PART 1

CONSTRUCTION AND DESIGN

1.1 plant location and surroundings

(1) Processing plants are not in areas subject to flooding unless sufficient safeguards are provided, and are not located in industrial areas where pollutions affect to safety of products produced.

(2) Plant surroundings are kept clean and free from objectionable odous, smoke, dust or other contamination. The areas are free of unused material capable of harbouring insects and rodents. Plant surroundings that are not in the control of the establishment, appropriate prevention from access of pest are provided.

(3) Surrounding drains are sufficient in capacity.

1.2 Processing areas and separation

(1) Sufficient space is provided for such placement of equipment and other materials used in processing. Space is also provided to promote an easy maintenance of hygienic operations.

(2) Processing areas are properly designed to prevent microbiological and chemical contaminations as well as other foreign matters onto products. Cross contaminations can be reduced or prevented by proper measures, e.g. physical separation of processing areas, process of different products in different time. The entire area where cooked product processing is conducted is to be separated from the raw product areas.

1.3 Floors / Walls and Ceilings

(1) The interior walls are in good repair, made of strong impervious materials, light coloured surfaces without cracks and easy to clean.

(2) During processing, floors, walls and ceilings are kept clean and free from accumulated waste for a long time. At end of work, floors in wet areas are to be cleaned and disinfected thoroughly. Pipes on ceilings are adequately cleaned, that drip or condensate does not contaminate food.

(3) Floors are not slippery and have enough slope to allow adequate drainage. The junction between floors and walls should be curved or round.

(4) Walls are free of ledges. If these are present, they shall be sloped to prevent the collection of dust. Where walls made of glass, they should have prevention of glass spreading in case of breakage.

1.4 Drains

(1) Drains are kept clean and constructed of smooth and impervious material and are of sufficient size to carry off process effluents and water from cleaning operations. Floor drains are covered with metal or other approved material. The covers are well designed to allow water to drain properly.

(2) Adequate drainage is provided in numbers and size to carry off process effluents effectively.

(3) Effluent flow-out direction is properly designed. Water from raw material preparation area (e.g. gutting, deheading, skinning) is not discharged backwards to the cleaning area through the drain system.

1.5 Lighting

(1) A minimum illumination of 20 foot candles (220 lux) is provided on all working areas and not less than 50 foot candles (540 lux) at points requiring close examination of the product.

(2) Light bulbs suspended over the working areas where fish is handled at any stage of processing are of the safety type or covered by clear shields to prevent glass from falling into the products in case of breakage. Light fixtures should be of a design which permits easy cleaning of surfaces where dust and debris may collect.

1.6 Ventilation

(1) Sufficient ventilation is provided to eliminate odour, heat, smoke and excessive condensation.

(2) The air-flow from the building shall be from the more hygienic areas to the less hygienic ones.

PART 2

EQUIPMENT AND INSTRUMENTS

2.1 Equipment and instruments

(1) All equipment and instruments are kept clean, constructed with a smooth interior, are of a non-corrodible impervious material and free of cracks. Equipment and instruments that come in contact with food are made of approve materials which do not transmit toxic substances, odor or taste to food.

(2) All equipment and instruments used in processing areas should be designed and constructed as to facilitate thorough cleaning and disinfection. Proper controls are taken as to prevent products from lubricant contamination.

(3) Cleaned equipment are kept in clean condition to prevent recontamination.

(4) Monitoring devices used for controlling, measuring, or recording, to prevent microbiological growth, i.e. thermometers, pH meters, water activity meters, shall be accurate and adequately maintained, calibrated and adequate in number for designated uses.

2.2 Cleaning equipment

(1) This equipment is constructed from impervious and rust resistant material, so as to provide ease of cleaning and maintenance, and kept clean.

(2) Equipment is stored in a sanitary manner to prevent being the source of dirt or microbial contamination.

2.3 Offal containers

(1) Containers in which offal is stored shall be watertight and constructed of material easily kept clean.

(2) The containers are kept separate and used only for offal. They must not be used for holding fish intended for food or for any materials or utensils used in the food processing operation.

PART 3

CHEMICALS AND PACKAGING MATERIAL

3.1 Ingredients and Chemicals

(1) Ingredients and chemicals used during production should be approved to be safe for food, clearly identified and kept appropriately in the separate rooms where prevent contamination and rodent.

(2) Toxic compounds should be stored in a separate room kept away from ingredients or foods and be clearly identified. They should be properly utilized have a clear application method. The use of toxic compounds is permitted only under precaution and restriction by trained operators.

3.2 Packaging Materials

Packaging material should be made of suitable materials and provide adequate protection for product to minimize contamination, prevent damage, kept in clean separated area where protect the entry of rodents, insect and dust.

PART 4

CLEANING AND SANITATION

4.1 Cleaning

(1) Cleaning programs appropriately provide cleaning methods to ensure that all parts of the establishment and equipment are appropriately clean with suitable cleaning methods. All food contact surfaces should be sanitized after cleaning.

