

SECTION 3

GOOD MANUFACTURING PRACTICES FOR THE ON-SHORE HANDLING AND PROCESSING OF TUNA

3.1 INTRODUCTION

Tuna is a very delicate fish, which demands that the quality of the product be protected at all times. We must view the workmanship methods of handling tuna and ensure that every method of handling is to protect the tuna at all times.

In this section, Good Manufacturing Practices (GMP) will be outlined to show the proper methods which should be adapted to maintain a good quality product for the end user. GMP procedures are aimed at the prevention of problems by controlling and maintaining the quality of the tuna at all times. When we receive the product at the unloading site we cannot improve the quality of the product, we can only try to maintain the existing quality.

The biology and GMP for handling tuna on board is given in Section 1.

To prevent deterioration in the quality of tuna, the temperature of the tuna must be maintained at 0°C at all times during catching, storage on vessel, unloading, processing and shipping. Histamine production is controlled by minimizing the internal temperature of the tuna to below 7°C at all times.

The GMP procedures in this section will attempt to establish a set of guidelines to help the processor in the production of tuna products.

This chapter is set up into a series of guidelines. They are listed as follows:

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|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| a) | Processing Procedures for the Proper Receiving, Grading, Processing Holding, Packing of Fresh Whole Tuna; Frozen Tuna Loins; Frozen Tuna Sticks; and Proper Packing Procedures. | 3.1 |
| b) | Employee Requirements | 3.2 |
| c) | Plant Facility Requirements | 3.3 |
| d) | Proper Cleaning Procedures | 3.4 |

In examining processing procedures (a), we will take a step-by-step approach used in the processing of tuna.

Receiving	3.1.1
Grading	3.1.2
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The processing procedures list the factors which can affect the processing operation, and the methods of correcting these problems.

3.1.1 Receiving

During receiving it is very important to have the tuna delivered to the receiving

area in a proper insulated container, which is made up of slush ice and salt water. Tuna is to be properly handled in a safe and proper manner. The temperature of the tuna is very important and there should be a form that shows the recorded temperature that has been inspected at time of discharge.

Section 4.2.3 shows the type of forms which is required to be completed at point of discharge. These forms will also show if there is a problem with the temperature of the tuna. If there is any problems at time of discharge, then when the product arrives to the receiving area it can be corrected.

Points of Concern

No tuna is to be taken into the receiving area that has become decomposed, unwholesome and/or contaminated.

No tuna which has not been properly gutted is permitted.

No tuna is to be accepted at the receiving area which has been transported by the means of an open truck.

No tuna is to be placed on the floor of the receiving area. Tuna which is placed on the floor will become contaminated very easily. It is unacceptable to have a product that is being processed for human consumption handled in this manner. There are too many ways for the floor to be contaminated, and in turn cause contamination to the product.

3.1.2 Grading of Tuna

The grading of tuna is done at this stage for colour, condition and size. Tuna must be placed on a proper grading table when being inspected for these procedures.

Section 5 details the system that is used for the grading of Bigeye and Yellow Fin Tuna for colour and condition and the forms which should be completed when inspection of tuna is being carried out.

During quality inspection for colour and condition, the tuna should be marked as to what market it is intended for by placing a tag with the proper markings on them.

Points of Concern

Tuna are not to be placed on floor, for fear of contamination and damage to the outer area of the fish.

Tuna are not to be dragged on floor area for fear of damage.

Tables for the inspection and processing of tuna are to be constructed of a smooth surface which is free from cracks and crevices. The table should be constructed of approved materials.

During inspection all attempts must be taken to prevent the contamination of the tuna from foreign material.

All utensils used during the inspection procedure must be clean and safe.

3.1.3 Cooling

Tuna must be kept cool at all times to ensure that there is no rise in the core temperature of the tuna.

Tuna is not to be left exposed for a long period of time.

Tuna should only be removed from the slush tanks as they are going to be processed.

The core temperature of the tuna should be at 0°C at all times.

Tuna for domestic markets must be maintained at a proper core temperature.

The air temperature in the processing area should be maintained at 18°C or less.

Points of Concern

Tuna which has a high temperature is not permitted to be exported.

Tuna is not to be removed from slush tanks until time of packing for shipping. Temperature before being removed from the tanks must be at 0°C.

If temperature of tuna rises above 7°C than the meat is being exposed to the process of increasing chances of histamine. The only way that this compound can be controlled is by eliminating the chances of a rise in the temperature.

3.1.4 Processing of Whole Fresh Tuna

Tuna is to be placed on tables whereby the process of removing the fins is carried out. All fins should be removed properly at this stage in production.

