

**KENYA STANDARD**

**DKS 1652: 2025**

ICS 67.120.30:  
67120.30

**Second Edition**

**Hygienic practices on commercial fishing vessels  
— Code of practice**

**PUBLIC REVIEW DRAFT**

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## TECHNICAL COMMITTEE REPRESENTATION

The following organizations were represented on the Technical Committee:

Kenya Marine and Fisheries Research Institute (KEMFRI)

Government Chemist's Department

Kendag Ltd.

Diamond Sea Food

Fish Quality Control Laboratory

Hazina Ya Ziwa EPZ Ltd.

Kumbatia SeaFood

County Government of Kisumu — Fisheries Department

Simple Life processing and Services Ltd.

Kendag Ltd.

Das Group (K) Ltd.

Kenya Fisheries Service-Aquaculture Division

Crustaceans Processors Ltd.

Sea harvest Kenya limited

Polucon Services Kenya Ltd.

Brinkley Ltd.

National Public Health Laboratories Ltd.

East African Seafood Ltd.

Kenya Fisheries Services

Kenya Bureau of Standards — Secretariat

## REVISION OF KENYA STANDARDS

In order to keep abreast of progress in industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

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**DKS 1652: 2025**

ICS 67.020;  
67.120.30

**Second Edition**

**Hygienic practices on commercial fishing vessels —  
Code of practice**

Kenya Bureau of Standards, Popo Road, Off Mombasa Road,  
P.O. Box 54974 - 00200, Nairobi, Kenya



+254 020 6948000, + 254 722202137, + 254 734600471



info@kebs.org



@KEBS\_ke



kenya bureau of standards (kebs)

## Foreword

This Kenya Standard was prepared by the Readymade Garments Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

Kenya Bureau of Standards (KEBS) has established Technical Committees (TCs) mandated to develop Kenya Standards (KS). The Committees are composed of representatives from the public and private sector organizations in Kenya.

Kenya Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft Kenya Standards are circulated to stakeholders through the KEBS website and notifications to World Trade Organization (WTO). The comments received are discussed and incorporated before finalization of the standards, in accordance with the Procedures for Development of Kenya Standards.

Kenya Standards are subject to review, to keep pace with technological advances. Users of the Kenya Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off. This Second Edition of the standard has been reviewed to incorporate reviewed test methods for microbiology and heavy metal contaminant limits.

This Second edition cancels and replaces the first edition (KS 1652:2000) which has been technically revised.

During the preparation of this standard, reference was made to the following documents:

Codex Stan 193, Codex General Standard for contaminants in Foods and feeds.

The Public Health Act, Cap. 242 of the Laws of Kenya.

Acknowledgement is hereby made for the assistance derived from these sources.



## Hygienic practices on commercial fishing vessels — Code of practice

### 1 Scope

This draft Kenya Standard prescribes general hygiene principles for certain aspects of the design, construction and operation of factory vessels and other commercial fishing vessels (carrier).

### 2 Normative references

The following referenced documents referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EAS 12, *Potable water — Specification*

EAS 39, *General principles of food hygiene — Code of practice*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

- 3.1 adequate**  
sufficient to accomplish the intended purpose of this standard
- 3.2 chilled product storage hold**  
designated area in the vessel used to store products in contact with a cooling medium
- 3.3 chiller**  
designated room equipped with a machine to bring down the temperature of the product to between 0 °C and 4 °C as it awaits freezing
- 3.4 cleaning**  
removal of soil, product residues, dirt or other objectionable matter
- 3.5 contamination**  
any substance not intentionally added to food that is present as a result of production, processing, handling, or environmental factors
- 3.6 disinfectant**  
chemical agents or physical methods (or both) used to reduce, without adversely affecting the product, the number of micro-organisms to a level that will not lead to harmful contamination of the product.
- 3.7 Disinfection**  
chemical agents or physical methods (or both) to reduce, without adversely affecting the product, and reducing the number of micro-organisms to a level that will not lead to harmful contamination of the product

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### 3.8

#### **freezer**

room or device specifically designed to lower the temperature of the product through the zone of maximum crystallization (for most products, between  $-0\text{ }^{\circ}\text{C}$  and  $-5\text{ }^{\circ}\text{C}$ ) and down to an equilibrium temperature below  $-18\text{ }^{\circ}\text{C}$ , within a period of time appropriate for the product

### 3.9

#### **frozen product storage hold**

hold specially designed for the storage of frozen foods and that has sufficient refrigeration capacity to maintain a temperature of  $-18\text{ }^{\circ}\text{C}$  when storing products that have already been frozen to a temperature not exceeding  $-18\text{ }^{\circ}\text{C}$

### 3.10

#### **handling area**

any operation in the reception, preparation, processing, packaging and storage of the product.

### 3.11

#### **hygiene**

all measures necessary to ensure the safety, soundness and wholesomeness of the product at all stages, from reception to final delivery

### 3.12

#### **ice**

frozen potable or clean sea water that does not contain substances that may be hazardous to health or that may contaminate the product

### 3.13

#### **impermeable**

covering, surface or lining that does not permit the passage of liquids

### 3.14

#### **packaging material**

any containers such as cartons, bins, boxes, cases and plastic bags, or wrapping and covering material such as foil, film, metal, paper, wax-paper and plastics

### 3.15

#### **potable water**

water that complies with the requirements of EAS 12

### 3.16

#### **pounds**

areas in the product hold or on deck that are divided by stanchions and portable or fixed vertical dividers and that are intended for the storage of the product

### 3.17

#### **processing**

heading, gutting, sealing, bleeding, washing, cleaning, trimming, chilling, freezing and packaging of the product

### 3.18

#### **processing area**

area where the product is processed and packed.

### 3.19

#### **product**

food of aquatic origin, fresh, processed and frozen destined for human consumption

**3.20**  
**refrigerated sea water hold**

hold for the containment of clean sea water cooled by the addition of ice or by means of a suitable refrigeration system. The salt content is normally about 3 %

**3.21**  
**regular**

following a systematic action in time or manner, adequate for the requirements of the managing authority

**3.22**  
**sea water**

clean sea water that is free from polluting substances

**3.23**  
**storage holds**

storage holds of the types defined in 3.2, 3.9 and 3.20.

**3.24**  
**waste**

product that is not fit for human consumption, such as fish scales, mucus, blood and guts

## **4 Product hygiene management system**

The food hygiene management system shall be in accordance with EAS 39

## **5 General design, layout and construction of vessels**

### **5.1 General**

**5.1.1** The design and construction of a vessel and the construction materials shall be such as to permit easy and adequate cleaning and disinfecting and to facilitate the maintenance of good hygiene.

