Sanitation standard operating procedures (SSOPs)

The SSOPs are meant to control general sanitation issues concerning food. These are also designed for effectively controlling risk factors at specific steps in production. These steps, known as control points, are the following:

1. Managing the Receiving Control Point

Foods must be moved quickly to storage, but several important procedures are required on delivery. The preventative measures and recommended practices involved in food safety assurance at the receiving Control Point are discussed below.

1.1. Sensory analysis

Contamination with harmful or unwanted substances at unacceptable levels may be (but is not always) apparent to the senses. Off odor is a sign of decomposition in many foods (especially fish and other seafood products). To the trained eye, a food's appearance can be a good measure of quality. Furthermore, tasting of some raw, potentially hazardous agricultural commodities (e.g. raw milk, raw meat or fish) is not recommended. We may say that sensory qualities of food may point to unwholesome conditions or spoilage.

1.2. Condition of frozen foods

Frozen foods should be received frozen solid, because any evidence of thawing may indicate interruption of the cold chain. Large ice crystals are signs that the foods have been stored under fluctuating temperature conditions and have warmed or thawed and refrozen during storage or transport. In any case, frozen foods that have been allowed to thaw and refreeze will have substandard quality and should be rejected.

1.3. Delivery vehicle inspection

Vehicles should be inspected for any evidence of contamination. Food delivered in dirty trucks should be rejected.

1.4. Chemical use and storage

Chemicals should not be in contact with either packaged or exposed foods, and chemical containers should be examined for any signs of damage or evidence of spillage. Chemicals should be moved to safe storage areas away from food products as soon as possible.

1.5. Approved source of food products and ingredients

Food products received at a food service facility must be from an approved, regulated commercial manufacturer or as accepted by the regulatory authority.

1.6. Foreign objects

Foreign objects may already be in foods as a result of harvesting and processing. Employees must be careful to inspect the integrity of incoming packages on receipt and to inspect foods such as beans or rice for small stones. Foreign objects may also find their way into torn packages, broken bottles, and damaged cans, allowing contamination to occur.

1.7. Pest management

As doors are frequently open, the receiving area is a primary source of pest entry into a food service facility. Therefore, the receiving areas must be diligently monitored for pest activity. The protection of outer openings with screens, self closing doors make it more difficult for pests to enter. Rodents are especially good climbers, and efforts must be taken to identify and seal all points of entry.

2. Managing the Cold Storage Control Point

After perishable foods have been delivered and accepted, they should be moved to cold storage at 41°F (5°C) as quickly as possible. The preventative measures and recommended practices involved in food safety assurance at the Cold Storage Control Point are discussed below.

2.1. Time and temperature controls

Improper cooling and cold storage is often cited as the most prevalent factor in food borne illness outbreaks. Storage temperatures at or below 41°F (5°C) are considered to be safe. Temperatures of up to 45°F (7°C) may also be considered safe. Placing hot foods in cold storage with the intention of "cooling them down" is a very hazardous practice.

2.2. Sufficient equipment and cold storage space

Lack of storage space results in crowding of refrigeration units, leading to impeded airflow, and ultimately exposure of the foods to unsafe temperatures or environmental conditions. Therefore, a sufficient cold storage area along with adequate shelving are necessary for the food to remain safe.

2.3. Prevention of cross-contamination

Separate shelves in cold storage rooms for holding raw items and prepared foods reduces the risk for cross-contamination during storage. Moreover, prevention of cross-contamination can be easily accomplished by good storage techniques such as the use of containers with tight-fitting lids.

2.4. Foods stored off the floor

Food products must be stored at least 6 inches off the floor. Shelving units must provide a six-inch clearance space for cleaning. Floor storage is acceptable only if the food container is hermetically sealed and protected from floor moisture. Cans and bottles more than likely meet the "hermetically sealed" definition.

