Chapter 3
Prevention of Cross-Contamination

Introduction

This area relates to employee practices to prevent product contamination; physical separation of raw and cooked product; and plant design to prevent contamination. This chapter focuses on microbial or bacterial cross-contamination. Chemical cross-contamination is discussed in Chapter 6.

3-1. **Key Sanitation Condition No. 3:**

- Employee ‘practices’ to prevent cross-contamination;
- Separation of raw and ready-to-eat foods; and
- Plant design to prevent cross-contamination.

Raw seafood, like other raw foods, contains microorganisms that cause food spoilage and may also contain harmful microorganisms called pathogens that are bacteria or viruses that can cause human illness. These microorganisms can come directly from the marine environment or from contamination that occurs after fish or shellfish products have been harvested. Likewise, people who work in food handling operations can harbor pathogens on their skin and hands, and in their digestive system or respiratory tract. These bacteria and other microorganisms have no means of their own to move around in a food handling or processing plant. They must be physically carried from one place to another.

Hands, gloves, outer garments, utensils, food contact surfaces of equipment that come in contact with waste, the floor, or other unsanitary objects can contribute to product contamination. Employees should be trained on how and when to properly wash and sanitize their hands, gloves, and outer wear, as well as equipment such as shovels and buckets that come into contact with the floor or waste. It is also very important to stress that in order to effectively clean equipment, all residual product must be removed; the equipment must be cleaned with hot water and/or the appropriate detergent; and the equipment must then be sanitized.
3-2. Cross-Contamination:

Cross-contamination is the transfer of biological or chemical contaminants to food products from raw foods, food handlers, or the food handling environment. The type of cross-contamination most frequently implicated in foodborne illness occurs when pathogenic bacteria or viruses are transferred to ready-to-eat foods.

Monitoring

3-3. Goal:

To prevent cross-contamination from insanitary objects to food, food-packing materials and other food-contact surfaces, including utensils, gloves and outer garments, and raw product to cooked product or ready-to-eat products.

To effectively control cross-contamination you need to evaluate and monitor all areas of the processing or food handling environment to ensure that raw products are not handled, stored or processed in a manner that will allow them to contaminate cooked, ready-to-eat, or heat-and-serve products that will not be fully cooked before they are eaten. A designated individual should check at the beginning (Pre-Op) of the work day or shift to ensure that all planned processing or handling activities involving raw products will be conducted in areas that are adequately separated from processing activities that involve cooked or ready-to-eat products. The same individual should also periodically check to ensure that these activities remain segregated throughout the work period. If employees move between these areas or activities they should wash and sanitize their hands before handling cooked or ready-to-eat products. Footbaths or other control measures should also be used when employees move from one area to another. Movable equipment, utensils or conveyances should be cleaned and sanitized before they are moved from raw product areas to areas where cooked or ready-to-eat products are handled or processed. Product storage areas such as coolers should be checked daily, generally about half way through the work period and at the end of the work day, to ensure that cooked and ready-to-eat products are adequately separated from raw products.
Common Daily Sanitation Practices
to Prevent Cross-Contamination:

- Adequate separation of raw and cooked or ready-to-eat product handling or processing activities;
- Adequate separation or protection of products in storage;
- Food handling or processing areas and equipment adequately cleaned and sanitized;
- Employee hygiene, dress and hand washing practices;
- Employee food handling practices and utensils; and
- Employee traffic or movement about the plant.

A supervisor or other designated employee should monitor employee hygiene at the beginning of the workday or shift and periodically during the work period. This evaluation should ensure that employees are clean, are wearing appropriate attire including hair restraints if necessary, and are not wearing jewelry or other ornamentation that could contaminate products. Employee practices should also be monitored periodically throughout the work period to ensure that cross-contamination does not occur. Employee practices that should be monitored include: that gloves are used appropriately; that hand wash and sanitizing procedures are used properly; that inappropriate activities such as drinking, eating, and smoking do not occur in food handling areas; and that employees working with raw products do not go to or move equipment to areas where cooked or ready-to-eat products are handled.

NOTE: In accordance with the federal Seafood HACCP regulations, the monitoring of employee hand washing “practices” is associated with the key sanitation condition number 3 for prevention of cross-contamination (Chapter 3). The monitoring for the “condition” of the hand washing facilities are monitored under the key sanitation condition number 4 for maintenance of hand washing, hand sanitation and toilet facilities (Chapter 4).

In most cases, hand washing practices in bathrooms cannot be easily monitored. However, hand washing practices at hand washing stations in or near food handling or processing areas can be visually monitored. The individual conducting sanitation monitoring should check to be sure that employees are washing their hands and are using appropriate hand washing and sanitizing techniques. The frequency of this monitoring activity will vary depending on the situation. Hand washing and sanitizing practices can be most readily observed and monitored before work begins, when employees return to food handling or processing after lunch or other breaks in the shift or work day, after using the bathroom or handling insanitary objects like garbage. Locations where employees may move from raw product handling areas to cooked or ready-to-eat product handling areas should receive particular attention. Daily monitoring of hand washing may need to be conducted more frequently in operations that are handling or processing cooked or ready-to-eat foods. When employees are observed not washing and sanitizing their hands when required or using inadequate hand washing and sanitizing practices, supervisors should require an immediate correction.
3-5. **Examples of Poor Employee Practices:**

- Handling raw product, then handling cooked product;
- Working near or on the floor, then handling product;
- Handling trash cans, then handling product;
- Returning from restrooms without washing hands;
- Shovel used to handle floor waste, also used to handle product;
- Scratching face, then handling product; and
- Touching unclean cooler door handle, then handling product.

**Corrections**

Corrections to any unsatisfactory activity or condition which could result in cross-contamination should be made in a timely manner to prevent potential contamination of food and food contact surfaces. When conditions in food handling areas are observed that could lead to cross-contamination, processing or handling activities should stop until the area is cleaned and sanitized and raw and finished product handling or processing activities are adequately separated. If the potential for cross-contamination is observed in storage, cooked or ready-to-eat products should be immediately separated or covered. If contamination is likely, the product should be segregated and held until a decision is made regarding the safety of the product. Based on this decision, the product may be diverted to a safe use, reprocessed, or discarded if contamination has occurred.