**5.1.2** The design and construction of the vessel shall be such as to obviate the danger of direct or indirect contamination of the product and product contact surfaces, and to facilitate hygienic operations by means of a regulated flow in the process, from the reception of the raw product to the delivery of the final product.

**5.1.3** Vessels meant to be factory vessels shall be large enough to accommodate adequate processing and freezing equipment and shall have adequate freezing and frozen storage space. The frozen product processed and stored on board shall be of the same quality as that processed and stored in land-based processing plants.

### **5.2 Water supply**

#### **5.2.1 Potable water**

Potable water used shall comply with KS EAS 12.

#### **5.2.2 Hot water**

Hot water at a temperature of at least 85 °C shall, where practicable, be available in processing areas for washing equipment and product contact surfaces. Hot water, at temperature of between 40 °C and 50 °C, shall preferably be available in ablution facilities.

#### **5.2.3 Sea water**

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**5.2.3.1** Vessels shall be so designed and constructed that sea water for washing the product contact surfaces or for bathing purposes is taken in at the deepest possible point of the vessel and opposite waste discharge point.

**5.2.3.2** Sea water shall be carried in completely separate lines, with no cross-connection with, or back-siphonage into, the system that carries potable water.

### **5.2.4 Steam**

If facilities are provided for the manufacture of steam for use in handling of the product, the steam shall not contain substances that may be hazardous to health or that may contaminate the product during processing.

### **5.2.5 Ice**

Vessels using ice as a chilling medium shall preferably be so designed and constructed that facilities are provided for the manufacture /or/ storage or both of adequate quantities of ice in a manner to protect the ice from contamination.

## **5.3 Compressed air and gases**

If compressed air and gases are used in direct or indirect contact with the product or the product contact surfaces, they shall not contain substances that may be hazardous to health or that may contaminate the product.

## **5.4 Facilities for the disposal of waste and sewage**

**5.4.1** Drainage pipes and sewer pipes shall be impermeable and corrosion resistant (or treated to prevent corrosion) and the joints shall be watertight. The pipes should not pass through any part of product handling area, except in the case of drainage pipes and channels that service a particular part of a product handling area.

**5.4.2** All waste disposal lines shall be able to carry peak loads. There shall be no cross-connection with, or back-siphonage into, the systems that carry potable water and sea water.

**5.4.3** Facilities for the disposal of all waste, including sewage, shall be below the water line for the vessel.

**5.4.4** If sewage tanks are installed, their outlets shall preferably have valves that close automatically when sea water for washing purposes is taken in.

**5.4.5** A separate waste storage room/area, designed to prevent contamination of the product contact surfaces, shall be provided for the storage of large quantities of waste until it can be disposed off safely.

## **6 Structural requirements for product handling areas**

### **6.1 Position**

**6.1.1** Product handling areas shall be well defined hygienic areas on deck or below deck. They shall be so positioned as to prevent contamination such as sewage, bilge water, smoke, fuel, fumes, oil and grease.

**6.1.2** The area where the product is prepared that is where the raw product is headed, gutted, scaled, bled, washed, cleaned and trimmed shall be separated from the packing area.

### **6.2 Lighting**

**6.2.1** Adequate natural or artificial lighting shall be provided throughout the product handling area. Artificial lighting shall not significantly change the colour of the product.

**6.2.2** Artificial sources of light and lighting fixtures suspended over product handling areas shall be of a safety type. They shall be protected to prevent contamination of the product in case of breakage. Suspended fixtures shall be so constructed and so situated that they are easy to clean and maintain.

### **6.3 Ventilation**

**6.3.1** Adequate ventilation shall be provided.

**6.3.2** The direction of the airflow shall, where possible, be from a more hygienic area to a less hygienic area.

**6.3.3** Ventilation openings shall be provided with screens or other protective enclosures.

### **6.4 Temperature and shade**

**6.4.1** Below deck, the temperature in all product handling areas shall at all times be kept as low as possible.,

**6.4.2** The area on deck where part of the handling process is carried out may be provided with shade. Fine overhead sprays that deliver clean sea water may be installed to lower the temperature of the product to keep the product moist if shaded

### **6.5 Bulkheads and decks**

**6.5.1** All deck surfaces of product handling areas shall be non-slip, but smooth and easy to clean and disinfect openings in the hull, designed for drainage. Grating, if used, shall preferably be stainless steel or of food grade plastics. Deck to bulkhead junctions shall preferably be covered to facilitate cleaning.

**6.5.2** Bulkheads shall be impermeable, smooth, light coloured and easy to clean.

### **6.6 Surfaces in contact with the product**

Surfaces that may come into contact with the product shall be impermeable, corrosion resistant, , light coloured, smooth and easy to clean, disinfect and maintain. Wood, if used, shall be sealed with an impermeable, smooth and light- coloured material that will not contaminate the product.

No projections or other features that could cause damage to the product shall protrude above the surface.

### **6.7 Equipment and utensils**

#### **6.7.1 Materials**

**6.7.1.1** All equipment and utensils used in product handling areas shall preferably be made of durable stainless metal, or of other impermeable, corrosion-resistant material that will not transmit toxic substances, odour or taste to the product, or cause colour, texture changes in the product.

**6.7.1.2** The material used for containers such as fish bins shall, in addition, be light coloured.

**6.7.1.3** The material shall be capable of withstanding repeated cleaning and disinfection.

#### **6.7.2 Design and construction of equipment**

**6.7.2.1** All equipment and utensils shall be so designed and constructed as to prevent hygiene hazards. They shall facilitate the rapid and efficient handling of the product. Equipment and utensils shall be easy to dismantle, clean and disinfect and dismantle where applicable

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**6.7.2.2** Stationary equipment shall be installed in such a manner as to permit easy access and shall be easy to clean and disinfect. The position of stationary equipment shall not impede drainage of water towards the drainage channels on deck.

**6.7.2.3** Equipment or lifts for conveying the product from one process to another shall preferably be mechanically operated. Conveyors for transferring the product to the hold shall be so designed as to prevent damage to the product.

**6.7.2.4** Channels or chutes that are flushed with continually flowing sea water and that empty into the drainage system shall be installed at the gutting tables, to remove all waste.

**6.7.2.5** Mechanically operated product washing equipment shall be so designed that an adequate washing period is achieved without damage to the product. If mechanically operated washing equipment is not supplied, manual product washing equipment shall be installed. Continuously flowing sea water shall be supplied by means of appropriate mechanism near the bottom of the containers. These shall cause a swirl of water to form in the washer, allowing dirty water and scum to spill off and drain away. Alternatively, overhead sprays delivering cold sea water shall be installed.