(2) Detergent and disinfectant used should be suitable qualification on purpose and safe using in food processing plant.

(3) Cleaning program should be continually and effectively monitored for their suitability and effectiveness.

4.2 Pest Control

(1) No pest should be allowed in any area of a food plant.

(2) Plant construction should be maintained in good repair without cracks or holes and provided protective device to prevent the entry of such as drain or ventilators where pests are likely to gain access should be kept sealed by suitable screens. Keeping all areas in good sanitation.

(3) Provide eradication program and monitoring to examine for evidence of infestation. Treatment with suitable physical, chemical or biological agents are approved by competent authority. Eradication should be done by trained person.

4.3 Waste Management

(1) Waste store must be appropriately kept clean and good sanitation. When waste material is stored in container outside the establishment, the container must be kept covered. Waste management should be done in sanitary manner without contamination to food.

(2) Waste must not be allowed to accumulate in food handling, food storage and other working areas. Waste to outside working area appropriately.

4.3 Effluent Disposal Method

Effluent from fish processing operation shall be disposed of in such a manner that the waste is inaccessible to flies and pest. Effluent should not contaminate water supply, food and processing area.

PART 5

HYGIENE REQUIREMENTS

5.1 Water Supply and Ice

(1) Water supply shall be sufficient for the operations intended and shall be derived from an adequate source. Any water that contacts food or food contact surfaces shall be safe and of adequate sanitary quality (potable water standard : Total coliforms not more than 2.2 MPN/100 ml and no pathogenic bacteria)

(2) An adequate water supply is provided for daily work including cleaning equipment and personnel. Provide that there is not backflow or cross contamination between piping systems that discharge waste water or sewage and piping systems that carry water for food or food manufacturing.

(3) Ice shall be manufactured from potable water kept and transferred in a sanitary condition to prevent contamination**.**

(4) Non-potable water, for example, fire control, steam production, refrigeration and other similar purposes where it would not contaminate food shall have a separate system. Non-potable water systems shall be identified and shall not connect with, or allow reflux into, potable water systems.

(5) If use chlorine in water supply, it should be determined free residual chlorine at least 2 times a day. Quality of water and ice shall be tested frequently to control their standard.

5.2 Hand Washing Facilities

(1) Hand washing facilities must be adequate and conveniently located at the entrance of the work area.

(2) Hand washing facilities shall be kept in good repair and in a clean and sanitary condition. Devices or fixtures, such as water control valves, so designed and constructed to protect against recontamination of clean, sanitized hands.

(3) Prepare effective hand, glove sanitizing at the entrance of the work area and monitor the effective of sanitizer.

5.3 Foot Dips

Foot dips are to be located at every entrance and appropriately provide disinfectant. If use chlorine, free residual chlorine should be more than 200 ppm. They should be charged water and controlled appropriate water level.

5.4 Aprons, Gloves and Boots

Aprons, gloves and boots are kept in sanitary condition and separated areas with good ventilation.

5.5 Changing room

Adequate changing rooms for personnel separate from the work areas. They should be kept clean ,have good ventilation ,and avoid creating an environment conductive to pests.

5.6 Cafeteria

Provide clean and sanitary cafeteria, and avoid creating an environment conductive to pests. Waste material should be stored in bins with cover and removed every day.

5.7 Toilet Facilities

(1) Adequate, suitable toilet facilities are provided

Employee(s)	Toilet(s)
1-9	1
10-24	2
25-49	3
50-100	5

for a situation that there are more than 100 employees, add 1 toilet for every 30 employees.

(2) Shall be maintained in a sanitary condition, kept in good repair, good ventilation and provide tissue paper and bins with cover. Toilet doors should not be opened into area where food is exposed to airborne contamination, except where alternate means have been taken to protect against such contamination (such as double doors or positive air-flow systems)

(3) Providing hand washing facilities designed and constructed to protect against recontamination of clean hands including hand dips and foot dips.

PART 6

EMPLOYEES

6.1 Employee Health

(1) Medical examination of food handler should be carried out before being admitted to work if clinically or epidemiologically indicated and at least annually thereafter. Food handlers should not have or appears to have contagious diseases, illness such as Hepatitis, Tuberculosis, Tertussis, etc. and carriers of any diseases such as Cholera, Typhoid, Diarrhea until the condition is corrected

(2) Food handlers should not have open lesion or infected wounds or any abnormal source of microbial contamination by which there is a reasonable possibility of food becoming contaminated, except suitable prevention. Personnel shall be instructed to report such health condition to their supervisors.

6.2 Employee Practices

(1) Avoid eating, drinking, using tobacco, chewing gum in production areas, and sneezing and coughing over unprotected food.

(2) Removing all unsecured jewelry and other objects that might fall into food.

(3) Food handlers should always wash and sanitize their hands at the start of food handling activities, immediately after using the toilet

and during the work when appropriate. They should maintain adequate personnel cleanliness.

6.3 Wearing

Wearing where appropriate in an effective manner to prevent contamination such as hair nets, caps, gloves made of an impermeable material. Clothing should be kept clean and changed at work.

