

## 1 Scope

This standard applies to fresh-chilled, fresh-frozen and treated tuna, of Scombroidea family, for human consumption or further processing.

Tuna products could be obtained from the following species listed in Annex A.

## 2 References

The titles of the standards and publications referred to in this standard are listed on the back cover.

## 3 Definition of terms

For the purpose of the standard, the following terms shall mean:

**3.1 Chilling** refers to the process of cooling fish to a temperature approaching that of melting ice.

**3.2 Clean seawater** refers to seawater which meets the same microbiological standards as potable water, and is free from objectionable odor and substances.

**3.3 Contaminant** refers to any biological or chemical agent, foreign matter, or other substances not intentionally added to the food, which may compromise food safety or its suitability.

**3.4 Dressed tuna** refers to the portion of fish remaining after be-heading, gutting and fins trimmed. Also referred to as Headless, Gutted and Tailless (HGT).

**3.5 Fresh fish** refers to fish or fishery products that have received no preserving treatment other than chilling.

**3.6 Frozen fish** refers to fish that have been subjected to a freezing process sufficient to reduce the temperature of the whole product to a level low enough to preserve the inherent quality of the fish, and that have been maintained at this low temperature.

**3.7 Glazing** refers to the application of a protective layer of ice formed at the surface of a frozen product by spraying it with, or dipping it into, clean seawater, potable water or potable water with approved additives, as appropriate.

**3.8 Tuna loin** refers to longitudinal quarter of the great lateral muscle freed from skin, scales, visible blood clots, bones, gills, viscera and from the non-striated part of such muscle, which part (known automatically as the median superficial muscle) is highly vascular in structure, dark in color because of retained blood, and granular in form.

**3.9 Potable water** refers to water suitable (both health and acceptability considerations) for drinking and cooking purposes.

## 4 Description

### 4.1 Product description

The products are fresh-chilled, fresh-frozen and treated tuna prepared and presented either in these following forms:

- a) whole round;
- b) whole gilled and gutted (GG);
- c) dressed; and
- d) choice cuts as:
  - belly meat (only the belly is cut off in a diamond shape);
  - blocks or loins (each fillet cut further into dorsal and ventral parts); and
  - small blocks (ready to be sold in supermarkets as cubes, crazy cuts and steaks).

### 4.2 Process description

Properly caught and killed tuna are bled; prepared into forms as defined in Section 4.1; and subjected to any of the processing methods described below.

#### 4.2.1 Fresh-chilled

Rapid cooling and chilling should be applied to fish throughout the handling process.

- a) The whole round; whole gilled and gutted (GG); and dressed tuna are chilled in clean seawater ice-slurry, and stored in ice maintained at 0°C to 4°C.
- b) Other tuna product forms are subjected to immediate chilling temperature of 0°C to 4°C using other appropriate methods (e.g. direct icing and other forms of refrigeration).

#### 4.2.2 Fresh-frozen

All tuna product forms are immediately frozen to a core temperature of -30°C or lower using appropriate freezing methods, and followed by storage at -18°C or lower.

#### 4.2.3 Treated tuna

- a) Filtered smoke – the smoke is generated and the distillate collected. The distillate is then injected or flashed to the tuna meat to fix the bright red color of the meat.
- b) Carbon monoxide (CO) treated – CO gas is either injected or flashed for color retention of the meat.

1 **5. Essential composition and quality factors**

2  
3 **5.1 Basic ingredients**

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5 **5.1.1 Raw material (Tuna)**

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7 The product shall be prepared from sound tuna which are of a quality fit to be sold as fresh for  
8 human consumption.

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10 **5.1.2 Water**

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12 Water for washing, cleaning, glazing and cooling shall be potable as defined in Section 3.9.

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14 **5.2 Final product**

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16 5.2.1 The final product shall meet the requirements of this standard when lots examined in  
17 accordance with Section 12 and comply with the provisions set out in Section 11. Products  
18 shall be examined by the methods given in Section 10.

19  
20 5.2.2 The final product shall not have more than 50 ppm of histamine, based on the average  
21 of the sample unit tested.

22  
23 5.2.3 The final product shall have meat color and condition scores of 50 to 30 as described  
24 in Annex B.