### **6.8 Storage facilities**

#### **6.8.1 Deck pounds**

**6.8.1.1** If storage space below deck is limited, adequate pounds should be available on deck, so that the product obtained from separate hauls and product that has been sorted into species and size, can be kept apart.

**6.8.1.2** Stanchions and vertical dividers, which shall have vertical drain slots along their bases shall be made from impermeable and corrosion-resistant material and shall be easy to dismantle and clean.

#### **6.8.2 Frozen Product Storage Holds**

**6.8.2.1** Frozen product storage holds shall be adequate for the intended production and capable of being maintained at -18 °C and below. Automatic temperature recorders, that are preferably tamperproof, shall be installed.

**6.8.2.2** The frozen product storage holds shall be separate from the freezer and shall be well insulated, to minimise fluctuation in temperature. The linings shall be impermeable and corrosion resistant and the joints shall be completely watertight. Pipes or conduits passing through the holds shall be sunk into the lining or neatly boxed-in and insulated.

**6.8.2.3** Any resultant corners and projections shall not impede the drainage of the hold and they shall be smooth and easy to clean. Decks shall slope towards drainage channels.

**6.8.2.4** Facilities for defrosting shall be available to expedite cleaning procedures.

**6.8.2.5** Cooling grids, if used, shall be installed under the deck head and against the sides of the hold.

#### **6.8.3 Chilled product storage holds**

**6.8.3.1** Chilled product storage holds of large vessels shall preferably be divided into pounds by the installation of bulkheads in order to accommodate different species and sizes of product. Bulkheads shall have vertical drain slots along their bases and shall be removable to facilitate cleaning and the conversion of the vessel to cater for specific types of product stowage.

**6.8.3.2** Shelves, bulkheads and stanchions shall be made from impermeable and corrosion resistant material and shall be easy to dismantle and clean. The shelves shall be so installed that the maximum depth of product, when stowing is by bulk, does not exceed 600 mm. In deep holds, the stanchions shall be attached to

the hold structure and hull such that the weight of the load does not press on the product on the lowest shelves. There shall be sufficient drainage space between the lowest shelves and the floor of the hold.

**6.8.3.3** Shelves shall preferably be corrugated or perforated to enable melt water trickle and carry away mucus, blood and micro-organisms.

**6.8.3.4** Product holds shall be provided with an effective drainage system and bilge pumps for the removal of meltwater as fast as it accumulates. Bilge sumps shall be readily accessible. Bilge pump connections to the sumps shall be fitted with coarse screen fitters.

**6.8.3.5** Holds containing tanks shall have deck troughs that drain from all areas of the hold to bilge sump. Products hold bilge lines shall be fitted with non-return valves to prevent back-flow.

**6.8.3.6** If the product is to be chilled and stowed in containers in the hold, the stanchions and dividing structure shall be so designed that the containers can be accommodated close together, i.e. without there being large air gaps between them, large air gaps will result in excessive melting of the ice. The containers shall have drainage holes in their bases, shall be of uniform size and, where practicable, shall be large enough to accommodate the larger fish species without bending the fish.

#### **6.8.4 Refrigerated sea water systems**

**6.8.4.1** The construction of a system for the refrigeration of sea water is strongly recommended, particularly in the case of short voyages or when a vessel is making large hauls. The cooling capacity of the system shall be such that large quantities of product can rapidly be chilled and the temperature maintained.

**6.8.4.2** A refrigerated sea water system shall have adequate capacity to prevent a significant rise in temperature of the pre-chilled water when the holding tanks are being loaded with the product.

**6.8.4.3** Tanks shall be insulated, impermeable and corrosion resistant. Effective means of circulating the sea water in the tanks shall be installed. Holding tanks shall be equipped with coarse screen filters. They shall be so designed and constructed as to allow a constant and unobstructed flow of the refrigerated water.

#### **6.8.5 Storage room for fish bait**

**6.8.5.1** Separate storage facilities for fish bait shall be provided. However, on small vessels, bait may be kept in the frozen product storage hold if the bait is fresh.

**6.8.5.2** Daily lots shall, in this case, be tightly sealed container and stored separately from the frozen product.

**6.8.5.3** Fresh bait for immediate use shall be kept in a separate pound or special container, well away from the product.

#### **6.8.6 Chiller**

A chiller should be provided for processed or packed product waiting for freezing.

#### **6.8.7 Loose equipment**

Suitable stands, shelves and cupboards shall be provided for the storage of loose equipment.

#### **6.8.8 Packaging materials store**

A clean and dry storage room, with shelves or pallets at least 200 mm from the floor, should be provided. This room should be away from areas where the packaging materials can be contaminated.

#### **6.8.9**

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**6.8.9.1** Storage facilities for protective clothing shall be provided at the entrance/exit to the different product handling areas.

**6.8.9.2** Below deck, pegs (attached to the bulkheads) or overhead rails shall be provided for the hanging of aprons and oilskins. Hooks or impermeable, perforated shelves shall be available for gloves, boots and headgear. For deck operations, and easily accessible, spacious and ventilated wardrobe of hygienic design shall be provided. Pegs and shelves designated for each type of item shall be installed.

**6.8.9.3** Lockers or a lobby should be available for the storage of protective jackets and overalls.

### **6.8.10 Cleaning agents and detergents**

**6.8.10.1** Adequate lengths of deck hoses shall be provided and supplied with sea water at adequate pressure for the cleaning of product handling areas on deck. When not in use, the hoses shall be coiled and stacked away from the product handling area.

**6.8.10.2** A lockable room or cupboard shall be provided for the storage of cleaning agents, detergents scouring pads, cloths, brooms, squeegees and brushes. Equipment used for the cleaning of product handling areas shall be clearly marked by colour-coding or any other indelible means.

## **6.9 Freezers**

### **6.9.1 General**

Freezers shall be so designed that they are reliable, of adequate capacity and suitable for particular product. They shall be easy to clean. Facilities for defrosting shall be available to expedite cleaning procedures or to remove excessive layers of frost from the cooling surfaces. Freezers shall be of robust construction and capable of running for long period with little attention.

### **6.9.2 Air-blast freezers**

Air-blast freezers shall be capable of freezing the product in the shortest possible time. They shall be equipped with suitable freezer trolleys, shelves shallow freezer trays and fitted hooks. A cold air speed of 3m/s to 6 m/s shall be maintained in all areas of such freezers

### **6.9.3 Contact-plate freezers**

Contact-plate freezers shall be capable of freezing the product in the shortest possible time. The plates shall consist of corrosion-resistant materials. Depending on the type of product to be frozen, contact plate freezers shall be of either the vertical or the horizontal contact-plate type. A system for defrosting the plates shall be incorporated to facilitate loading and unloading of the product.