3-6. **Corrections Concerning Cross-contamination:**

- Stop activities, if necessary, until the situation is corrected;
- Take steps to prevent contamination from re-occurring;
- Evaluate product safety and, if necessary, divert, reprocess or discard affected products; and
- Document what corrections were taken.

If improper employee hygiene or poor food handling practices are observed, employees should be corrected. In particular, when employees are observed not washing and sanitizing their hands when required or using inadequate hand washing and sanitizing practices, supervision should require an immediate correction. Expected performance and practices should be reviewed. Employees should also understand why these practices could cause the products that they are handling to be unsafe and
the potential impacts on the company and their job. Taking advantage of these teachable moments can often be more effective than formal training programs which should also be utilized when employees are hired and periodically to ensure employees understand what is expected of them.

Records

The daily sanitation control records should include space for observations and corrections for each of the potential opportunities for cross-contamination that could occur in the plant. The record should allow the individual conducting the monitoring activities to note if conditions are satisfactory or unsatisfactory, when monitoring was conducted and who conducted it. The record should provide space to describe any corrections that are taken when unsatisfactory conditions are observed. Although the recording form may list designated periods for checks (e.g., morning and afternoon shift), concerns for cross-contamination should extend through the entire work day. Records are only required for regularly scheduled monitoring.

In the example daily sanitation control record (3-8), this company has modeled a form to check for pre- and post-operational concerns for cross-contamination in storage, and during routine practices throughout the work day. In contrast, some firms may choose to record storage checks at the end of work (post-op) and at the beginning of the next work day (pre-op). This may seem redundant, but for some companies events or changes can occur in storage between work days. Likewise, a company should conduct monthly monitoring of the entire processing operation (3-9) to check and correct any potential cross-contamination problems due to the basic plant layout (e.g., food flow vs. personnel traffic).

3-7. Continuous monitoring for cross-contamination:

Although the recording form may list designated periods for checks (e.g., morning and afternoon shift), concerns for cross-contamination should extend through the entire work day.
# Daily Sanitation Control Record

**Report Date:** 10/22/99  
**Firm Name:** Any Seafood Co., Inc.  
**Firm Address:** Anywhere, USA

### Sanitation Area and Goal

<table>
<thead>
<tr>
<th>Sanitation Area and Goal</th>
<th>Pre-Op Time</th>
<th>Start Time</th>
<th>4 Hour Time</th>
<th>8 Hour Time</th>
<th>Post-Op Time</th>
<th>Comments and Corrections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7:35A</td>
<td>8:10A</td>
<td>12:15</td>
<td>4:26P</td>
<td>6:00P</td>
<td></td>
</tr>
</tbody>
</table>

#### 1) Safety of Water
(See Monthly Sanitation Control Record)
- Back Siphonage-Hoses (S/U)  
  - U  

#### 2) Condition and Cleanliness of Food Contact Surfaces
(See Monthly Sanitation Control Record)
- Equipment cleaned and sanitized  
  - Line 1: (S/U)  
  - Line 2: (S/U)  
- Sanitizer Strength  
  - Sanitizer Type: Chlorine  
  - Strength: 100-200 ppm  
  - Line 1: (ppm) 100  
  - Line 2: (ppm) 100  
- Gloves and aprons clean and in good repair  
  - Line 1: (S/U) U  
  - Line 2: (S/U) S  

#### 3) Prevention of Cross-Contamination
(See Monthly Sanitation Control Record)
- Hands, gloves, equipment, and utensils washed/sanitized after contact with unsanitary objects (S/U)  
  - S  
  - S  
  - U  
- Employees working on raw products, wash and sanitize hands/gloves/outerwear before working with cooked products (S/U)  
  - S  
  - S  
  - U  
- Unpackaged cooked products separated from raw products (S/U)  
  - S  
  - S  
  - U  

**Notes:**
- Replaced backflow prevention on hose faucet  
- Adjusted to 100 ppm before use (4:40 P)  
- Replace 10 pairs of gloves (8:30 A)  
- Two staff told to change aprons before changing work stations  
- Raw fillets stored above & dripping onto boned smoked fish. Product checked and repacked.

S = Satisfactory  
U = Unsatisfactory
### Monthly Sanitation Control Record

**Report Date:** 1/21/99  
**Firm Name:** Any Seafood Co., Inc  
**Firm Address:** Anywhere, USA

<table>
<thead>
<tr>
<th>Sanitation Area</th>
<th>Decision</th>
<th>Comments/ Corrections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Safety of Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safe and sanitary source (S/U) (annual)</td>
<td>S</td>
<td>Municipal water bill and analysis on file (1/10/99) Requested installation of air gap in water line used to fill new thaw tank</td>
</tr>
<tr>
<td>No cross-connections in hard plumbing (S/U)</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>2) Condition and Cleanliness of Food Contact Surfaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing equipment and utensils in suitable condition (S/U)</td>
<td>U</td>
<td>Replaced cracked cutting board at station no. 2.</td>
</tr>
<tr>
<td>3) Prevention of Cross-contamination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical conditions of plant and layout equipment (S/U)</td>
<td>S</td>
<td>Put new storage table in receiving area to segregate raw product.</td>
</tr>
</tbody>
</table>

*S = Satisfactory / U = Unsatisfactory*

Additional Comments:
- Air gap installed 1/22/99
- Need plan to phase out all wooden cutting boards
- Added another table to keep incoming raw and cooked fish separate at receiving (11.30).

**Signature (Initials):** BSJ
Background

Understanding Cross-Contamination

The type of cross-contamination most frequently implicated in foodborne illnesses occurs when pathogenic bacteria or viruses are transferred to ready-to-eat foods that are not usually cooked before they are eaten. This is a particular concern for seafood products that have been previously thermally processed to produce a final, edible product (e.g., cooked shrimp, prepared entrees, smoked fish, dried seafoods, seafood salads and surimi analog product). It is also a significant concern for seafoods that are eaten with any prior exposure to heat (e.g., raw molluscan shellfish, raw fish and pickled fish). The possible consequences for foodborne illnesses are obvious if these products contain potential pathogen microbial contaminates.

