finger-tips and transfer of the organism to foods. *J Hyg*. 69:673–81.
25. Price PB. 1938. The bacteriology of normal skin: a new quantitative test applied to a study of the bacterial flora and the disinfectant action of mechanical cleansing. *J Infect Dis*. 63:301–18.
26. Restaino L, Wind CE. 1990. Antimicrobial effectiveness of hand washing for food establishments. *Dairy Food Environ Sanitation*. 10(3):136–41.
27. Reybrouck G. 1986. Handwashing and hand disinfection. *J Hosp Infect*. 8:5–23.
28. Rotter ML, Ayliffe GAJ. 1991. Practical guide on rationale and testing procedures for disinfection of hands. World Health Organization.
29. Rotter ML, Koller W. 1991. A European test for the evaluation of the efficacy of procedures for the antiseptic handwash? *Hyg Med*. 16:4–12.
30. Rose JB, Slifko TR. 1999. Giardia, Cryptosporidium, and Cyclospora and their impact on foods: a review. *J Food Protect*. 62(9):1059–70.
31. Sattar SA, Springthorpe VS. 1996. Environmental spread and germicide control of viruses in hospitals. *Infect Control Steril Technol*. 2(7):30–6.
32. Schurmann W, Eggers HJ. 1985. An experimental study on the epidemiology of enteroviruses: water and soap washing of poliovirus 1—contaminated hands, its effectiveness and kinetics. *Med Microbiol Immunol*. 174:221–36.
33. Smith GA Jr. 1991. Handwashing et cetera. Lexington Board of Health, Personal Hygiene Sanitation Programs, Lexington, KY.
34. Stiles ME, Sheena AZ. 1987. Efficacy of germicidal hand wash agents in use in a meat processing plant. *J Food Protect*. 50(4):289–95.
35. Sprunt K, Redman W, Leidy G. 1973. Antibacterial effectiveness of routine hand washing. *Pediatrics*. 52 (2):264–71.
36. Williams REO. 1963. Healthy carriage of Staphylococcus aureus: its prevalence and importance. *Bacteriol Rev*. 27:56–71.

### **2-301.13 Special Handwashing Procedures**

Reserved.

### **2-301.14 When to Wash**

1. Ojajarvi J. 1980. Effectiveness of handwashing and disinfection methods in removing transient bacteria after patient nursing. *J Hyg Camb*. 85:193–203.

### **2-301.16 Hand Antiseptics**

1. Code of Federal Regulations, Title 21, Part 178.1010 Sanitizing Solutions.
2. Code of Federal Regulations, Title 21, Part 170.39 Threshold of Regulation for Substances Used in Food-Contact Articles.
3. Code of Federal Regulations, Title 21, Part 182 Substances Generally Recognized as Safe.
4. Code of Federal Regulations, Title 21, Part 184 Direct Food Substances Affirmed as Generally Recognized as Safe.
5. Code of Federal Regulations, Title 21, Part 186 Indirect Food Substances Affirmed as Generally Recognized as Safe for Use in Contact with Food.
6. Federal Register (59) No. 116, June 17, 1994, Tentative Final Monograph (TFM) for Health Care Antiseptic Drug Products; Proposed Rule. Page 31440.
7. Food and Drug Administration, Center for Drug Evaluation and Research, Office of Pharmaceutical Science, Office of Generic Drugs, 2009. [Approved Drug Products with Therapeutic Equivalence Evaluations](#) (the Orange Book).
8. Food and Drug Administration. 2009. [Inventory of Effective Food Contact Substance \(FCS\) Notifications](#). CFSAN/Office of Food Additive Safety.
9. Food and Drug Administration. FDA's [Inventory of GRAS Notices](#).
10. Food and Drug Administration, January, 2005. Investigations Operations Manual, Chapter 5, Establishment Inspection, Subchapter 530, Food Section 534, Equipment and Utensils.
11. Stiles ME, Sheena AZ. 1987. Efficacy of germicidal hand wash agents in use in a meat processing plant. J. Food Prot. 50(4):289–94.

### **2-302.11 Maintenance (Fingernails)**

1. Pether JVS, Gilbert RJ. 1971. The survival of salmonellas on finger-tips and transfer of the organisms to foods. J Hyg Camb. 69:673–81.
2. Pottinger J, Burns S, Manake C. 1989. Bacterial carriage by artificial versus natural nails. Am J Infect Control, 17(6):340–4.

### **2-303.11 Prohibition (Jewelry)**

### **2-304.11 Clean Condition (Outer Clothing)**

### **2-401.11 Eating, Drinking, or Using Tobacco**

### **2-402.11 Effectiveness (Hair Restraints)**

1. Code of Federal Regulations, Title 21, Sections 110.10 Personnel. (b) (1) “Wearing outer garments suitable to the operation ....” (4) “Removing all unsecured jewelry ....” (6) “Wearing, where appropriate, in an effective manner, hair nets, head bands, caps, beard covers, or other effective hair restraints.” (8) “Confining...eating food, chewing gum, drinking beverages or using tobacco....” and (9) “Taking other necessary precautions ....”

### **2-403.11 Handling Prohibition (Animals)**

1. Bond R, Saijonmaa-Koulumies LEM, Lloyd DH. 1995. Population sizes and frequency of *Malassezia pachydermatis* at skin and mucosal sites on healthy dogs. *J Small Animal Pract.* 36:147–50.
2. Code of Federal Regulations, Title 21, Section 110.35(c).
3. Food and Drug Administration, 1985. Premises—Acceptability of pets in common dining areas of group residences (5/17/85). Retail Food Protection Program Information Manual.
4. Hirooka EY, Muller EE, Freitas JC, Vicente E, Yoshimoto Y, Bergdoll MS. 1988. Enterotoxigenicity of *Staphylococcus intermedius* of canine origin. *Int J Food Microbiol.* 7:185–91.
5. Khambaty FM, Bennett RW, Shah DB. 1994. Application of pulsed-field gel electrophoresis to the epidemiological characterization of *Staphylococcus intermedius* implicated in a food-related outbreak. *Epidemiol Infect.* 133:75–81.

## **Chapter 3 Food**

### **3-201.11 Compliance with Food Law**

1. Centers for Disease Control. 1987. International outbreak associated with ungutted, salted whitefish. *MMWR.* 36:812–13.
2. Code of Federal Regulations, Title 21, Part 16, Regulatory Hearing Before the Food and Drug Administration.
3. Code of Federal Regulations, Title 21, Part 101, Food Labeling.
4. Code of Federal Regulations, Title 21, Part 115, Shell Eggs.
5. Federal Register: (Volume 65, Number 234), pp 76091–76114.
6. Goverd KA, Beech FW, Hobbs RP, Shannon R, 1979. The occurrence and survival of coliforms and salmonellas in apple juice and cider. *J Appl Bacteriol.* 46:521–30.
7. Zhao T, Doyle MP, Besser RE. 1993. Fate of enterohemorrhagic *Escherichia coli* O157:H7 in apple cider with and without preservatives. *Appl Environ Microbiol.* 59(8):2526–30.

### **3-201.12 Food in a Hermetically Sealed Container**

1. Code of Federal Regulations, Title 21, Parts 108 - Emergency Permit Control, 113—Thermally Processed Low-acid Foods Packaged in Hermetically Sealed Containers, and 114—Acidified Foods.

### **3-201.13 Fluid Milk and Milk Products**

1. Black RE, Jackson RJ, Tsai T, Medvesky M, Shaygani M, Feely JC, et al. 1978. Epidemic *Yersinia enterocolitica* infection due to contaminated chocolate milk. *N Engl J Med.* 298:76–9.
2. Food and Drug Administration/U.S. Public Health Service Publication. 2007. No. 229, 2007 revision. [Grade “A” Pasteurized Milk Ordinance](#).
3. Potter ME, Kauffmann AF, Blake PA, Feldman RA. 1984. Unpasteurized milk: the hazards of a health fetish. *J Am Med Assoc.* 252:2048–52.

### **3-201.14 Fish**

1. Code of Federal Regulations, Title 21, Part 123 Fish and Fishery Products.
2. Code of Federal Regulations, Title 21, Part 101.17(h) Food labeling warning notice, and safe handling statement.
3. Code of Federal Regulations, Title 9, Part 317.2(l) Labels: definition; required features.
4. Code of Federal Regulations, Title 9, Part 381.125(b) Special handling label requirements.
5. Engleberg NC, Morris JG Jr, Lewis J, McMillan JP, Pollard RA, Blake PA. 1983. Ciguatera fish poisoning: a major common source outbreak in the U.S. Virgin Islands. *Ann Intern Med.* 98:336–7.
6. EPA. 2004. [Annual national listing of fish advisories](#) and Press Release. EPA-823-R-04-005, August 24, 2004, EPA Releases 12th Annual National Listing of Advisories.
7. EPA. 2004. [What you need to know about mercury in fish and shellfish, 2004 EPA and FDA advice for: women who might become pregnant, women who are pregnant, nursing mothers, young children.](#) Press Release, March 2004, EPA-823-R-04-005.
8. EPA. 2004. Technical fact sheet (available in [PDF](#)), EPA-823-F-04-016, August 2004. National listing of fish advisories.
9. Liston J. 1990. Microbial hazards of seafood consumption. *Food Technol.* 44(12):56, 58–62.
10. Morris JG Jr. 1988. *Vibrio vulnificus*: A new monster of the deep? *Ann Intern Med.* 109:261–3.
11. Taylor SL. 1986. Histamine food poisoning: toxicology and clinical aspects. *CRC Crit Rev Toxicol.* 17:91–128.

### **3-201.15 Molluscan Shellfish**

1. Food and Drug Administration/U.S. Public Health Service. 2007. [National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish.](#)
2. Guzewich JJ, Morse DL. 1986. Sources of shellfish in outbreaks of probable viral gastroenteritis: implications for control. *J Food Prot.* 49:389–94.
3. Sobsey MD, Hackney CR, Carrick RJ, Ray B, Speck MC. 1980. Occurrence of enteric bacteria and viruses in oysters. *J. Food Prot.* 43:111–28.

### **3-201.16 Wild Mushrooms**

1. Ammirati JF, Traquair JA, Horgen PA. 1985. Poisonous mushrooms of the northern United States and Canada. University of Minnesota Press, Minneapolis, MN.
2. Associated Press. 1997. CNN report: poisonous mushrooms kill Sebastiani wine family member. Cable News Network, Inc. January 16, 1997.
3. Baltimore Sun Newspaper via Associated Press, February 9, 1996. Report on girl who picked deadly mushrooms with family gets liver transplant.
4. Chang ST, Hayes WA. 1978. The biology and cultivation of edible mushrooms. Academic Press, New York.
5. Food and Drug Administration. 1987. Food supplies—wild mushrooms (6/11/87). Retail Food Protection Program Information Manual.