### **6.9.4 Immersion freezers**

Immersion freezers shall be capable of freezing large fish species to a temperature below -18 °C, in the shortest possible time. The structural requirements of immersion freezers shall be the same as those for refrigerated sea water systems. The freezing medium shall be such that it does not impart any objectionable odours or flavours to the product or affect its quality.

## **6.10 Washing facilities**

### **6.10.1 Facilities for washing of equipment**

**6.10.1.1** Troughs and water lines for the washing of equipment shall be installed away from, but within convenient reach of, the product handling area. Suitable drying stands or shelves shall be provided to keep equipment off the deck.

**6.10.1.2** High pressure or high frequency oscillating water or detergent equipment shall be installed wherever possible.

### **6.10.2 Hand-washing facilities**

**6.10.2.1** A hand-wash basin shall be provided in the lobby at the entrance/exit of the product handling area. Hand-wash basins shall also, where practicable, be provided at strategic points inside the product handling area. In the case of product handling on deck, hand-wash basins shall be provided inside the product handling area, but at a position closest to the water closets. Access to hand-wash basins at all times be unobstructed.

**6.10.2.2** Hand-wash basins shall be corrosion resistant, impermeable and easy to clean. Liquid soap dispensers containing disinfectant soap or removable finger-dip trays containing liquid disinfectant soap shall be supplied.

**6.10.2.3** Preset volume-controlled taps shall be provided that operate by means other than hands that are preferably supplied with clean water and, where necessary, suitable hygienic means of drying hands such as disposable paper towels.

**6.10.2.4** Separate hand-washing facilities for crew not engaged in the handling of the product shall be provided outside the product handling area.

### **6.10.3 Facilities for washing of protective clothing**

**6.10.3.1** Plastic brushes on corrosion-resistant chains, disinfecting soap or powder such as hypochlorite, and a spray nozzle shall be provided at the hand wash basins for the cleaning of plastics protective clothing.

**6.10.3.2** If other types of protective clothing are to be washed on board, laundering facilities shall be supplied in an area well away from the product handling area.

## **7 Structural requirements for crew's quarters**

### **7.1 General**

**7.1.1** The galley and mess room/area, cabins, change rooms and ablution facilities shall be completely separated from, and shall not open directly into, product handling area.

**7.1.2** Decks shall have a non-slip surface and shall be easy to clean and maintain.

### **7.2 Galley and mess room/area**

**7.2.1** Eating, cooking and galley utensils shall be made of impermeable material. Galley equipment, mess tables and benches made of wood shall be sealed with an impermeable, smooth and preferably light-coloured material that is easy to clean and disinfect.

**7.2.2** Facilities for the washing and storage of eating, cooking and galley utensils shall be provided in or near the galley.

**7.2.3** Mess-room bulkheads shall be light coloured, smooth, impermeable and washable.

**7.2.4** A galley pantry shall be provided that is dry and vermin proof.

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**7.2.5** Refrigeration facilities for perishable foodstuffs shall be provided in or near the galley. On small vessels, perishable foodstuffs may be stored in the frozen product storage hold, if the food is tightly sealed containers in plastics bags, placed in closed cartons and stored separate from the frozen product.

**7.2.6** The mess room/area shall be provided with adequate tables and benches. On small vessels the mess area may be on deck, provided that it is well separated from product handling areas, sheltered and near the galley.

### **7.3 Cabins crew members**

**7.3.1** Special attention shall be given to comfortable and hygienic accommodation for the crew. Overcrowded and congested quarters lead to disease or the spread of communicable diseases among crew members

**7.3.2** A spacious berth shall be provided for each crew member. Clean, removable mattress covers, and sufficient clean bedding shall be available.

**7.3.3** A suitable wardrobe, chest of drawers or loading box for clothes and other personal effects shall be provided for each crew member.

**7.3.4** Ventilation shall be adequate and shall, if necessary, be augmented by mechanical means.

### **7.4 Ablution facilities**

#### **7.4.1 Bulkheads and decks**

**7.4.1.1** Water closets, showers and bathrooms shall each be completely enclosed by bulkheads. Bulkhead-to-deck junctions shall be covered to facilitate cleaning and disinfections. Bulkheads shall be light coloured, impermeable and washable.

**7.4.1.2** Decks shall have a light-coloured, non-slip surface that is impermeable and washable. In addition, decks shall slope towards drainage facilities to prevent pooling of water.

#### **7.4.2 Water closets**

**7.4.2.1** At least one water closet shall be provided on the vessel for every 10 crew members.

**7.4.2.2** Water-closet bowls shall be securely attached and completely sealed to the floor.

**7.4.2.3** Water-closet cubicles shall be well ventilated. Ventilation shall be such that air is drawn into the water-closet cubicle from more hygienic area. The air shall then be extracted to the outside of the vessel, or to an area well removed from the product handling area.

**7.4.2.4** If water-closet cubicle doors do not open into a vestibule, they shall be fitted with self-closing devices.

**7.4.2.5** A hand -wash basin shall be provided in the vestibule of water-closet cubicles or at the exit of the water-closet cubicle (whichever is applicable). Hand-wash basins shall be corrosion resistant, impermeable and easy to clean. Liquid soap dispensers containing disinfectant soap or removable finger-dip trays containing liquid disinfectant soap shall be supplied. Taps that operate by means other than hands or elbows and that are preferably supplied with clean water shall be provided.

#### **7.4.3 Showers and bathrooms**

At least one shower or bath shall be provided on the vessel for every 10-crew member. Each shower or bath should have a fresh (potable) hot and cold water supply, and soap shall be supplied. If shower or bathroom doors do not open into a vestibule, they shall be fitted with self-closing devices.

#### **7.4.4 Laundering facilities**

If laundering facilities for the washing of personal clothing are provided on board, they shall be situated well away from the product handling area, e.g. near the bathroom.

### **8 Pest control**

**8.1** There shall be an effective and continuous programme for the control of pests. The vessel shall regularly be inspected for evidence of infestation.

**8.2** Control measures involving treatment with chemical, physical or biological agents shall only be undertaken by, or under direct supervision of the responsible officer. The responsible officer shall have a thorough understanding of the potential hazards to health that result from the use of these agents. These hazards include those, which may arise from the control agents. Control measures shall be carried out in accordance with the recommendations of the administering authority.

**8.3** Pesticides, registered for the purpose, shall only be used if other preventative measures cannot be used effectively. Before pesticides are applied, care shall be taken to safeguard all product, equipment and utensils from contamination. After the application of pesticides, equipment and utensils contaminated accidentally shall, before they are used be thoroughly cleaned to remove pesticides residues.

**8.4** Pesticides shall be stored well away from product handling areas, in a well-ventilated cabinet or room under lock and key. They shall only be dispensed and handled by properly trained personnel.

