CODEX ALIMENTARIUS
INTERNATIONAL FOOD STANDARDS

Food and Agriculture Organization of the United Nations
World Health Organization

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STANDARD FOR QUICK FROZEN BLOCKS OF FISH FILLET, MINCED FISH FLESH AND MIXTURES OF FILLETS AND MINCED FISH FLESH

CODEX STAN 165-1989

Adopted in 1989. Revised in 1995. Amendments 2011, 2013, 2014

1. SCOPE

This standard applies to quick frozen blocks of cohering fish flesh, prepared from fillets[1] or minced fish flesh or a mixture of fillets and minced fish flesh, which are intended for further processing.

2. DESCRIPTION

2.1 Product Definition

Quick frozen blocks are rectangular or other uniformly shaped masses of cohering fish fillets, minced fish or a mixture thereof, which are suitable for human consumption, comprising:

(i) a single species; or

(ii) a mixture of species with similar sensory characteristics.

Fillets are slices of fish of irregular size and shape which are removed from the carcass by cuts made parallel to the back bone and pieces of such fillets, with or without the skin.

Minced fish flesh used in the manufacture of blocks are particles of skeletal muscle which have been separated from and are essentially free from bones, viscera and skin.

2.2 Process Definition

The product after any suitable preparation shall be subjected to a freezing process and shall comply with the conditions laid down hereafter. The freezing process shall be carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18°C or colder at the thermal centre after thermal stabilization. The product shall be kept deep frozen so as to maintain the quality during transportation, storage and distribution.

Indutrial repacking or further processing of intermediate quick frozen material under controlled conditions which maintain the quality of the product followed by the reapplication of the quick freezing process is permitted.

These products shall be processed and packaged so as to minimize dehydration and oxidation.

2.3 Presentation

Any presentation of the product shall be permitted provided that it:

- meets all requirements of this standard, and
- is adequately described on the label to avoid confusing or misleading the consumer.

Blocks may be presented as boneless, provided that boning has been completed including the removal of pin-bones.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Fish

Quick frozen blocks shall be prepared from fillets or minced flesh of sound fish which are of a quality fit to be sold fresh for human consumption.

3.2 Glazing

If glazed, the water used for glazing or preparing glazing solutions shall be of potable quality or shall be clean sea-water. Potable water is fresh-water fit for human consumption. Standards of potability shall not be less than those contained in the latest edition of the WHO "International Guidelines for Drinking Water Quality". Clean sea-water is sea-water which meets the same microbiological standards as potable water and is free from objectionable substances.

3.3 Other Ingredients

All other ingredients used shall be of food grade quality and conform to all applicable Codex standards.

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[1] Including pieces of fillets.

3.4 Decomposition

The products shall not contain more than 10 mg/100 g of histamine based on the average of the sample unit tested. This shall apply only to species of *Clupeidae, Scombridae, Scombresocidae, Pomatomidae* and *Coryphaenedae* families.

3.5 Final Product

Products shall meet the reguirements of this standard when lots examined in accordance with Section 9 comply with the provisions set out in Section 8. Products shall be examined by the methods given in Section 7.

4. FOOD ADDITIVES

Only the use of the following additives is permitted.

Humectants – Moisture/Water Retention Agents		
INS Number	Additive Name	Maximum Level in Product
339(i)	Sodium dihydrogen phosphate	2200 mg/kg as phosphorus, singly or in combination
339(ii)	Disodium hydrogen phosphate	
339(iii)	Trisodium phosphate	
340(i)	Potassium dihydrogen phosphate	
340(ii)	Dipotassium hydrogen phosphate	
340(iii)	Tripotassium phosphate	
341(i)	Calcium dihydrogen phosphate	
341(ii)	Calcium hydrogen phosphate	
341(iii)	Tricalcium phosphate	
450(i)	Disodium diphosphate	
450(ii)	Trisodium diphosphate	
450(iii)	Tetrasodium diphosphate	
450(v)	Tetrapotassium diphosphate	
450(vii)	Calcium dihydrogen diphosphate	
451(i)	Pentasodium triphosphate	
451(ii)	Pentapotassium triphosphate	
452(i)	Sodium polyphosphate	
452(ii)	Potassium polyphosphate	
452(iii)	Sodium calcium polyphosphate	
452(iv)	Calcium polyphosphate	
452(v)	Ammonium polyphosphate	
542	Bone phosphate	
401	Sodium alginate	GMP