The belly cavity is inspected for workmanship to ensure that there are no gut remnants left in the belly wall of the tuna.

The area around the head where the gills have been removed must be inspected to ensure that it is properly cleaned. If there are any dead blood present it must be removed immediately. The section of visible bone around the head section must, if not already during catching being cleaned properly, be completed at this time.

The inner belly lining must be properly trimmed. Any pieces of the membrane which are hanging or loose must be removed properly. When the tuna has been inspected for workmanship, if the tuna are to be held for any period of time before being packed and shipped, they must be placed in properly constructed slush tanks, which have clean and safe slush ice and salt water.

If the temperature of the wash water is high, it is recommended that the water be cooled before coming in contact with the tuna. One method is to pass the wash water through a coil of copper pipe which has been placed in an ice/water slurry.

Points of Concern

No tuna which is decomposed, tainted or unwholesome shall be processed.

No tuna is to be inspected or processed on the floor surface of the processing area. The reason for this is to prevent contamination.

No tuna is to be dragged across the floor. Tuna is a very delicate fish. It is very easy to damage the skin surface of the tuna. If the scales are damaged and the skin is torn, the condition of the tuna will be affected by this method of handling tuna. The outer meat when the tuna is being dragged will also be damaged causing a decrease in the usable meat. Remember that the buyer is only paying for the amount of product that he can use.

No tuna is to be exposed to the heat for a long period of time. If the temperature of the meat of the tuna is permitted to rise it will create a quality problem.

No tuna should be placed in improperly designed slush tanks.

No blood is permitted to remain in the tuna. This will cause rancidity to form in the meat of the tuna, causing health and quality problems.

If these measures are followed, tuna will be protected from contamination and damage to the scales, skin, and outer meat.

3.1.5 Processing and Packing of Fresh Tuna Loins

Tuna which is being directed for processing as fresh tuna loins must be processed immediately prior to shipping.

Tuna loins must be processed and inspected for any defects as quickly and as carefully as possible. All defects must be removed at time of processing.

Tuna loins must be covered immediately in a proper approved poly sheet immediately after being inspected.

Tuna loins are to be packed in a proper shipping box which must contain either frozen gel-packs or dry ice.

Tuna loins should only be produced in a specially designed temperature controlled room. The air temperature should not exceed 18°C.

Points of Concern

No tuna loins that is unsafe, decomposed, or unwholesome is permitted to be packed or shipped.

Tuna loins must maintain a temperature of 0°C.

No fresh tuna loins destined for sashimi are permitted to be processed from tuna that does not meet the colour and condition score of 40 and higher.

No tuna loins are to be transported in an unrefrigerated truck.

3.1.6 Packing and Shipping of Whole Fresh Tuna for Exporting

Tuna must have a core temperature of 0°C before it is placed into carton for shipping.

Tuna is to be removed from the slush tanks just prior to packing.

The outer surface must be wiped clean with a sponge and clean safe salt water.

The belly section must be wiped clean from any water or foreign material.

The belly wall must be packed with frozen gel packs to help in maintaining the core temperature of the tuna.

The outer skin surface must be covered with green tuna paper which has been previously soaked in salt water. This will prevent the skin of the tuna from losing its moisture; and also, where there are more than one tuna in a carton, it will protect each tuna from the other.

The tuna after being properly covered is to be placed gently into the carton. The carton must contain two sheets of 10 mil poly which is large enough to completely cover the tuna.

Before closing the plastic you must place frozen gel packs around the tuna to help maintain the proper temperature. If dry ice is used, it must be placed in the container so as not to cause freezer burn to the skin surface and the outer meat.

The carton must be constructed of water tight material and have strength to withstand packages stacked on top of each other without being crushed.

The carton must also be constructed of material that prevents the transfer of temperature. It must be designed for cold retention and be insulated from external temperatures.

Transporting of fresh tuna packed for air shipment. The truck must contain a chill unit so as to maintain the air temperature at 0°C during transportation to the airport.

Points of Concern

Tuna which is decomposed or unwholesome is not permitted to be packed for export.

Tuna, at no time is to be removed from the slush tanks and placed on the floor prior to or during the processing operation.

Tuna that is improperly chilled shall not be packed for shipping.

No tuna is to be shipped unless each container contains either frozen gel packs and/or dry ice.

No tuna is to be placed into carton without proper protection of the skin.

No tuna is to be packed without the belly section containing a proper amount of frozen gel packs.

No carton to be used which does not reach the requirements mentioned above.

No tuna to be transported to the airport in non-coolant trucks.