25  
26 5.2.4 The final product shall conform to the following microbiological quality requirements  
27 in Table 1:

28  
29 **Table 1 – Microbiological quality requirements**

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Test/Microorganism	n	C	m	M
1. APC/SPC, cfu/g*	5	3	5x10 <sup>5</sup>	10 <sup>7</sup>
2. <i>E. coli</i> , MPN/g*	5	2	11	500
3. <i>Salmonella</i> /25g*	5	0	0	-
4. <i>Shigella</i> **	5	0	0	-
5. <i>Staphylococcus aureus</i> (coagulase +), cfu/g*	5	2	10 <sup>3</sup>	10 <sup>4</sup>
6. <i>Vibrio cholera</i> **	5	0	0	-
7. <i>V. parahaemolyticus</i> , cfu/g*	5	2	10 <sup>2</sup>	10 <sup>3</sup>
8. <i>Listeria monocytogenes</i>	5	0	0	-

31  
32 Legend:

33 **n** -number of sample units selected from a lot of food to be examined

34 **m** -acceptable level of microorganism determined by a specified method; the values are generally based  
35 on levels that are achievable under GMP

36 **M** -level which when exceeded in one or more samples would cause the lot to be rejected as this  
37 indicates potential health hazard or imminent spoilage

38 **c** -maximum allowable number of defective or marginally acceptable units

## 6 Food additives

Food additives when used shall be in accordance with the regulations as prescribed by the Food and Drug Administration (FDA) or based on the Codex General Standard for Food Additives (CODEX STAN 192-1995).

## 7 Contaminants

The products shall comply with the maximum level of contaminants as specified in Annex C.

## 8 Hygiene and handling

The products shall be prepared and processed under hygienic conditions in accordance with the Revised Guidelines on Current Good Manufacturing Practice in Manufacturing, Packing, Repacking, or Holding Food (DOH AO No. 153 s. 2004) and its future amendments, the ASEAN-CANADA Fisheries Post-Harvest Technology Project – Phase II: Improved Quality Control for Handling and Processing of Fresh and Frozen Tuna At Sea and On Shore, and the following Codex Recommended Codes of Practice (CAC/RCP):

- a) General Principles of Food Hygiene (CAC/RCP 1-1969); and
- b) Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003).

## 9 Packaging and labeling

### 9.1 Packaging

The product shall be packaged in appropriate food grade containers. Packaging can be done individually or in bulk. No instance should mixed species be packed in bulk.

All cartons for the shipping of either fresh or frozen tuna must be new, clean, and sound.

### 9.2 Labeling

The product shall be labeled according to the provisions of the Codex General Standard for the Labeling of Prepackaged Foods (CODEX STAN 1-1985), the Rules and Regulations Governing the Labeling of Prepackaged Food Products Distributed in the Philippines (DOH-BFAD/FDA Administrative Order No. 88-B series of 1984) and its future amendments.

#### 9.2.1 Retail package/container (for choice cuts)

Each retail product package shall be labeled and marked with the following information:

- a) The name of the product shall be “Fresh-chilled” or “Fresh-frozen” and the corresponding English or common/local name with its scientific name in parenthesis, e.g. Fresh-chilled Yellowfin Tuna (*Thunnus albacares*) or Fresh-frozen “Bariles” (*Thunnus albacares*). The products may be labeled with the following forms as presented in Section 4.1. The products may be called by other common/local names provided that such names are accepted in the country of distribution;

1       **If treated, then the label should contain the words “filtered smoke treated tuna”**  
2       **or “CO treated tuna” that can be conspicuously displayed in front of the package.**

- 3       b) The net content by weight in the metric system (grams or kilograms) and/or number of  
4       pieces. The net weight based on other systems of measurement required by importing  
5       countries shall appear in parenthesis after the metric net weight. Where the product has  
6       been glazed, the declaration of net contents of the product shall be exclusive of the  
7       glaze.
- 8       c) The label shall state that the product must be stored under conditions to maintain the  
9       best quality during transport, storage and distribution (e.g. keep frozen, keep chilled,  
10      store at temperature not exceeding 4<sup>0</sup>C if chilled or -18<sup>0</sup>C if frozen);
- 11      d) The name and address of either of the following: manufacturer, packer, distributor,  
12      importer, exporter or vendor;
- 13      e) The lot identification code/number;
- 14      f) The words “Product of the Philippines” or the country of origin if imported; and
- 15      g) The pictorial presentation (optional). Pictorial presentation of the product on the label  
16      should not mislead the consumer with respect to the product so illustrated

#### 17 18   9.2.2   **Non-retail container**

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

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

### 27 28   **10       Methods of sampling, examination and analysis**

#### 29 30   **10.1     Method of sampling**

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32   Sampling of lots for examination of the final product shall be in accordance with the General  
33   Guidelines on Sampling (CAC/GL 50-2004). A sample unit is the individually packed product  
34   or a 1kg portion from bulk containers.

#### 35   **10.2     Method of sensory and physical examinations**

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37   Samples taken for sensory and physical examination shall be assessed by persons trained in  
38   such examination using the Guidelines for the Sensory Evaluation of Fish and Shellfish in  
39   Laboratories (CAC/GL 31-1999).

#### 40 41   **10.3     Methods of analysis**

##### 42 43   **10.3.1   Determination of histamine**

44   According to the AOAC 977.13.

**10.3.2 Determination of heavy metals**

According to the Codex Recommended Methods of Analysis and Sampling (CODEX STAN 234-1999) or an equivalent analysis method.