Antioxidants		
INS Number	Additive Name	Maximum Level in Product
300	Ascorbic acid	GMP
301	Sodium ascorbate	
303	Potassium ascorbate	
304	Ascorbyl palmitate	1 g/kg
In Minced Fish Flesh Only		
Acidity Regulators		
INS Number	Additive Name	Maximum Level in Product
330	Citric acid	GMP
331	Sodium citrate	
332	Potassium citrate	
Thickeners		
412	Guar gum	GMP
410	Carob bean (Locust bean) gum	
440	Pectins	
466	Sodium carboxymethyl cellulose	
415	Xanthan gum	
407	Carrageenan and its Na, K, NH4 salts (including Furcelleran)	
407a	Processed EucheumaSeaweed (PES)	
461	Methyl cellulose	

5. HYGIENE

It is recommended that the products covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of the *General Principles of Food Hygiene* (CAC/RCP 1-1969), the *Code of Practice for Fish and Fishery Products* (CAC/RCP 52-2003), the *Code of Practice for the Processing and Handling of Quick Frozen Foods* (CAC/RCP 8-1976) and other relevant Codex Codes of Hygienic Practice and Codes of Practice.

The products shall comply with any microbiological criteria established in accordance with the *Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods* (CAC/GL 21-1997).

The final product shall be free from any foreign material that poses a threat to human health.

When tested by appropriate methods of sampling and examination prescribed by the Codex Alimentarius Commission, the product:

(i) shall be free from microorganisms or substances originating from microorganisms in amounts which may represent a hazard to health in accordance with standards established by the Codex Alimentarius Commission;

(ii) shall not contain histamine that exceeds 20 mg/100 g in any sample unit. This applies only to species of Clupeidae, Scombridae, Scombresocidae, Pomatomidae and Coryphaenedae families;

(iii) shall not contain any other substances in amounts which may represent a hazard to health in accordance with standards established by the Codex Alimentarius Commission.

6. LABELLING

In addition to the provisions of the *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985) the following specific provisions apply;

6.1 Name of The Food

The name of the food shall be declared as "x y blocks" in accordance with the law, custom or practice of the country in which the product is distributed, where "x" shall represent the common name(s) of the species packed and "y" shall represent the form of presentation of the block (see Section 2.3).

If the product has been glazed with sea-water, at statement to this effect shall be made

The name "quick frozen", shall also appear on the label, except that the term "frozen" may be applied in countries where this term is customarily used for describing the product processed in accordance with subsection 2.2 of this standard.

The proportion of mince in excess of 10% of net fish content shall be declared stating the percentage ranges: 10-25, >25-35, etc. Blocks with more than 90% mince are regarded as mince blocks.

The label shall state that the product should be maintained under conditions that will maintain the quality during transportation, storage and distribution.

6.2 Net Contents (Glazed Blocks)

Where the food has been glazed, the declaration of net contents of the food shall be exclusive of the glaze.

6.3 Storage Instructions

The label shall include terms to indicate that the product shall be stored at a temperature of -18°C or colder.

6.4 Labelling of Non-Retail Containers

Information specified above shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, and the name and address of the manufacturer or packer as well as storage instructions, shall appear on the container.

However, lot identification, and the name and address of the manufacturer or packer may be replaced by an identification mark provided that such mark is clearly identifiable with the accompanying documents.

7. SAMPLING, EXAMINATION AND ANALYSES

7.1 Sampling Plan for Fish Blocks

Sampling of lots for examination of the product shall be in accordance with the sampling plan defined below. The sample unit is the entire block.

Lot Size (Number of blocks)	Sample Size (Number of blocks to be tested, n)	Acceptance number (c)
< 15	2	0
16 - 50	3	0
51 – 150	5	1
151 - 500	8	1
501 – 3200	13	2
3201 – 35000	20	3
> 35000	32	5

If the number of defective blocks in the sample is less than or equal to c, accept the lot; otherwise, reject the lot.
Sampling of lots for examination of net weight shall be carried out in accordance with an appropriate sampling plan meeting the established criteria established by the Codex Alimentarius Commission.

7.2 Sensory and Physical Examination

Samples taken for sensory and physical examination shall be assessed by persons trained in such examination and in accordance with procedures elaborated in Sections 7.3 through 7.7 and Annex A and in accordance with the *Guidelines for the Sensory Evaluation of Fish and Shellfish in Laboratories* (CAC/GL 31-1999).

7.3 Determination of Net Weight

7.3.1 Determination of Net Weight of Product Not Covered by Glaze

The net weight (exclusive of packaging material) of each sample unit representing a lot shall be determined in the frozen state.

7.3.2 Determination of Net Weight of Products Covered by Glaze

As soon as the package is removed from frozen temperature storage, open immediately and place the contents under a gentle spray of cold water until all ice glaze that can be seen or felt is removed. Remove adhering water by the use of paper towel and weigh the product.

An alternate method is outlined in Annex B.

7.4 Procedure for the Detection of Parasites for skinless blocks of fish fillets (Type I method)

The entire sample unit is examined non-destructively by placing appropriate portions of the thawed sample unit on a 5 mm thick acryl sheet with 45% translucency and candled with a light source giving 1500 lux 30 cm above the sheet.