3.1.7 Processing of Frozen Tuna Loins and Sticks

Tuna which is destined for frozen production must be processed as quickly and as carefully as possible as soon as it is received. Sections 3.1.7.1 and 3.1.7.2 show parts of tuna loins and section 3.1.7.3, the dressing of eviscerated tuna.

Fresh Tuna which is destined for frozen loin production must be properly handled. The tuna must be transferred to the loin production area in a proper manner. The fish must be moved into the production area by means of containers or trolley.

All care must be taken to ensure that during the production process that no tuna comes in contact with any contamination.

Frozen loins and sticks must be processed in a proper clean and safe environment. The production facilities must be properly constructed so as to produce the best quality product with the utmost of care. The workmanship of the product must be controlled at all times.

Temperature must be reduced as quickly as possible after the production has been completed.

Air-blast freezing is recommended because low temperatures can be obtained very quickly. The blast freezer should be able to reduce the product's core temperature to -60°C within 6 hours. After the product is properly frozen it must be stored in the cold storage. The temperature of the cold storage must be maintained at -50°C or lower.

Both the blast freezer and the cold storage should have a recorder to continuously record the temperatures .

During the processing of tuna there are to be no chemicals added to enrich the colour of the loins or sticks, unless they have been previously approved for human consumption by the competent authority having jurisdiction. A

description of the chemicals should accompany the frozen production which contains the additives.

After freezing and during the removal of outer skin, only the amount of production which can be properly handled is to be removed from the cold storage.

During the removal of the skin and defects, all care must be taken to ensure that the product does not come in contact with any contamination.

Before the product is placed into the carton, it is required to be placed through a metal detector to ensure that there is no metals present in the meat.

Each tuna loin is to be placed into a sleeve and the sleeve properly sealed to ensure that the frozen loin or sticks are protected from contamination.

During the time that the frozen product is out of the cold storage for final processing, all care must be taken to minimize the chance of rise in temperature.

Points of Concern

No tuna which is tainted, decomposed, and unwholesome shall be processed.

No tuna is to be placed on the floor before processing commences.

No tuna is to be removed from the slush tanks until ready for processing.

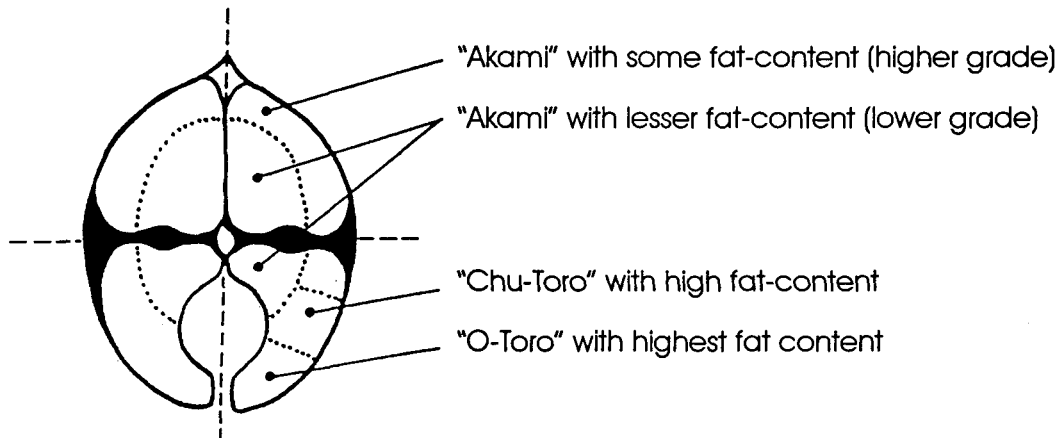
No tuna is to be dragged across the production floor.

No product is to be removed from the blast freezer until proper core temperature has been reached.

All products are to be properly covered with plastic sleeves and placed into a proper shipping carton.

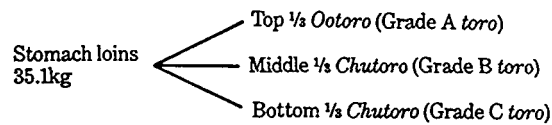
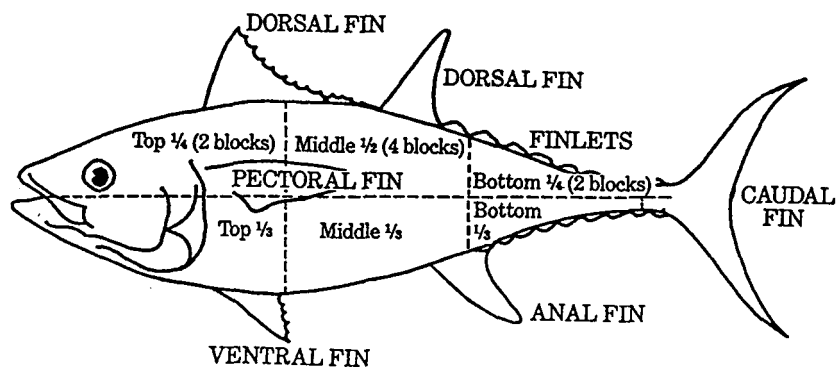
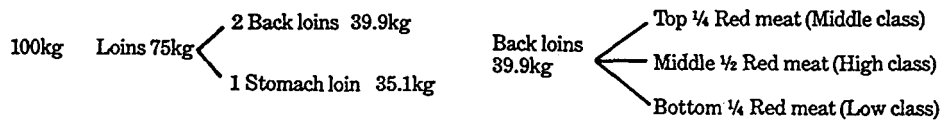
No frozen product is to be transported from the processing plant by open truck.

