CODEX ALIMENTARIUS COMMISSION

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World Health Organization

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CX 5/35 **CL 2015/1-FFP**

January 2015

TO: Codex Contact Points

Interested International Organizations

FROM: Secretariat, Codex Alimentarius Commission
Joint FAO/WHO Food Standards Programme
Viale delle Terme di Caracalla, 00153 Rome, Italy

SUBJECT: **Request for Comments: Appendices for Optional Final Product Requirements for Commodities in the *Code of Practice for Fish and Fishery Products* (CAC/RCP 52-2003)**

DEADLINE: **30 June 2015**

COMMENTS:

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BACKGROUND

1. CCFFP33 agreed that Appendices on optional final product requirements for commodities in the *Code of Practice for Fish and Fishery Products* (CAC/RCP 52-2003) would not be sent for adoption as part of the Code, and that a Circular Letter would be sent to invite proposals for sections of the already adopted or draft Appendices to be integrated into the Code to address only essential safety or quality aspects, for consideration at the next session.[1]

2. CCFFP33 also confirmed, that as agreed at its previous session, further work should continue on Appendix I to provide useful information on the correct use of Modified Atmosphere Packaging, and that it would also be included in the Circular Letter.[1]

Request for comments

3. Comments are hereby requested on the Appendices I, III, IV, V, VI, VIII, IX and XI (*see* the Annex 1 to this Circular Letter).

4. When submitting comments, governments and international organizations are invited to consider CCFFP33 discussion and decision (REP14/FFP paras 125-132) and for:

- Appendices III, IV, V, VI, VIII, IX and XI, to make concrete proposals on those parts to be retained (essential safety or quality aspects) and the location in the Code of Practice to which these parameters should be transferred; and
- Appendix I on modified atmosphere packaging, to note the decision of CCFFP33 that work should continue on this appendix, with the view to retain it as an appendix to the Code and make comments on how to improve or complete the text.

5. Governments and international organizations wishing to provide comments should do so in writing **preferably by e-mail** to the above addresses before **30 June 2015.** Where applicable, comments should be in accordance with the general guidance for the provision of comments (see Annex 2 to this Circular Letter).

[1] REP14/FFP, para. 132

ANNEX 1

APPENDIX I

MODIFIED ATMOSPHERE PACKAGING

GOOD PROCESS CONTROLS ARE ESSENTIAL WHEN PACKING FILLETS AND SIMILAR PRODUCTS IN A MODIFIED ATMOSPHERE

Modified atmosphere packing (MAP), in which the composition of the atmosphere surrounding the fillet is different from the normal composition of air, can be an effective technique for delaying microbial spoilage and oxidative rancidity in fish.

For white fish gas mixtures containing 35-45% CO_2, 25-35% O_2 and 25-35% N_2 are recommended. Gas mixtures containing up to 60% CO2 in combination solely with N_2 are recommended for oily fish. The inclusion of CO_2 is necessary for inhibiting common aerobic spoilage bacteria such as *Pseudomonas* species and *Acinetobacter/Moraxella* species. However, retail packs of fillets or similar products, too high a proportion of CO2 in the gas mixture can induce pack collapse, excessive drip and may cause bleaching. Other gases, N2 and O2, are included as diluents to prevent these effects. O_2 is preferentially excluded from oily fish in MA packs so as to inhibit oxidative rancidity. A gas/product ration of 3:1 is commonly recommended. Any reductions in this ration can result in an impaired shelf-life extension.

The extent to which the shelf-life of the product can be extended by MAP will depend on the species, fat content, initial bacterial load, gas mixture, type of packaging material and, especially important, the temperature of storage. Determination of the shelf life of a particular product should be by a suitably qualified person such as a food technologies or microbiologist. Since fish can be contaminated with *Clostridium botulinum* type E great care has to be exercised when determining the shelf life. Although it is generally accepted that *Clostridium botulinum* does not grow at temperatures below +3°C other factors, e.g. salt content or pH etc. can also have an inhibitory effect. Thus when determining the shelf life of MAP fresh fish it is advisable to do challenge tests on the product which accurately reflect the product conditions and storage and distribution environment. It is very important to note that the inclusion of O_2 does not preclude the growth of *Clostridium botulinum* type E and temperature control throughout the shelf life of the product is very important. In many circumstances it is considered undesirable to use ice to cool these packs and therefore mechanical refrigeration methods are preferred.

Seal integrity of MA packs is a critical control point since it determines whether a MA pack is susceptible to external microbial contamination and air dilution of the gas mixture. Essential checks on heat sealing should include proper alignment of the sealing heads or jaws, dwell time, temperature, pressure and machine speed. Great care should be taken to ensure that the seal area is not contaminated with product, product drip or moisture since seal integrity may be reduced. In addition, the quality of the film used is important, particularly with regard to gas permeability, and only film with a clearly defined specification from reputable manufacturers should be used.

Maintenance of the correct gas mixture injected into MA packs is essential to ensure product quality, appearance and shelf life extension. For these reasons routine gas analysis of MA packs should be included as part of the process control. Analysis of the gases within MA packs can indicate faults with seal integrity, MA materials, MAP machinery or gas mixing prior to flushing. The use of continuous gas analysers is recommended. Immediate gas analysis following packing is necessary as CO_2 absorption takes place rapidly.

APPENDIX III

OPTIONAL FINAL PRODUCT REQUIREMENTS[2] - FRESH, FROZEN AND MINCED FISH

These end product specifications describe the optional defects for quick frozen fish. The descriptions of optional defects will assist buyers and sellers in describing those defect provisions, which are often used in commercial transactions or in designing specifications for final products.

The following definitions are recommendations for use by purchasers or sellers of quick frozen fish in designing specifications for final product. These specifications are optional and are in addition to the essential requirements prescribed in the appropriate Codex Product Standards and may be appropriately applied for purchases or sales of fresh fish.