7.5 Determination of Proportions of Fillet and Minced Fish in Quick Frozen Blocks prepared from Mixtures of Fillets and Minced Fish [2 3]

According to the AOAC Method - "Physical Separation of Fillets and Minced Fish", AOAC 1988, 71, 206 (Type II).

7.6 Determination of Gelatinous Condition

According to the AOAC Methods - "Moisture in Meat and Meat Products, Preparation of Sample Procedure"; AOAC 1990, 983.18 and "Moisture in Meat" Method A, 950.46; AOAC 1990.

7.7 Cooking Methods

The following procedures are based on heating the product to an internal temperature of 65 -70°C. The product must not be overcooked. Cooking times vary according to the size of the product and the temperatures used. The exact times and conditions of cooking for the products should be determined by prior experimentation.

Baking Procedure: Wrap the product in aluminum foil and place it evenly on a flat cookie sheet or shallow flat pan.

Steaming Procedure: Wrap the product in aluminum foil and place it on a wire rack suspended over boiling water in a covered container.

Boil-In-Bag Procedure: Place the product into a boilable film-type pouch and seal. Immerse the pouch into boiling water and cook.

Microwave Procedure: Enclose the product in a container suitable for microwave cooking. If plastic bags are used, check to ensure that no odour is imparted from the plastic bags. Cook according to equipment instructions.

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2 This method has been evaluated for cod only, but in principle, should be appropriate to other fish species or mixed species.

3 This method is accurate for levels of mince greater than 10%.

7.8. Thawing Procedure for Quick Frozen Blocks

Air Thaw Method:

Frozen fish blocks are removed from the packaging. The frozen fish blocks are individually placed into snug fitting impermeable plastic bags or a humidity controlled environment with a relative humidity of at least 80%. Remove as much air as possible from the bags and seal. The frozen fish blocks sealed in plastic bags are placed on individual trays and thawed at air temperature of 25°C (77°F) or lower. Thawing is completed when the product can be readily separated without tearing. Internal block temperature should not exceed 7°C (44.6°F).

Water Immersion Method:

Frozen fish blocks are removed from the packaging. The frozen fish blocks are sealed in plastic bags. Remove as much air as possible from the bags and seal. The frozen fish blocks are placed into a circulating water bath with temperatures maintained at 21°C $\pm$ 1.5°C (70°F $\pm$ 3°F). Thawing is completed when the product can be easily separated without tearing. Internal block temperature should not exceed 7°C (44.6°F).

7.9 Determination of histamine

Methods meeting the following method performance criteria may be used:

ML (mg/100g)	Minimum applicable range (mg/100 g)	LOD (mg/100 g)	LOQ (mg/100g)	RSDR (%)	Recovery	Applicable methods that meet the criteria
10 (average)	8 – 12	1	2	16.0	90 – 107	AOAC 977.13 | NMKL 99, 2013 NMKL 196, 2013
20 (each unit)	16 – 24	2	4	14.4	90 – 107	AOAC 977.13 | NMKL 99, 2013 NMKL 196, 2013

8. DEFINITION OF DEFECTIVES

The sample unit shall be considered defective when it exhibit any of the properties defined below.

8.1 Deep Dehydration

Greater than 10% of the surface area of the sample unit exhibits excessive loss of moisture clearly shown as white or yellow abnormality on the surface which masks the colour of the flesh and penetrates below the surface, and cannot be easily removed by scraping with a knife or other sharp instrument without unduly affecting the appearance of the block.

8.2 Foreign Matter

The presence in the sample unit of any matter which has not been derived from fish (excluding packing material), does not pose a threat to human health, and is readily recognized without magnification or is present at a level determined by any method including magnification that indicates non-compliance with good manufacturing and sanitation practices.

8.3 Parasites

The presence of two or more parasites per kg of the sample unit detected by a method described in 7.4 with a capsular diameter greater than 3 mm or a parasite not encapsulated and greater than 10 mm in length.

8.4 Bones (in packs designated boneless)

More than one bone per kg of product greater or equal to 10 mm in length, or greater or equal to 1 mm in diameter; a bone less than or equal to 5 mm in length, is not considered a defect if its diameter is not more than 2 mm. The foot of a bone (where it has been attached to the vertebra) shall be disregarded if its width is less than or equal to 2 mm, or if it can easily be stripped off with a fingernail.

8.5 Odour and Flavour

A sample unit affected by persistent and distinct objectionable odours or flavours indicative of decomposition or rancidity or of feed.

8.6 Flesh abnormalities

A sample unit affected by excessive gelatinous condition of the flesh together with greater than 86% moisture found in any individual fillet, or a sample unit with pasty texture resulting from parasitic infestation affecting more than 5% of the sample unit by weight.