3.1.7.1: Tuna *AKAMI* and *TORO*



Source: Narasaki

3.1.7.2: Proportion of *Akami* and *Toro*



Source: Williams; Queensland Fishing Industry Training Council

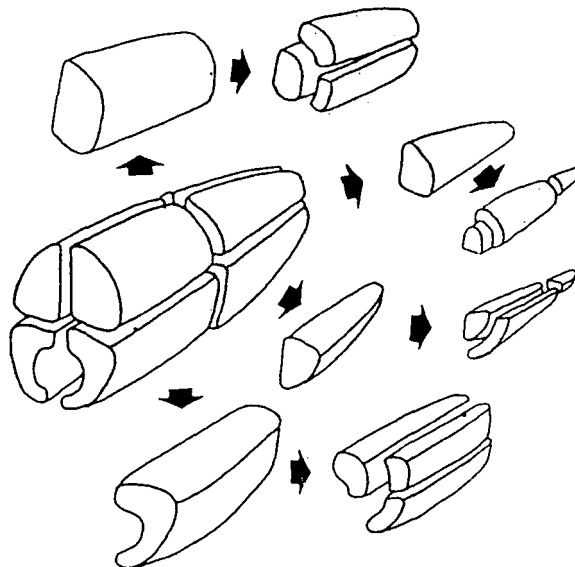
From INFOFISH Technical Handbook 1, Handling and Processing of Tuna for Sashimi.

3.1.7.3 Dressing of Eviscerated Tuna

Place the fish on a clean cutting-board on one side with the head to your left.

- Hold the pectoral fin and raise it slightly. Insert knife neat the base of pectoral fin and cut down towards the dorsal line, and move the knife gently following the line of the operculum.
- Cut just behind the isthmus to the base of the pectoral fin also following the line of the operculum to complete the cut. Sometimes , the pelvic fins are removed at this stage by cutting from the isthmus.
- Turn the fish onto the other side, and repeat the above steps, followed by chopping the backbone by holding the head and using a heavy knife or hacksaw until the head is cut.
- The fully dressed tuna is then quarter filleted by inserting a sharp knife through the back until reaches the backbone, and cutting along the dorsal line as shown in the following diagrams.
- The four quarter-fillets are then carefully sliced into thinner fillets, or directly cut into blocks of 300-400 mm in length for the wholesale market. Upon proper chilling condition, these blocks can be stored up to one week.

*Filleting of
Dressed Tuna for Sashimi*



Source: Narasaki, 1986

From INFOFISH Technical Handbook 1, Handling and Processing of Tuna for Sashimi.

3.1.8 Processing of Tuna for Domestic Market

No tuna which is tainted, decomposed or unwholesome shall be processed for the domestic market.

Tuna must be properly chilled before being shipped.

Tuna is to be properly stored in slush ice and salt water prior to shipping.

Tuna is to be properly transported to the market.

Points of Concern

No tuna for the domestic market is to be left on the processing floor.

Tuna which is improperly gutted or is not gutted is not permitted to be shipped to the market.

No tuna for the domestic market is to be left in the open air with no covering.

No tuna is to be shipped to the market in open trucks.

No tuna is to be shipped without being properly iced.

3.1.9 Summary

The main point to remember is the way in which tuna is to be handled at all time.

Tuna is graded by both the colour and condition of the whole fish.

The freshness and colour are the main factors that are considered in determining the price which is to be paid for tuna. The next factor is determined by the Yield Recovery of the meat. This is determined by the condition of the outer surface. By looking at the scales and skin they determine how much of the outer meat will be used.

When we sell a whole tuna, we sell the whole fish which includes the scales, and skin as well as the meat. The end user will only pay for what usable meat he will recover from the tuna. For every time that a tuna is dragged, pulled, or slides across a floor there is not only damage to the loss of scales or torn skin, but also damage to the outer meat area, both in contamination and in loss of usable product.