1.1 Quick Frozen Finfish, Uneviscerated and Eviscerated

Defect	Recommended Defect Description
a) Body Deformation	Deformation of the back (hump-back) or of the head if present (hooked snout) as a result of the extension of cartilaginous material in these areas as the fish approaches spawning condition.
b) Damage to protective coating	Voids in the ice glaze or tears in the covering membrane.
c) Surface defects:	
Discoloration from bruises	Readily discernible localised discoloration caused by diffusion of blood into the flesh.
Cuts, wounds and other skin breaks	Readily discernible damage to the skin
Discoloured skin	Readily discernible deviation from the normal characteristic colour of the species concerned.
d) Gutting and Cleaning Defects	Improper washing
	Belly burn or loose belly bones.
Gill and body cavity cuts	Misplaced cuts made during gutting.
	Incomplete removal of the viscera.
Remains of viscera	Inadequate removal of slime, blood and bits of viscera from the surface of the fish and from the body cavity.
	Readily discernible enzymatic damage to the tissues in the area of the belly cavity, or loose belly bones in the abdominal cavity, which have become detached from the flesh.

1.2 Quick Frozen Fish Fillets[3]

Defect	Recommended Defect Description
a) Moderate Dehydration	A loss of moisture from the surface of the sample unit, which is colour masking, but does not penetrate the surface and can be easily removed by scraping. Over 10% of the total surface area; or

Pack Size	Defect Area
a) <200 g units	>25cm^2
b) 201-500 g units	>50cm^2
c) 501- 5000 g units	>150cm^2
d) 5001-8000 g units	>300cm^2
e) 8000 g units	>500 cm^2

b) Ragged or Torn Fillets	Longitudinal edges markedly and excessively irregular. Each instance.

[2] Optional final product specifications for Quick-frozen Finfish, Uneviscerated and Eviscerated were developed from the Codex Standard for Quick-frozen Gutted Pacific Salmon (CODEX STAN 36-1981).

[3] In skinless Flat Fish, small pieces of white skin should not be regarded as defects, provided that the skin does not exceed more than 10% of the surface area of the fillets in the sample unit.

c) Small Pieces (not applicable to fillets cut from blocks)	A fillet piece weighing less than 25 g.
d) Skin and black membrane(does not include sub-cutaneous layer). In flat fish white skin is not regarded as defect.	Skinless fillets Each piece greater than 3 cm^2
e) Black Membrane or Belly Lining (does not include white membrane)	Skin-on fillets Each piece greater than 3 cm^2
f) Scales: Attached to skin	Skin-on fillets - scaled Each area of scale greater than 3 cm^2
Readily noticeable loose scales	Skinless fillets More than 5, or in the case of hake fillets, more than 10 loose scales
g) Blood Clots (spots)	Any mass or lump of clotted blood greater than 5 mm in diameter.
h) Bruises & Discoloration	Diffused blood causing distinct reddish, brownish or other off-coloration. Any aggregate area of discoloration or bruising exceeding 3 cm^2.
i) Fins or part of fins	Two or more bones connected by membrane, including internal or external bones, or both in a cluster. Any instance where a bone in the fin exceeds 40 mm in length.
j) Bones	Any bone greater than or equal to 10 mm in length or with a diameter greater than or equal to 1 mm; any bone greater than or equal to 5 mm in length is not to be considered if the diameter is not greater than or equal to 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 be easily stripped off by a finger nail
Critical Bone	Each defect whose maximum profile cannot be fitted into a rectangle, drawn on a flat solid surface, which has a length of 40 mm and a width of 10 mm.
k) Packaging Material	Each instance.
l) Viscera	Each instance of the internal organs.

1.3 Quick Frozen Blocks of Fish Fillet, Minced Fish Flesh and Mixtures of Fillets and Minces Fish Flesh

Defect	Recommended Defect Description
a) Block Irregularity (applies only to blocks intended for cutting into cores for fish slices or fish portions)	Deviations from declared dimensions (e.g. length, width and thickness of a block), non-uniformity of shape, poor angles, ragged edges, ice pockets, air pockets or other damage which would result in product loss. Deviation from declared (nominal) dimensions: Length, width and thickness (i) Over 5mm in any dimension. (ii) Edges (formed by two surfaces) A gap greater than 10 mm between the actual and true edge. (iii) Angles (formed by three edges) A gap greater than 10 mm between the actual and true corner.
b) Ice pockets	Each pocket with a surface area greater than 10 cm^2.
c) Air pockets (including troughs)	Each pocket with a surface area greater than 2 cm^2 and with a depth greater than 3 mm

d)Moderate Dehydration	A loss of moisture from the surface of the sample unit which is colour masking, but does not penetrate the surface and can be easily removed by scraping. Over 10% of total surface area, or

Pack Size	Defect Area
a) <200g units	>25cm^2
b) 201-500g units	>50cm^2
c) 501-5000g units	>150 cm^2
d) 5001-8000g units	>300 cm^2
e) >8000g units	>500 cm^2

e) Skin and Black Membrane Skin (does not include sub-cutaneous layer). In flat fish white skin is not regarded as a defect.	Skinless fillet block Each piece greater than 3 cm^2
f) Black Membrane or Belly Lining (does not include white membrane)	Skin-on fillet blocks Each instance greater than 3 cm^2
g) Scales (Attached to skin)	Skin-on fillet blocks (scaled) Each area of scale greater than 3 cm^2
Scales (Readily noticeable loose scales)	Skinless fillet blocks More than 5, in the case of hake fillets, more than 10 loose scales.
h) Blood Clots (spots)	Any mass or lump of clotted blood.
i) Bruises and Discoloration	Diffused blood causing distinct reddish brownish or other off coloration which appears as significantly intense discoloration due to melanin deposits, bile stains, liver stains or other causes. . Any aggregate area of discoloration or bruising exceeding 3 cm^2.
Minced part of mixed blocks:	Objectionable discoloration, spots or particles derived from skin, black membrane, blood clots, blood spots, spinal cord or viscera. **Distinctly discoloured, spotted or otherwise heavily deviating from the colour of the species**. (ii) Objectionable deviation from the colour of the fillet.
j) Fins or Parts of Fins	Two or more bones connected by membrane, including internal or external bones, or both, in a cluster. Any instance where a bone in the fin exceeds 40 mm in length.
k) Bones	Any bone greater than or equal to 10 mm in length or with a diameter greater than or equal to 1 mm; any bone less than or equal to 5 mm in length is not to be considered if the diameter is not greater 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 2 mm or if it can be easily stripped off by a finger nail.
Critical Bone	Each bone whose maximum profile cannot be fitted into a rectangle, drawn on a flat solid surface, which has a length of 40 mm and a width of 10 mm.
l) Viscera	Each instance.
m) Packaging Material	Each instance.]