3-10. Typical raw or ready-to-eat seafood that will not be cooked before they are eaten:

- Cooked shrimp and other cooked shellfish;
- Smoked fish or shellfish;
- Dried, pickled or cured fish or shellfish;
- Surimi products;
- Seafood salads;
- Heat and serve entrees;
- Molluscan shellfish to be eaten raw; and
- Finfish to be eaten raw (sashimi or sushi).

3-11. Sources of pathogens that could cross-contaminate finished products:

- Seafood handlers and other plant personnel;
- Raw seafood;
- Equipment or utensils; and
- Processing plant environment.

Both employees and food contact surfaces often serve as vectors for the transmission of pathogenic microorganisms to food. These microorganisms can be introduced to the product from outside areas, rest rooms, contaminated raw materials, waste or waste receptacles, floors, and other insanitary objects. Raw products in the plant may also serve as a reservoir of pathogenic microorganisms so care must be taken to prevent cooked or ready-to-eat products from being contaminated by raw products,
food contact surfaces used for raw products or employees who handle raw products. Both employees
and equipment that touch raw seafood can transmit these microorganisms to the cooked product. Fi-
nally, proper construction of the processing plant is essential if other sanitary measures are to be suc-
cessful. For example, incompatible operations, such as handling of raw materials and handling of cooked
or other ready-to-eat products should be physically separated from each other. Raw and ready-to-eat
products should also be physically separated in storage coolers. The movement of employees and equip-
ment should be controlled or procedures such as using boot dips or requiring hand washing when em-
ployees move from one area of the plant to another should be used.

Product Flow and Plant Layout

3-12. Goal:
To ensure that product handling and/or processing procedures prevent the cross-contamination of seafood products by raw
materials, ingredients or processing operations.

Separate raw and ready-to-eat products:

◆ When receiving products or ingredients;
◆ During processing or handling operations;
◆ During storage; and
◆ During shipping.

Special procedures or designated areas for handling raw materials, ingredients, or packaging
materials may be necessary to prevent the contamination of finished products. Unit processing opera-
tions may also need to be physically separated. Processing should be conducted in a way that will prevent
the finished product from being contaminated by raw materials, processing machinery, conveyors, uten-
sils, other equipment, garbage or other refuse such as fish entrails, racks or other inedible portions of the
raw materials used in the plant. It is critical that procedures are in place to ensure that raw and cooked or
ready-to-eat products are adequately separated during receiving and storage as well as during process-
ing. Raw and ready-to-eat products should be physically separated in coolers or other storage areas. It is
generally a good idea to have separate coolers for storage of raw products and finished ready-to-eat
products. If this is not possible or feasible, ready-to-eat products should be stored in a designated area in
the cooler that is separated by a barrier or enough distance so that raw products cannot drip or splash
onto ready-to-eat products. Ready-to-eat products should never be stored below raw products that
could drip onto them. Ingredients and packaging materials should also be stored in appropriate areas of
the plant to prevent raw products, garbage or other materials from contaminating them.
3-14. Prevent cross-contamination during processing by:

- Designating separate areas for handling raw and ready-to-eat products;
- Controlling the movement of equipment from one area to another; and
- Controlling the movement of employees from one area to another.

Careful design of product flow and unit processing operations is also necessary to prevent cross-contamination. Ideally raw products and finished ready-to-eat products should be handled in separate areas of the plant. Processing operations should be designed in such a way that products, equipment and personnel do not move from raw to finished product handling areas. Special attention should be given to controlling the movement of equipment and personnel from areas where raw product is handled to areas where ready-to-eat products are handled. Some operations have utilized color coding schemes to ensure that equipment used in raw product handling areas which could contain pathogens is not used in areas where ready-to-eat products are handled. Attention should also be paid to the movement of employees from one area of the plant to another. Food handlers working with raw products can carry bacteria from these products on their hands, clothes, and shoes that could contaminate ready-to-eat product handling areas. Techniques such as requiring employees to wash their hands, changing outer garments, or walk through sanitizing foot baths when moving from raw product handling areas to ready-to-eat product handling areas can be used to minimize the potential for cross-contamination.

Employee Hygiene and Food Handling Practices

3-15. Goal:

Prevent cross-contamination of seafood products by ensuring that employees follow proper personal hygiene and hand washing practices.

By far the easiest area of cross-contamination to identify is personnel practices. In contrast, it is also the hardest to control. For example, personnel often have the ability to contaminate product, simply by touching it with their hands. Gloves are frequently used to avoid direct hand contact, but gloves may create a sense of false security for food handlers. Dirty gloves, like dirty hands, can also contaminate products if they are not kept clean. In many instances, the use of gloves may not be practical, and effective hand washing and sanitation procedures must be used. Even when gloves are used, hands should be thoroughly washed and sanitized prior to covering the hands.
3-16. Employee hygiene practices:

- Hand washing;
- Jewelry;
- Hair/beards;
- Footwear;
- Eating, drinking, smoking, etc.; and
- Other - perspiration, cosmetics, medicine.

Current GMP require that all persons working in direct contact with food, food-contact surfaces, and food-packaging materials conform to hygienic practices while on duty to the extent necessary to protect against contamination of food. The methods for maintaining cleanliness include, but are not limited to:

1. Washing hands thoroughly (and sanitize if necessary to eliminate undesirable microorganisms) in a designated hand-washing facility before starting work, after each absence from the work station, and at any other time when the hands may have become soiled or contaminated.

2. Removing all unsecured jewelry and other objects that might fall into food, equipment, or containers, and removing hand jewelry that cannot be adequately sanitized during periods in which food is manipulated by hand. If such hand jewelry cannot be removed, it may be covered by material which can be maintained in an intact, clean, and sanitary condition and which effectively protects against the contamination by these objects of the food, food-contact surfaces, or food-packaging materials.