Tuna must be handled very carefully at all times, it is not to be dragged across a processing floor. The floor is not to be used as part of the processing operation.

We must improve the workmanship of the tuna wherever and whenever possible. If we show the buyers that we are improving our work methods and

decreasing any damage to the tuna then we can be in a position to demand more return on the end product.

3.2 EMPLOYEE REQUIREMENTS

3.2.1 Health

No employee who is known to be suffering from any communicable disease is permitted to work with tuna.

No employee who is a known carrier of any disease is permitted to work with tuna.

No employee who has infected wound or open cuts on their body shall be employed in the direct handling of tuna.

REASON: A person who is suffering from a communicable disease or who is a carrier can infect the tuna product with bacteria capable of causing food poisoning. A person who has open cuts or infected wounds must not be employed in the working area due to the fact that there is danger of infecting the tuna product with food poisoning organisms.

3.2.2 Hand-Washing

Each employee who is involved in the processing of tuna products must wash their hands with warm water and liquid or powered soap immediately after each absence from their work area.

REASON: In order to maintain satisfactory sanitary conditions in the processing area each person is required to wash their hands. Unless the employees wash their hands properly after each time they return to the work station then the contamination of the product, work station, and utensils that they are using will become infected.

3.2.3 Hand Covering, Disinfecting

All hand coverings used by the employees in the handling of tuna, must be kept clean and disinfected on a continuous basis.

REASON: Large numbers of bacteria accumulate on protective hand coverings. Unless they are frequently cleaned and disinfected, they become a serious source of contamination to the product.

3.2.4 Outer Garments and Head Gear

3.2.4.1 All employees engaged in the production of tuna are required to wear coveralls, smocks, or coats, and headgear which is approved by the competent authority having jurisdiction.

REASON: Unless the clothing of the employees handling the product is clean, there is danger that contamination will occur on the product. Headgear is also necessary to protect the product from

contamination.

3.2.4.2 Protective outer garments worn by employees in the tuna processing operations is to be kept clean at all times.

REASON: Unless the protective clothing worn by the employees is kept clean at all times there is the danger of contamination to the products.

3.2.5 Smoking and Spitting

No person is permitted to smoke or spit in any working area which is designated for processing.

REASON: Smoking is objectionable because of the danger of contamination to the tuna products with ash, cigarette butts and matches. Spitting is objectionable to public health.

3.3 PLANT FACILITY REQUIREMENTS

3.3.1 Building

The building must be properly constructed in accordance with the requirements of the competent authorities having jurisdiction.

The building should be properly enclosed with the proper construction of the facility meeting all requirements for the processing of fresh/frozen tuna products. Listed are the requirements which should be followed in the processing facility.

REASON: The area of a processing building for the production operation of tuna products must be properly enclosed so as to prevent contamination from occurring to the product.

The tuna must be protected at all times from contamination. As we have discussed previously in this report, tuna if not handled properly at all times can become contaminated very easily.

The area when properly enclosed with the proper air temperature will ensure that the tuna will not be exposed to excessive heat and also will be protected from the contamination of the outer air itself.

3.3.2 Floors

Floors are to be constructed of a durable material which is properly sloped so as to ensure that the drainage occurs.

The floors must be maintained in good repair at all times. It is impossible to prevent hair line cracks on the floor. Action is to be taken when such cracks are large enough to cause difficulty in cleaning.

Floors must be properly sloped so as to ensure the rapid disposal of waste and

are easy to clean.

Floors in processing area are to be kept clean at all times, and at the end of production they must be properly sanitized.

REASON: If floors are not constructed of proper approved material and is not sloped properly, then there can be problems with the sanitation of this area. If there are cracks or crevices in the floor area it can cause a build up of bacteria. If there is an inadequate sloping of the floor it will prevent the proper removal of liquid and solid waste from the processing area.

3.3.3 Drains

All drains are to be properly constructed. They are to be smooth and properly sloped to ensure the removal of waste from the processing area.

All drains which are connected to a sewer line must have a check backwater valve installed to prevent a backflow.

All drains must be constructed deep enough so as to prevent overflowing onto the processing floor. If this occurs it can create an unsanitary condition.

All drains which exit the processing and production areas are to be equipped with a metal flap or covering to prevent entrance to rodents and or animals.

Drains are to be cleaned at all times to prevent a build up of stale water. There should be a good flow of water running throughout the drains.

REASONS: If the drains are not placed properly in the floors, there will be a problem with the sanitary condition of the plant.

3.3.4 Walls

The surface of the walls in all processing areas must be constructed of a smooth surface. If the surface is not smooth it is very hard to keep clean.