APPENDIX IV

OPTIONAL FINAL PRODUCT REQUIREMENTS - FROZEN SURIMI

These end product specifications describe the optional defects for frozen surimi. The descriptions of optional defects will assist buyers and sellers in describing those defect provisions which are often used in commercial transactions or in designing specifications for final products.

Frozen surimi is myofibrillar protein concentrate prepared from fish meat without retaining the original shape of fish, so that it is difficult to determine its quality from its appearance. Moreover, it is generally not consumed directly, but further processed. This means that the quality of frozen surimi is measured by both the compositional properties and the functional properties for surimi-based products. Therefore, it is strongly recommended to inspect such functional properties, as the following quality attributes, that are different from those for other fishery products.

It is most important to evaluate the following primary test attributes: moisture content, pH and objectionable matter of raw surimi and gel strength, deformability, and colour of cooked surimi gel. Other secondary attributes may be measured as desired.

1. Primary Quality Attribute

1.1 Raw Surimi Tests

Preparation of test sample:

Put 2-10 kg of frozen surimi in a polyethylene bag, seal the bag, and temper the surimi at room temperature (20°C) or below so that the temperature of the surimi rises to approximately -5°C. Do not soften the surface of the test sample.

1.1.1 Moisture

Sample for moisture content should be taken from the interior of a surimi block to insure no freezer burn (surface dehydration) of the sample has occurred. Put the test sample in a polyethylene bag or polyethylene bottle, seal the bag or bottle and let the test sample thaw so that the temperature of the sealed article rises to room temperature. Then measure the moisture using any of the following methods:

In case of using a drying oven method (see AOAC Method);

In case of using an infrared lamp moisture tester, take out 5 g of the test sample precisely weighed with a sample tray, and dry it immediately [Details of the method to be provided]; or

In case of using a microwave drying moisture tester (see AOAC Method). [Details of an alternate method to be provided].

Calculate the moisture according to the following formula to the first decimal place.

In using any of the measurement methods, test two or more pieces of the test sample, and indicate the average value obtained thereby.

When measuring a fatty test sample with a microwave drying moisture tester, cover the top of the sample tray with glass fibre paper to prevent fat from splashing, as being dried.

$$\text{Moisture (\%)} = \frac{\text{Pre-dry weight (g) - After-dry weight (g)}}{\text{Pre-dry weight}}$$

1.1.2 pH

Add 90 or 190 *ml* as needed to disperse the sample of distilled water to 10 g of the test sample as need to disperse. Homogenize it, and then measure pH of the suspension with a glass electrode pH meter to second decimal place. Indicate the value obtained thereby.

1.1.3 Objectionable Matter

The term "objectionable matter" as used in this item shall mean skin, small bone and any objectionable matter other than fish meat.

Spread 10 g of the test sample to the thickness of 1 mm or less, and count the number of visible objectionable matter in it. Indicate the value obtained thereby, provided an objectionable matter of 2 mm or larger shall be counted as one and an objectionable matter smaller than 2 mm shall be counted as one half, respectively, and any unnoticeable matter smaller than 1 mm shall be disregarded.

The inspection method for distinguishing scales visibly unnoticeable is specified in Section 2.1.1 of this Appendix.

1.2 Cooked Surimi Gel Tests

1.2.1 Gel Strength and Deformability

Two methods are presented here. The test to use should be decided upon between buyer and seller.

1.2.1.1 Puncture Test

Preparation of test sample:

Put 2-10 kg of frozen surimi in a polyethylene bag, seal the bag, and temper the surimi at room temperature (20°C) or below so that the temperature of the surimi rises to approximately -5°C. Do not soften the surface of the test sample.

Preparation of surimi gel for testing: Surimi gel not containing added starch

A. Comminution

Sample volume necessary for surimi paste preparation depends on the capacity of mixing instrument used. Use of 1.5 kg or more is necessary to represent the property of 10 kg of block. Regarding that enough amount of surimi is necessary for consistency of testing, equipment of large capacity which can mix surimi of 1.5 kg or more must be installed in laboratory. When you use larger size of the equipment, you also need to put in adequate amount of surimi in accordance with equipment to secure enough texture of surimi paste. Crush 1.5 kg or more of the test sample with a silent cutter, then add 3% of salt to it, and further grind and mash it for 10 minutes or more into homogenized meat paste. Remember to keep the temperature of the material to be tested, at 10°C or less.

Desirable timing for adding salt is at -1.5°C.

Desirable temperature of the test material is 5-8°C.

B. Stuffing

Stuff a polyvinylidene chloride tube of 48 mm width (30mm in diameter), when flatten, with approximately 150 g (resulting in approximately 20 cm in length) of the meat paste by the use of a stuffer with a 18 mm diameter stuffing tube, and tie the both ends of the tube.

C. Heating

Heat the test material in hot water of 84-90°C for 30 minutes.

At the time the test material is being put in, the temperature drop should not exceed 3°C.

D. Cooling

Immediately after finishing the heating treatment, put the test material in cold water and fully cool it, and then leave it at the room temperature for 3 hours or longer.

Test Method

Perform between 24 and 48 hours after cooking the following measurements of the prepared inspection sample of surimi gel of which temperature should equilibrate to the room temperature and record the temperature of the sample at the time of measurement.

Measure the gel strength and deformability of the inspection sample of surimi gel with a squeeze stress tester (rheometer). Use a spherical (plunger), of which diameter shall be 5 mm and speed shall be 60 mm/minute.

Remove film off the inspection sample of surimi gel, cut it into 25 mm long test specimen, and place test specimen on the sample deck of the tester so that the centre of the test specimen will come just under the plunger. Apply load to the plunger, and measure the penetration force in g and the deformation in mm at breakage.

Record the obtained value of the penetration and deformation in g by integral number. Record the obtained value of the deformation in mm to the first decimal place.