3. Managing the Dry Storage Control Point

Foods in dry storage are generally referred to as non–perishables or staples. Although dry foods do not support rapid bacterial growth under conditions of dry storage, certain pathogens (e.g., *Salmonella)* are highly capable of survival in dried foods. For example, cocoa products, dried milk products, and dehydrated egg products have been associated with foodborne illness from *Salmonella* contamination and certain nut products can be a source of *Listeria.* Thus assurances of the safety and quality of dry products should be obtained from suppliers. In addition, dry food products must be stored so that they are protected from other contamination. For example, chemical and physical contamination and pest infestations are significant hazards to control at the dry storage control point.

4. Managing the Food Preparation Control Point

Food preparation activities include thawing, portioning, chopping, cutting, trimming, grinding, mixing, washing and peeling.

4.1. Prevention and control of contamination from the food itself

4.1.1. Prevention of cross-contamination

4.1.2. Washing fruits and vegetables

4.1.3. Thawing

To avoid temperature abuse during thawing, four methods are commonly recommended:

Thawing under refrigeration

Adequate time must be allowed because the thawing in a refrigerator may take one or some days depending upon the quantity and type of food.

Thawing under cold running water

Thawing under cold running water should be a technique used with small portions of foods.

Thawing in a microwave oven

It is possible to use the ‘‘low’’ or “defrost” settings of a microwave oven to thaw foods. Foods thawed in a microwave should be cooked immediately on removal from the microwave or cooked in the microwave itself.

Thawing during cooking

When cooking frozen foods, it is vitally important to ensure that the interior portion of the food is adequately cooked. Generally, cooking frozen foods requires approximately a third more cooking time than cooking thawed or fresh foods.

4.1.4. Minimizing time at unsafe temperatures

4.2. Prevention and control of contamination from equipment and utensils

4.2.1. Cleaning and sanitizing equipment and utensil surfaces

Equipment and utensils routinely come in contact with raw animal foods and can be a source of cross-contamination with pathogens during preparation. Therefore, sanitizing of equipment under certain conditions is critical to food safety and must be effective.

4.2.2. Separate equipment/utensils for raw and ready to eat (RTE) foods

Separate equipment and utensils for preparing raw and ready to eat foods reduces the risk for cross–contamination.

4.2.3. Controlled use of disposable gloves

Surfaces of gloves become contaminated in the same way as hands. In a sense gloves can be thought of as a layer of skin. Changing single-use gloves may be thought as that of washing hands. In case of touching same nature food material, changing of gloves would be necessary after they have been torned.

4.3. Prevention and control of contamination from people

4.3.1. Personal hygiene practices

Of the types of contamination that can be spread by people, biological agents (e.g., bacteria, viruses, and parasites) are the most serious threats to public health. Following are given practices of food handlers which are considered as unhygienic.

Unhygienic Practices of Food Handlers

- Wiping hands on cloths and aprons again and again
- Chewing gum and/or smoking while working with foods
- Holding toothpicks, straws, or other objects in the mouth while preparing foods hands that may trap contamination or fall into foods
- Wearing excessive jewelry
- Having long fingernails
- Wearing nail polish
- Wearing false fingernails
- Touching infected pimples and boils
- Not wearing water coverings over bandages
- Wearing soiled clothing
- Not wearing a hair restraint

4.4. Prevention and control of contamination from environmental hazards

4.4.1. Potable water

Water serves several culinary and sanitary functions including ice making, dilution of chemicals, hand washing and ware washing and general cleaning. Any water used in a food service facility must be potable (considered safe from microbiological and chemical hazards) by existing regulations. Written standard operation practices (SOPs) should be developed and implemented with regard to testing and certification that the water supply meets, or exceeds, the regulatory requirements for hazardous chemical residues (e.g., heavy metals, pesticides, volatile organics, nitrates) as well as microbiological standards (e.g., coliform).

4.4.2. Design and maintenance of plumbing

All plumbing, including water lines must be kept in good repair. There should be preventative maintenance programs in place for plumbing fixtures such as sinks that receive constant use. Repairs of leaks should be prompt to prevent water damage.

4.4.3. Sewage disposal

The piping that carries the wastes to the sewage system must be constructed and located so as to prevent the release of wastewater into the food facility or onto the premises.