**10.3.3 Determination of microorganisms in Table 1**

According to the procedure described by FDA Bacteriological Analytical Manual (BAM), published by AOAC, 2001, 12th Edition or the latest edition or an equivalent analysis method.

**10.3.4 Determination of net weight****10.3.4.1 Determination of net weight of products 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.

**10.3.4.2 Determination of net weight of products covered by glaze**

As soon as the package is removed from low temperature storage, open immediately and place the contents under a gentle spray of cold water. Agitate carefully so that the product is not broken. Spray 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 in a tare pan.

**10.3.5 Procedure for the detection of parasites (Type 1 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.

**10.3.6 Thawing****10.3.6.1 Air thaw method**

Frozen fish are removed from the packaging. The frozen fish 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 sealed in plastic bags are placed on individual trays and thawed at air temperature of 25<sup>0</sup>C or lower. Thawing is completed when the product can be readily separated without tearing. Internal fish temperature should not exceed 7<sup>0</sup>C.

**10.3.6.2 Water immersion method**

Frozen fish are removed from the packaging. The frozen fish are sealed in plastic bags. Remove as much air as possible from the bags and seal. The frozen fish are placed into a circulating water bath with temperatures maintained at 21<sup>0</sup>C + 1.5<sup>0</sup>C. Thawing is completed when the product can be easily separated without tearing. Internal fish temperature should not exceed 7<sup>0</sup>C.

**10.3.6.3 Other methods as appropriate.****11 Definition of defectives**

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

**11.1 Freezer burn**

More than 10% of the declared weight of the frozen whole or choice cut tuna is affected by dehydration evident in more than 10% of the surface area.

**11.2 Foreign matter**

The presence in the sample unit of any matter which has not been derived from tuna (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.

**11.3 Odor**

Presence of distinct objectionable odor indicative of decomposition.

**11.4 Color**

Discoloration characterized by fading (“*yaki*”), greening or darkening of the characteristic color of the product (rainbow color).

**11.5 Texture**

Textural breakdown of the flesh, characterized by softening muscle structure.

**11.6 Parasites**

Presence of parasites or parasitic infestation (pinholes) in the tuna meat.

**12 Lot of acceptance**

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

- a) the total number of defective sample units as classified according to Section 11 does not exceed the acceptance number (c) of the appropriate sampling plan (AQL-6.5);
- b) the average net weight of all sample units is not less than the declared weight, provided there is no unreasonable shortage in any individual container; and
- c) the essential composition and quality factors, food additives, contaminants, hygiene and handling, and labeling requirements of Sections 5, 6, 7, 8 and 9, respectively, are met.

## Annex A

Table 2 – Major tuna species in the Philippines

Scientific name	English name	Local name
<i>Thunnus obesus</i> *	Big eye tuna	Bariles/Tambakol
<i>Thunnus albacares</i>	Yellowfin tuna	Bariles/Tambakol
<i>Thunnus orientalis</i>	Pacific Bluefin tuna	Bariles/Tambakol
<i>Thunnus tonggol</i>	Longtail tuna	Tambakol
<i>Thunnus alalunga</i>	Albacore tuna	Tambakol
<i>Gymnosarda unicolor</i>	Dogtooth tuna	Tambakol
<i>Katsuwonus pelamis</i>	Skipjack tuna	Gulyasan
<i>Euthynnus affinis</i>	Eastern little tuna	Katsorita/Kawa-kawa
<i>Sarda orientalis</i>	Striped bonito	Tambakol
<i>Auxis rochei</i>	Bullet tuna	Tulingan, aloy
<i>Auxis thazard</i>	Frigate tuna	Tulingan
<i>*The catching of this species needs approval of the Bureau of Fisheries and Aquatic Resources (BFAR).</i>		



Annex B

Table 3 – Point score system for grading tuna

<b>A. Color scores</b>
<b>1. Very good (50)</b> a. Meat is translucent, glossy. b. Colors are bright red (reddish). c. Fat is clearly visible.
<b>2. Good (40)</b> a. Meat is little translucent, and less glossy. b. Colors are less bright red (reddish). c. Fat just visible in outer layers.
<b>3. Medium (30)</b> a. Meat is translucent, and has lost its gloss. b. Colors are a little dull, may appear a little brownish. c. No fat visible in outer layers.
<b>4. Poor (20)</b> a. The meat is almost opaque, no gloss. b. The color of the meat is distinctively brownish, and dull. c. There is no visible fat in the outer layers; the meat is the same color throughout.
<b>5. Very poor (10)</b> a. The meat is opaque. b. The color of the meat is brown, whitish or grey. c. No fat visible in the outer layers.
NOTE: The natural color of tuna is affected by many factors. The most important one being the freshness, fat content, and time of exposure to the air. Freshly cut surface of tuna meat are dark, and become bright red as the tissues take up oxygen. It is important to remember this factor when grading, you must wait 30 minutes after the notches are cut.