Prepare six or more test specimens from the same inspection sample of Surimi gel, and test each of them. Record the average values obtained thereby.

1.2.1.2 Torsion Test

Preparation of the surimi gel test specimen

A. Comminution

Temper frozen surimi at room temperature (near 25 degree C) for 1 hr., or in a refrigerated tempering room to approximately -5°C. Cut the tempered surimi blocks into slices or chunks and load into bowl of a silent

cutter or cutter/mixer equipped for vacuum use. First reduce the frozen surimi to a powder by comminution at low speed without vacuum. Add sodium chloride (2% on total batch weight basis) and ice/water (sufficient to obtain 78% final moisture content on total batch weight basis). Secure the lid and begin chopping again at low speed with no vacuum, gradually (if possible) increasing to high speed (about 2000 rpm). At the point that the mixture becomes a single mass, turn on the vacuum pump and allow approximately 70-80% of a full vacuum (approximately 20- 25 inch Hg or 500-650 mm Hg) to be obtained. During comminution insure that paste is scraped from the walls and balls of paste are forced down into the blades of a cutter/mixer. Discontinue chopping when a temperature of 5-8°C is obtained. A minimum 6 minute chopping time is recommended.

B. Stuffing

Transfer the paste to the sausage stuffer with a minimum of air incorporation. Maintain paste temperature below 10°C at all times. Stuff into polycarbonate or stainless steel tubes 1.9 cm (i.d.) of an appropriate length, typically about 20 cm. Tubes should be sprayed with lecithin release agent prior to filling. Stuff the paste uniformly and without air pockets into tubes. Cap or seal both ends and place in ice bath until ready to heat process (within one hour).

C. Heating

Heat process by immersing filled tubes in a water bath previously equilibrated to the proper temperature. Time-temperature relationships for thermal processing are: low temperature setting ability: 0-4°C for 12-18 hours, followed by 90°C for 15 min; median temperature setting ability: 25°C for 3 hours, followed immediately by 90°C for 15 min; high temperature setting ability: 40°C for 30 minutes, followed immediately by 90°C for 15 min; evaluation of protease activity: 60°C for 30 minutes, followed immediately by 90°C for 15 min; rapid cooking effect: 90°C for 15 minutes. It is recommended that water baths be heated to about 5°C higher than the intended treatment temperature, to account for the heat loss experienced upon loading, and the temperature be adjusted approximately within 2 minutes, possibly requiring ice addition.

Only cold water species will demonstrate good setting ability at lower temperatures. The heat process used to prepare the sample should be specified; if not, it is assumed that only the rapid cooking effect is being assessed. Relative proteolytic activity is assessed by comparing tests conducted on gels prepared at 60/90°C with those processed only at 90°C.

Ohmic heating can be used as a means of heating method. Heat is uniformly generated through electrical resistance. Paste placed in a chlorinated PVC tube is heated between two electrodes. Internal temperature of 90 can be reached within 1 min. Heating rate (fast and slow) can be controlled linearly. This method provides another advantage: Pacific whiting surimi or others with proteolytic enzymes can be successfully gelled (without enzyme inhibitors) under ohmic heating because fast heating can inactivate the enzyme.

D. Cooling

After heat processing, quickly transfer tubes to an ice water bath and equilibrate to 0°C. Remove gels from tubes with a plunger and seal in plastic bags. Keep samples refrigerated until tested (within 48 hours).

Test Method

Perform within 24 hours the following measurements of the prepared inspection sample of surimi gel, whose temperature should be equilibrated to the room temperature (20-25°C).

Measurement of Stress and Strain:

The gel-forming ability of surimi is evidenced by the fundamental rheological properties of the test product when strained to failure (breakage). Allow refrigerated samples to reach room temperature (near 25°C) before testing. Cut test specimens to length of about 30 mm. Attach specimens to mounting discs at each flat end with cyanoacrylate glue, being careful to place samples in centre of mounting discs. Mill centre of test specimens to a capstan shape, the milled portion being 1 cm. in diameter. Mount the milled test specimen in the torsion rheometer. Rotate top of sample to the point of sample failure (breakage) and record torque and rotational distance at this point. Calculate and report stress and strain at sample failure as: Stress = t = 1581 x (torque units); Strain = $\ln [1+(g^2/2) + g(1+g^2/4)^{0.5}]$, where g = 0.150 x (rotational distance, mm) - 0.00847 x (torque units). In practice these equations are normally programmed onto a computer linked to the torsion rheometer for data acquisition and analysis, thus yielding directly the stress and strain measurements.

1.2.2 Colour

Cut the inspection sample of Surimi gel into flat and smooth slices 15 mm or more thickness, and immediately measure with a colour-difference meter the cross section of the slice pieces in the values of L*(lightness) ,a* (red-green) and b* (yellow-blue) to the first decimal place. Test three or more slice pieces, and indicate the averages of the values obtained thereby.

2. Secondary Quality Attributes

2.1 Raw Surimi Tests

Preparation of test sample:

Put 2-10 kg of frozen surimi in a polyethylene bag, seal the bag, and defrost the surimi at room temperature (20°C) or below so that the temperature of the surimi rises to approximately -5°C. Do not soften the surface of the test sample.

2.1.1 Objectionable Matter(Scales)

After the measurement according to Appendix.1.1.3 add 100 *ml* of water to the same test sample, homogenize it, further add 100 *ml* of 0.2M-NaOH solution to it, and dissolve it with a stirrer. Filter the dissolved solution with filter paper (No.2), wash the residue with water, and then dry it at 105 for two hours. Count the number of scales obtained thereby, and indicate that number in (brackets) appearing subsequent to the number of the objectionable matter according to Section.1.1.3 of this Appendix.

After having dissolved, leave the dissolved solution still to insure precipitation, and scoop up as much skim as possible before filtration.