6. Gecan JS, Cichowicz SM. 1993. Toxic mushroom contamination of wild mushrooms in commercial distribution. *J Food Prot.* 56(8):730–4.
7. Hoard R, Hoard K, 1980. *Poisonous hallucinogenic mushrooms*. 2nd edition. Homestead Books, Brookfield, NY.
8. Lincoff G, Mitchel D. 1977. *Toxic and hallucinogenic mushroom poisoning*. Van Nostrand Reinhold Company, New York.

### **3-201.17 Game Animals**

1. Code of Federal Regulations, Title 50, Part 17 Endangered and Threatened Wildlife and Plants.
2. Code of Federal Regulations, Title 9, Part 352 Exotic animals; voluntary inspection of rabbits.
3. Code of Federal Regulations, Title 9, Part 354 Voluntary inspection of rabbits and edible products thereof.
4. Codex Alimentarius Commission. 1993. Draft revised code of hygienic practice for game (April 1993). *Alinorm 93/16A, Appendix IV*, pp. 119–49.
5. Federal Food, Drug, and Cosmetic Act, as Amended. 21 U.S.C. 201 et seq.
6. Federal Meat Inspection Act. 21 U.S.C. 601 et seq.
7. Hogue AT, Dreesen DW, Greene SS, Ragland AD, James WO, Bereron EA, et al. 1993. Bacteria on beef briskets and ground beef: correlation with slaughter volume and antemortem condemnation. *J. Food Prot.* 56(2):10–13, 119.
8. Poultry Products Inspection Act. 21 U.S.C. 451 et seq.

### **3-202.11 Temperature**

1. Code of Federal Regulations, Title 9, Part 590 Egg Products Inspection Act, Temperature and labeling requirements.
2. Humphrey TJ. 1994. Contamination of egg shell and contents with *Salmonella enteritidis*: a review. *Int J Food Microbiol.* 21(1994):31–40.
3. Mishu B, Koehler J, Lee L, Rodrigue D, Brenner FH, Blake P, et al. 1994. Outbreaks of *Salmonella enteritidis* infections in the United States, 1985–1991. *J Infect Dis.* 169:547–52.
4. Rosenow EM, Marth EH. 1987. Growth of *Listeria monocytogenes* in skim, whole and chocolate milk, and in whipping cream during incubation at 4, 8, 13, 21 and 35°C. *J Food Prot.* 50:452–459, 463.
5. St. Louis ME, Morse DL, Potter ME, DeMelfi TM, Guzewich JJ, Tauxe RV, et al. 1988. The emergence of Grade A eggs as a major source of *Salmonella enteritidis* infections: new implications for the control of salmonellosis. *J Am Med Assoc.* 259:2103–7.

### **3-202.12 Additives**

1. Barlett PA, Morrie JG Jr, Spengler J. 1982. Foodborne illness associated with niacin: report of an outbreak linked to excessive niacin in enriched cornmeal. *Public Health Rep.* 97:258–60.
2. Code of Federal Regulations, Title 9, Subpart C, Section 424.21(b) Food ingredients and sources of radiation.

3. Code of Federal Regulations, Title 21, Parts 170–180 relating to food additives and irradiation.
4. Code of Federal Regulations, Title 21, Parts 181–186 relating to prior-sanctioned ingredients and direct and indirect substances generally recognized as safe.
5. 5 Code of Federal Regulations, Title 40, Part 180 Tolerances for pesticides chemicals in food, and exceptions.
6. Food and Drug Administration. 1987. Food supplies—sulfiting agents on food in retail food establishments (9/10/87). Retail Food Protection Program Information Manual.
7. Food and Drug Administration. 2003. [Color additives: FDA's regulatory process and historical perspectives](#). Reprinted from *Food Safety Magazine* October/November 2003 issue, CFSAN/Office of Cosmetics and Colors.
8. Food and Drug Administration. 2007. [Summary of color additives listed for use in the United States in foods, drugs, cosmetics, and medical devices](#). CFSAN/Office of Food Additive Safety.
9. Food and Drug Administration. 2009. [Inventory of effective food contact substance \(FCS\) notifications](#). CFSAN/Office of Food Additive Safety.

### **3-202.13 Eggs**

1. Bradshaw JG, Shah DB, Forney E, Madden JM. 1990. Growth of *Salmonella enteritidis* in yolk of shell eggs from normal and seropositive hens. *J Food Prot.* 53(12):1033–6.
2. Centers for Disease Control. 1988. Update: *Salmonella enteritidis* infections and Grade A shell eggs—United States. *MMWR.* 37:490–6.
3. Gast RK, Beard CW. 1990. Production of *Salmonella enteritidis*—contaminated eggs by experimentally infected hens. *Avian Dis.* 34:438–46.
4. Kim CJ, Emery DA, Rinkle H, Nagaraja KV, Halvorson DA. 1989. Effect of time and temperature on growth of *Salmonella enteritidis* in experimentally inoculated eggs. *Avian Dis.* 33:735–42.
5. St. Louis ME, Morse DL, Potter E, DeMelfi TM, Guzewich JJ, Tauxe RV, et al. 1988. The emergence of Grade A eggs as a major source of *Salmonella enteritidis* infections. *J Am Med Assoc.* 259:2103–7.
6. United States Standards, Grades, and Weight Classes for Shell Eggs, AMS 56.200 et seq., administered by the Agricultural Marketing Services of USDA.

### **3-202.14 Eggs and Milk Products, Pasteurized**

1. Baker RC, Hogarty S, Poon W, Vadehra DV. 1983. Survival of *Salmonella typhimurium* and *Staphylococcus aureus* in eggs cooked by different methods. *Poultry Sci.* 62:1211–6.
2. Code of Federal Regulations, Title 21, Part 133, Cheeses and related cheese products.
3. Code of Federal Regulations, Title 21, Part 135, Frozen desserts.
4. Code of Federal Regulations, Title 9, Part 590, Inspection of Eggs and Egg Products (Egg Products Inspection Act).
5. Cunningham FE. 1977. Egg pasteurization. In: Stadelman J, Cotterill OJ, eds. *Egg science and technology*. 2nd edition. AVI Publishing Company, Inc., Westport, CT; 161–86.

6. Doyle MP, Meske LM, Marth EH. 1985. Survival of *Listeria monocytogenes* during the manufacture and storage of nonfat dry milk. *J Food Prot.* 48(9):740.
7. Food and Drug Administration/U.S. Public Health Service. 2007. [Grade “A” pasteurized milk ordinance](#). Publication no. 229.
8. Tacket CO, Dominguez LB, Fisher HJ, Cohen ML. 1985. An outbreak of multiple-drug-resistant *Salmonella* Enteritis from raw milk. *J Am Med Assoc.* 253:2058–60.

### **3-202.16 Ice**

1. Cliver DO. 1988. Virus transmission via foods: a scientific status summary by the Institute of Food Technologists’ Expert Panel on Food Safety and Nutrition. *Food Technol.* 42(10):241–8.
2. Jackson GL. 1990. Parasitic protozoa and worms relevant to the U.S. *Food Technol.* 44(5):106–12.

### **3-202.17 Shucked Shellfish, Packaging and Identification**

1. Code of Federal Regulations, Title 21, Subpart D—Specific Administrative Decisions Regarding Interstate Shipments, Section 1124.60(d) Molluscan shellfish.
2. Food and Drug Administration/U.S. Public Health Service. 2007. [National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish](#).

### **3-202.18 Shellstock Identification**

#### **3-202.19 Shellstock, Condition**

1. Code of Federal Regulations, Title 21, Part 1240, Control of Communicable Disease, Molluscan Shellfish.
2. Food and Drug Administration/U.S. Public Health Service. 2007. [National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish](#).
3. Freudenthal AR, Jijina JL. 1988. Potential hazards of *Dinophysis* to consumers and shellfisheries. *J Shellfish Res.* 7:695–701.
4. Klontz KC, Lieb S, Schreider M, Janowski HT, Baldy LM, Gunn RA. 1988. Syndromes of *Vibrio vulnificus* infections: clinical and epidemiological features in Florida cases 1981–1987. *Ann Intern Med.* 109:318–23.
5. Morse DL, Guzewich JJ, Hanrahan JP, Stricot R, Shayegani M, Deible R, et al. 1986. Widespread outbreaks of clam and oyster associated gastroenteritis: role of Norwalk virus. *N Engl J Med.* 314:678–81.
6. Nishitani L, Chew K. 1988. PSP toxins in Pacific Coast states: monitoring programs and effects on bivalve industries. *J Shellfish Res.* 1:653–69.
7. Rippey SR. 1994. Seafood borne disease outbreaks. U.S. Department of Health & Human Services, Public Health Service, Food and Drug Administration, Office of Seafood.

#### **3-202.110 Juice Treated**

1. Code of Federal Regulations, Title 21, Part 120 Hazard Analysis and Critical Control (HACCP) Systems.

2. Code of Federal Regulations, Title 21, Part 101.17(g) Juices that have not been specifically processed to prevent, reduce, or eliminate the presence of pathogens.
3. Code of Federal Regulations, Title 21, Part 120.4 Process Controls.

### **3-203.11 Molluscan Shellfish, Original Container**

1. Food and Drug Administration. 1983. Food Supplies—Special requirements for retaining shell-stock “tags.” (3/29/83), Retail Food Protection Program Information Manual.
2. Food and Drug Administration, Center for Food Safety and Applied Nutrition. 2007. [National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish](#).

### **3-203.12 Shellstock, Maintaining Identification**

1. Colburn KG, Kaysner CA, Wekell MM, Matches JR, Abeyta C Jr, Stott RF. 1989. Microbiological quality of oysters (*Crassostrea gigas*) and water of live holding tanks in Seattle, WA markets. *J Food Prot.* 52(2):100–4.
2. Food and Drug Administration/U.S. Public Health Service. 2007. [National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish](#).