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## Annex B (Cont...)

**B. Condition scores****1. Very good (50)**

- a. No apparent defects/damage (no rips, tears, cuts and abrasions).
- b. Scales intact.
- c. Fish looks as though it has just been lifted from the water, natural body colors bright.
- d. Flesh at notch very firm, springs back quickly on pressing lightly with fingertips. No soft spots present on carcass surface.

**2. Good (40)**

- a. Slight defects/damage; there are a few minor rips, tears, cuts, and abrasions.
- b. Some scales loss.
- c. Body colors are little dull.
- d. Flesh at notch springs back slowly on pressing lightly with fingertips. One or two very small soft spots present on carcass surface.

**3. Medium (30)**

- a. Noticeable defects/damage; a maximum of two rips, tears, cuts, abrasions which could affect the meat yield.
- b. Small patches of scales lost.
- c. Body colors dull/dark.
- d. Flesh at notch less firm, does not spring back fully on pressing lightly with fingertips. Several small spots present on carcass surface.

**4. Poor (20)**

- a. More than two rips, tears, cuts or abrasions, which could affect the meat yield.
- b. Large patches of scales lost.
- c. Body colors dark.
- d. Bleaching, red staining very apparent.
- e. Flesh at notch soft, does not spring back at all on pressing lightly with fingertips. Large soft areas on carcass surface.

**5. Very poor (10)**

- a. Severe body damage, distortion.
- b. Severe scale loss.
- c. Body colors dark.
- d. Severe bleaching, staining.
- e. Flesh at notch very soft, falling apart. Carcass surface breaking up.
- f. Meat has evidence of parasites or disease.

NOTE: Condition has two aspects: carcass and flesh condition. Carcass condition is assessed in terms of damage of the exterior damage to the skin; for example rips, cuts and tears. Flesh condition is done by assessing the meat at the tail cut to see if there is gaping, parasites and disease, and also along the exterior surface of the carcass damage which can be felt with the fingers. Bruising is one example.

Source:

Wiryanti J., Glynn G. and Limpus L., 1997. *Improved Quality Control for Handling and Processing of Fresh and Frozen Tuna At Sea and On Shore. ASEAN-CANADA Fisheries Post-Harvest Technology Project – Phase II, p.134-137*

## Annex C

Table 4 – Acceptable levels of heavy metals in fish

Heavy metal	Maximum level
Lead	0.3 ppm (0.3 mg/kg) <sup>1</sup>
Cadmium	0.1 ppm (0.1 mg/kg) <sup>2</sup>
Mercury	1 ppm (1 mg/kg) <sup>1</sup>

*Sources:*

1 CODEX STAN 193-1995 (Codex General Standard for Contaminants and Toxins in Food and Feed)

2 COMMISSION REGULATION (EC) No 1881/2006 (Maximum levels for certain contaminants in foodstuffs)

## References

The following referenced documents are indispensable for the application 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.

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CODEX STAN 234-1999, Rev.2-2007, Amend.2-2011. Codex Recommended Methods of Analysis and Sampling. Codex Alimentarius Commission. Food and Agriculture Organization/World Health Organization. Rome, Italy. ([www.codexalimentarius.org](http://www.codexalimentarius.org))

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DOH-FDA Circular No. 2013-010, dated February 27, 2013. Revised Guidelines for the Assessment of Microbiological Quality of Processed Foods, Table 11. Fish and Fish Products: Fresh Frozen Fish. Food and Drug Administration. Department of Health. Alabang, Muntinlupa City, Philippines. ([www.fda.gov.ph](http://www.fda.gov.ph))

DOH Administrative Order No. 2007-0012. Philippine National Standard for Drinking Water 2007. Department of Health. Philippines.

EC No. 1881/2006, Commission Regulation. Official Journal of European Union. December 20, 2006.

Miyake, M.; Guillotreau, P.; Sun, C-H; Ishimura, G. Recent developments in the tuna industry: stocks, fisheries, management, processing, trade and markets. *FAO Fisheries and Aquaculture Technical Paper*. No.543. Rome, FAO. 2010. 125p.

Blanc, Michel et al. Onboard Handling of Sashimi-Grade Tuna : A Practical Guide for Crew Members / Michel Blanc ; Aymeric Desurmont ; Steve Beverly – Revised Edition – Noumea, New Caledonia: Secretariat of the Pacific Community, 2005.

Title 21 – Food and Drugs, Code of Federal Regulation. Food and Drug Administration. Department of Health and Human Services. USA. 2012

<http://www.fao.org/fi/glossary/default.asp>. (Accessed on February 13, 2014)