Walls must be constructed of a waterproof material to prevent a build up of bacteria and debris.

Walls should be of a light colour so as to be able to detect dirt. The light colour also gives the establishment a bright and sanitary appearance.

Where walls are constructed of sheeting materials, all joints must be made water tight by the use of a suitable jointing compound.

Walls where they are joined to the floor must be equipped with a proper water tight curb. This curb is installed to prevent any build up of bacteria which can cause contamination to the tuna products.

REASON: If walls are not properly constructed and kept clean and waterproofed then there will be a problem with the building up of bacteria and debris.

3.3.5 Ceilings and Overhead Protection

Processing area which have ceilings and or overhead protection must be constructed of materials which are free from cracks, crevices and open joints.

There should be no exposed area where by dust or debris may collect and subsequently fall or be flown on the product.

REASON: The work area and product must be protected from falling debris which could be a source of contamination to the tuna products.

3.3.6 Overhead Lighting

All overhead lighting must be placed into the ceiling whereby there cannot be any build up of dust and debris.

All lighting bulbs and lighting tubes must be constructed of non-shattered material.

REASON: The production area and product must be protected from falling debris, dust and broken lighting. If this happens, it would be a source of contamination to the tuna products.

3.3.7 Toilet Facilities

There should be the proper types and number of toilet facilities to accommodate the number of employees.

The following numbers are suggested .as a guide for the number of toilet facilities:

1 to 9 Employees	1 Toilet
10 to 24 Employees	2 Toilets
25 to 49 Employees	3 Toilets
50 to 100 Employees	5 Toilets
for every 30 employees over 100 an extra toilet is required.	

Toilet areas should be ventilated to the outside.

All toilet rooms must be constructed of a smooth surface, washable, light-coloured and the floors must be constructed of approved materials. There must be wherever possible a floor drain in the facilities.

There should be a foot dip which covers the area larger than the door opening as you leave the wash room facilities.

The door to the washroom area must be self closing.

There is required an automatic wash basin equipped with a foot paddle with the proper liquid or powered soap attached. There is also needed an automatic air hand dryer to be in place rather than the use of paper towels.

REASONS: The presence in food products of organisms associated with sewage or human disease or infection is highly objectionable. Poor sanitary practices may contribute to outbreaks of gastro-intestinal disease and other infections among workers.

3.3.8 Water Supply

An adequate supply of safe, sanitary water that has a coliform bacteria count of less than two per hundred millilitre.

OR

A water supply which has been approved by the competent authorities having jurisdiction.

Water used in the operation of fresh tuna must be either pure and safe salt water of fresh water approved with salt added to match the equivalent of salt water.

REASON: We must ensure that the water supply will not be a source of contamination to the tuna products.

There must be no cross-connection with the water which is used in the processing and the water which is used for the cooling of freezing equipment. Only approved water is to be used throughout the whole process, even in the wash down system or the drain system.

3.3.9 Floor Tanks for the Holding and Cooling of Tuna

All the floor tanks for the holding and cooling of tuna must be constructed of a non-corrodible material.

The construction of these tanks shall be so constructed that the surfaces are smooth, free from the cracks and crevices and can be properly drained and cleaned.

These tanks must have installed into them a proper non-corrodible ramp which is constructed of a smooth surface, free from cracks and crevices and can be properly cleaned.

All floor tanks must be between 30 to 50 cm above the surface of the floor to protect any contaminated water from draining from the floor surface into the tanks.

REASON: All floor tanks if not constructed with the proper materials, with the surface area being smooth and free from cracks and crevices will cause damage to the outer surface of the tuna, causing areas for contamination to set into the meat.

3.3.10 Overhead Pipes

There are to be no overhead pipes in any areas of the processing facility.

Pipes even if they are covered to prevent rust or condensation from falling are not permitted in the processing areas.

REASON: The work area and product must be protected from any falling debris and dust which could be a source of contamination to the products.

3.3.11 Processing, Grading and Packing Tables

All table surfaces used in the operation for the processing, grading and packing of fresh tuna must be made of non-corrodible material such as stainless steel, salt water resistant aluminium alloys, fibreglass reinforced, and plastic sheets which is made of approved material.

Any of these materials which are used in the process must be made of a smooth surface free from cracks and crevices. Wood is not to come in contact with the product.

REASONS: If there are materials which are not corrosion resistant, non-smooth and not free from cracks and crevices used in the production of tuna then there is a good chance that contamination of the product will occur.

3.3.12 Conveyors Used in the Production of Loins

Conveyor belts that come in contact with tuna loin production must be equipped with a spray washer and where practical a scraper.