2.1.2 Crude Protein Content

AOAC Kjeldahl Method

2.1.3 Sugar Content

Precisely weigh 10 g of the test sample, put it in a 50 ml beaker, add to it 10 ml of 2% trichloroacetic acid (TCA) solution, and fully stir the material. Leave it still for approximately 10 minutes, stir it again, and leave it still for 10 minutes. Filter it with filter paper(No.2), drop some part of the filtered liquid on a refractometer (for Brix 0-10% use), and read the graduation on the refractometer. Apply it to the following formula and calculate a value to the first decimal place. Indicate the value obtained thereby.

Calibrate in advance the refractometer at a specified temperature with distilled water.

Sugar(%)=2.04 x Brix(%) - 2.98

2.1.4 Crude Fat Content

Put in a mortar, a precisely weighed 5-10 g of the test sample with approximately same quantity of anhydrous sodium sulphate and a small amount of refined sea sand. Mash the material uniformly into dry powder, and put it in a cylindrical filter paper. Do not fail to take out and put in the cylindrical filter paper the powder remaining in the mortar by the use of a small amount of ethyl ether and absorbent cotton. Extract and determine the fat according to Soxhlet method, and calculate a value according to the following formula to the first decimal place. Indicate the value obtained thereby.

Fill the ends of the cylindrical filter paper with a slight amount of absorbent cotton so that the material to be tested will not fall out.

Dry the extraction receptacle in advance at 100 - 106°C, and weigh it.

Extraction speed shall be 20 times per hour.

$$\text{Crude Fat}(\%) = \frac{(W_1 - W_0)}{S} \times 100$$

S : Quantity of test sample taken(g)

W_0 : Weight of receptacle(g)

W_1 : Weight of receptacle after fat has been extracted(g)

2.1.5 Colour and Whiteness

Colour: Temper frozen surimi completely to room temperature (near 25°C). Fill into a 50 ml glass beaker (4 cm diameter, 5.5 cm height) and measure colour values of L*, a*, and b* (CIE Lab system) to the first decimal point. Complete contact between the test specimen and the colorimeter measurement port, as well as filling of the beaker with no voids, is recommended for consistent results. Measure three or more samples and record the average value.

Whiteness: Whiteness can be calculated as: whiteness = L* - 3b* or whiteness = 100 - $[(100 - L^*)^2 + a^{*2} + b^{*2}]^{0.5}$.

2.1.6 Pressure Induced Drip

Defrost 50 g of the test sample and put it in a circular cylinder of 35 mm inner diameter and 120-150 mm long made of stainless steel or synthetic resin and having 21 holes of 1.5 mm diameter distant 3 mm from each other opened in the bottom. Immediately apply 1 kg of load with a pressurizing cylindrical rod of 34 mm diameter, of which weight shall be included in the load. Leave as it is for 20 minutes, and then measure the weight of the dripped liquid. Calculate its percentage to the weight of the test sample to the first decimal place. Indicate the value obtained thereby.

2.2 Cooked Surimi Tests

2.2.1 Preparation of test sample

2.2.1.1 Water-added Surimi gel:

A. *Comminution*

Sample volume necessary for surimi paste preparation depends on the capacity of mixing instrument used. Use of 1.5 kg or more is necessary to represent the property of 10 kg of block. Regarding that enough amount of surimi is necessary for consistency of testing, equipment of large capacity which can mix surimi of 1.5 kg or more must be installed in laboratory. When you use larger size of the equipment, you also need to put in adequate amount of surimi in accordance with equipment to secure enough texture of surimi paste. Crush 1.5 kg or more of the test sample with a silent cutter, then add to it 3% of salt and 20% of 3% cooled salt water, and further grind and mash it for 10 minutes or more into homogenized meat paste. However, if using the remaining water-unadded, starch-unadded test material under Section 1.2.1.1.A of this Appendix, add 20% of 3% cooled salt water only, and further grind and mash it for 5 minutes into homogenized meat paste, while keeping the temperature at 10°C or less for cold water species, such as Alaska Pollocks (*Theragra chalcogramma*) . Warm water species may be processed at a slightly higher temperature (not to exceed [15°C]). However, better quality will be achieved at a lower temperature.

B. Casing

Same as Section1 2.1.1.B of this Appendix

C. Heating

Same as Section 1.2.1.1.C of this Appendix

D. Cooling

Same as Section 1.2.1.1.D of this Appendix

2.2.1.2 Starch-added Surimi gel

A. Comminution

Add 5% of potato starch to the meat paste prepared according to the method under Section 1.2.1.1.A of this Appendix, and mix (homogenize) within 5 minutes. Remember to keep the temperature of the test material at 10°C or below all the while. Desirable temperature of the test material is 7-8°C.

B. Stuffing

Same as Section 1.2.1.1.B of this Appendix

C. Heating

Same as Section 1.2.1.1.C of this Appendix. However, if performing treatment to secure Suwari (setting), same as Section 2.2.1.3.C of this Appendix Suwari- treated surimi gel.

D. Cooling

Same as Section 1.2.1.1.D of this Appendix.

2.2.1.3 Suwari (setting)-treated Surimi gel

A. Comminution

Same as Section 1.2.1.1.A of this Appendix.

B. Casing

Same as Section 1.2.1.1.B of this Appendix.

C. Heating

After treatment to secure Suwari (setting) in warm water of 30 (28-32)°C for 60 minutes, perform the same heating as Section 1.2.1.1.C of this Appendix.

D. Cooling

Same as Section 1.2.1.1.D of this Appendix.

2.2.2 Test method

Perform between 24 and 48 hours after cooking the following measurements of the prepared inspection sample of surimi gel which temperature should equilibrate to the room temperature and record the temperature of the sample at the time of measurement.

2.2.2.1 Whiteness

Whiteness, as an index for the general appearance of a surimi gel, can be calculated as: Whiteness = L* - 3b*. or: Whiteness = $100 - [(100 - L^*)^2 + a^{*2} + b^{*2}]^{0.5}$.

2.2.2.2 Expressible Moisture

Place a slice of surimi gel (2 cm diameter X 0.3 cm thick and about 1 g in weight) between two filter papers and press them by an oil pressure equipment under a fixed pressure (10 kg/cm^2) for 20 sec.

Calculate the expressible water according to the following formula to the first decimal place.