3. Wearing, where appropriate and in an effective manner, hairnets, headbands, caps, beard covers, or other effective hair restraints. Hair in food can be a source of both microbiological and physical contamination. Food handlers should be required to keep their hair clean and appropriate hair and/or beard restraints should be worn at all times in food handling areas.

4. Boots may transfer contaminants to workers hands when dressing or may track contaminants into processing areas. An ideal situation would be for plant employees to change their footwear before starting work. In some plants, employees use the same footwear inside and outside the plant environment. Under such a situation processors producing cooked product must take precautionary measures and enforce the use of footbaths containing sanitizers. When the plant has visitors, visitors must also adhere to the same control procedures. Often this can be accomplished by using disposable cotton boots or rubber footwear. Under such situations the visitor does not have to walk through a footbath.

5. Eating food, chewing gum, drinking beverages, or using tobacco should not occur in any areas where food may be exposed or where equipment or utensils are washed. Healthy people frequently harbor pathogens in their mouth and respiratory tract. When activities such as eating, drinking, or
smoking that involve hand to mouth contact occur, pathogens can be transferred to employees’ hands and then to the food products that they handle. These activities should not occur in food handling areas, and hands should be washed when employees return to work areas after engaging in these activities.

6. Implementing any other precautions necessary to protect against contamination of food, food-contact surfaces, or food-packaging materials with microorganisms or foreign substances including, but not limited to, perspiration, hair, cosmetics, tobacco, chemicals, and medicines applied to the skin.

**Establishing an Effective Hand Washing Program**

Training for hand washing is an essential part of your sanitation program. Seafood processing plants must manage a large work force that directly handle finished product and food contact surfaces. Unfortunately, it takes only a few untrained or uncooperative employees handling finished seafood product to create a sanitation contamination problem.

3-17. **Reason for a Hand Washing Program:**
- Many employees do not routinely wash their hands;
- Hand washing is not conducted properly; and
- Many employees do not understand the importance of hand washing.

The importance of hand washing is not fully appreciated by most employees. Data show that a significant number of food handlers do not wash hands or do not use proper techniques. After all, bacteria and other contaminants are not visible. Unfortunately, when an untrained employee can not see contaminants on their hands, they may assume there is no need to wash them. For the most part, supervisors can not determine the condition of employees’ hands by visual inspection. Systematic procedures and a routine hand-washing schedule are essential to controlling the spread of contaminants from employees’ hands to food.

Many employees do not comprehend the serious role their hands play in cross contamination, that is, touching an unsanitary object or substance and then touching food product. In order to have an effective hand-washing program, employees must grasp the importance of keeping themselves clean. For example, an employee may think that because hands are routinely washed and sanitized that food product can be safely handled. However, if this same employee is habitually touching soiled or contaminated clothing, hair or face and other body parts, then cross contamination is occurring.

Hand washing procedures must be part of an on-going training program. This is especially true for new employees. Supervisors should discuss requirements of the company before the employee is assigned to a workstation and keep a record of the points discussed. Overhead 3-21 provides a sample form that could be used for initial training of employees during the interview process.
How to Wash Hands

The primary purpose of hand washing is to remove unwanted microbiological and other contaminants. The ability and dexterity of employees’ hands to manipulate objects that remove edible seafood products from shells, exoskeletons and bones is remarkable. However, as they become soiled, the very features that make hands useful tools may also interfere with cleaning and sanitizing them. For example, all hands have wrinkles, crevices, rills and fingernails. The arms attached to hands may sweat and may have hair. It is important to wash and sanitize all of these areas to remove accumulated material.

3-18. How to wash hands:
- Remove jewelry;
- Wet hands with warm water (110°F);
- Lather and rub using warm water;
- Rinse;
- Dry with disposable paper towels; and
- Avoid recontamination.

To facilitate the proper washing and sanitizing of hands, remove jewelry and other objects that hide and protect soil and bacteria. Generally, wedding bands (without gemstones) are acceptable and can remain on the finger. Watches, bracelets and other arm and wrist ornaments are not acceptable. Fingernails should be clipped and filed. Hands should not have any infections, wounds or sores since hand washing will not remove pathogenic bacteria associated with these conditions. It is important to stress to employees that merely dipping hands in a sanitizing solution will not properly rid hands of pathogenic microorganism. Soils, such as fats, oils and other dense, difficult to remove materials, will protect microorganisms from sanitizing agents.

The U.S. Public Health Service’s Food Code is a useful publication for food processors (see appendix). It provides sound recommendations for sanitary production of food and food products including recommendations on washing hands. The most current issue of the Food Code specifies that “…employees shall clean their hands and exposed portions of their arms with a cleaning compound in a lavatory…by vigorously rubbing together the surfaces of their lathered hands and arms for a least 20 seconds and thoroughly rinsing with clean water. Employees shall pay particular attention to the areas underneath the fingernails and between the fingers.”

Generally, the first step for manual hand washing is to thoroughly wet exposed arms and hands (including the back of the hands) with warm water. Warm water is essential in good hand washing procedures. It softens some soil material and facilitates emulsification of soil material with the cleaning compound. The Food Code requires that water be capable of achieving a temperature of at least 43°C (110°F) for this purpose.

Introduce ample soap and vigorously rub hands together to produce an abundant lather. Liquid soap in a dispenser is probably the least messy way to distribute soap onto hands. There are many types of
soaps and detergents available for hand washing. Processors must be sure that soaps and detergents intended for hand washing facilities are specifically for hands. Some detergents intended for equipment cleaning might not be suitable for hands. A good basic soap is adequate for most operations.

Many food processing firms use antimicrobial soaps and detergents. Studies have shown that antimicrobial soaps are no more effective than regular soaps in removing unwanted microorganisms from hands and exposed arms. Care should be exercised if an anti-microbial soap is routinely used as part of a company’s hand washing program. It is possible that improperly used or overused that some of these soaps may cause skin irritations.

Supervisors should demonstrate and have employees practice the lathering procedures and the feel of the proper temperature of water. In addition, employees should be able to determine proper timing through practice. Remember, lathering and rubbing for 20 seconds followed by a thorough rinsing in clean water is a minimum. Employees may have to scrub longer depending on the soil build up or contamination of hands. Done properly, hand washing will remove most microorganisms of concern.