### **3-301.11 Preventing Contamination from Hands**

1. Bidawid S, Farber JM, Sattar SA. 2000. Contamination of foods by food handlers: experiments on Hepatitis A virus transfer to food and its interruption. *Applied Env Microbiol* 66(7):2759–63.
2. Black RE, Dykes AC, Anderson KE, Wells JG, Sinclair SP, Gary GW Jr, et al. 1981. Hand washing to prevent diarrhea in day care centers. *Am J Epidemiol.* 113:445–51.
3. Cliver DO, Kostenbader KD. 1984. Disinfection of virus on hands for prevention of food-borne disease. *Intern J Food Microbiol.* 1:75–87.
4. Crisley FD, Foter MJ. 1965. The use of antimicrobial soaps and detergents for hand washing in food service establishments. *J Milk Food Technol.* 28:278–284.
5. Food and Drug Administration, Center for Food Safety and Applied Nutrition. 2009. Hepatitis A virus, in *Bad Bug Book*, [Foodborne Pathogenic Microorganisms and Natural Toxins Handbook](#).
6. Goldmann DA. 1991. The role of barrier precautions in infection control. *J Hosp Infect.* 18(suppl A):515–23.
7. Goldmann DA, Larson E, 1992. Handwashing and nosocomial infections. *New Eng J Med.* 327(2):120–2.
8. Horwood MP, Minch VA, 1951. The numbers and types of bacteria found on the hands of food handlers. *Food Res.* 16:133–6.
9. Humphrey TJ, Martin KW, Whitehead A. 1994. Contamination of hands and work surfaces with *Salmonella enteritidis* PT4 during the preparation of egg dishes. *Epidemiol Infect.* 113:403–9.
10. Kaferstein FK, Motarjemi Y, Bettcher DW. 1997. Foodborne disease control: a transnational challenge. *Emerg Infect Dis.* 3 (4):503–11.
11. Lowbury EJJ, Lilly HA, Bull JP. 1964. Disinfection of hands: removal of transient organisms. *Brit Med J.* 2:230–3.

12. Mead PS, Slutsker L, Dietz V, McCraig LF, Bresee JS, Shapiro C, et al. 1999. [Food-related illness and death in the United States](#). *Emerg Infect Dis.* 5 (5):38.
13. Paulson DS. 1992. Evaluation of three handwashing modalities commonly employed in the food processing industry. *Dairy Food Environ Sanitation.* 12(10):615–8.
14. Pether JVS, Gilbert RJ. 1971. The survival of salmonellas on finger-tips and transfer of the organisms to foods. *J Hyg Camb.* 69:673–81.
15. Rose JB, Slifko TR. 1999. Giardia, Cryptosporidium, and Cyclospora and their impact on foods: a review. *J Food Protect.* 62(9):1059–70.
16. Ross M, Guzewich J. 1999. Evaluation of risks related to microbiological contamination of ready-to-eat food by food preparation workers and the effectiveness of interventions to minimize those risks. FDA White Paper, FDA, CFSAN.
17. Smith JL. 1993. Cryptosporidium and Giardia as agents of foodborne disease. *J Food Prot.* 56:451–61.
18. Williams REO. 1963. Healthy carriage of Staphylococcus aureus: its prevalence and importance. *Bacteriol Rev.* 27:56–71.

### **3-302.11 Packaged and Unpackaged Food—Separation, Packaging, and Segregation**

1. Code of Federal Regulations, Title 21, Part 109, Unavoidable Contaminants in Food for Human Consumption and Food-Packaging Material.
2. Dickson JS. 1990. Survival and growth of Listeria monocytogenes on beef tissue surfaces as affected by simulated processing conditions. *J Food Safety.* 10:165–74.
3. Doyle MP, Schoeni JL. 1987. Isolation of Escherichia coli O157:H7 from retail fresh meats and poultry. *Appl Environ Microbiol.* 53:2394–6.
4. Stern NJ, Hernandez MP, Blankenship L, Deibel KE, Doors S, Doyle MP, et al. 1985. Prevalence and distribution of Campylobacter jejuni and Campylobacter coli in retail meats. *J Food Prot.* 48(7):595–9.

### **3-302.12 Food Storage Containers, Identified with Common Name of Food**

### **3-302.13 Pasteurized Eggs, Substitute for Raw Shell Eggs for Certain Recipes**

1. Cunningham FE. 1977. Egg pasteurization. In: Stadelman J, Cotterill OJ, eds. *Egg science and technology*. 2nd edition. AVI Publishing Company, Inc., Westport, CT; 161–86.
2. USDA/ARS. 1969. *Egg pasteurization manual (ARS 74-48)*, USDA/ARS Albany, CA.

### **3-302.15 Washing Fruits and Vegetables**

1. Beuchat L. 1998. Food safety issues. surface decontamination of fruits and vegetables eaten raw: a review. World Health Organization.
2. Chia-Min L, Cheng-I W. 1997. Transfer of Salmonella montevideo onto the interior surfaces of tomatoes by cutting. *J Food Prot.* 60(7):858–63.
3. Geldreich EE, Bordner RH. 1971. Fecal contamination of fruits and vegetables during cultivation and processing for market. *J Milk Food Technol.* 34:184–95.

4. Heisick JE, Wagner DE, Nierman ML, Peeler JT. 1989. *Listeria* spp. found in fresh market produce. *Appl Environ Microbiol.* 55(8):1925–7.
5. Madden JM. 1992. Microbial pathogens in fresh produce—the regulatory perspective. *J Food Prot.* 55(10):821–3.
6. Satchell FB, Stevenson P, Andrews WH, Estela L, Allen G. 1990. The survival of *Shigella sonnei* in shredded cabbage. *J Food Prot.* 53:558–62.
7. Steinbrugge ES, Maxcy RB, Liewen MB. 1988. Fate of *Listeria monocytogenes* on ready-to-serve lettuce. *J Food Prot.* 51:596–9.

### **3-303.11 Ice Used as Exterior Coolant, Prohibited as Ingredient**

### **3-303.12 Storage or Display of Food in Contact with Water or Ice**

1. Andrews WH, Wilson CR, Poelma PL, Romero A. 1977. Bacteriological survey of channel catfish *Ictalurus punctatus* at the retail level. *J Food Sci.* 42:359–64.

### **3-304.11 Food Contact with Equipment and Utensils**

1. Chia-Min L, Cheng-I W. 1997. Transfer of *Salmonella montevideo* onto the interior surfaces of tomatoes by cutting. *J Food Prot.* 60(7):858–63.
2. Escartin EF, Ayala AC, Lozano JS. 1989. Survival and growth of *Salmonella* and *Shigella* on sliced fresh fruit. *J Food Prot.* 52(7):471–2.
3. Golden GA, Rhodehamel EJ, Kautter DA. 1993. Growth of *Salmonella* spp. in cantaloupe, watermelon, and honeydew melons. *J Food Prot.* 56(3):194–6.
4. Humphrey TJ, Martin KW, Whitehead A. 1994. Contamination of hands and work surfaces with *Salmonella enteritidis* PT4 during the preparation of egg dishes. *Epidemiol Infect.* 113:403–9.
5. Kim HU, Goepfert JM. 1971. Occurrence of *Bacillus cereus* in selected dry food products. *J Milk Food Technol.* 34:12–5.
6. Lopes JA. 1986. Evaluation of dairy and food plant sanitizers against *Salmonella typhimurium* and *Listeria monocytogenes*. *J Dairy Sci.* 69:2791–6.
7. Reida P, Wolff M, Pohls HW, Kuhlmann W, Legnacher A, Aleksic S, et al. 1994. An outbreak due to enterohemorrhagic *Escherichia coli* O157/H7 in a children day-care-center characterized by person-to-person transmission and environmental contamination. *Zentralblatt Fur Bakteriologie-International [Int J Med Micro Vir Para Infect Dis].* 28(4):534–43.
8. Scott E, Bloomfield SF. 1990. The survival and transfer of microbial contamination via cloths, hands, and utensils. *J Appl Bacteriol.* 68:271–8.

### **3-304.12 In-use Utensils, Between-use Storage**

1. Food and Drug Administration. 1984. Food Preparation—Between-use storage of food preparation utensils (5/14/84). Retail Food Protection Program Information Manual.

### **3-304.14 Wiping Cloths, Limitation**

1. Scott E, Bloomfield SF. 1990. Investigations of the effectiveness of detergent washing, drying and chemical disinfection on contamination of cleaning cloths. *J Appl Bacteriol.* 68:279–83.

2. Scott E, Bloomfield SF. 1990. The survival and transfer of microbial contamination via cloths, hands and utensils. *J Appl Bacteriol.* 68:271–8.

### **3-304.15 Gloves, Use Limitation**

1. Beezhold DH, Kostyal DA, Wiseman J. 1994. The transfer of protein allergens from latex gloves. *AORN J.* 59(3):605–13.
2. Reddy S. 1998. Latex allergy. *Am Fam Phys.* 57(1):93–100.
3. Schwartz HJ. 1995. Latex: A potential hidden “food” allergen in fast food restaurants. *J Allergy Clin Immunol.* 95:139–40.
4. Tomazic VJ, Shampaine EL, Lamanna A, Withrow TJ, Adkinson FN Jr, Hamilton RG. 1994. Cornstarch powder on latex products is an allergen carrier. *J Allergy Clin Immunol.* 93(4):751–8.

### **3-304.17 Refilling Returnables**

1. Food and Drug Administration. 1985. Food Protection—Refilling of take-home beverage containers (8/29/85). Retail Food Protection Program Information Manual.

### **3-306.13 Consumer Self-service Operations**

1. Food and Drug Administration. 1984. Food Protection—Customer self-service of bulk food (4/16/84). Retail Food Protection Program Information Manual.

### **3-401.11 Raw Animal Foods**

1. Baker RC. 1990. Survival of *Salmonella enteritidis* on and in shelled eggs, liquid eggs, and cooked egg products. *Dairy Food Environ Sanitation.* 10(5):273–5.
2. Blankenship LE, Craven SE. 1982. *Campylobacter jejuni* survival in chicken meat as a function of temperature. *Appl Environ Microbiol.* 44(1):88–92.
3. Bryan FL, McKinley TW. 1979. Hazard analysis and control of roast beef preparation in foodservice establishments. *J Food Prot.* 42(1):4–18.
4. Buzby JC. 2001. Children and microbial foodborne illness. *Food Rev.* 24(2):32–37.
5. Castellani AG, Clark RR, Gibson MI, Meisner DF. 1952. Roasting time and temperature required to kill food poisoning microorganisms introduced experimentally into stuffing in turkeys. *Food Res.* 18:131–8.
6. FoodNet Foodborne Diseases Active Surveillance Network. 2000. [1998 final report](#).
7. Centers for Disease Control and Prevention. 1993. Update: multistate outbreak of *Escherichia coli* O157:H7 infections from hamburgers—western United States, 1992, 1993. *MMWR.* 42(14):258–63.
8. Code of Federal Regulations, Title 9, Part 318.10, Prescribed Treatment of Pork and Products Containing Pork to Destroy *Trichinae*.
9. Doyle MP, Schoeni JL. 1984. Survival and growth characteristics of *Escherichia coli* associated with hemorrhagic colitis. *Appl Environ Microbiol.* 48 (4):855–6.
10. Dubey JP, Kotula AW, Sharar A, Andrews CD, Lindsay DS. 1990. Effect of high temperature on infectivity of *Toxoplasma gondii* tissue cysts in pork. *J Parasitol.* 76 (2):201–4.