6.4 Training

(1) Personnel responsible for identifying sanitation failures or food contamination should have a background of education or experience or a combination thereof, to provide a level of competency necessary for production of clean and safe food.

(2) Food handlers and supervisors should receive appropriate training in proper food handling techniques and food protection principles, and should be informed of dangers of poor personnel hygiene and unsanitary practices.

PART 7

CONTROL OF OPERATIONS

7.1 Raw Material and Other Ingredients

(1) Should be wholesome and suitable for human consumption. Record source of raw material and examine its internal temperature. When delivered to the plant, raw material shall be close to the temperature of 0°C. If the temperature is higher but the quality of raw material is acceptable, it shall be chilled in the plant immediately.

(2) Before receiving raw material should be examined organoleptic qualities every lot with recording and rejected if it is known to be decomposed or to contain harmful or extraneous substances.

(3) Receiving area are to be segregated from other processing areas. Adequate receiving area and convenient handling equipment should be provided. If handling raw material in outside establishment, it should be carried quickly and kept in an entirely covered container.

(4) Receiving areas are kept in clean condition and pest control program are provided.

(5) Receive raw material in good sanitation. Rejected fish are segregated. Fish with acceptable quality shall be washed with potable water before passing to further processing.

(6) Receive raw material shall be kept in clean container in separate area. Each lot shall be labeled or identified for convenient to manufacturing. Storage shall be clean and provide protection of raw material from deterioration and contamination.

(7) Frozen raw material shall be thawed in properly designed containers and in an areas isolated from other processing area. Potable water shall be provided for thawing and shall not be recirculated. If

necessary to use recycling of thawing water, it shall not be reused in more than 1 production lot.

7.2 General Processing

(1) The flow of product through the operation from raw material receiving to finished product should be linear and in order. Processors should minimize delay time or temperature abuse in all processing step and arrange entire operating in sequence of first in first out.

(2) Operate under good sanitation practice to prevent contamination to food such as gutting, deheading, peeling and buchering etc. in a separated clean area. After preprocessing, raw material shall be washed properly before next processing step.

(3) Control temperature of raw material in every processing step (except thermal processing step) close to 0°C or not more than 10°C, and -18°C for frozen products and also during loading products.

7.3 Cooking

(1) Raw material are washed before cooking and immediately cooled down after cooking by potable cool water or other methods which under good hygienic practices.

(2) For cooked products , the plant should validate that the heat treatment is adequate to destroy pathogenic bacteria especially *L. monocytogenes* The application of time and temperature control at a cooking step depends on critical factors such as the temperature of the cooker, type , size and initial temperature of the product.

(3) Control cooking time and temperature are during a cooking step and record data to assure that time and temperature during a cooking step are under controlled.

(4 Prevent cooked product from recontamination such as separation of raw material and cooked products. In case of delay, cooked products are kept chill at 0 – 2 ^{0}c and processed in 18 hours.

7.4 Batters , Breading

(1) Batters and bread shall be prepared in good hygienic not to induce microorganism contamination to product, and maintained in such a manner that they are protected against contamination.

(2) Control time and temperature during using batters and frequently change batters to prevent microorganism growth.

7.5 Freezing

(1) The temperature of freezers during freezing step should not be higher than -30 ^{0}c and should be recorded every batch. Freezers should have efficient capacity to bring product core temperature down to –18 ^{0}c as fast as possible and adequate capacity for daily production.

(2) Freezers and surroundings are kept clean.

7.6 Drying and Ferment

(1) Drying area, such as dried fish, and ferment area, such as fish sauce and pickled fish, shall be kept clean without any pest.

(2) Drying and ferment shall be performed so as to protect raw material against contamination.

7.7 Packing

(1) A separate clean room is provided for packing especially the packing of ready-to-eat products and should not allow persons passing by.

(2) Packing shall be performed in good hygienic against contamination. They should provide only potable water for deblocking and glazing.

Packing shall be performed in good hygienic against contamination. Provide only potable water for deblocking and glazing. In case of deblocking in tank, the tank is maintained clean and water are circulated all the time. Prevent the temperature of product from rising by properly handling.

(3) Establish code on each packaging material to be traced back to source of raw material and processing date

7.8 Cold Storage or Chill Room.

(1) Cold storage temperature is maintained at a constant -18 ^{0}C and chill room are maintained temperature < 7 ^{0}C. The indicating thermometer are provided to show the temperature of cold storage or chill room and installed in easy readable and suitable position. Room temperature of cold storage shall be read and record daily.

(2) Frozen products shall be stored without induction to contamination such as stored in tightly seal container place on pallet, separate type of products in separated areas, separated raw material and finished products. Cartons shall not be stacked closely to wall or too crowded.

(3) Cold storage and chill room shall be kept in reasonably clean and antiroom areas.

7.9 Laboratory

(1) Laboratory is provided for physical microbiological and chemical analysis for raw material, finished product inspection including verification.

(2) Standard methods are performed and laboratory shall meet general requirement of laboratory. .