

## Requirements of Fish Storage by Refrigeration and Freezing

Ensuring the safety of fish exhibited in the local market

*Disclaimer: The English version is a translation of the original in Arabic for information purposes only. In case of discrepancy, the Arabic original will prevail.*

## Objective

Maintaining the safety of fish exhibited in the local markets from the beginning of its handling until consumption, and emphasizing the importance of fish safety from any externalities during the period of sale.

## General Requirements

1. Boxes used for storage shall be made from hygienic, suitable material, easily cleaned and does not contaminate fish, and boxes shall be adequate in the size of fish to be packed.
2. Fish shall not be transported with any other goods that may contaminate\spoil the fish.
3. Fish shall be transported and stored, as quickly as possible in appropriate boxes, and it shall be arranged regularly in a horizontal position.
4. Fish transported by containers shall have a temperature not exceeding 4 °C for the chilled products and -18 °C for the frozen ones.
5. Water that is used for preparing the fish shall be safe or clean from the sea.

## Cold Storage Requirements

1. Fish should be carefully cleaned and cooled down to the temperature of melting ice (0 ° C).
2. Fish shall not be exposed to direct sunlight or to the drying effect of winds or any other harmful effects of the elements.
3. Ice that is used in the chilling process should be finely crushed and not used in any other process.

4. Ice shall be available at all areas of production and on ships with sufficient quantities. It shall be evenly distributed on all fishes in a hygienic method.

5. Chilled fish shall be transported immediately in suitable boxes and shall be arranged evenly in a horizontal position where crushed ice is alternately put in between, with the bottom and upper layers of crushed ice.

6. Fish shall be stored at a temperature ranging from  $-1^{\circ}\text{C}$  to  $4^{\circ}\text{C}$  during transportation, storage, and sale.

7. The level of ice at the top shall be similar to its level at the bottom and the process of draining of excess water shall be close to the floor and away from the unused ice.

**Refrigerated fish is prepared in the following forms:**

Whole fish

Whole gutted fish

Whole, headed and gutted fish

Boneless, skinless and gutted fish (fish fillet)

## **Freezing Storage Requirements**

1. Fish shall be frozen on the ship or transported to the freezing factory at a temperature not exceeding  $4^{\circ}\text{C}$  and in a period no longer than 12 hours.

2. The product shall be frozen immediately after preparation in fast freezers where the freezing process is accomplished when the temperature at the center of the product reaches  $-18^{\circ}\text{C}$ .

### **Fish is frozen in one of the following forms:**

- Whole fish: Freezing the fish at the form in which it is caught.
- Guttled fish: Fish which the viscera (guts) have been removed.
- Gilled and Guttled.
- Headed and Guttled.
- Prepared fish: Guttled, headed, tailed, finned and gilled.
- Fish portions: Portions of prepared fish with a fairly thickness not exceeding 40 mm.
- Fish fillets: Slices of fish of irregular size and shape without skin and bones which are obtained from fresh or previously frozen fish by cuts made parallel to the backbone.

### **Requirements to ensuring the safety of fish exhibited in the local market**

1. Refrigerated fish shall have the following characteristics:

**Skin / scales:** Scales shall not fall off easily from shellfish, but the skin for non-shell fish should be smooth and not wrinkled, and shall not be dull or sandy, and have brown / yellow sticky spots and mucous substances with an inconsistent and soft texture.

**Eyes:** It should be shiny, translucent, bulging and not sunken.

**Gills:** It should have normal color and not opaque yellow, brown or dark and it shall be free from mucous substances or to have few.

**Smell:** It should have its distinctive natural smell and to be free from unacceptable odors or flavor that indicates rottenness, rancidity or foreign smell.

**Clean and bruise-free:** Fish shall be without any signs of congestion, wounds or apparent swelling, and it shall be free from abdominal laceration for the whole uncleaned fish.

**Firm meat:** The flesh of the back area of fish shall return to its normal position after finger pressure.

2. Fish shall be free from unpleasant odors or foreign flavors.

3. Used packages shall be made from appropriate materials that preserve the product and its integrity, and the packages shall provide the necessary protection to the product.
4. Vending refrigerators should be designed to preserve chilled or frozen fish, and to be provided with shelves that facilitate the process of stacking the fish inside and allow the air passage.
5. Used refrigerators shall be able to maintain the standard temperature of the product under normal operating conditions.
6. Freezers shall be equipped with a thermometer fixed in its center.
7. Opened vending refrigerators shall be placed in a safe place far from heat or direct sunlight sources, and it is preferable to cover the storage space at night and during the closing of stores.
8. Any barriers prevent air distribution shall not be placed in storage refrigerators.
9. Chilled fish transported in containers shall be preserved at a temperature between 0 ° C and 4 ° C and frozen at a temperature not exceeding -18 ° C.
10. All sets used for cutting, cleaning and preparation shall be made from a suitable material which causes no contamination to fish and can be easily cleaned.
11. Fish exposed for sale in refrigerated cabinets shall be separated from hand touching of customers. Crushed ice used to cover and keep them cool. Fish for customer self-service sale shall be only frozen wrapped fish products.
12. Display refrigerators shall be chilled and able to fix fish temperature at the ideal degrees which create good conditions through the period of exposition.
13. Electric traps for insects shall be put at all sites of fish sale and cleaning.
14. Frozen fish shall not be regrouped after dissolving.
15. An automatic register shall be kept for large central refrigerators to indicate the temperature during the storage period or to take temperature data periodically and record it in a special register, where the temperature swings of the refrigerator do not exceed (+ 2 °C).

16. Storage space shall be clean and free from ice.
17. Ice buildup in normal refrigerators shall be removed, at least every week and it is preferable to use self-defrosting refrigerators.
18. Refrigerators shall be subjected to periodic maintenance under the supervision of specialized engineers.