4.4.3. Safe usage and storage of chemicals and toxic items

Chemicals are used throughout the establishment for a variety of reasons.

Sanitation

Sanitation is a part of pre–requisite programs and can also be incorporated into HACCP plan. In general, following four different sectors should be sanitized for the safety of food:

- Equipment
- Environment
- Air
- Water

Type of food contact surfaces

The type of material used to make up the food contact surface is of great importance. These surfaces are comprised of many materials including:

- Stainless Steel
- Rubber
- Plastic
- Fiberglass
- Concrete
- Soft Metals
- Wood (in some rare cases) etc

Organic residues may attach to these materials and provide a good source for the bacteria and also contribute to becoming a biofilm. Sanitizers can be used for cleaning the surfaces over these materials.

Food Plant Sanitizers

Sanitizers are chemical agents used to reduce microbial contamination in food plants to an acceptable level. They are not meant to leave a surface sterile.

Why use sanitizers?

The application of sanitizers are to help reduce product contamination during process and/or to help reduce microbial counts from raw product.

Steps for cleaning and sanitizing

Here are five steps to clean and sanitize the surfaces:

- Dry clean or physically removing soils and dirt
- Pre rinse
- Detergent application
- Post rinse
- Sanitize
- Rinsing

Pads, brushes and brooms can be used for dry cleaning and physical removal of soils and dirt particles. The purpose of the pre-rinse is to remove the majority of any organic challenge. This step reduces the amount of cleaning chemical that must be used, removes the heavy particles off the surfaces, and can remove resident bacteria from the surface. The post-rinse cycle removes any and all organic soils that have been removed by detergents. This post rinse cycle has also been shown to remove residual bacteria. Also, it is important to note, that this post rinse is critical because any and all cleaning chemistry (detergents) that remain will greatly affect the sanitizer that is applied.

Note that most cleaning chemistry is used at a pH of 12 and higher, and it is natural for most sanitizers to be on the acid side, as is the case of iodophors and acid sanitizers. If equipment is not rinsed thoroughly after cleaning, residual detergent will raise the pH which could reduce the effectiveness of the sanitizer used. Rinsing at the end may be considered paramount in removing the residual sanitizers. Table shows recommended sanitizers specified for different types of surfaces or plants along with their concentrations.

Time and schedules

Plan your work and work your plan. There should be realistic allocation of time and labor resources for cleaning and sanitation practices.

Table: Sanitizer concentration commonly used in food plants

Specific Area or Condition	Recommended Sanitizer	Concentration
Aluminium Equipment	Iodophor	25 ppm
	Quat	200 pprn
	$Cl0_2$	100 ppm
Bacteriostatic Film	Quat	200 pprn
	Acid- Anionic	100 ppm
Concrete Floors	Active Chlorine	1000-5000 ppm
	Quat	500-800 ppm
	$Cl0_2$	100 ppm
Conveyor Belts	Active Chlorine	300-500 ppm
	Iodophor	25 ppm
	$Cl0_2$	100 ppm
Cooler Walls & Ceilings	Quat	500-800 ppm
	$Cl0_2$	50 ppm
Hand Sanitizer	Iodophor	25 ppm
Hard Water	Acid-Anionic	130 ppm
	Iodophor	25 ppm
	Active Chlorine	200 ppm
	$Cl0_2$	100 ppm
High Iron Water	Iodophor	25 ppm
	$Cl0_2$	100 ppm
Plastic Crates	Iodophor	25 ppm
	$Cl0_2$	100 ppm
Porous Surface	Active Chlorine	200 ppm
	Quat	200 pprn
	$Cl0_2$	100 ppm
Processing Equipment	Acid Sanitizer	130 ppm
(Stainless Steel)	Active Chlorine	200 ppm
	Iodophor	25 ppm
	Quat	200 ppm
	$Cl0_2$	100 ppm
Rinse Water Treatment	Active Chlorine	2-7 ppm
	$Cl0_2$	1 ppm
Tile Walls	Iodophor	25 ppm
	Quat	500-800 ppm
	$Cl0_2$	50 ppm

Detergents and sanitizers application methods

Following are several methods of applying cleaning and sanitation chemistry.