Test three or more pieces of the test sample, and indicate the average value obtained thereby.

$$\text{Expressible water (\%)} = \frac{\text{Pre-pressed weight (g)-after-pressed weight (g)}}{\text{Pre-pressed weight (g)}}$$

Water holding capacity is also used as an index of surimi gel as well as the expressible water.

Water holding capacity (%) is calculated as follows.

$$\text{Water holding capacity (\%)} = \frac{\text{Expressible water content (g)}}{\text{Total moisture content of pre-pressed sample(g)}}$$

2.2.2.3 Folding test:

The folding test is conducted by folding a 5-millimeter thick slice of gel slowly in half and in half again while examining it for signs of structural failure (cracks). Make sure the sample is folded completely in half. Keep the folded state for five seconds, and then evaluate the change in the shape by 5 - stage merit marks. The minimum amount of folding required to produce a crack in the gel determines the score for this test. Test three or more slice pieces of the same inspection sample, and indicate the average mark obtained. In case of folding by hand, apply constant power throughout the folding surface.

Merit Mark	Property
5	No crack occurs even if folded in four.
4	No crack occurs if folded in two but a crack(s) occur(s) if folded in four.
3	No crack occurs if folded in two but splits if folded in four.
2	Cracks if folded in two.
1	Splits into two if folded in two.

2.2.2.4 Sensory (Biting) Test

Bite a 5 mm thick slice piece of the gel sample, and evaluate its resilience upon touch to teeth and cohesiveness upon bite by 10-stage merit marks. Test three or more slice pieces of the same inspection sample by a panel consisting of three or more experts, and indicate the average mark obtained thereby. Merit marks 2, 3, 4, 5 and 6 corresponds to the folding merit marks 1, 2, 3, 4 and 5 under (2), respectively.

Merit Mark	“Ashi (footing) Strength”
10	Extremely strong
9	Very strong
8	Strong
7	Slightly strong
6	Fair
5	Slightly weak
4	Weak
3	Very weak
2	Extremely weak
1	Incapable to form gel

APPENDIX V

OPTIONAL FINAL PRODUCT REQUIREMENTS - COATED QF FISHERY PRODUCTS

Type of product	Defect	Recommended Description
Frozen state	Presence of Surplus Loose Coating	Any excessive amount of loose material in the package as percentage of declared net weight.
	Excessive Fat (Oil)	Each instance of perceptible amounts of oil which have stained the inside of and soaked through the packaging.
	Ease of separation	Upon removal from the pack units do not separate easily by slight force exerted by hand without damage and without packaging material sticking to the surface, percentage of stick (fingers) or portions (fillets) affected.
	Broken Products	Broken products, which have been separated into pieces. Each instance.
	Damaged Products	Damaged products, which have been squashed, mashed or otherwise mutilated to an extent that appearance is materially affected. Each instance
	Discoloration of Coating	Colour of individual units which are black or very dark brown. Each instance. Colour significantly different from other units in the sample. Each instance. Widespread black spots derived from burnt breadcrumbs.
	Size uniformity (if declared)	Deviation of the individual size of stick or portion expressed as percentage of weight.
	Coating	Fish sticks (fingers), portions or fillets where the surface is not completely covered by breading and/or batter.
	Ice Pockets (which may result in coating damage during cooking)	Ice pockets with a surface area greater than1cm^2 (each instance). Air pockets with a surface area of greater than1cm^2 and with a depth of greater than 3 mm, each instance.
	Deep Dehydration	An excessive loss of moisture from the surface of the sample unit, which shows clearly on the surface and cannot be easily removed by scraping. Each instance greater than 5 cm ^{2}

Thawed state	Skin and black membranes (does not include sub-cutaneous layer silver lining)	Skinless fillet. Each piece greater than 3 cm^2
	Black membrane or belly-lining (does result in coating damage during cooking)	Skin-on fillet. Each instance greater than 3 cm^2 (not including white membrane)
	Scales (attached to skin) Readily noticeable loose scales	Skin-on fillet – scaled. Each area of scale greater than 3 $cm^{2.}$ Skinless fillet. More than 5 loose scales except in the case of hake fillets, 10
	Blood clots (spots)	Any mass of lump of clotted blood. Each instance greater than 5 mm in diameter.
	Bruises and Discoloration	Diffused blood causing distinct reddish, brownish or other off-coloration. Any aggregate area of discoloration or bruising exceeding 3 cm^2
	Fins or part of fins	Two or more bones connected by a membrane, including internal or external bones, or both in a cluster. Any instance where a bone in the fin exceeds 40 mm in length
	Viscera	Any viscera. Each instance.
	Embedded packaging material	Each instance.

APPENDIX VI

OPTIONAL FINAL PRODUCT REQUIREMENTS - SALTED FISH

[PART 1, ALREADY ADOPTED, REST TO BE COMPLETED]

These products specifications describe the optional defects for salted fish. The descriptions of optional defects will assist buyers and sellers in describing those defect provisions. These descriptions are optional and are in addition to the essential requirements prescribed in the appropriate Codex product standards.

1. PRODUCT DESIGNATION OF SALTED FISH OF GADIDAE FAMILY

Reference is given to the *Codex Standard for salted fish and dried salted fish of the Gadidae family of fishes* (CODEX STAN 167-1989).

Products from the following species, all belonging to the Gadidae family, that have been bled, gutted, beheaded and split so that approximately two-thirds of the backbone is removed, washed and fully saturated with salt. Salted fish used for production of dried salted fish shall have reached 95-percent salt saturation prior to drying.

	English name	**Latin name**
	Cod	*Gadus morhua*
	Pacific cod	*Gadus macrocephalus*
	Polar cod	*Boreogadus saida*
	Greenland cod	*Gadus ogac*
	Saithe	*Pollachius virens*
	Ling	*Molva molva*
	Blue ling	*Molva dypterygia*
	Tusk	*Brosme brosme*
	Haddock	*Gadus aeglefinus / Melanogrammus aeglefinus*
	Forkbeard	*Phycis blennoides*
	Pollock	*Pollachius pollachius*

Note: the section above is already adopted and in CAC/RCP52-2003.

Quality classification

Imperial/superior

Fish products in this trade category are made from fish that is thoroughly bled, well washed and rinsed to remove remains of blood and entrails, and with nape skin attached.