11. Dubey JP. 1998. *Toxoplasma gondii* oocysts survival under defined temperatures. *J Parasitol.* 84(4):862–5.
12. Goodfellow SJ, Brown WL. 1978. Fate of *Salmonella* inoculated into beef for cooking. *J Food Prot.* 41(8):598–605.
13. Hague MA, Warren KE, Hunt MC, Kropf DH, Kastner CL, Stroda SL, et al. 1994. Endpoint temperature, internal coked color, and expressible juice color relationships in ground beef patties. *J Food Sci.* 59(3):465–70.
14. Jay MT, Garrett V, Mohle-Boetani JC, Barros M, Farrar JA, et al. A multi-state outbreak of *Escherichia coli* O157:H7 infection linked to consumption of beef tacos at a fast-food restaurant chain. *Clin Infect Dis.* 2004;39(1):1–7.
15. Kotula AW, Murell KD, Acosta-Stein L, Lamb L. 1983. *Trichinella spiralis*: effect of high temperature on infectivity in pork. *Exp Parasitol.* 56:15–9.
16. Line JE, Fain AR Jr, Moran AB, Martin LM, Lechowich RV, Carosella JM, et al. 1991. Lethality of heat to *Escherichia coli* O157:H7: D-value and Z-value determinations in ground beef. *J Food Prot.* 54 (10):762–6.
17. Shah DB, Bradshaw JG, Peeler JT. 1991. Thermal resistance of egg-associated epidemic strains of *Salmonella enteritidis*. *J Food Sci.* 56:391–3.
18. Smith JL. 1994. *Taenia solium* neurocysticercosis. *J Food Prot.* 57(9):831–44.
19. Smith JL. 1992. *Toxoplasma gondii* in meats—a matter of concern? *Dairy Food Environ Sanitation.* 12(6):341–5.
20. USDA. 2001. Draft risk assessment of the public health impact of *Escherichia coli* O157:H7 in ground beef, executive summary (available in [PDF](#)). Office of Public Health and Science/Food Safety and Inspection Service/USDA.
21. Ward DR, Hackney CR. 1991. *Microbiology of marine food products*. Van Nostrand Reinhold, New York.
22. Webster RC, Esselen WB. 1956. Thermal resistance of food poisoning microorganisms in poultry stuffing. *J Milk Food Technol.* 19:209–12.

### **3-401.12 Microwave Cooking**

1. Aleixa JAG, Swaminathan B, Jamesen KS, Pratt DE. 1985. Destruction of pathogenic bacteria in turkeys roasted in microwave ovens. *J Food Sci.* 50:873–75, 880.
2. Czechowicz SM. 1996. Destruction of *Escherichia coli* O157:H7 in food and non-food systems by microwaves. Ph.D. Thesis. University of Minnesota.
3. Craven SE, Lillard HS. 1974. Effect of microwave heating of precooked chicken on *Clostridium perfringens*. *J Food Sci.* 39:211–2.
4. Dahl CA, Matthews ME, Marth EH. 1980. Fate of *Staphylococcus aureus* in beef loaf, potatoes and frozen and canned green beans after microwave heating in a simulated cook/chill hospital food service system. *J Food Prot.* 43:916–23.
5. Heddleson RA, Doores S. 1993. Factors affecting microwave heating of foods and microwave induced destruction of food pathogens—a review. *J Food Prot.* 57(11):1025–37.
6. Heddleson RA, Doores S, Anantheswaran RC, Kuhn GD. 1993. Viability loss of *Salmonella* species, *Staphylococcus aureus*, and *Listeria monocytogenes* in complex foods heated by microwave energy. *J Food Prot.* 59(8):813–8.

7. Sawyer CA, Biglari SA, Thompson SS. 1984. Internal end temperature and survival of bacteria on meats with and without a polyvinylidene chloride wrap during microwave cooking. *J Food Sci.* 49(3):972–3.
8. Sawyer CA. 1985. Post-processing temperature rise in foods: hot air and microwave ovens. *J Food Prot.* 48(5):429–34.

### **3-402.11 Parasite Destruction**

1. Bie JW, 1976. Experimental anisakiasis: cultivation and temperature tolerance determinations. *J Milk Food Technol.* 39:132–7.
2. Deardorff TL, Raybourne RB, Desowitz RS. 1986. Behavior and viability of third stage larvae of *Terranova* (HA) and *Anisakis simplex* (Type 1) under coolant conditions. *J Food Prot.* 47:49–52.
3. Deardorff TL, Throm R. 1988. Commercial blast-freezing kills third stage larvae of *Anisakis simplex* encapsulated in salmon and rockfish. *J Parasitol.* 74:233–50.
4. Food and Drug Administration. 1987. Food preparation—raw, marinated or partially cooked fishery products. Retail Food Protection Program Information Manual (8/21/87).
5. Food and Drug Administration. 1998. Fish and fishery products hazards and controls guide, Office of Seafood.
6. Gustafson PV. 1953. The effect of freezing on encysted *Anisakis* larvae. *J Parasitol.* 39:585–8.
7. Haigashi GI. 1985. Foodborne parasites transmitted to man from fish and other aquatic foods. *Food Technol.* 39(3):69–74.
8. Jackson GL. 1990. Parasitic protozoa and worms relevant to the U.S. *Food Technol.* 44(5):106–12.
9. Kaneko J, Bartram P. 1994. A position paper dated May 25, 1994 submitted to Dockets Management Branch, U.S. Food and Drug Administration in response to the proposed FDA HACCP program for seafood. See Part 4: Critical Review of FDA Position on Parasite Hazards in Tuna.
10. Ronald K. 1960. The effects of physical stimuli on larval stages of *Terranova decipiens*. *Can J Zool.* 38:623–42.
11. Ruitenbergh EJ. 1970. *Anisakiasis: pathogenesis, serodiagnosis and control.* University of Utrecht, Netherlands.

### **3-402.12 Records, Creation, and Retention**

#### **3-403.11 Reheating for Hot Holding**

1. Bennett RW, Berry MR. 1987. Serological activity and in vitro toxicity of *Staphylococcus aureus* enterotoxins A and D in selected canned foods. *J Food Sci.* 52:416–8.
2. Bradshaw JG, Peeler JT, Twedt RM. 1979. Thermal inactivation of *Clostridium botulinum* toxins types A and B in buffer, and beef and mushroom patties. *J Food Sci.* 44(6):1653–7.
3. Craven SE. 1980. Growth and sporulation of *Clostridium perfringens* in foods. *Food Technol.* 34(4):80–7.

4. Food Refrigeration & Process Engineering Research Centre, reporting period 1 March 95 to 1 August 96. Determination of unsatisfactory temperature distributions within foods heated in microwave ovens. Measurement and Testing Programme (MTP), Framework 3, Part 2, contract number MATI-CT 940014, University of Bristol, UK.
5. Heddleson RA, Doores S, Anantheswaran RC, Kuhn GD. 1993. Viability loss of *Salmonella* species, *Staphylococcus aureus*, and *Listeria monocytogenes* in complex foods heated by microwave energy. *J Food Prot.* 59(8):813–8.
6. Johnson KM, Nelson CL, Busta FF. 1983. Influence of temperature on germination and growth of spores of emetic and diarrheal strains of *Bacillus cereus* in growth medium and in rice. *J Food Sci.* 48:286–7.
7. Licciardello JJ, Ribich CA, Nickerson JTR, Goldblith SA. 1967. Kinetics of the thermal inactivation of type E *Clostridium botulinum* toxin. *Appl Microbiol.* 15(2):344–9.
8. Roy RJ, Busta FF, Thompson DR. 1981. Thermal inactivation of *Clostridium perfringens* after growth at several constant and linearly rising temperatures. *J Food Sci.* 46:1586–91.
9. Woodburn MJ, Somers E, Rodriguez J, Schantz EJ. 1979. Heat inactivation rates of botulism toxin A, B, E, and F in some foods and buffers. *J Food Sci.* 44:1658–61.

### **3-501.11 Frozen Food**

### **3-501.12 Potentially Hazardous Food (Time/Temperature Control for Safety Food), Slacking**

### **3-501.13 Thawing**

1. Bryan FL, McKinley TW. 1974. Prevention of foodborne illness by time-temperature control of thawing, cooking, chilling and reheating of turkeys in school lunch kitchens. *J Milk Food Technol.* 37:420–9.

### **3-501.14 Cooling**

1. Blankenship LC, Craven SE, Leffler RG, Custer C. 1988. Growth of *Clostridium perfringens* in cooked chili during cooling. *Appl Environ Microbiol.* 54(5):1104–8.
2. Bryan FL. 1974. Identifying foodborne disease hazards in food service establishments. *J Environ Health.* 36(6):537–40.
3. Bryan FL. 1979. Prevention of foodborne diseases in food service establishments. *J Environ Health.* 41(4):198–206.
4. Dickerson RW Jr, Read R.B Jr. 1973. Cooling rates of foods. *J Milk Food Technol.* 36(3):167–71.
5. Juneja VK, Snyder OP Jr, Cygnarowicz-Provost M. 1994. Influence of cooling rate on outgrowth of *Clostridium perfringens* spores in cooked ground beef. *J Food Prot.* 57(12):1063–7.
6. Lewis MN, Weisner HH, Winter AR. 1953. Bacterial growth in chicken salad. *J Am Diet Assoc.* 29:1094–9.
7. Longrée K, White JC. 1955. Cooling rates and bacterial growth in food prepared and stored in quantity. I: Broth and white sauce. *J Am Diet Assoc.* 31:124–132.

8. USDA/FSIS. 1999. Final rule-performance standards for the production of certain meat and poultry products. Fed Reg. 64:(3):732-49.

### **3-501.15 Cooling Methods**

1. Bryan FL. 1990. Application of HACCP to ready-to-eat chilled foods. Food Technol. 45(7):7077.
2. Rollin JL, Matthews ME. 1977. Cook-chill foodservice systems: temperature histories of a cooked beef product during the chilling process. J Food Prot. 40:782-4.