Clean, disposable paper towels should be available to thoroughly dry hands after washing. Improperly drying of hands could actually create cross contamination problems. For example, properly cleaned hands dried on soiled or contaminated towels would negate the best-intended hand washing effort.

How to Sanitize Hands

When necessary, hand sanitizing should immediately follow hand washing. Hands should be dipped in a sanitizing solution to destroy any remaining microorganisms. Hand sanitizing solutions should be safe to the individual and should not pose a contamination problem for the food product. There are numerous types of commercially available hand sanitizing solutions. Most use chlorine or iodine as the active ingredient. The Food Code provides some guidelines in using hand-sanitizing solutions. Sanitizing agents are regulated and must be used according to regulations and manufacturers recommendations. Typically, hand sanitizers are composed of chlorine compounds or iodine compounds intended for that purpose. According to the Food Code, a chemical hand sanitizing solution used as hand dip shall be maintained clean and at a strength equivalent to at least 100 ppm chlorine. These hand dips may be in individual bowls at workstations or in facets near workstations. Since some sanitizing agents dissipate over time, they must be monitored often to ensure proper strength. Keep in mind that concentrated sanitizing solutions are considered to be toxic substances and must be properly stored.

When to Wash and Sanitize Hands

An essential part of an effective hand-washing program is knowing when to wash and sanitize. It is not enough to instruct employees to wash when hands are dirty or soiled. There are specific times to wash. The Food Code gives the following times for employees to wash their arms and hands:
3-19. When to wash arms and hands:
- 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; and
- During food preparation, as often as necessary to remove soil and contamination and to prevent cross-contamination when changing tasks.

Management’s Role in Employee Hygiene

Management must also play a role in helping employees prevent cross-contamination. Management should provide a clear understanding of the personal hygiene practices and company policies regarding illness and other health conditions such as infected wounds that could contaminate products. (Refer to Chapter 7 for complete information on managing employee health conditions.) Policies that provide reassurance that employees will not lose their job if they report that they have an illness or a communicable disease should be developed. A protocol for employees posted in work areas that describe good personal hygiene and health practices is recommended. Training programs designed to help employees understand exactly what is expected of them and why it is important should be utilized. Management should continually emphasize how important it is for employees to maintain a high level of cleanliness and good health and should serve as role models for good work habits and acceptable hygienic practices. Management should also take steps to ensure that visitors are required to follow the same hygienic practices as employees, and have policies in place that prevent unauthorized personnel from being in food handling areas. Supervisors should utilize one-on-one training when employee practices are corrected to ensure that they understand what practices or behavior is required and why those practices are important to the company and the safety of the products they are producing. Management should also assume responsibility for providing properly located and maintained facilities and equipment that will allow employees to adhere to personal hygiene requirements including:

a) Dressing or changing rooms that are adequate and properly maintained.
b) Laundry services and/or uniform services as necessary.
c) Designated employee areas for breaks where eating and drinking is allowed.

3-20. Management’s role:
- Set policies that outline personal hygiene expectation;
- Set policies for employees with an illness (Chapter 7);
- Training;
- Monitoring and enforcement; and
- Provide adequate employee facilities.
Sources of Additional Information


Price, Robert J. Retail Seafood Cross-contamination. California Sea Grant Extension Program Publication UCSGEP 90-6, University of California-Davis, 1990.


3-21. Employee orientation form for hand washing and sanitizing requirement.

EMPLOYEE TRAINING
HAND WASHING AND SANITIZING

Preparation of Hands:
◆ No jewelry (other than a plain wedding band) is permitted. This includes watches and bracelets;
◆ Fingernails will be clipped and filed for each cleaning; and
◆ Hands and arms must be free of infections and sores.

How to Wash Hands:
◆ Use ample liquid soap from a dispenser;
◆ Use warm water;
◆ Lather exposed arms and hands for 20 seconds by vigorously rubbing;
◆ Thoroughly rinse hands in clean, warm water (110°F);
◆ Use foot operated faucets to prevent re-contamination of hands;
◆ Dry hands thoroughly and properly dispose of paper towels;
◆ Dip hands in sanitizing solution; and
◆ Do not touch unsanitary objects.

When to Wash Hands:
Wash hands routinely:
◆ After touching bare human body parts;
◆ After coughing, sneezing, using a handkerchief or disposable tissue;
◆ After handling soiled equipment or utensils;
◆ Immediately before engaging in food preparation;
◆ During food preparation as often as necessary to remove soil and contamination; and
◆ Other activities that may require it.

I have discussed and understand the above teaching points on hand washing and the use of toilets in this facility.

Employee___________________________ Date_________________________
3-22.

<table>
<thead>
<tr>
<th>Sanitation Control Guide</th>
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<tbody>
<tr>
<td>Entry date:</td>
</tr>
</tbody>
</table>

**Concern:**  Proper Hand Washing Procedures

**Examples:**
Employees fail to wash and sanitize hands before work or as needed periodically during the work day. Employees fail to wash and sanitize hands after working with raw product before working with ready-to-eat products.

**Controls and Monitoring:**
Observe employee hand washing and sanitizing practices at hand wash stations in food handling or processing areas. **Frequency:** Daily, Start-up and after every break. Conduct periodic hand washing and sanitizing training for all employees and reinforce with posted reminders. **Frequency:** When employed and semi-annual.

**Recommended Corrections:**
Immediately require employees to re-wash and sanitize hands when improper hand washing practices are observed. Evaluate situation to determine if products may have been contaminated. Provide posted signs reminding employees of proper procedures. Conduct one-on-one training as appropriate, and schedule training programs as necessary.

**Records:**
- Daily Sanitation Control Record
- Employee Training Records
Sanitation Control Guide

Entry date: Cross-Contamination FDA Key Condition No. 3

**Concern:** Prevent Cross-Contamination by Plant Personnel

**Examples:**
Personal hygiene requirements are not being followed. Employees working in food handling areas are observed wearing inappropriate jewelry, not using appropriate hair or beard restraints, or are wearing clothes or shoes that are not appropriate and/or clean. Employee practices that involve hand-to-mouth contact such as eating, drinking, and smoking are observed in the product handling areas of the plant. Employees are using unacceptable food handling practices that could contaminate products such as touching ready-to-eat foods with their bare hands or returning ready-to-eat products that have dropped onto the floor to production lines.