The fish is to be properly split and evenly salted, well pressed and restacked during processing. The fish is to be light-coloured and firm, and without blemishes.

This category may include fish with the following characteristics:

1. poorly bled bellies
2. small tears or longitudinal cracks
3. not properly rinsed
4. some blood clots
5. somewhat unevenly salted

When assessing fish for this category, special consideration will be given to fish that has been thoroughly bled and properly restacked during production. In this case, somewhat larger defects will be tolerated if the overall impression justifies this, particularly if the fish is light-coloured and firm.

Universal

Fish that do not meet the requirements to Imperial/Superior are to be classified as Universal.

This trade category may include fish with the following characteristics:

1. inadequately split

2. round tail
3. inadequately washed or rinsed
4. insufficient removal of backbone
5. moderate blood clot
6. major tears or longitudinal cracks
7. moderate cracking
8. minor blood, liver and/or bile stains

The fish must retain its natural shape. Disfiguring blemishes such as stains/lumps of dried blood or remains of entrails shall be removed.

Popular

Fish that does not satisfy the requirements to Universal, but which nevertheless is fit for human consumption is to be categorised as Popular. However, this trade category must not contain fish that is sour, has been exposed to contamination, has ragged bellies, bile or gut content, fish that is badly cracked/loose fleshed or visibly affected with red halophilic bacteria (pink) or heavily infested halophilic mould (dun).

2. Product designation of ….

APPENDIX VIII

OPTIONAL FINAL PRODUCT REQUIREMENTS – LOBSTERS AND CRABS (TO BE COMPLETED)

The following definitions are recommendations for use by purchasers or sellers of lobsters in designing specifications for final product. These specifications are optional and are in addition to the essential requirements prescribed in the appropriate Codex Product Standard.

Quick Frozen Lobsters

Defect	**Recommended Defect Description**
a)Appearance	(i) Not easily separated without thawing when labelled as individually quick frozen.
	(ii) Colour not generally uniform and non characteristic of the product, species and habitat or areas from which harvested
	(iii) In the case of products in the shell, the shell is not firm and is broken
b) Damaged	Broken telson, cuts or scars penetrating the shell, crushed or cracked shell.
c) Soft Shell	The shell is easily flexed by hand.
d) Opacity	The raw meat is not characteristically translucent. (% affected by weight)
e) Texture	The meat of lobster, rock lobsters, spiny lobsters and slipper lobsters is tough, fibrous, mushy or gelatinous. (% affected by weight).

APPENDIX IX

OPTIONAL FINAL PRODUCT REQUIREMENTS - SHRIMPS & PRAWNS

A. FROZEN AND IQF PEEL AND DE-VEIN SHRIMPS OR PRAWN

QUALITY FACTOR

Determination of Grade

The grade should be determined by examining the product in the frozen, thawed and cooked states, using the table of deduction:

100 to 90 **First quality**

89 to 80 **Second quality**

Flavour:	Characteristic, without unpleasant flavours.
Frozen:	Means the product with a thermal centre of maximum temperature of -18° C (0° F)
Odour:	Characteristic. Yodoform odour isn't considered a defect.
Dehydration:	The shell and/or meat of the shrimps or prawns have parts that affect appearance, texture and flavour.
Texture:	Texture should be firm, but tender and moist. Slight: fairly firm, only slightly tough or rubbery, does not form a fibrous mass in the mouth, moist but not mushy. Moderate: moderately tough or rubbery, has noticeable tendency to form a fibrous mass in the mouth, moist but not mushy. Excessive: excessively tough or rubbery, has marked tendency to form a fibrous mass in the mouth, or is very dry or very mushy.
Black spots:	The shell and/or meat of the shrimps or prawns should be absent of black spots that affect the appearance.
Broken:	Shrimps with a broken part bigger than ¾ of the size.
Piece:	Part of shrimps or prawns, minimal ¼ of the size.
Extraneous material:	All the material present in the pack that isn't part of shrimps or prawn and is not dangerous.
Uniformity of size:	Select by count 10 of the largest shrimps or prawns, and 10 of the smallest shrimps or prawns and divide the largest weight by the smallest weight to get a weight ratio.

Evaluation of flavour and odour:

For the evaluation of odour hold the shrimps or prawns close to the nose for evaluation. If the results of the raw odour evaluation indicate the existence of any off-odours, the sample shall be cooked to verify the flavour and odour.

Steam method:

Put the sample in a plastic bag, and place on a wire rack suspended over boiling water in a covered container. Steam the packaged product for 5 to 10 minutes.

Examination for physical defects:

Each of the shrimps or prawns in the sample should be examined for defects using the list of defect definitions.

Schedule of Point Deductions per Sample

Type of Product	Factor scored	Method of determining score	Deduct
Frozen State	Dehydration	Up to 5% From 5.1% to 10% More than 10% More than 15%	0 3 6 11
Thaw State	Black spot only in shell	Absence Up to 5% Each 4% additional or less	0 1.5 2
	Black spot in meat	Absence Up to 3% From 3.1% to 5% Each 5% additional or less	0 1 2 2
	Broken, damaged and pieces	Up to 1% From 1.1% to 3% Each 3% additional or less	1 2.5 2.5
	Dehydration	Absence Up to 2% From 2.1 to 5% More than 5%	0 3 6 11
	Dehydration in meat	Absence Slight Moderate Excessive	0 3 6 11
	Heads and unacceptable shrimps or prawns	Up to 1% Each 1% additional or less	2 3
	Extraneous material, not dangerous	1 piece 2 pieces More than 2 pieces Sand	1 2 4 21
	Uniformity of size	Slightly larger or smaller. Each 3% or fraction. Larger or smaller. Each 3% or fraction.	1 2
	Odour	Characteristic. Slightly different to characteristic. Moderately different to characteristic. Excessively different to characteristic.	0 6 12 21
	Inappropriate peel and de-vein	Absence Over 1%; not over 6% Over 6.1%; not over 10% More than 10%	0 1 2 4
	Shells	Up to 3% Each 1% additional or less	0 2
Cooked State	Texture	Firm, but tender and moist Slight Moderate Excessive	0 2 4 21
	Odour	Characteristic Slight Unpleasant	 0 21