REASON: Because tuna comes in contact with conveyor belts during production, it leaves large numbers of bacteria on the surface of the belt. Unless the belt is equipped with a good water spray, bacteria will accumulate and the tuna meat will come in contact, becoming heavily contaminated.

3.3.13 Chutes, Containers, Trolleys

All chutes, containers and trolleys are to be made of a non-corrodible material, other than wood, and shall be free from cracks, crevices and made of a smooth surface.

Wood or galvanized metal is not permitted to be used.

REASON: Wood and galvanized metal are not acceptable due to the fact that there is too great a risk of contamination. If the chutes, containers, and trolleys are not made of proper materials such as stainless steel, saltwater-resistant aluminium, or reinforced fibreglass, and are smooth and free from cracks and crevices then there is a high risk of contamination to the products.

3.3.14 Animals

Dogs, cats, and other animals are not allowed in or around processing establishment.

REASON: Dogs, cats, and other animals are potential carriers of diseases and, when present in a food establishment, are contamination hazards to the

establishment and to the tuna products.

3.3.15 Rodents and Insects

A proper rodent and insect control program must be in place with all areas of the processing facility. Where pesticides are being used only trained people with the proper equipment should be used in this manner that prevents the contamination of the products.

All openings where these rodents and insects can gain access to the plant must be protected by the proper methods.

Only pesticides which have been approved for use around food are permitted to be used. These pesticides are only to be used after approval by the competent authorities having jurisdiction.

REASONS: Rodents and insects are potential public health hazards. Rodents carry diseases which can be transmitted to man by contamination of food with rodent excreta and urine. The common house fly has long been known as a carrier of diseases caused by micro-organisms. Any type of insect is objectionable. There is also a danger of contamination to the tuna products with rodent hairs or droppings and insect fragments.

3.3.16 Trays and Trolleys Used in the Frozen Production

All trays and trolleys used in the production of tuna loins or sticks destined for freezing must be made of non-corrodible materials, other than wood, and shall be free from cracks and crevices.

Trays and trolley which come in contact with the tuna meat must be made of either stainless steel, or saltwater-resistant aluminium alloys. The frame must be made of a smooth surface, free from cracks and crevices, and be easily cleaned.

REASONS: Only corrosion-resistant material is permitted in the handling of tuna product destined for freezing. The use of any other material can cause contamination to the product.

3.3.17 Freezing Facilities

Freezing facilities for processed tuna loins and sticks shall be capable of reducing the temperature at the centre of the fish to -60°C within 6 hours.

REASON: It is very important to have the product frozen as quickly as possible. If the tuna meat is exposed to a slow freezing it will create quality problems to the meat.

The slow removal of the warm temperature from the meat will cause the centre of the meat to be soft and cruddy. This in turn will cause a decrease in the quality of the product.

3.3.18 Freezing Facility Temperature Recorder

All freezing facilities are required to have a recorder in place to continuously monitor the room temperature.

REASON: There must be a system to record the temperature of the room so as to determine if there is a problem with the freezing of the product. If there are changes in the temperature whereby it rises and falls it can create moisture loss and freezer burn to the product. This will cause a decrease in quality and a loss in yield.

3.3.19 Packing Material for Fresh Tuna Shipping and Material Used in Shipping

All cartons used in the shipping of fresh tuna must be constructed from a strong cardboard material.

The carton must be waterproof to prevent water damage and weaken the carton.

The carton must be made watertight. This is done by ensuring that the tuna are wiped clean and that there are two sheets of 10 mil (very heavy) plastic covering the tuna.

The carton must have cold retention capability and insulation from external temperature factors. This is very important in the quality control factor for the shipping of tuna.

Frozen gel packs or dry ice must be available for the packing of fresh tuna.

Tuna paper must be available for covering the skin to protect it from damage in shipping.

REASON: Tuna carton must be constructed in such a manner that during shipping the cartons are able to be stacked on top of each other without being crushed. Improper cartons will create problems to the quality of the tuna.

3.3.20 Offal Removal

Bins or containers in which offal is stored shall be watertight, constructed of either metal or other material approved by the authorities and, where necessary to prevent contamination of the processing plant or any fish therein, be equipped with well-fitted covers.

REASON: If offal to other refuse while being on site at the processing facility is not properly stored it will create a safety problem. It will attract insects, birds and rodents. Therefore it is very important to have the proper container or bin which is properly covered at all times.

3.3.21 Temperature in Processing Tuna

The room temperature in the processing areas should be controlled at 18°C or less.

REASON: The lower that the air temperature can be kept during the processing of fresh tuna the better it will be in helping maintain the meat temperature of the tuna. Remember that if the meat temperature rises above 7°C, it will create quality problems.