### **3-501.16 Potentially Hazardous Food (Time/Temperature Control for Safety Food), Hot and Cold Holding**

1. Abdul-Raouf UM, Beauchat LR, Ammar MS. 1993. Survival and growth of *Escherichia coli*:O157:H7 in ground roasted beef as affected by pH, acidulants, and temperature. Appl Environ Microbiol. 59(8):2364-8.
2. Ahmed AA, Moustafa MK, Marth EH. 1983. Incidence of *Bacillus cereus* in milk and some milk products. J Food Prot. 46:126-8.
3. Angelotti R, Foter MJ, Lewis KL. 1961. Time-temperature effects on *Salmonellae* and *Staphylococci* in foods. II. Behavior in warm holding temperatures. Am J Publ Health. 51:76-88.
4. Baxter R, Holzappel WH. 1982. A microbial investigation of selected spices, herbs, and additives in South Africa. J Food Sci. 47:570-8.
5. Blankenship LC, Craven SC, Leffler RG, Custer C, 1988. Growth of *Clostridium perfringens* in cooked chilli during cooling. Appl Environ Microbiol. 54: 1104-8.
6. Brown DF, Twedt RM. 1972. Assessment of the sanitary effectiveness of holding temperatures on beef cooked at low temperature. Appl Microbiol. 24: 599-603.
7. Bryan FL, Bartleson CA, Christopherson N. 1981. Hazard analyses, in reference to *Bacillus cereus*, of boiled and fried rice in Cantonese-style restaurants. J Food Prot. 44:500-12.
8. Collee JG, Knolden JA, Hobbs BC. 1961. Studies on the growth, sporulation and carriage of *Clostridium welchii* with special reference to food poisoning strains. J Appl Bacteriol. 24:326-9.
9. Craven SE, Blankenship LC, McDonel JL. 1981. Relationship of sporulation, enterotoxin formation and spoilage during growth of *Clostridium perfringens* type A in cooked chicken. Appl Environ Microbiol. 41: 1184-91.
10. Doyle MP, Bains NJ, Schoeni JL, Foster EM. 1982. Fate of *Salmonella typhimurium* and *Staphylococcus aureus* in meat salads prepared with mayonnaise. J Food Prot. 45:152-6.
11. El-Sherbeeney MR, Saddik MF, Aly HE-L, Bryan FL. 1985. Microbiological profile and storage temperatures of Egyptian rice dishes. J Food Prot. 48: 39-43.
12. Fermanian C, Fremy M, Claisse M. 1994. Effect of temperature on the vegetative growth of type and field strains of *Bacillus cereus*. Lett Appl Microbiol. 19: 414-8.
13. Hall HE, Angelotti R. 1965. *Clostridium perfringens* in meat and meat product. Appl Microbiol. 13: 352-4.

14. Johnson KM, Nelson CL, Busta FF. 1983. Influence of temperature on germination and growth of spores of emetic and diarrheal strains of *Bacillus cereus* in a broth model and in rice. *J Food Sci.* 48: 286–7.
15. Kim HU, Goepfert JM. 1971. Occurrence of *Bacillus cereus* in selected dry food products. *J Milk Food Technol.* 34:12–5.
16. Ladiges WC, Foster JF, Ganz WM. 1974. Incidence and viability of *Clostridium perfringens* in ground beef. *J Milk Food Technol.* 37(12):622–3.
17. Lillard HS. 1971. Occurance of *Clostridium perfringens* in boiler processing and further processing operations. *J Food Sci.* 36:1008–10.
18. Makukutu CA, Guthrie RK. 1986. Survival of *Escherichia coli* in food at hot-holding temperatures. *J Food Prot.* 49(7):496–9.
19. Mead GC. 1969. Growth and sporulation of *Clostridium welchii* in breast and leg muscle of poultry. *J Appl Bacteriol.* 32:86–95.
20. Mead P, Slutsker L, Dietz V, McCaig LF, Bresee JS, Shapiro C, et al. 1999. Food related illness and death in the United States. *Emerg Infect Dis* 5:607–25.
21. Mikolajcik EM, Kearney JW, Kristofferson T. 1973. Fate of *Bacillus cereus* in cultured and direct acidified skim milk and cheddar cheese. *J Milk Food Technol.* 36:317–20.
22. Morita TN, Woodburn MJ. 1977. Stimulation of *Bacillus cereus* growth by protein in cooked rice combinations. *J Food Sci.* 42 (5):1232–125.
23. Nakamura M, Kelly KD. 1968. *Clostridium perfringens* in dehydrated soups and sauces. *J Food Sci* 33:424–6.
24. Park Y, Mikolaicik EM. 1979. Effect of temperature on growth and alpha toxin production by *Clostridium perfringens*. *J Food Protect.* 42:848–51.
25. Rusul G, Yaacob NH. 1995. Prevalence of *Bacillus cereus* in selected foods and detection of enterotoxin using TECRA-VIA and BCET-RPLA. *Int J Food Microbiol.* 25: 31–39.
26. Seals JE, Snyder JD, Edell TA, Hatheway CL, Johnson CJ, Swanson RC, et al. 1981. Restaurant associated botulism: transmission by potato salad. *Am J Epidemiol.* 113:436–44.
27. Shoemaker SP, Pierson MD. 1976. “Phoenix phenomenon” in the growth of *Clostridium perfringens*. *Appl Environ Microbiol.* 32(6):803–07.
28. Smart JL, Roberts TA, Stringer MF, Shah N. 1979. The incidence and serotypes of *Clostridium perfringens* on beef, pork and lamb carcasses. *J Appl Bacteriol.* 46:377–83.
29. Solomon HM, Kautter DA. 1988. Outgrowth and toxin production by *Clostridium botulinum* in bottles of chopped garlic. *J Food Prot.* 51(11):862–5.
30. Strong DH, Canada JC, Griffiths B. 1962. Incidence of *Clostridium perfringens* in American foods. *Appl Microbiol.* 11:42–4.
31. Strong DH, Ripp NM. 1967. Effect of cooking and holding on hams and turkey rolls contaminated with *Clostridium perfringens*. *Appl Microbiol.* 15:1172–7.
32. Willardsen RR, Busta FF, Allen CE, Smith LB. 1978. Growth and survival of *Clostridium perfringens* during constantly rising temperatures. *J Food Sci.* 43:470–5.
33. Willardsen RR, Busta FF, Allen CE. 1979. Growth of *Clostridium perfringens* in three different beef media and fluid thioglycollate medium at static and constantly rising temperatures. *J Food Protect.* 42: 144–8.

### **3-501.17 Ready-to-eat, Potentially Hazardous Food (Time/Temperature Control for Safety Food), Date Marking**

### **3-501.18 Ready-to-eat, Potentially Hazardous Food (Time/Temperature Control for Safety Food), Disposition**

1. Chen Y, Ross WH, Scott VN, Gombas DE. 2003. *Listeria monocytogenes*: low levels equal low risk. *J Food Prot.* 66(4):570–7.
2. Code of Federal Regulations, Title 21, Part 114 Acidified foods.
3. Code of Federal Regulations, Title 21, Part 133 Cheeses and related cheese products.
4. Code of Federal Regulations, Title 9, Part 430. 2003. Control of *Listeria monocytogenes* in Ready-to-Eat Meat and Poultry Products.
5. Code of Federal Regulations, Title 21, Part 110 Current good manufacturing practice in manufacturing, packing, or holding human food.
6. Code of Federal Regulations, Title 9, Part 317 Labeling, marking devices, and containers.
7. Code of Federal Regulations, Title 21, Part 131 Milk and cream.
8. Food and Drug Administration/CDC. 2003. [Reducing the Risk of \*Listeria monocytogenes\*](#). FDA/CDC 2003 Update of the *Listeria* Action Plan.
9. Food and Drug Administration/USDA/CDC. 2003. Quantitative Assessment of the Relative Risk to Public Health from Foodborne *Listeria monocytogenes* Among Selected Categories of Ready-to-Eat Foods.
10. Food and Drug Administration. 2001. Docket No. 99N-1168 and FSIS Docket No. 00-048N, 2001. Draft assessment of the relative risk to public health from foodborne *Listeria monocytogenes* among selected categories of ready-to-eat foods.
11. Food and Drug Administration. 1999. [Date marking of cheese](#). Retail Food Protection Team Program Information Manual (12/15/99).
12. Genigeorgis C, Carniciu M, Dutulescu D, Farver TB. 1991. Growth and survival of *Listeria monocytogenes* in market cheeses stored at 4 to 30°C. *J Food Prot.* 54(9):662–8.
13. Gombas DE, Chen Y, Clavero R, Scott VN. 2003. Survey of *Listeria monocytogenes* in ready-to-eat foods. *J Food Prot.* 66(4):559–69.
14. Palumbo SA. 1986. Is refrigeration enough to restrain foodborne pathogens? *J Food Prot.* 49(12):1003–9.
15. Rosso L, Bajard S, Flandrois JP, Lahellec C, Fournaud J, Veit P. 1996. Differential growth of *Listeria monocytogenes* at 4 and 8°C: consequences for the shelf life of chilled products. *J Food Prot.* 59:944–9.
16. Ryser ET, Marth EH. 1987. Behavior of *Listeria monocytogenes* during the manufacture and ripening of cheddar cheese. *J Food Prot.* 50(1):7–13.
17. Steinbruegge ED, Maxcy RB, Liewen MB. 1988. Fate of *Listeria monocytogenes* on ready to serve lettuce. *J Food Prot.* 51:596–9.
18. USDA Agricultural Research Service. [Pathogen Modeling Program Version 7.0](#). Microbial Food Safety Research Unit, Wyndmoor, PA.

19. USDA/FSIS. 2006. Directive 10.240.4. 2006. Verification procedures for the *Listeria monocytogenes* regulation and microbial sampling of ready-to-eat (RTE) products for the FSIS Verification Testing Program (available in [PDF](#)).
20. Wallace FM, Call JE, Porto ACS, Cocoma GJ, ERRC Special Project Team, Luchansky JB. 2003. Recovery rate of *Listeria monocytogenes* from commercially prepared frankfurters during extended refrigerated storage. *J Food Prot.* 66(4):584–91.
21. Yousef AE, Marth EH. 1988. Behavior of *Listeria monocytogenes* during the manufacture and storage of Colby cheese. *J Food Prot.* 51(1):12–5.

### **3-501.19 Using Time as a Public Health Control**

1. Bryan FL, Kilpatrick EG. 1971. *Clostridium perfringens* related to roast beef cooking, storage and contamination in a fast food service restaurant. *Am J Public Health.* 61 (9):1869–85.
2. Conference for Food Protection, Council III Committee Report. 2004. Time as a public health control. Conference for Food Protection.
3. Doan CH, Davidson PM. 1999. Growth of *Bacillus cereus* on oil-blanched potato strips for “home-style” french fries. *J Food Sci.* 64:909–12.
4. Doan CH, Davidson PM. 1999. Growth and production of Enterotoxin A by *Staphylococcus aureus* on “home-style” french fries. *J Food Sci.* 64:913–7.
5. Ferguson RD, Shelef LA. 1990. Growth of *Listeria monocytogenes* in soy milk. *Food Microbiol.* 7:49–52.
6. ICMSF. 1996. *Microorganisms in Foods 5. Characteristics of microbial pathogens.* Chapter 2, *Bacillus cereus.* Blackie Academic & Professional, London; P20–35.
7. ICMSF. 1996. *Microorganisms in Foods 5. Characteristics of microbial pathogens.* Chapter 6, *Clostridium perfringens.* Blackie Academic & Professional, London; P112–25.
8. Johnson KM, Nelson CL, Busta FF. 1983. Influence of temperature on germination and growth of spores of emetic and diarrheal strains of *Bacillus cereus* in growth medium and in rice. *J Food Sci.* 48:286–7.
9. Mead PS, Slutsker L, Dietz V, McCaig LF, Bresee JS, Shapiro C, et al. 1999. Food related illness and death in the United States. *Emerg Infect Dis.* 5 (5):607–25.
10. Melling J, Capel BJ. 1978. Characteristics of *Bacillus cereus* toxin. *FEMS Micro Lett.* 4:133–35.
11. Sionkowski PJ, Shelef LA. 1990. Viability of *Listeria monocytogenes* strain Brie-1 in the avian egg. *J Food Prot.* 53(1):15–17.
12. Solomon HM, Kautter DA. 1986. Growth and toxin production by *Clostridium botulinum* in sautéed onions. *J Food Prot.* 49(10):618–20.
13. Solomon HM, Kautter DA. 1988. Outgrowth and toxin production by *Clostridium botulinum* in bottled chopped garlic. *J Food Prot.* 51(11):862–5.
14. Tatini SR. 1973. Influence of food environments on growth of *Staphylococcus aureus* and production of various enterotoxins. *J Milk Food Technol.* 36(11):559–63.
15. USDA Agriculture Agricultural Research Service. Pathogen Modeling Program Version 7.0. [Microbial Food Safety Research Unit](#). Wyndmoor, PA.