B. BREADED SHRIMPS OR PRAWNS

QUALITY FACTOR

Determination of Grade

The grade should be determined by examining the product in the frozen and cooked states, using the table of deduction:

100 to 85 First quality

84 to 75 Second quality

Schedule of Point Deductions per Sample:

Type of Product	Factor scored		Method of determining score	Deduct
Frozen State	Broken		Break or cut greater than ¾ of the size	15
	Uniformity of size		Over 1.0; not over 1.35 Over 1.36; not over 1.40 Over 1.41; not over 1.45 Over 1.46; not over 1.50 Over 1.51; not over 1.55 Over 1.56; not over 1.60 Over 1.61; not over 1.65 Over 1.65	0 1 1.5 2 2.5 3.0 3.5 4
	Easy of separation		Slight: Hand separation difficult. Each affected. Moderate: Separated with knife. Each affected.	1 2
Cook State	Black spot in meat		Absence Up to 5% Each 4% additional or less	0 1.5 2
	Coating defects		Absence Up to 3% From 3.1% to 5% Each 5% additional or less	0 1 2 2
	Texture	Shrimp flesh	Firm, but tender and moist Slight Moderate Excessive	0 2 4 15
		Coating	Moderately dry, soggy or tough Mealy, pasty, very tough	5 15

APPENDIX XI

OPTIONAL FINAL PRODUCT REQUIREMENTS - CANNED FISH

The following definitions are recommendations for use by purchasers or sellers of canned fish in designing specifications for final product. These specifications are optional and are in addition to the essential requirements prescribed in the appropriate Codex Product Standards.

1. Canned finfish

Defects	**Recommended Defect Description**
a) Drained or Washed Drained Weight	The drained weight of fish (liquid pack), or the washed drained weight of fish (sauce packs) shall be not less than the following % (m/m) of water capacity of the can when packed in : (i) edible oil 70% (ii) own juice ; brine or water ; marinade ; aspic 60% (iii) sauces, also with other packing media added 50%
Exuded water (oil packs only)	Water content (expressed as % of declared net contents of can). (i) fish packed in oil > 8% (ii) fish packed in oil with own juice > 12%
Separation of sauces	Sauce separated into solid and liquid (except oil)
b) Appearance	The product in a can shall comprise fish of an appearance and colour characteristic of the genus processed and packed in the manner indicated.
Dressed Fish and Cutlets in Various Packing Media	Cutting, Trimming and Evisceration (i) Parts of tail (except for small fish) and/or head (ii) Hard scutes (jack mackerel) (iii) More than one fish with feed except for small fish and cutlets in the belly uncut. Excessive amount of viscera (one or more fish not eviscerated). Non characteristic pieces (i) Each additional small piece (ii) Over 10% of flake or further disintegrated fish flesh, skin, bone or fin fragments.
Fillets, Bits, and Flakes in Various Packing Media	Cutting and Trimming Parts of head, tail, viscera or scutes each instance. Skin (fillets labelled skinless) - Each instance greater than 3 cm^2 Black Membrane - Each instance greater than 5 cm^2 Non characteristic pieces (fillets and pieces only) Flake or further disintegrated fish flesh clearly separated from fillets or pieces of fillets (expressed as % of drained fish solids material)
Discoloration, packing media	The packing medium not of normal colour and consistency for the type of pack.
Fill of Container	A can, not well filled with fish and packing media not in accordance with the type of pack.

2. Canned sardines and sardine-type products

Defects	Recommended Defect Description
a) Appearance	The fish in the container : (i) are not reasonably uniform in size ; (ii) are not of an appearance or colour characteristic of the species processed or packed in the manner indicated ; (iii) are not neatly cut to remove the head ; (iv) have excessive ventral breaks (unsightly rupture of the ventral area), or breaks and cracks in the flesh. (v) More than 40% of fish in a can having ventral breaks of half the length or more of the abdominal cavity (vi) The packing medium is not of normal colour and consistency for the type. (vii) The can is not well filled with fish.
b) Exuded water (oil packs only)	Water content expressed as % of net contents of can

3. Canned tuna and bonito

No optional defects have been developed for this product.

4. Canned salmon

Defect	**Recommended Defect Description**
a) Appearance	(i) The can is not well filled with fish.
(i) Cross fill (ii) Ragged appearance	(ii) In the case of regular packs, the sections of fish are not arranged so that the cut surfaces are approximately parallel to the opened end and the skin side is not parallel to the walls of the can. Regular packs are not reasonably free from cross packs and pieces or sections of vertebrae across the top of the can.
	(iii) The oil and liquid released during processing are not normal and characteristic of the species packed.
b) Bones	Hard bone
c) Colour of Flesh	Fish having the appearance and colour of the following : (i) Mixed colours in a single can (ii) Abnormal pale colour for the species (iii) Belly burn
d) Bruising and Blood Spots	Presence of bruising or blood spots expressed as a % of the net content of the can.

5. Canned crab meat

Defect	**Recommended Defect Description**
Appearance	On opening the cans are not well filled and are not well arranged where appropriate for the style of presentation.

6. Canned shrimps or prawns

No optional defects have been developed for this product.

ANNEX 2

GENERAL GUIDANCE FOR THE PROVISION OF COMMENTS

In order to facilitate the compilation and prepare a more useful comments' document, Members and Observers, which are not yet doing so, are requested to provide their comments under the following headings:

(i) General Comments

(ii) Specific Comments

Specific comments should include a reference to the relevant section and/or paragraph of the document that the comments refer to.

When changes are proposed to specific paragraphs, Members and Observers are requested to provide their proposal for amendments accompanied by the related rationale. New texts should be presented in underlined/**bold** font and deletion in ~~strikethrough font~~.

In order to facilitate the work of the Secretariats to compile comments, Members and Observers are requested to refrain from using colour font/shading as documents are printed in black and white and from using track change mode, which might be lost when comments are copied/pasted into a consolidated document.

In order to reduce the translation work and save paper, Members and Observers are requested not to reproduce the complete document but only those parts of the texts for which any change and/or amendments is proposed.