**Controls and Monitoring:**

Check employee personal hygiene practices including use of clean and acceptable clothing, aprons or other work garments. **Frequency: Daily, after every break.**

Check personal habits of employees to ensure that eating, drinking, smoking or other activities that involve hand to mouth contact are not conducted in food handling areas. **Frequency: Daily, between every break.**

Check employee food handling practices and ensure that there is no direct hand contact with cooked or ready-to-eat foods. **Frequency: Daily, between every break.**

Monitor employee movements from raw product to ready-to-eat product handling areas to ensure that proper hand washing and other measures such as the use of footbaths used to prevent cross-contamination are being properly used. **Frequency: Daily, after every break.**

**Recommended Corrections:**
1. Require employees to immediately correct deviations from expected personal hygiene practices. Ask employees to review company personal hygiene policies. Provide training. 2. Require employees to immediately stop smoking, drinking, or eating in food handling areas. Inform employees where and when these activities are permitted and provide training as necessary to reinforce how this behavior can contaminate foods. 3. Immediately correct employees who are observed using poor food handling practices. Provide instructions and on site training if necessary. If contamination is likely, segregate the product and evaluate its safety. 4. Require any employees who go from raw product handling areas to finished product handling areas to wash their hands before handling ready-to-eat products. Provide instructions or training as necessary as incidents occur.

**Records:**
Daily Sanitation Control Record
Employee Training Records and/or Pre-employment agreements
## Sanitation Control Guide

<table>
<thead>
<tr>
<th>Entry date:</th>
<th>Cross-Contamination</th>
<th>FDA Key Condition No. 3</th>
</tr>
</thead>
</table>

**Concern:** Prevent Cross-Contamination by Processing and Handling Procedures

**Examples:**
1. A conveyor belt used for packaging raw fish fillets is not cleaned and sanitized before employees start packaging smoked eels and surimi. 2. Raw clams and oysters are stored in the cooler under a shelf that contains boxes of raw fish on ice. 3. Customer orders that include ready-to-eat foods like smoked fish, cooked shrimp, and raw clams and oysters are assembled on the same table where raw fish are filleted. 4. Hand trucks used to unload boxes of raw fish from delivery trucks to storage coolers are then used to transfer trays of smoked eels and salted fish to finished product storage cooler. 5. Pallets of boxes to be used to pack consumer retail packages of cooked shrimp and surimi are stored on the floor in the fish filleting area of the plant.

**Controls and Monitoring:**
1. Stationary equipment such as conveyor belts are cleaned and sanitized after being used for raw products and before it is used for ready-to-eat products. **Frequency:** Daily, every 4 hours.
2. Product storage coolers should be routinely monitored to ensure that raw and ready-to-eat products are stored separately or when stored together are physically separated by enough space to prevent raw products from dripping or splashing onto ready-to-eat products. **Frequency:** Daily, every 4 hours, and post-op.
3. Food handling and processing activities should be routinely monitored to ensure that raw and ready-to-eat foods are handled and/or processed in designated areas that are adequately separated to prevent cross-contamination. **Frequency:** Daily, every 4 hours, and semi-annual review for plant operations.
4. The movement of equipment from raw product handling areas to ready-to-eat product handling areas should be controlled. Ideally equipment should not move from one area to another or should at least be cleaned and sanitized before using for ready-to-eat products. **Frequency:** Daily, every 4 hours, and semi-annual review for plant operations.
5. Product packaging materials used for ready-to-eat products should be stored in designated areas where it is not exposed to contamination from raw products or other contaminants found in or outside the plant.

**Recommended Corrections:**
1. Ensure that this equipment is properly cleaned and sanitized after being used for raw products and before it is used for ready-to-eat products. Discard products that are likely to have been contaminated and train employees as necessary. 2. Move ready-to-eat products to designated area of cooler physically separated by a barrier or enough space to ensure that raw products cannot drip or splash onto ready-to-eat products. Discard products that were likely to have been contaminated and provide employee instruction or training as needed. 3. Physically separate food handling or processing operations for raw products from ready-to-eat products. Discard products that are likely to have been contaminated, and provide employee instructions and/or training as necessary to ensure that this practice does not reoccur. 4. Properly clean and sanitize the work surfaces and instruct employees that such equipment must be cleaned and sanitized before moving from one area to another. Discard products that likely to have been contaminated. 5. Discard, recondition, or divert contaminated packaging material or ingredients to an acceptable use. Ensure that there are adequate storage areas for these materials.

**Records:**
Daily Sanitation Control Record  
Employee Training Records

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Chapter 4

Maintenance of Hand Washing, Hand Sanitizing, and Toilet Facilities

Introduction

This area is intended to primarily deal with the location, ‘condition’ and maintenance of hand washing, hand sanitizing and toilet facilities. This topic is closely linked with the monitoring requirements under key sanitation condition number 3 (Chapter 3) for monitoring hand washing and sanitizing practices to prevent cross-contamination.

4-1. Key Sanitation Concern No. 4:

- Condition of hand washing facilities;
- Condition of hand sanitizing facilities; and
- Condition of toilet facilities.

Seafood processing facilities generally require a significant amount of manual handling of the products. Cutting, filleting, shucking, peeling, sorting, and packaging are just a few examples of the manual steps that are conducted with worker hands. In some instances, cooked ready-to-eat products such as crab meat and crawfish meat must be handled to remove and to package the meat. Other seafood value-added products (soups, smoked fish, sandwiches, and other specialty items) may also be handled by workers without any further cooking prior to consumption. Unfortunately, human hands are used for more than just handling seafoods by plant workers. They may be used to greet others (handshake), combing hair, scratching, eating during a lunch break, handling unsanitary objects, and going to the toilet. When engaged in these activities, hands may become contaminated with harmful microorganisms and substances.