### **9 Provisions for the maintenance for hygiene on vessels**

#### **9.1 Crew to be engaged**

**9.1.1** In addition to the crew engaged for the smooth and effective performance of the vessel itself, and those engaged to handle the product, crew shall be designated for the cleaning and maintenance of all equipment and services. Cleaning and maintenance will include the cleaning and maintenance of ventilation, lighting, sewerage and drainage to guarantee the hygienic processing of the product.

**9.1.2** Technically competent personnel shall be appointed to supervise the handling of the product.

#### **9.2 Health Aspects**

**9.2.1** All crew members shall undergo medical examinations after every six months

**9.2.2** A crew member who is found to be a carrier of a communicable disease, or who is suffering from diarrhoea or any condition or injury causing discharge of serum or pus from any part of the body, shall be prohibited from handling the product. He shall be forbidden to enter any product handling area until he has been medically examined and declared fit to resume his duties.

**9.2.3** Adequate first-aid facilities shall be available.

#### **9.3 Training of crew**

Crew members engaged to handle the product shall be trained in the hygienic handling of the product and personal hygiene. They should understand the precautions necessary to prevent contamination of the product. Instruction shall include the relevant information contained in this standard.

#### **9.4 Intake of sea water**

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**9.4.1** Sea water shall be taken in while the vessel is in forward motion or when it is against the prevailing current. If the vessel is fitted with sewer tanks, their outlets shall be closed when sea water is taken in. When the vessel is afloat near to towns, industrial plants, food processing establishments or other commercial fishing vessels, extreme care shall be exercised when sea water for washing purposes is taken in.

**9.4.2** While the vessel is in port, only treated sea water or potable water taken from the shore main supply shall be used for cleaning and washing the vessel.

**9.4.3** Only sea water needed for the cooling of engines shall be taken directly from the sea while the vessel is in port.

### **9.5 Ice**

**9.5.1** If an ice manufacturing plant is installed, it shall be cleaned regularly and maintained in a serviceable and hygienic condition.

**9.5.2** Ice left from a previous voyage shall be discarded. Vessels that do not have ice manufacturing facilities shall take fresh, clean ice on board at the beginning of each voyage.

### **9.6 Hygienic disposal of waste and sewage**

**9.6.1** Drainage pipes and sewer pipes shall be maintained in a thoroughly serviceable condition.

**9.6.2** Used water containing waste shall not be allowed to accumulate in equipment or decks. It shall be disposed off immediately through the drainage channels or the openings designed for this purpose. Care shall be taken that solid materials do not block the drainage channels or the openings at any time. Product hold bilge sumps shall be drained regularly.

**9.6.3** If waste cannot be disposed off immediately, it shall be stored in the waste storage room/ area set aside for this purpose.

**9.6.4** While the vessel is in port, all waste, including sewage, shall be disposed off only at the designated point.

**9.6.5** Waste shall preferably not be disposed off in sheltered waters or near public beaches, inhabited areas or shellfish growing areas.

### **9.7 Personal Hygiene and hygienic conduct in product handling areas**

#### **9.7.1 Personal cleanliness**

Crew members engaged in the handling of the product shall maintain a high degree of personal cleanliness. Jewellery shall not be worn, and fingernails shall be kept short, clean and unvarnished.

#### **9.7.2 Washing of hands**

**9.7.2.1** Adequate disinfectant soap shall be provided in the dispensers at all times.

**9.7.2.2** After using the water closet, all crew members shall wash their hands with disinfectant soap and running water. If available, warm water shall be used. In addition, crew members handling the product shall wash their hands in the manner described above, as frequently as is necessary.

This shall also be done before they commence their work, or after contaminated material or product has been handled. The wearing of gloves shall not exempt the operator from washing his hands thoroughly.

#### **9.7.3 Cleaning agents and detergents**

**9.7.3.1** Adequate lengths of deck hoses shall be provided and supplied with sea water at adequate pressure for the cleaning of product handling areas on deck. When not in use, the hoses shall be coiled and stacked away from the product handling area.

**9.7.3.2** A lockable room or cupboard shall be provided for the storage of cleaning agents, detergents scouring pads, cloths, brooms, squeegees and brushes. Equipment used for the cleaning of product handling areas shall be clearly marked by colour-coding or any other indelible means.

#### **9.7.4 Hygienic Conduct**

**9.7.4.1** Any conduct that may result in contamination of the product shall be strictly prohibited in product handling areas. This includes eating, the use of tobacco, chewing of gum or spitting.

**9.7.4.2** All crew members shall be forbidden to take pets on board. This will prevent animal hair, bird feathers and excreta from being carried on shoes and clothes to product handling areas.

**9.7.4.3** Any pest observed by a crew member shall immediately be reported to the supervising officer so that corrective action may be instituted.

### **9.8 Cleaning and maintenance of Product Handling Areas**

#### **9.8.1 General**

**9.8.1.1** Cleaning and disinfecting shall meet the provisions of this standard. Cleaning agents and disinfectants shall be adequate.

**9.8.1.2** Sea water that has been used for the cooling of engines and condensers shall NEVER be used for the cleaning of any equipment, utensils and product contact surfaces.

**9.8.1.3** As blood, mucus, fish scales and other product waste are difficult to remove after they have dried, cleaning operations shall be carried out while the waste is still wet.

**9.8.1.4** As organic material rapidly combines with, and neutralize the disinfectant ability of many disinfectants, thorough cleaning shall precede disinfection.

#### **9.8.2 Lighting fixtures**

**9.8.2.1** Light bulbs and lighting fixtures shall be cleaned on a regular basis, or whenever necessary. Light bulbs shall be replaced whenever necessary.

**9.8.2.2** Care shall be taken not to contaminate the product in any way during the cleaning or replacement of light bulbs and lighting fixtures.

#### **9.8.3 Bulkheads and decks**

Bulkheads and decks shall be cleaned and disinfected on a regular basis, or whenever necessary.

#### **9.8.4 Equipment, utensils and product contact surfaces**

**9.8.4.1** To prevent contamination of the product, all equipment, utensils and product contact surfaces shall be cleaned, disinfected and rinsed after each cycle of operations. This shall be done before the waste of previous operations has dried. In addition, all equipment, utensils and product contact surfaces shall be rinsed at the start of each day's operations to remove any residual disinfectant. Care shall be taken not to contaminate the product during cleaning operations.

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**9.8.4.2** All parts of the fishing gear that may come into contact with the product shall be freed (as is reasonably practical) of dead product and other organic material after each haul. Fishing gear shall be cleaned as far as is practicable when operations have ceased.