### **3-502.11 Variance Requirement**

1. Barber FE, Deibel RH. 1972. Effect of pH and oxygen tension on Staphylococcal growth and enterotoxin formation in fermented sausage. *Appl Microbiol.* 24:891–8.
2. Dickerson RW, Read RB. 1968. Calculations and measurement of heat transfer in foods. *Food Technol.* 22:1533.
3. Dickerson RW, Read RB. 1973. Cooling rates in foods. *J Milk Food Technol.* 36(3):167–71.
4. Food and Drug Administration. 1999. [Guidance for Industry: Reducing Microbial Food Safety Hazards for Sprouted Seeds](#). Washington, D.C.
5. Food and Drug Administration. 1999. [Guidance for Industry: Sampling and Microbial Testing of Spent Irrigation Water During Sprout Production](#). Washington, D.C.
6. Montville R, Schaffner DW. 2004. Analysis of published sprout seed sanitation studies shows treatments are highly variable. *J Food Prot.* 67(4):758–65.
7. National Advisory Committee on Microbiological Criteria for Foods. 1992. Hazard analysis and critical control point system. *Int J Food Microbiol.* 16:1–23.
8. Pierson MD, Corlett DA Jr. eds. 1992. HACCP principles and applications. Van Nostrand Reinhold, New York.
9. Shigehisa T, Nakagami T, Taji S. 1985. Influence of heating and cooling rates on spore germination and growth of *Clostridium perfringens* in media and in roast beef. *Jpn J Vet Sci.* 47(2):259.
10. Snyder OP Jr. 1986. Applying the hazard analysis and critical control points system in foodservice and foodborne illness prevention. *J Foodservice Systems* 4:125–31.
11. Sperber WH. 1982. Requirements of *Clostridium botulinum* for growth and toxin production. *Food Technol.* 36(12):89–94.
12. Tanaka N. 1982. Challenge of pasteurized process cheese spreads with *Clostridium botulinum* using in-process and post-process inoculation. *J Food Prot.* 45:1044–50.
13. Troller JA. 1972. Effect of water activity on enterotoxin A production and growth of *Staphylococcus aureus*. *Appl Microbiol.* 24(3):440–3.

### **3-502.12 Reduced Oxygen Packaging Without a Variance, Criteria**

1. Association of Food and Drug Officials. 1990. Retail guidelines - Refrigerated foods in reduced oxygen packages. *J Assoc Food Drug Offic.* 54(5):80–84.
2. Aureli P, Di Cunto M, Maffei A, De Chiara G, Fransiosa G, Accorinti L, et al. 2000. An outbreak in Italy of botulism associated with a dessert made with mascarpone cream cheese. *Europ J Epidemiol.* 16:913–8.
3. Bennett RW, Amos WT. 1982. *Staphylococcus aureus* growth and toxin production in nitrogen packed sandwiches. *J Food Prot.* 45(2):157–61.
4. Berrang ME, Brackett RE, Beuchat LR. 1989. Growth of *Listeria monocytogenes* on fresh vegetables under controlled atmosphere. *J Food Prot.* 52:702–5.
5. Briozzo J, de Lagarde EA, Chirife J, Parada JL. 1983. *Clostridium botulinum* Type A growth and toxin production in media and process cheese spread. *Appl Environ Microbiol.* 45:1150–2.
6. Code of Federal Regulations, Title 21, Part 133 Cheeses and Related Cheese Products.

7. Code of Federal Regulations, Title 9, Part 424 Preparation and Processing Operations, Use of food ingredients and sources of radiation.
8. Conner DE, Scott VN, Bernard DT, Kautter DA. 1989. Potential *Clostridium botulinum* hazards associated with extended shelf-life refrigerated foods: a review. *J Food Safety* 10:131–53.
9. Davis H, Taylor JP, Perdue JN, Stelma N Jr, Humphreys JM Jr, Roundtree R III, et al. 1988. A shigellosis outbreak traced to commercially distributed shredded lettuce. *Am J Epidemiol.* 128(6):1312–21.
10. Doyle MP. 1991. Evaluating the potential risk from extended shelf-life refrigerated foods by *Clostridium botulinum* inoculation studies. *Food Technol.* 44(4):154–6.
11. Farber JM, Dodd KL, eds. 1995. Principles of modified-atmosphere and sous vide product packaging. Technomic Publishing Company, Inc., Lancaster, PA.
12. Gill CO, Delacy KM. 1991. Growth of *Escherichia coli* and *Salmonella typhimurium* on high-pH beef packaged under vacuum or carbon dioxide. *Int J Food Microbiol.* 13:21–30.
13. Glass KA, Johnson EA. 2004. Factors that contribute to the botulinal safety of reduced-fat and fat-free process cheese products. *J Food Prot.* 67:1687–93.
14. Gould GW. 1999. Sous vide foods: conclusions of an ECFE botulinum working party. *Food Control.* 10:47–51.
15. Grau FH, Vanderline PB. 1990. Growth of *Listeria monocytogenes* on vacuum packaged beef. *J Food Prot.* 53:739–741, 746.
16. Johnson EA, Nelson JH, Johnson M. 1990. Microbiology safety cheese made from heat-treated milk, Part 1 Executive summary, introduction and history. *J Food Prot.* 53:441–52.
17. Juneja V, Martin ST, Sapers GM. 1998. Control of *Listeria monocytogenes* in vacuum-packaged pre-peeled potatoes. *J Food Science* 63(5):911–4.
18. Kautter DA. 1964. *Clostridium botulinum* type E in smoked fish. *J Food Sci.* 29:843–9.
19. Marth EH. 1998. Extended shelf life refrigerated foods: microbiological quality and safety. *Food Technol* 5(2):57–62.
20. National Advisory Committee on Microbiological Criteria for Foods. 1990. Refrigerated foods containing cooked, uncured meat or poultry products that are packaged for extended refrigerated shelf life and that are ready-to-eat or prepared with little or no additional heat treatment (available in [PDF](#)). Washington, DC.
21. New York Department of Agriculture and Markets. 1993. Guidelines for Reduced Oxygen Packaging at Retail. Division of Food Safety and Inspection.
22. Nolan DA, Chamblin DC, Troller JA. 1992. Minimal water activity for growth and survival of *Listeria monocytogenes* and *Listeria innocua*. *Int J Food Microbiol.* 16:323–35.
23. Olarte C, González-Fandos E, Giménez M, Sanz S, Portu J. 2002. The growth of *Listeria monocytogenes* in fresh goat cheese (Cameros cheese) packaged under modified atmospheres. *Food Microbiol.* 19:75–82.
24. Pourshafie MR, Saifie M, Shafiee A, Vahdani P, Aslani M, Salemian J. 1998. An outbreak of food-borne botulism associated with contaminated locally made cheese in Iran. *Scand J Infect Dis.* 30:92–94.

25. Refrigerated Foods and Microbiological Criteria Committee of the National Food Processors Association. 1988. Factors to be considered in establishing good manufacturing practices for the production of refrigerated foods. *Dairy Food Sanitation*. 8(6):288–91.
26. Refrigerated Foods and Microbiological Criteria Committee of the National Food Processors Association. 1988. Safety Considerations for New Generation Refrigerated Foods. *Dairy Food Sanitation*. 8(1):5–7.
27. Smelt JPP, Raatjes GJM, Crowther JS, Verrips CT, 1981. Growth and toxin formation by *Clostridium botulism* at low pH values. *J Appl Bact*. 52:75–82.
28. Townes JM, Cieslak PR, Hatheway CL, Solomon HM, Holloway JT, Baker MP, et al. 1996. An outbreak of Type A Botulism associated with a commercial cheese sauce. *Ann Int Med*. 125:558–63.
29. Whitley E, Muir D, Waites WM. 2000. The growth of *Listeria monocytogenes* in cheese packed under a modified atmosphere. *J Appl Microbiol*. 88:52–7.

### **3-601.11 Standards of Identity**

### **3-601.12 Honestly Presented**

### **3-602.11 Food Labels**

### **3-602.12 Other Forms of Information**

### **3-603.11 Consumption of Raw or Undercooked Animal Foods**

1. Centers for Disease Control and Prevention. 1993. Update: Multistate outbreak of *Escherichia coli* O157:H7 infections from hamburgers—western United States, 1992,1993. *MMWR*. 42(14):258–63.
2. Code of Federal Regulations, Title 9, Part 319 Definitions and standards of identity or composition.
3. Code of Federal Regulations, Title 21, Part 101—Food labeling.
4. Code of Federal Regulations, Title 9, Part 317 Labeling, marking devices, and containers.
5. Federal Food, Drug, and Cosmetic Act, Sec. 403(q)(3)-(5), nutrition labeling.
6. Morris JG Jr. 1988. *Vibrio vulnificus*: A new monster of the deep? *Ann Intern Med*. 109:261–3.
7. Potter ME, Kauffmann AF, Blake PA, Feldman RA. 1984. Unpasteurized milk: the hazards of a health fetish. *J Am Med Assoc*. 252:2048–52.
8. St. Louis M, Morse DL, Potter ME, DeMelfi TM, Guzewish JJ, Tauxe RV, et al. 1988. The emergence of Grade A eggs as a major source of *Salmonella enteritidis* infections: New implications for the control of Salmonellosis. *J Am Med Assoc*. 259:2103–7.
9. Tacket CO, Dominguez LB, Fisher HJ, Cohen ML. 1985. An outbreak of multiple-drug-resistant *Salmonella enteritidis* from raw milk. *J Am Med Assoc*. 253:2058–60.