1. **Soak tanks**
2. **Foam tanks**
3. **Automated system, e.g. Clean in Place (CIP) systems**

These systems are usually found in dairies, beverage plants, and other processing facilities and allow for cleaning and sanitizing without having to disassemble the equipment. All CIP systems have the capability to inject chemical product at the prescribed dilution rate without any hand mixing.

4. **COP (cleaning out of place) systems**

COP is cleaning out of place. This means that equipment is disassembled and placed in a tank which allows the equipment to soak in the cleaning solution. A pump can be installed which will allow the water to agitate the parts, or air can be introduced to cause agitation.

5. **High pressure systems**

High pressure systems are excellent in some areas such as cleaning outside areas, fork lifts, loading and receiving docks.

Common Detergents used

Basic Alkalis

- Caustic soda
- Sodium metasilicate
- Tri–sodium phosphate

Complex phosphates

- Sodium tetra phosphate
- Sodium tri–polyphosphate
- Sodium hexametaphosphate

Organic compounds

- Tetra sodium pyrophosphate
- Organic acids
- Mineral acids
- Wetting agents

Common sanitizers used

- Chlorine
- Chlorine dioxide
- Iodophores
- Peroxyacetic acid
- Quaternary ammonium compounds

Ideal Sanitizers – should

- Destroy vegetative microorganisms
- Be dissolve in water
- Be inexpensive, easy to use
- Not irritate skin
- Not have offensive odor

Cleaning Chemistry

Acid products are used for removing mineral deposits such as milk stone, beer stone, and calcium carbonate types of minerals, rust and so forth. There are many acids on the market (e.g. phosphoric, sulfamic, nitric) that can remove the mineral deposits.

Neutral pH products are not used a great deal in the food processing industry due to the type of organic challenge that is encountered. However, there are some special applications when an acid or an alkaline product can do damage to equipment, plastics, or other materials. Then a neutral product is indicated.

Alkaline products are in the pH range of 7 to 14. The higher the pH, the stronger the action of the alkaline. Caustic soda was used to remove carbonaceous deposits, fats, oils, greases, and the like. Alkaline products are now blended to include surfactants, wetting agents and other ingredients to increase the efficacy of the product. Alkaline products are indicated for use on organic challenge such as fats, oils, grease, protein and carbonaceous deposits.

Chemical Definitions

Corrosiveness – Protecting the processing equipment from harsh cleaning products is important due to the deterioration of the metal. Some cleaning products will “burn” aluminum, and will destroy galvanized coatings. Also, bronze and copper metal will be destroyed by high pH cleaning products. In this instance, a neutral buffered chemical product is indicated.

Water softening – Caustic soda will form a film of calcium and magnesium carbonates in hard water. Softening will precipitate the hard water elements as insoluble salts.

Rinsability – The ability of a detergent to be freely rinsed from the surface. This ability is of prime importance not only for the chemicals to be rinsed away but also to drain away any bacteria that has been destroyed in the cleaning process. There should not be any residues of cleaning chemical on the surfaces of equipments or utensils.

Wetting/penetration agents – The use of these agents depends upon diffusion rates, concentration, and how rough the surface of the material is. Surface active agents are clearly much better to all other products in allowing the oils to be rinsed away and for the penetration of the agents into ‘cracks and into the holes of the solid deposits.

Solubilization – Lactose, found in milk solids, is soluble in water and therefore easily removed. Mineral salts, found in stone deposits are solubilized by acid cleaning solutions, thus chemically altering these products into soluble substances.

Peptization – This occurs only by chemical action without agitation and is usually associated with the removal of proteins.

Emulsification – This is the action of breaking up fats and oils and dispersing them throughout the cleaning solution.

Saponification – A deep fat fryer should be rinsed with an acid product as the alkaline cleaner will mix with any residual oil, thereby creating a “soap,” and may cause the finished product to have a “soapy taste.”