**9.8.4.3** Before any product is taken on board, and between each haul of the gear, the deck areas that may come into contact with the product and the empty pounds shall be hosed down with sea water. These areas shall then be brushed, disinfected and rinsed to remove all visible dirt and waste.

### **9.8.5 Processing substances**

Substances used for frying, cooking and smoking the product shall be replaced at regular intervals. Leftover crumbs, dough, used oil and artificial smoking chemicals shall be discarded. Containers shall be cleaned after the product has been delivered on land.

### **9.8.6 Product holds**

**9.8.6.1** As wastewater in product holds will contaminate the product, bilge sumps beneath the product holds shall be emptied regularly. Bilge pumps and filters of bilge pump connections to the sumps shall be inspected regularly.

**9.8.6.2** Immediately after the product has been delivered on land, all ice used for bulk stowage of the product shall be discarded. Product holds and the bilge sumps below the product holds shall be emptied completely. While still wet, the holds, bilge sumps and filters of bilge pump connections to the sumps shall be thoroughly cleaned, disinfected and rinsed.

**9.8.6.3** Refrigerated sea water systems shall be maintained in a thoroughly serviceable condition. Immediately after the product has been delivered on land, the holding tanks shall be emptied and the tanks and screen filters brushed to remove persistent waste.

**9.8.6.4** While still wet, the systems shall be cleaned by the circulation of sea water or potable water through all parts of the system. This procedure shall be repeated, using a suitable cleaning and disinfecting agent. The system shall then be rinsed with sea water or potable water.

### **9.8.7 Freezers and frozen product storage holds**

**9.8.7.1** Excessive layers of ice and frost shall be removed from the cooling surfaces of freezers by activating the defrosting mechanism between loads.

**9.8.7.2** Plates of contact-plate freezers and freezer trays shall be cleaned and disinfected at the end of each day's operations.

**9.8.7.3** Freezers and frozen product storage holds shall be maintained in a thoroughly serviceable condition and shall be defrosted, cleaned and disinfected as necessary after the product has been delivered on land.

## **9.9 Maintenance of, and hygienic conduct in, crew's quarters**

**9.9.1.1** Galley and mess room/area shall be tidied and cleaned on a daily basis, or more frequently if necessary. Eating, cooking and galley utensils shall be washed and stored in the designated areas.

**9.9.1.2** Perishable foodstuffs shall be kept in the refrigeration facilities provided for the purpose. On small vessels, frozen foods, if kept in the frozen product storage hold, shall be made up into daily rations. This will ensure that only sealed containers are left in the frozen product storage hold.

**9.9.1.3** Crew members shall not take on board any foodstuffs for private use, except prepacked snacks meant for consumption between meals.

## **9.9.2 Bulkheads and decks**

Bulkheads and decks shall be washed and disinfected on a regular basis, or whenever necessary.

## **9.9.3 Cabins**

**9.9.3.1** Quarters shall be tidied and cleaned on a daily basis, or more frequently, if necessary.

**9.9.3.2** Mattress covers and all bedding shall be replaced with clean, laundered covers and bedding after each voyage lasting longer than a month, or more frequently, if necessary.

**9.9.3.3** Crew members shall not take on board any articles that may lead to contamination or congestion of the quarters or any articles not essential for comfortable lodging for the duration of a voyage.

**9.9.3.4** Cabins shall be cleared of personal effects that may lead to contamination and congestion and shall be cleaned, disinfected and deodorised after each voyage.

## **9.9.4 Ablution facilities**

Ablution facilities shall be tidied, cleaned and disinfected on a daily basis, or more frequently, if necessary.

## **9.9.5 Personal clothing**

**9.9.5.1** Crew members engaged in the handling of the product shall be suitably dressed in comfortable clothes (preferably of cotton or linen). If long-sleeved shirts are worn, plastics sleeves shall be worn over the shirt sleeves. Crew members shall always wear protective clothing over their personal clothing while they are handling the product.

**9.9.5.2** Personal clothing shall be washed in the laundering facilities provided for that purpose. When dry, personal clothing shall be stored in the wardrobe, chest of drawers or loading box provided for that purpose.

## **9.10 Supervision**

There shall be adequate supervision to ensure compliance with clause 9 of this standard.

# **10 Hygienic handling of the product**

## **10.1 Storage of packaging materials**

**10.1.1** Packaging materials shall be stored in the designated area on the shelves or pallets provided. The packaging materials shall never be placed on the deck where it could be trodden on or otherwise contaminated.

**10.1.2** Packaging materials may be kept in the frozen product storage hold, if they are placed on shelves, stands or pallets away from the frozen product.

## **10.2 Co-ordinated handling of the product**

**10.2.1** Before the product is washed, stowed in ice or refrigerated sea water or processed and frozen (whichever is applicable), all steps in the production process shall be so co-ordinated that unnecessary accumulation of the product is avoided. All steps shall be performed without unnecessary delay and under conditions that prevent the possibility of contamination, deterioration, or the development of pathogenic and spoilage micro-organisms.

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**10.2.2** As rough handling causes blood clots, bruising, or breakage of the muscle fibres of the product, great care shall be taken to ensure that the product is not trodden on, kicked or damaged in any way. The product shall, in addition, not be piled too high on deck.

**10.2.3** Line-caught fish shall be landed by hooking them under the gills only and shall be stunned (on the head only) as soon as they are taken on board. To prevent the spine of the fish from breaking, the tail shall never be used to lift heavy fish.

### **10.3 Reception and protection on deck**

**10.3.1** The area on deck that will come into contact with the product shall be well pre-cooled by hosing it down with sea water before the product is unloaded.

**10.3.2** During handling operations on deck, the product shall not be exposed to direct sunlight, or to the drying effect of wind. The product shall be kept moist and cool by spraying it with sea water or by covering it with ice. Product such as squid shall, in addition, be protected from rain.

**10.3.3** The temperature of product awaiting processing shall be kept below 15°C, or, if possible, the product shall be kept alive, e.g. in the case of lobsters.

**10.3.4** The product obtained from separate hauls shall be kept apart by keeping the product in separate pounds. The product shall be processed in the sequence in which it is received on deck.

### **10.4 Sorting of the product**

**10.4.1** The product shall preferably be sorted in accordance with species and size as soon as it is received on board. The product shall then be washed and stowed in ice or refrigerated sea water, or processed and frozen (whichever is applicable).

**10.4.2** Species that are unsuitable for human consumption shall immediately be discarded to prevent contamination of the edible catch. Damaged product intended for processing into value-added products, shall be stored separately.

**10.4.3** Product in pre-gutting pounds shall not be piled too deeply. Adequate vertical dividers with drain slots along their bases shall be used to prevent the product from being crushed owing to the motion of the vessel.