### **3-801.11 Pasteurized Foods, Prohibited Reservice, and Prohibited Food**

1. Besser RE, Lett SM, Webber JT, Doyle MP, Barrett TJ, Wells JG, et al. 1993. An outbreak of diarrhea and hemolytic uremic syndrome from *Escherichia coli* O157H:7 in fresh-pressed apple cider. *J Am Med Assoc.* 269(17):2217–20.
2. Code of Federal Regulations, Title 21, Part 120 Hazard Analysis and Critical Control Point (HACCP): [Procedures for the Safe and Sanitary Processing and Importing of Juice.](#)
3. Conner DE, Kotrola JS. 1995. Growth and survival of *Escherichia coli* O157H:7 under acidic conditions. *Appl Environ Microbiol.* 61:382–5.
4. Goverd KA, Beech FW, Hobbs RP, Shannon R. 1979. The occurrence and survival of coliforms and salmonellas in apple juice and cider. *J Appl Bacteriol.* 46:521–30.
5. Humphrey TJ, Martin KW, Whitehead A. 1994. Contamination of hands and work surfaces with *Salmonella enteritidis* PT4 during the preparation of egg dishes. *Epidemiol Infect.* 113: 403–9.
6. Miller LG, Kaspar CW. 1994. *Escherichia coli* O157:H7 acid tolerance and survival in apple cider. *J Food Prot.* 57(6):460–4.
7. Zhao T, Doyle MP, Besser RE. 1993. Fate of enterohemorrhagic *Escherichia coli* O157:H7 in apple cider with and without preservatives. *Appl Environ Microbiol.* 59(8):2526–30.

## **Chapter 4 Equipment, Utensils, and Linens**

### **4-101.13 Lead, Use Limitation**

1. Food and Drug Administration. 2003. Compliance program guidance manual, program 7304.019, [Toxic elements in food and foodware, and radionuclides in food](#)—import and domestic, Chapter 04—Pesticide and Chemical Contaminants.
2. Food and Drug Administration. 1995. [Compliance policy guide section 545.450 pottery \(ceramics\); imported and domestic—lead contamination](#) (CPG 7117.07).
3. Food and Drug Administration. 1998. Dangers of lead still linger. *FDA Consumer.* Jan–Feb.

### **4-101.14 Copper, Use Limitation**

1. Low BA, Donahue JM, Bartley CB. 1996. Final Report—A Study on Backflow Prevention Associated with Carbonators. NSF International, Ann Arbor, MI; 18–20.
2. Peterson CS. 1979. *Microbiology of food fermentation.* 2nd edition. AVI Publishing Co., Inc., Westport, CT; 288–293.

### **4-101.16 Sponges, Use Limitation**

1. Enriquez CE, Enriquez-Gordillo R, Kennedy DI, Gerba CP. 1997. Bacteriological survey of used cellulose sponges and cotton dishcloths from domestic kitchens. *Dairy Food Environ Sanitation.* 17(1):20–24.

### **4-101.17 Wood, Use Limitation**

1. Abrishami SH, Tall BD, Bruursema TJ, Epstein PS, Shah DB. 1994. Bacterial adherence and viability on cutting board surfaces. *Journal Food Saf.* 14 (1994):153–72.
2. Agricultural Research Service, U.S. Department of Agriculture. 1993. ARS affirms plastic cutting board policies. *Food Chemical News.* 1993 Dec 6;56–7.

3. Code of Federal Regulations, Title 21, Part 178.3800 Preservatives for wood.

#### **4-204.13 Dispensing Equipment, Protection of Equipment and Food**

1. NSF/ANSI 18-2007 Manual Food and Beverage Dispensing Equipment. [NSF International](#).

#### **4-501.13 Microwave Ovens**

1. Code of Federal Regulations, Title 21, Part 1030.10 Microwave ovens.

#### **4-501.114 Manual and Mechanical Warewashing Equipment, Chemical Sanitization—Temperature, pH, Concentration, and Hardness**

1. Code of Federal Regulations, Title 21, Part 1030.10 Microwave ovens.
2. Code of Federal Regulations, Title 40, Part 180.940 Tolerance exemptions for active and inert ingredients for use in antimicrobial formulations (food-contact surface sanitizing solutions).
3. Miller MP. 1984. Relationship of factors affecting bactericidal effectiveness of chlorine sanitizing solutions. Final report. National Sanitation Foundation, Ann Arbor, MI., subcontract No. 9013-092-108-H0620-101; Booz, Allen & Hamilton, Inc. contract No. 223-80-2295.
4. Miller MP. 1985. Relationship of factors affecting bactericidal effectiveness of chlorine sanitizing solutions. Addendum to final report. National Sanitation Foundation, Ann Arbor, MI., subcontract No. 9013-092-108-H0620-101; Booz, Allen & Hamilton, Inc. contract No. 223-80-2295.
5. National Sanitation Foundation. 1990. Report on the bacterial effectiveness of a chlorine sanitizing solution at contact times of less than ten seconds. Purchase order #FDA 665531-00-90-RB. National Sanitation Foundation, Ann Arbor, MI.

#### **4-602.11 Equipment Food-contact Surfaces and Utensils**

1. Tauxe RV, Cohen ML. 1996. Memo dated January 10, 1996, re: bacterial contamination of iced tea. Sent to State and Territorial Epidemiologists and State and Territorial Public Health Laboratory Directors. Memo includes two fact sheets by the Tea Association of the U.S.A., Inc.

#### **4-603.17 Returnables, Cleaning for Refilling**

1. Food and Drug Administration. 1985. Food Protection—Refilling of take-home beverage containers (8/29/85). Retail food protection program information manual.

#### **4-703.11 Hot Water and Chemical**

1. Miller MP. 1984. Relationship of factors affecting bactericidal effectiveness of chlorine sanitizing solutions. Final report. National Sanitation Foundation, Ann Arbor, MI., subcontract No. 9013-092-108-H0620-101; Booz, Allen & Hamilton, Inc. contract No. 223-80-2295.
2. Miller MP. 1985. Relationship of factors affecting bactericidal effectiveness of chlorine sanitizing solutions. Addendum to final report. National Sanitation Foundation, Ann Arbor, MI., subcontract No. 9013-092-108-H0620-101; Booz, Allen & Hamilton, Inc. contract no. 223-80-2295.

3. National Sanitation Foundation. 1990. Report on the bacterial effectiveness of a chlorine sanitizing solution at contact times of less than ten seconds. Purchase order #FDA 665531-00-90-RB. National Sanitation Foundation, Ann Arbor, MI.

#### **4-901.11 Equipment and Utensils, Air Drying Required**

1. Code of Federal Regulations, Title 40, Part 180.940 Tolerance Exemptions for Active and Inert Ingredients for Use in Antimicrobial Formulations (food-contact surface sanitizing solutions), before contact with food.

### **Chapter 5 Water, Plumbing, and Waste**

1. Code of Federal Regulations, Title 40, Part 180.940 Tolerance Exemptions for Active and Inert Ingredients for Use in Antimicrobial Formulations (food-contact surface sanitizing solutions), before contact with food.
2. Code of Federal Regulations, Title 21, Part 129—Processing and Bottling of Bottled Drinking Water.
3. [International Association of Plumbing and Mechanical Officials](#), 2003 Uniform plumbing code. Walnut, CA. Available for sale.
4. [International Code Council](#). 2003 International plumbing code. Falls Church, VA. Available for sale.

#### **5-102.12 Nondrinking Water**

1. FDA. 2008. [Program information manual, retail food protection, storage and handling of tomatoes](#). Posted 10/05/07, updated 09/25/08
2. FDA. 2008. [Guide to minimize microbial food safety hazards for fresh-cut fruits and vegetables](#). Posted 10/26/98, updated 08/19/03, 02/2008.

#### **5-202.12 Handwashing Facility, Installation**

1. American Society for Testing and Materials. Designation: E 1838-02, standard test method for determining the virus-eliminating effectiveness of liquid hygienic handwash and handrub agents using the fingerpads of adult volunteers. ASTM, Philadelphia, PA.
2. American Society for Testing and Materials. Designation: E 2011-99, standard test method for evaluation of handwashing formulations for virus-eliminating activity using the entire hand. ASTM, Philadelphia, PA.
3. American Society for Testing and Materials, Designation: E 1327-90 (reapproved 2000), standard test method for evaluation of health care personnel handwash formulations by utilizing fingernail regions. ASTM, Philadelphia, PA.
4. American Society for Testing and Materials, Designation: E 1174-00, standard test method for evaluation of health care personnel or consumer handwash formulations. ASTM, Philadelphia, PA.
5. Code of Federal Regulations, Title 21, Part 129 Processing and Bottling of Drinking Water.

#### **5-203.13 Service Sink**

1. Barker J, Bloomfield SF. 2000. Survival of Salmonella in bathrooms and toilets in domestic homes following salmonellosis. *J Appl Microbiol.* 89:137–44.

2. Barker J, Jones MV. 2005. The potential spread of infection caused by aerosol contamination of surfaces after flushing a domestic toilet. *J Appl Microbiol.* 99:339–47.
3. Barker J, Vipond IB, Bloomfield SF. 2004. Effects of cleaning and disinfection in reducing the spread of Norovirus contamination via environmental surfaces. *J Hosp Infect.* 58:42–9.
4. Cheesbrough JS, Green J, Gallimore CI, Wright PA. 2000. Widespread environmental contamination with Norwalk-like viruses (NLV) detected in a prolonged hotel outbreak of gastroenteritis. *Epidemiol Infect.* 125:93–8.
5. Gerba CP, Wallis C, Melnick JL. 1975. Microbiological hazards of household toilets: droplet production and the fate of residual organisms. *Appl Microbiol.* 30(2):229–37.
6. Mokhtari A, Jaykus L, 2009. Quantitative exposure model for the transmission of norovirus in retail food preparation. *Int J Food Microbiol.* 133 (1–2):38–47.

### **5-203.15 Backflow Prevention Device, Carbonator**

1. American Society of Sanitary Engineering. [ASSE product performance standards](#), Standard 1022. ASSE International, Westlake, OH.

## **Chapter 6 Physical Facilities**

### **6-202.15 Outer Openings, Protected**

1. National Fire Protection Association. 2009. [NFPA 101 life safety code](#). Quincy, MA. Available for sale.
2. National Fire Protection Association, 2009. *NFPA 101 life safety code handbook*. Quincy, MA.

### **6-303.11 Intensity**

1. Illuminating Engineering Society of North America. 2000. *Lighting Handbook*. 9th edition. IESNA Publications Dept., New York, NY.

### **6-301.12 Hand Drying Provision**

1. Patrick DR, Findon G, Miller TE. 1997. Residual moisture determines the level of touch-contact-associated bacterial transfer following hand washing. *Epidemiol Infect.* 119:319–25.