9. LOT ACCEPTANCE

A lot shall be considered as meeting the requirements of this standard when:

(i) the total number of defective sample units as classified according to Section 8 does not exceed the acceptance number (c) of the sampling plan in Section 7; and

(ii) the average net weight of all sample units is not less than the declared weight, provided there is no unreasonable shortage in any container; and

(iii) the Food Additives, Hygiene and Labelling requirements of Sections 4, 5 and 6 are met.

ANNEX A

SENSORY AND PHYSICAL EXAMINATION

1. Complete net weight determination, according to defined procedures in Section 7.3 (de-glaze as required).
2. Examine the frozen block for the presence of dehydration by measuring those areas which can only be removed with a knife or other sharp instrument. Measure the total surface area of the sample unit, and calculate the percentage affected.
3. Thaw and individually examine each block in the sample unit for the presence of foreign matter, bone where applicable, odour, and textural defects.
4. In cases where a final decision on odour can not be made in the thawed uncooked sate, a small portion of the disputed material (approximately 200 g) is sectioned from the block and the odour and flavour confirmed without delay by using one of the cooking methods defined in Section 7.7.
5. In cases where a final decision on gelatinous condition cannot be made in the thawed uncooked state, the disputed material is sectioned from the block and the gelatinous condition confirmed by cooking as defined in Section 7.7. or by using procedure in Section 7.6. to determine if greater than 86% moisture is present in any fillet. If cooking evaluation is inconclusive, then procedure in 7.6. would be used to make the exact determination of moisture content.

ANNEX B

METHOD FOR THE DETERMINATION OF NET CONTENT OF FROZEN FISH BLOCKS COVERED BY GLAZE

Glazing is not used for Q.F. blocks of white fish. Only Q.F. blocks of herring, mackerel and other brown (fat) fish are glazed, which are destined for further processing (canning, smoking). For such blocks the following procedure may be applicable (tested with block frozen shrimps).

1. PRINCIPLE

The pre-weighed glazed sample is immersed into a water bath by hand till all glaze is removed (as felt by fingers). As soon as the surface becomes rough, the still frozen sample is removed from the water bath and dried by use of a paper towel before estimating the net product content by repeated weighing. By this procedure thaw drip losses and/or re-freezing of adhering moisture can be avoided.

2. EQUIPMENT

- Balance - sensitive to 1 g
- Water bath, preferably with adjustable temperature
- Circular sieve with a diameter of 20 cm and 1-3 mm mesh apertures (ISO R 565)
- Paper or cloth towels with smooth surface
- A freezed box should be available at the working place

3. PREPARATION OF SAMPLES AND WATER BATH

- The product temperature should be adjusted to -18/-20°C to achieve standard deglazing conditions (especially necessary if a standard deglazing period shall be defined in case of regular shaped products).
- After sampling from the low temperature store remove, if present, external ice crystals or snow from the package with the frozen product.
- The water bath shall contain an amount of fresh potable water equal to about 10 times of the declared weight of the product; the temperature should be adjusted on about 15°C to 35°C.

4. DETERMINATION OF GROSS-WEIGHT "A"

After removal of the package, the weight of the glazed product is determined: In case of single fish fillets, single weights are recorded (A 1-A n). The weighed samples are placed intermediately into the freezer box.

5. REMOVAL OF GLAZE

The pre-weighed samples/sub-samples are transferred into the water bath and kept immersed by hand. The product may be carefully agitated, till no more glaze can be felt by the finger-tips on the surface of the product: change from slippery to rough. Needed time, depending on size/shape and glaze content of the product, 10 to 60 sec. (and more in case of higher glaze contents or if frozen together).

For block-frozen products in consumer packs (also for single glaze products, which are frozen together during storage) the following (preliminary) procedure may be applicable: The pre-weighed block or portion is transferred onto a suitable sized sieve and immersed into the water bath. By slight pressure of the fingers separating deglazed portions are removed fractionally. Short immersing is repeated, if glaze residues are still present.

6. DETERMINATION OF NET WEIGHT "B"

The deglazed sample/sub-sample, after removal of adhering water by use of a towel (without pressure) is immediately weighed. Single net-weights of sub-samples are summed up: B_1-$_n$.

7. DETERMINATION OF GLAZE-WEIGHT "C"

$$\text{Gross weight "A"} - \text{Net weight "B"} = \text{Glaze weight "C"}$$

8. CALCULATION OF PERCENTAGE PROPORTIONS:

$$\%\ \text{net content of the product "F"} = \frac{\text{"B"}}{\text{"A"}} \times 100$$

$$\%\ \text{glaze – related to the gross weight of the product "G"} = \frac{\text{"C"}}{\text{"A"}} \times 100$$

$$\%\ \text{glaze – related to the net weight of the product "H"} = \frac{\text{"C"}}{\text{"B"}} \times 100$$