### **10.5 Bleeding and gutting**

**10.5.1** The product shall be bled and gutted as soon as it is received on board, ensuring that all pieces of gut and liver, which facilitate spoilage, are thoroughly removed. The more perishable species and smaller fish (unless they are to be packed whole) shall be bled and gutted before other or larger species.

**10.5.2** The product shall be inspected carefully for the presence of worms and other parasites. If the liver of a fish is heavily infested with worms, the flesh may also be infested. If worms are also found in the belly lining, 24 units shall be inspected at random. If more than 4 units of the sample are found to be infested, the skipper shall be informed. He shall then consider a change in the fishing grounds. Parasite-infested product shall be stowed separately from uninfested product or shall be discarded.

**10.5.3** All waste resulting from the gutting process shall be disposed off via the channels or chutes installed at the gutting tables.

**10.5.4** Product contact surfaces shall be rinsed frequently during handling operations and holding bins shall be rinsed when they are emptied.

**10.5.5** If the product cannot be bled and gutted immediately, it shall be washed under the overhead sea water sprays and chilled, either by ice stowage or by immersing the product in tanks of refrigerated sea water as soon as it is received on board.

## **10.6 Washing of the product**

**10.6.1** Immediately after having been gutted, the product shall be washed in potable water or sea water to remove all blood, mucus and pieces of gut. The used water and waste shall be disposed off immediately. Washed product shall never be placed in dirty holding bins.

**10.6.2** All washed product that cannot be processed immediately shall be chilled as soon as possible.

## **10.7 Separation of daily hauls**

Daily hauls shall, if possible, be stowed in ice separately from one another and stowage records kept. This will ensure that each day's catch can be identified and kept apart when the product is processed on board or when it is off-loaded for processing at land-based processing plants.

## **10.8 Bulk stowage in ice**

**10.8.1** No product, whether fresh or processed, shall be bulk-stowed at ambient temperature since considerable pressure damage to the flesh as well as rapid deterioration by micro-organisms may occur.

**10.8.2** The product shall be transferred to the hold by means of chutes or shall be lowered in suitable containers. Damage to the product through the use of shovels, rakes and gaffs shall be avoided. When the product is being loaded into the hold, deck hatches shall not be left open longer than necessary since undesirable heat may leak into the hold.

**10.8.3** The product shall be stowed thickly interspersed with ice, at a temperature of 0 °C, on shelves or in pounds in the hold. Ice shall, in addition, separate the product from any surrounding structure such as shelves or bulkheads. There shall be enough ice to cover the product until it is delivered on land at the end of the voyage. Heat leakage into the hold, as well as ice meltage during the voyage, shall be taken into account. Because ice melts quicker at bulkheads and against the side of the ship, sufficient ice shall be scooped into such area to counter excessive melting.

**10.8.4** As fish at the bottom of deep layers lose considerable weight, each layer of product and ice shall not exceed 600 mm in depth. If the product is of a fragile species, the layer of product and ice shall be much thinner.

**10.8.5** Cooling grids shall be controlled in such a manner the temperature in the hold does not go above 0°C while the product is in ice stowage, thus preventing the top layer of product from freezing.

## **10.9 Ice storage in containers**

**10.9.1** Only product of the same species and of uniform size should be packed in a container. The product, thickly interspersed with ice, shall be packed loosely on a layer of ice in the container. The upper layer of product shall then be so covered by ice that the ice does not protrude above the rim of the container. This will prevent compression of the product when containers are stacked. Large fish shall be packed in containers large enough when containers are stacked. Large fish shall be packed in containers large enough to accommodate them without individual fish having to be bent.

**10.9.2** Containers shall be so placed in the stanchions that there is minimum space between them. If there is excessive space between containers, the spaces shall be filled with ice to keep the temperature of the product down.

## **10.10 Stowage in refrigerated sea water**

### **10.10.1 Filleting**

**10.10.1.1** Fish for filleting should be selected from pre-rigor or rigor fish.

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**10.10.1.2** If fillets cut from pre-rigor fish cannot be frozen directly, they shall be chilled by stowing them in ice made from sea water.

NOTE: Potable water, ice made from potable water, is known to increase shrinking of fillets cut from pre-rigor fish, but has no effect on fillets cut from rigor fish.

**10.10.1.3** Post-rigor fish shall, if possible, immediately be processed into value-added products or preparations for less critical markets, not intended for export. Alternatively, they shall be frozen or stowed in ice until they can be processed into value-added products such as minced fish preparations and battered or crumbed products, etc.

### 10.10.2 Packaging

Whole fish in rigor shall be handled carefully. Fish that have gone into rigor in a bent position shall not be straightened to fit into packages, since this will cause excessive gaping in fillets when the product is thawed for processing.

### 10.10.3 Freezing

#### 10.10.3.1 General

**10.10.3.1.1** Product intended for freezing shall be of the highest quality possible. The general appearance of the product, its size, percentage of fat, amount of feed, presence of disease, damage, and contamination or deterioration during handling are important factors in deciding on the type of end product.

**10.10.3.1.2** Freezing shall be carried out in an orderly manner, placing the product in the freezer in the sequence in which it was caught and using the type of freezer that is suitable for the type of product to be frozen.

NOTE: Vertical contact-plate freezers are recommended for the freezing of large blocks of whole product and horizontal contact-plate freezers for the freezing of blocks of smaller species or for packages of product. Air-blast freezing may be used for blocks of whole product and is recommended for individual round fish and large species that cannot be accommodated by contact-plate freezers. Freezing by immersion is usually used for large species such as tuna, which are intended for canning.

**10.10.3.1.3** While in operation, all freezing systems shall be monitored and any defects quickly rectified, since any malfunction of the system may result in the spoilage of the product.

#### 10.10.3.2 Transfer of product to the freezer

**10.10.3.2.1** Product that has been packed shall be placed in the freezer within 30 minutes. When freezing space is inadequate owing to excessively large catches, unpacked product shall be kept in ice in bins, which shall then be stacked in the chiller.

**10.10.3.2.2** Before contact-plate freezers are loaded, refrigeration and defrosting valves shall be closed so that the plates are neither heated nor chilled during the loading operation.

**10.10.3.2.3** Fish that are in rigor in a bent position shall not be straightened when being loaded into the freezer trays. They shall instead be frozen in blocks as they are and coded as being bent so that they can be recognized before further processing.

NOTE: When fish have gone into rigor in a bent position, the muscle structure will be damaged when they are forced to their natural position, causing gaping in the fillets cut from them.

**10.10.3.2.4** Unpacked product that is to be frozen in blocks shall be packed as closely as possible and with such a manner that individual specimens retain their normal shape without being bent or squashed. Distorted or damaged trays or forms shall not be used to contain the product.