Obviously, hand washing is necessary in a facility that produces raw fishery products. Hand washing and hand sanitizing is necessary for those employees who handle ready-to-eat food, or food packaging materials or food contact surfaces for ready-to-eat products. If hands are not properly washed
and sanitized prior to handling seafood products, they may serve as a significant source of pathogenic microorganisms or chemical contamination on finished seafood products. Food processing facilities must establish an effective hand washing program. The availability and maintenance of toilet facilities are essential parts of the hand washing program in order to prevent the spread of filth and pathogenic organisms throughout the plant.

**Monitoring**

4-2. **Goal:**

To support a necessary hand washing program to prevent the spread of filth and potential pathogenic organisms about the processing area or to foods.

Hand washing facilities in bathrooms and hand wash stations in food handling and processing areas should be checked at least once per day to ensure that they are clean, functioning properly, and have the necessary supplies including hot water, soap, disposable paper towels, and a trash receptacle. More than one daily check may be required for certain food operations. The type and frequency of the periodic checks would depend on the food products and processing methods. For example, the daily sanitation control record (Form 4-6) includes checks every 4 hours for proper sanitizer concentration at the hand sanitizer stations or dips used by the employees processing the ready-to-eat foods (Line 2). The concentration of hand sanitizer in hand dip stations should be checked with appropriate test strips when they are made up and as often as necessary depending on the sanitizer, and how often hand dips are used. One daily pre-op check for the hand washing and sanitizing stations is sufficient for employees working on raw, to-be-cooked seafoods (Line 1).

Similar checks for the condition and functionality of the toilet facilities should be made at least once per day. A pre-op check would be the best time to check to assure the toilet facilities are in proper running order for the employees before and during the work day. Toilet facilities must always be in proper working order and cleaned routinely to avoid serious contamination. As part of the daily SSOP checklist, each toilet must be flushed and examined for proper function. A back flow or blocked toilet can spread fecal contamination throughout the plant. Improper conditions could contribute to possible cross-contamination for both ready-to-eat and raw, to-be-cooked seafoods.

4-3. **Recommended monitoring for hand washing, hand sanitizing and toilet facilities:**

- Condition of hand washing facilities;
- Condition of hand sanitizing facilities; and
- Condition of toilet facilities.
NOTE: In accordance with the federal Seafood HACCP regulations, the monitoring of employee hand washing “practices” is associated with the key sanitation condition number 3 for prevention of cross-contamination (Chapter 3). The monitoring for the “condition” of the hand washing facilities are monitored under the key sanitation condition number 4 for maintenance of hand washing, hand sanitation and toilet facilities (Chapter 4).

**Corrections**

4-4. **Corrections:**
- Fix or replenish supplies in toilets and hand wash stations;
- Discard and make up new hand sanitizer solutions if concentration is incorrect;
- Record observations of corrections taken when unsatisfactory conditions are observed; and
- Repair improperly working toilets.

When monitoring of toilet and hand washing facilities indicate that supplies are lacking or they are not functioning properly, the problem should be corrected immediately by fixing broken equipment or replenishing supplies. When inadequate hand sanitizer concentrations are observed, a new hand dip with the proper concentrations should be provided and employees should be required to rewash and sanitize their hands if necessary. A responsible, knowledgeable individual should assess the situation to determine if any products have been contaminated. If so, the affected products should be segregated and reprocessed, diverted to a safe use, or discarded. Supervision should take advantage of this “teachable moment” to explain why and how to maintain proper sanitizer concentrations.

**Records**

4-5. **Records for the condition of facilities to clean and sanitize hands, and for toilets:**
- Condition and location of hand washing stations or sinks, and toilet facilities;
- Condition and availability of hand sanitizer stations, sinks or dips;
- Concentration of hand sanitizers; and
- Corrections taken when unsatisfactory conditions are observed.

A Daily Sanitation Control Record (Form 4-6) or log should include space for recording observations that indicate the facility conditions are checked periodically during the day. The records should identify where and when each observation was made, whether the conditions observed were satisfactory or unsatisfactory, the actual concentration of any sanitizers observed, any necessary corrections, and by whom and when was the observation made. The federal HACCP mandate emphasizes the need for “positive” records or actual measures such as the concentration of hand sanitizers.
# Daily Sanitation Control Record

### Report Date: 10/22/99

**Line 1:** Raw Seafood (not ready-to-eat)  
**Line 2:** Ready-to-eat

<table>
<thead>
<tr>
<th>Sanitation Area and Goal</th>
<th>Pre-Op Time:</th>
<th>Start Time:</th>
<th>4 Hour Time:</th>
<th>8 Hour Time:</th>
<th>Post-Op Time:</th>
<th>Comments and Corrections</th>
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<tbody>
<tr>
<td>1) Safety of Water</td>
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<td>Replaced backflow</td>
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<td>(See Monthly Sanitation</td>
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<td></td>
<td>prevention on hose</td>
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<tr>
<td>Control Record)</td>
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<td>faucet</td>
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<td>◆ Back Siphonage-Hoses</td>
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<td>2) Condition and</td>
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<td>Cleanliness of Food</td>
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<td>Contact Surfaces</td>
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<td>Control Record)</td>
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<td>◆ Equipment cleaned and</td>
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<td>sanitized</td>
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<td>◆ Sanitizer Strength</td>
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<td>Sanitizer Type: Chlorine</td>
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<td>Line 1: (ppm)</td>
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<td>50</td>
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<td>before use (4:40 P)</td>
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<td>◆ Gloves and aprons</td>
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<td>clean and in repair</td>
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<td>Replace 10 pairs of</td>
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<td>gloves (8:30 A)</td>
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<td>3) Prevention of</td>
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<td>Two staff told to</td>
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<tr>
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<td></td>
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<td></td>
<td>changing work stations</td>
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<tr>
<td>◆ Hands, gloves,</td>
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<td>Raw fillets stored</td>
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<td>equipment, and</td>
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<td>above &amp; dripping onto</td>
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<td>utensils washed/sanitized</td>
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<td>boxed smoked fish,</td>
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<td>after contact with</td>
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<td></td>
<td>Product checked and</td>
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<td>unsanitary objects</td>
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<td>repacked.</td>
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<td>◆ Employees working on</td>
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<td>raw products, wash and</td>
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<td>sanitize hands/gloves/</td>
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<td>outerwear before working</td>
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<td>with cooked products</td>
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<td>◆ Unpackaged cooked</td>
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<td>products separated from</td>
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<td>raw products (S/U)</td>
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</tbody>
</table>