### **6-501.18 Cleaning Plumbing Fixtures**

1. Barker J, Bloomfield SF. 2000. Survival of Salmonella in bathrooms and toilets in domestic homes following salmonellosis. *J App Microbiol.* 89:137–44.
2. Barker J, Jones MV. 2005. The potential spread of infection caused by aerosol contamination of surfaces after flushing a domestic toilet. *J App Microbiol.* 99, 339–47.
3. Barker J, Vipond IB, Bloomfield SF. 2004. Effects of cleaning and disinfection in reducing the spread of Norovirus contamination via environmental surfaces. *J Hosp Infect.* 58:42–9.
4. Cheesbrough JS, Green J, Gallimore CI, Wright PA. 2000. Widespread environmental contamination with Norwalk-like viruses (NLV) detected in a prolonged hotel outbreak of gastroenteritis. *Epidemiol Infect.* 125:93–8.
5. Gerba CP, Wallis C, Melnick JL. 1975. Microbiological hazards of household toilets: droplet production and the fate of residual organisms. *Appl Microbiol.* 30(2):229–37.

## **Chapter 7 Poisonous or Toxic Materials**

### **7-202.12 Conditions of Use**

1. Federal Insecticide, Fungicide, and Rodenticide Act (available in [PDF](#)), 7 USC 136 Definitions, (e) Certified Applicator, of the Federal Insecticide, Fungicide, and Rodenticide Act.

### **7-204.11 Sanitizers, Criteria**

1. Code of Federal Regulations, Title 40, Part 180.940 Tolerance exemptions for active and inert ingredients for use in antimicrobial formulations (food-contact surface sanitizing solutions).

### **7-204.12 Chemicals for Washing Fruits and Vegetables, Criteria**

1. Code of Federal Regulations, Title 21, Part 173.315, Chemicals used in washing or to assist in the peeling of fruits and vegetables.

### **7-204.13 Boiler Water Additives, Criteria**

1. Code of Federal Regulations, Title 21, Part 173.310, Boiler water additives.

### **7-204.14 Drying Agents, Criteria**

1. Code of Federal Regulations, Title 21, Part 184, Direct Food Substances Affirmed as Generally Recognized as Safe.
2. Code of Federal Regulations, Title 21, Parts 175, Indirect Food Additives: Adhesives and Components of Coatings.
3. Code of Federal Regulations, Title 21, Parts 178, Indirect Food Additives: Adjuvants, Production Aids, and Sanitizers.
4. Code of Federal Regulations, Title 21, Parts 176, Indirect Food Additives: Paper and Paperboard Components.
5. Code of Federal Regulations, Title 21, Parts 177, Indirect Food Additives: Polymers.
6. Code of Federal Regulations, Title 21, Part 186, Indirect Food Substances Affirmed as Generally Recognized as Safe.
7. Code of Federal Regulations, Title 21, Part 181, Prior-Sanctioned Food Ingredients.
8. Code of Federal Regulations, Title 21, Part 182, Substances Generally Recognized as Safe.
9. Code of Federal Regulations, Title 21, Part 170.39, Threshold of regulation for substances used in food-contact articles.

### **7-205.11 Incidental Food Contact, Criteria**

1. Code of Federal Regulations, Title 21, Part 178.3570, Lubricants with incidental food contact.

### **7-206.11 Restricted-use Pesticides, Criteria**

1. Code of Federal Regulations, Title 40, Part 152 Subpart I, Classification of Pesticides.

## **Additional Chapter 7.0 Food Safety References**

Mead PS, Slutsker L, Dietz V, McCaig LF, Bresee JS, Shapiro C, et al. 1999. Food-related illness and death in the United States. *Emerg Infect Dis.* 5(5).

Food and Drug Administration, Center for Food Safety and Applied Nutrition. 1998. Foodborne pathogenic microorganisms and natural toxins handbook: the “bad bug book.”

Guzewich J, Ross MP. 1999. Evaluation of risks related to microbiological contamination of ready-to-eat food by food preparation workers and the effectiveness of interventions to minimize those risks. Food and Drug Administration.

Food and Drug Administration, Center for Food Safety and Applied Nutrition. 2000. CFP 2000 backgrounder: no bare hand contact.

Larson E, 1995. APIC guidelines for handwashing and hand antisepsis in healthcare settings. *Am J Infect Control.* 23:251–69.

NSF International. 1983. NSF C2-1983, Special equipment and/or devices (food service equipment). Ann Arbor, MI.

NSF International. 1996. ANSI/NSF 2-1996, Food equipment. Ann Arbor, MI.

NSF International. 1996. ANSI/NSF 3-1996, Commercial spray-type dishwashing and glasswashing machines. Ann Arbor, MI.

NSF International. 1999. ANSI/NSF 4-1999, Commercial cooking, rethermalization, and powered hot food holding and transport equipment. Ann Arbor, MI.

NSF International. 1992. NSF 5-1992, Water heaters, hot water supply boilers, and heat recovery equipment. Ann Arbor, MI.

NSF International. 1996. ANSI/NSF 6-1996, Dispensing freezers (for dairy dessert-type products). Ann Arbor, MI.

NSF International. 1997. ANSI/NSF 7-1997, Commercial refrigerators and storage freezers. Ann Arbor, MI.

NSF International. 1992. ANSI/NSF 8-1992, Commercial powered food preparation equipment. Ann Arbor, MI.

NSF International. 1992. ANSI/NSF 12-1992, Automatic ice making equipment. Ann Arbor, MI.

NSF International. 1992. ANSI/NSF 13-1992, Refuse compactors and compactor systems. Ann Arbor, MI.

NSF International. 1996. ANSI/NSF 18-1996, Manual food and beverage dispensing equipment. Ann Arbor, MI.

NSF International. 1998. ANSI/NSF 20-1998, Commercial bulk milk dispensing equipment. Ann Arbor, MI.

NSF International. 1996. ANSI/NSF 21-1996, Thermoplastic refuse containers. Ann Arbor, MI.

NSF International. 1997. ANSI/NSF 25-1997, Vending machines for food and beverages. Ann Arbor, MI.

NSF International. 1980. NSF 26-1980, Pot, pan, and utensil commercial spray-type washing machines. Ann Arbor, MI.

NSF International. 1992. ANSI/NSF 29-1992, Detergent and chemical feeders for commercial spray-type dishwashing machines. Ann Arbor, MI.

NSF International. 1991. ANSI/NSF 35-1991, Laminated plastics for surfacing food service equipment. Ann Arbor, MI.

NSF International. 1996. ANSI/NSF 36-1996, Dinnerware. Ann Arbor, MI.

NSF International. 1992. ANSI/NSF 37-1992, Air curtains for entranceways in food and food service establishments. Ann Arbor, MI.

NSF International. 1997. ANSI/NSF 51-1997, Food equipment materials. Ann Arbor, MI.

NSF International. 1992. ANSI/NSF 52-1992, Supplemental flooring. Ann Arbor, MI.

NSF International. 1997. ANSI/NSF 59-1997, Mobile food carts. Ann Arbor, MI.

Standard specification for factory assembled anodeless risers and transition fittings in polyethylene (PE) fuel gas distribution systems, ASTM Designation: F 1973-99.

## **14.8 Integrated Pest Management**

Armed Forces Pest Management Board. 1994. Technical Information Memorandum No. 29. Integrated pest management in and around buildings. Defense Pest Management Information Analysis Center. Washington, DC.

Code of Federal Regulations, Title 40, Parts 152-186. Federal Insecticide, Fungicide, and Rodenticide Act.

D’Agnese JJ. 2008. Integrated pest management system guide for cruise ships. 7th edition. Cruise Ship Consultation Service, Fernandina Beach, FL.

Educational Foundation of the National Restaurant Association. 1992. Applied Foodservice Sanitation. 4th edition. John Wiley & Sons, New York.

National Restaurant Association. Pest management in restaurants. Washington, DC.

ServSafe. 1999. The educational foundation of the National Restaurant Association, Chicago, IL.

U.S. Army. 1996. Cockroach IPM: installation integrated pest management program for German cockroach control.

## **14.9 Housekeeping**

APIC. 1996. Handbook of infection control. 2nd edition. Association for Professionals in Infection Control and Epidemiology. Mosby, St. Louis, MO.

ASHRAE. Guideline 12-2000, Minimizing the Risk of Legionellosis Associated with Building Water Systems.

Black JG. 1995. Microbiology: principles and application. 3rd edition. Prentice Hall, Upper Saddle River, NJ.

Block SS. 1991. Disinfection, sterilization & preservation. 4th edition. Williams & Wilkins, Philadelphia, PA.

Bollin GE, Plouffe JF, Para MF, Hackman B. 1985. Aerosols containing “Legionella pneumophila” generated by shower heads and hot-water faucets. Appl Environ Microbiol. 50(5):1128–31.

Breiman R, Fields B, Volmer L, et al. 1989. Definitive association of shower use with Legionnaires' disease: possible role of amoebae (Abstract). In: Program and abstracts of the 89th Annual Meeting of the American Society for Microbiology. American Society for Microbiology, Washington, DC; 126.

Centers for Disease Control and Prevention. 1997. Final recommendations to minimize transmission of Legionnaires' disease from whirlpool spas on cruise ships.

Collins CH, ed. 1981. Disinfectants: their use and evaluation of effectiveness. Technical Series No 16. Society for Applied Bacteriology. Academic Press, San Diego, CA.

Freije MR, Barbaree JM, ed. 1996. Legionellae control in health care facilities: minimizing risk. HC Information Resources, Indianapolis, IN.

Freije MR. 1998. Minimizing the risk of Legionella in cooling towers and other HVAC equipment. HC Information Resources, Indianapolis, IN.

Nester E, Nester M. 1997. Microbiology: a human perspective. 2nd edition. McGraw Hill, New York, NY.

Robinson M. 1997. Housekeeping. Bantam Books, New York, NY.

Rutala RW. 1996. APIC guidelines for selection and use of disinfectants. Am J Infect Control. 24:13–42.

Tortora G. 1998. Microbiology: an introduction. 6th edition. Addison-Wesley, Reading, MA.

#### **14.10 Child Activity Centers**

American Academy of Pediatrics and American Public Health Association Staff. 1992. Caring for our children: national health & safety performance standards. Washington, DC.

National Resource Center for Health & Safety in Child Care, <http://nrc.uchsc.edu/national/index.html>.

Rutala RW. 1996. APIC guidelines for selection and use of disinfectants. Am J Infect Control. 24:13–42.

Young FE. 1989. In day-care centers, cleanliness is a must. FDA Consumer. U.S. Food and Drug Administration. Washington, DC.

#### **14.11 Administrative Guidelines**

Centers for Disease Control and Prevention. 2001. Recommended shipbuilding construction guidelines for passenger vessels destined to call on U.S. ports.

Centers for Disease Control and Prevention. Summary of sanitation inspections of international cruise ships. [www.cdc.gov/nceh/vsp](http://www.cdc.gov/nceh/vsp).