**10.10.3.2.5** A system of labels or colour codes shall be used when product is being loaded into a freezer, to assist in the later identification of the frozen product.

### **10.10.3.3 Effective freezing of the product**

**10.10.3.3.1** Refrigeration valves of contact-plate freezers shall be opened immediately after the product has been loaded. Freezer plates shall be brought into contact with the product that the product is gently compressed. Undue pressure shall never be used to fit oversized product into the freezing space. The resultant blocks shall be of regular shape and uniform size to facilitate industrial reprocessing of the blocks.

**10.10.3.3.2** Freezer trolleys shall be positioned in air-blast freezers that the product is in constant contact with the cold air. A space of not more than 60 mm shall be left around freezer trays to allow continuous air flow. Trolleys shall be so spaced that the air current is not blocked. Nevertheless, spaces between trolleys and the bulkheads of the freezer shall be as small as possible to prevent air from following open air corridors. Empty trolleys shall be filled with empty trays. The cold air speed shall be maintained in all areas of the freezer.

**10.10.3.3.3** The freezing speed of the product shall be regularly monitored and shall comply with the minimum requirements of the compulsory specification for frozen fish, frozen marine molluscs and frozen fish and frozen marine mollusc products, the compulsory specification for frozen rock lobster products, or the compulsory specification for frozen shrimps (prawns), langoustines and crabs, whichever is applicable. The product shall not be transferred from the freezer to frozen storage unless the core temperature of the product has dropped to  $-18^{\circ}\text{C}$  or below.

NOTE 1: Packaging materials insulate the product and may result in slow freezing. As a longer freezing time may affect the quality of the product, the freezing of such product should be expedited.

NOTE 2: Optimum freezing of the product will only be obtained by:

- a) following the plant operation instructions of the manufacturer of the freezer; and
- b) implementing the minimum specific freezing times for the different species.

NOTE 3: in the case of air blast freezers the product may dehydrate if it is stored in the freezer for longer than the recommended freezing time

**10.10.3.3.4** To minimize salt penetration in the case of large specimens frozen by immersion, the core temperature of the product shall be reduced as rapidly as possible.

**10.10.3.3.5** The product shall be removed from the freezing medium when its core temperature has dropped to between  $-12^{\circ}\text{C}$  and  $-15^{\circ}\text{C}$ , and as core temperature shall then be reduced to below  $-18^{\circ}\text{C}$  during frozen storage. Owing to salt penetration, fillets shall be frozen by immersion.

**10.10.3.3.6** Frozen product, shall not be stored in the freezers for longer than the recommended freezing time.

### **10.10.3.4 Glazing and/or wrapping**

**10.10.3.4.1** To minimize oxidation and dehydration, product that has not been packed and sealed before freezing shall be glazed or enclosed in material with low oxygen permeability (or both) before being loaded into cold storage.

**10.10.3.4.2** Water used for glazing shall be as near to freezing point as possible, e.g. below  $4^{\circ}\text{C}$ , to prevent frozen blocks or product from cracking and to facilitate glazing. If the product is not transferred directly to the frozen product storage hold and the glaze on the product has melted, the product shall be reglazed.

### **10.10.3.5 Transfer of the frozen product to frozen product storage holds**

**10.10.3.5.1** To avoid thawing of the product, frozen blocks of product shall be removed from contact-plate freezers as soon as adhesion to the plate is broken by defrosting.

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**10.10.3.5.2** Frozen product shall be handled carefully to minimize breakage or damage to the layer of glaze. Cartons with frozen product shall be strapped in such a way that they do not break when handled.

**10.10.3.5.3** The transfer of product from freezers to the frozen product storage hold shall be expeditious.

**NOTE:** In hot weather, the temperature inside large cartons of frozen product may rise by 5 °C within 30 min, while the temperature of individual fish units may rise at a rate of about 1°C every two minutes. The raised temperature will adversely affect the quality of the product being transferred, while the additional heat introduced into the frozen product storage hold will negatively affect product already in storage.

### **10.10.4 Storage of by-product**

By-products shall be stored separately from the product.

### **10.10.5 Frozen storage of the product**

**10.10.5.1** Frozen product shall be so stowed in such a manner that it cannot be damaged as a result of the motion of the vessel. Broken blocks and individually frozen specimens shall be stowed separately from undamaged blocks.

**10.10.5.2** Surfaces shall be so designed to allow sufficient air flow, and adequate removal of heat leakage.

**10.10.5.3** Minimal fluctuation in temperature shall be allowed in the frozen product storage hold. If no automatic temperature recorder is installed, hourly manual temperature records shall be kept. Thermometers and temperature recorders shall be calibrated annually.

**10.10.5.4** If temperatures fluctuate excessively, the reason shall be investigated and corrective action taken promptly.

**10.10.5.5** A stowage plan of the frozen product storage hold be kept on board to facilitate identification of the different types of products during off-loading at the harbour.

### **10.10.6 Off-loading at land-based processing plants or cold storage rooms**

**10.10.6.1** All product whether chilled or bulk stowed in refrigerated sea water, shall be off-loaded as soon as possible after arrival in the harbour. Off-loading should preferably be carried out by mechanical means.

**10.10.6.2** Daily catches of unfrozen product shall be kept apart during off-loading. The temperature and hygienic conditions under which the product had been stowed shall be maintained after off-loading.

**10.10.6.3** Cleaning of the equipment and product holds shall be completed before fresh ice is taken on board or fresh batches of ice or refrigerated sea water are made for the next voyage.

## **11 Product history and labelling of the frozen product**

### **11.1 Product history**

**11.1.1** A copy of the product history, which shall include stowage and freezing records and description of batch codes, shall be made available to land-based processing plants to determine further processing or marketing of the product

**11.1.2** Accurate freezing and stowage records shall be kept. Such records shall include the applicable of the following:

- a) loading and unloading times of freezers and holds;
- b) number and size of frozen blocks or packages per freezer load;

- c) species per freezer load;
- d) product of lesser quality;
- e) product containing parasites;
- f) product processed during malfunction of equipment; and
- g) product that has not been directly frozen after processing.

**11.1.3** Batch codes shall be allocated to all the items listed in 11.1.2.

## **11.2 Labelling for export purposes**

Labelling for export purposes shall be in accordance to relevant competent authorities' regulations.

## **11.3 Labelling for local distribution**

**11.3.1** Shall be in accordance to national product specifications.

**11.3.2** If product packed and labelled for export is sold on the local market, the information required in 11.3.1 shall be added to that on the existing label.



## Bibliography

KS 1652:2000, *Code of hygienic practice on commercial fishing vessels*

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