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**Firm Name:** Any Seafood Co., Inc.  
**Firm Address:** Anywhere, USA
### Daily Sanitation Control Record (page 2)

|--------------------------|----------------------|---------------------|-------------------|---------------------|---------------|--------------------------|

4) Maintenance of Hand-washing, Hand-sanitizing, and Toilet Facilities
   - Hand-washing and hand-sanitizing stations adequate
     - Hand-washing station
       Line 1: (S/U)  
       Line 2: (S/U)  
     - Hand-sanitizing station  
     Sanitizer Type: Iodine  
     Strength: 12.5-25 ppm  
     Line 2: (ppm)  
       25  
       25  
       25  

5) Protection from Adulterants and  
6) Labeling, Storage, and Use of Toxic Compounds
   - Product protected from contamination (S/U)  
   - Cleaning compounds, lubricants, and pesticides labeled and stored properly (S/U)  

7) Employee Health Conditions
   - Employees do not show signs of medical problems (S/U)  

8) Exclusion of Pests
   - Pests excluded from processing area (S/U)  

S = Satisfactory / U = Unsatisfactory  
Signature or initials: BSJ
Background

Careful planning is required in providing and equipping hand washing and toilet facilities. Plant managers should consider both location and number. The Food Code is an excellent reference for basic considerations. In addition, local and state regulations may require the establishment of hand washing and toilet facilities in specific locations based on the number of employees. In general, hand-washing facilities are located either in the toilet room or immediately outside the door. Some employers require that employees not only wash hands after going to the toilet in the wash room but also wash them again at a designated hand-wash sink in the processing room. This double wash procedure gives greater control of potential fecal cross-contamination and provides an opportunity for the employer to observe and monitor post-toilet hand washing. This is extremely important, since one of the most serious sources of contamination may come from employees that fail to properly wash their hands after using the toilet.

Hand washing facilities should be located in other areas of the processing facility to provide ample opportunities for employees to wash. Hand washing facilities should be dedicated solely for that purpose. They should never be used to wash dishes, utensils or other items that may soil or contaminate the area. Hand washing should never be conducted in sinks used for food preparation on in sinks used for cleaning and sanitizing the plant. In addition, if hand washing facilities are used for other purposes, it could prevent or delay employees from using them. Each hand washing facility should provide the following items at all times:

4-7. Recommendations for Hand Washing Facility:

♦ Clean at all times;
♦ Strategically located as per regulations, near bathrooms and entrances to the processing area;
♦ Dedicated to hand washing only;
♦ Liquid soap in dispenser;
♦ Hot water (43°C or 110°F);
♦ Use of disposable paper towels or air blowers; and
♦ Adjacent hand sanitizing facilities.

Hand Sanitizers

There are numerous types of commercially available hand sanitizing solutions. Most use chlorine or iodine as the active ingredient. The Food Code provides some guidelines in using hand-sanitizing solutions. Sanitizing agents are regulated and must be used according to regulations and manufacturers recommendations. Typically, hand sanitizers are composed of chlorine compounds or iodine compounds intended for that purpose. According to the Food Code, a chemical hand sanitizing solution used as hand dip shall be maintained clean and at a strength equivalent to at least 100 ppm chlorine. Many processors will provide sanitizer hand dips to be used between hand washings. These hand dips may be in individual bowls at workstations or in facets near workstations. Since some sanitizing agents dissipate
over time, they must be monitored often to ensure proper strength. Keep in mind that concentrated sanitizing solutions are considered to be toxic substances and must be properly stored.

Hand sanitizers should be checked with the appropriate test strips to ensure that the proper concentration is being used. Test strips specifically designed to measure the amount of iodine or chlorine sanitizer being used are readily available from manufacturers of these products. Misuse of hand sanitizers could actually cause problems by irritating employees’ skin and causing infectious rashes or irritations. Processors should also be aware that sanitizing agents should be used under correct conditions. For example, a chlorine compound may dissipate over time and lose its effectiveness. Some chlorine compounds may be rendered ineffective when in the presence of organic matter such as in a crustacean peeling plant where hands are subject to a high organic load. Consequently, hand sanitizing hand dips should be changed frequently to insure that they are clean and maintained at the proper strength.

4-8. **Hand Sanitizing Facilities:**

- Proper sanitizer concentrations with strengths of 100-200 ppm chlorine, or 12.5-25 ppm iodine;
- Frequent monitoring and changes to maintain proper concentrations; and
- Conveniently located to encourage employee use but to avoid contact with foods.
Reference and Further Reading


<table>
<thead>
<tr>
<th>Concern:</th>
<th>Proper maintenance of hand washing facilities and toilets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples:</td>
<td>Hand wash station lacks proper supplies and hot water. Hand sanitizer not available at the proper concentration or not properly maintained. Toilets not working properly or not cleaned.</td>
</tr>
<tr>
<td>Controls and Monitoring:</td>
<td>Check handwash and sanitation station for adequate supply of soap, towels, hot water and hand sanitizer. Frequency: Daily, pre-op; water temperature weekly. Check condition, operation and cleanliness of all toilets. Frequency: Daily, pre-op.</td>
</tr>
<tr>
<td>Recommended Corrections:</td>
<td>Immediately provide necessary supplies. Make necessary adjustments in water temperature. Refill hand sanitizer containers and discard sanitizer if concentration is incorrect. Make up new hand dip sanitizing solution and verify correct concentration with test strips. Clean and repair all toilets before allowing employees to use and work in processing area.</td>
</tr>
<tr>
<td>Records:</td>
<td>Daily Sanitation Control Record</td>
</tr>
</tbody>
</table>