3.3.22 Hot Water Supply

Hot water shall be provided and maintained at a minimum temperature of 43°C in sufficient quantity for the fresh and frozen tuna processing facilities.

REASON: Hot water is necessary for efficient hand washing. It also greatly assists in the washing of equipment after processing is completed. The action of detergents used in the cleaning of the equipment is chemical in nature and the speed of reaction increases with the rise in the water temperature. Without the use of hot water there will be a serious chance that the product will become contaminated, due to poor washing of hands and poor cleaning of equipment.

3.3.23 Ice

Only clean ice which is made from a source of water which has been approved by the competent authorities having jurisdiction may be used in a fresh tuna and/or a frozen tuna operation.

Where block ice is being used, all sawdust and other debris must be removed by washing with approved water under pressure. Ice, at time of use, must not have a coliform bacteria MPN count of more than 2 per 100 millilitres.

Containers used for the handling and storage of ice shall be constructed of non-corrodible material and all such containers must be well maintained and kept clean at all times.

Processing facilities which receive their ice from an outside source must ensure that the ice which they are receiving meets the requirements that are discussed in these regulations.

When receiving ice from outside sources, only ice which is transported in either clean and safe closed trucks equipped with a cooling unit or insulated containers are to be used.

No ice which is contaminated is permitted to be used in the processing of tuna.

No ice which is transported in unsafe or unclean trucks or containers are to be accepted by the processing plants. Ice being transported in this manner will become contaminated and cause contamination to the products.

3.3.24 Plant Surroundings

The area and beach surroundings which are in direct contact with the processing facility shall be kept clean and safe at all times.

REASON: The accumulation of refuse in the area and beach surroundings

around the processing facility may give rise to objectionable odours, which will attract insects and rodents and thus become a sanitation problem.

3.3.25 Sewage

Sewage, including liquid waste from fish processing operations, shall be disposed of in such a manner that the waste is inaccessible to flies and the water supply for the establishment will not become contaminated. Any disposal system which can contaminate the waste supply, then that water supply will not be approved.

REASON: Sewage is characterized by the presence of vast numbers of bacteria of public health significance. Unless sewage is effectively removed, working surfaces will become contaminated. Any disposal system which can contaminate the water supply, then that water supply will not be approved.

3.4 PROPER CLEANING PROCEDURES

3.4.1 Clean-up Procedures

EVERY QUALITY ASSURANCE PROGRAM SHOULD INCLUDE A COMPREHENSIVE WRITTEN CLEANING AND DISINFECTION PROGRAM FOR ITS OPERATION. THIS PROGRAM SHOULD ENSURE THAT ALL FISH HANDLING AREAS ARE ADEQUATELY CLEANED AND DISINFECTED.

The specifics of the cleaning program will vary according to individual circumstances and the program should be designed to meet the needs of each operation. Each cleaning step may be customised to provide the best possible results. Where appropriate, programs should be drawn up in consultation with relevant specialist.

Once the cleaning and disinfection program has been designed it is important that it be recorded. The written program will serve as a reference document for the training and daily function of personnel engaged in cleaning and disinfection. Where written cleaning programs are used, they should specify:

- areas, items of equipment and utensils to be cleaned;
- responsibility for particular task;
- method and frequency of cleaning; and
- monitoring arrangements.

It will also serve as a reference for management and the agency having jurisdiction against which the daily clean-up can be measured. The written program should specify the cleaning and disinfection to be performed in every food-handling area. A separate program may be created for different processing areas or lines, as required. Cleaning schedules should be prepared to cover every item of equipment and all areas of the factory including toilets, cloakrooms, and dining and rest areas.

Cleaning can be carried out by the separate or combined use of physical methods, such as scrubbing or turbulent flow, and chemical methods using detergents, alkalis or acids. A typical cleaning and disinfection process may

involve as many as six separate steps:

1 PRE-CLEANING

Preparation of area and equipment for cleaning. Involve steps such as removal of all product from area, protection of sensitive components and packaging materials from water, removal by hand or squeegee of fish scraps, etc.

2 PRE-RINSE

A rinsing with water to remove remaining large pieces of loose soil or gross debris from surfaces.

3 CLEANING

Treatment of surfaces with an appropriate detergent to remove soil or to loose soil and bacteria film and hold them in solution or suspension.

4 RINSE

A rinsing with water to remove loosened soil and residues of detergent.

5 DISINFECTION

Where necessary, application of chemicals and/or heat to destroy most microorganisms on surface.

6 POST-RINSE

A final rinse with water to remove disinfectant. This step is not applicable or recommended in all situations.