

## 1 Scope

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3 This standard applies to fresh and frozen cephalopods of the following families: Loliginidae,  
4 Sepiidae and Octopodidae for consumption after cooking or further processing.

## 6 2 References

7  
8 The titles of the standards and publications referred to in this Standard are listed on the back  
9 cover.

## 11 3 Definition of terms

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

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15 **3.1 Arm** refers to one of the circumoral appendages of cephalopods. Arms are designated  
16 by the numbers I to IV, starting with I as the dorsal (or upper) pair.

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18 **3.2 Cephalopods** refer to animals with tentacles converging at the head, and around the  
19 mouth. For the purpose of this Standard, these include species of squids, cuttlefishes and  
20 octopuses.

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22 **3.3 Chilling** refers to the process of cooling cephalopods to a temperature approaching  
23 that of melting ice.

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25 **3.4 Circumoral appendages** refer to the 8 arms plus the 2 tentacles of squids/cuttlefishes.  
26 All arise from the head and encircle the mouth.

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28 **3.5 Fresh cephalopods** refer to cephalopods that are newly caught or harvested, properly  
29 handled and chilled.

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31 **3.6 Contaminant** refers to any biological or chemical agent, foreign matter, or other  
32 substances not intentionally added to the food, which may compromise food safety or its  
33 suitability.

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35 **3.7 Frozen cephalopods** refer to cephalopods that have been subjected to a freezing  
36 process sufficient to reduce the temperature of the whole product to a level low enough to  
37 preserve the inherent quality of the cephalopods and that have been maintained at this low  
38 temperature.

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40 **3.8 Gladius or pen** refers to the feather or rod-shaped chitinous supporting structure in the  
41 dorsal midline of squids.

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43 **3.9 Glazing** refers to the application of a protective layer of ice formed at the surface of a  
44 frozen product by spraying it with, or dipping it into potable water or potable water with  
45 approved additives, as appropriate.

46  
47 **3.10 Potable water** refers to water suitable (both health and acceptability considerations)  
48 for drinking and cooking purposes.

1 **3.11 Tentacles** refer to the modified fourth pair of appendages in squids/cuttlefishes, used  
2 for prey capture. The distal ends contain clubs with suckers and/or hooks; stalks frequently  
3 devoid of suckers.

#### 4 Description

##### 4.1 Product description

9 The products are fresh or frozen cephalopods consisting of, but not limited to, the following  
10 species listed in Annex A. The products for each species are prepared with the following types  
11 and forms as presented in Sections 4.1.1 and 4.1.2.

##### 4.1.1 Squid and cuttlefish

- 15 a) Whole round – squid/cuttlefish with complete organs.
- 16 b) Whole cleaned – squid/cuttlefish whether with attached or detached heads, fins (flaps)  
17 and skins; without eyes, beak and internal organs.
- 18 c) Tube – squid/cuttlefish without skin, internal organs, head and gladius/cuttlebone; with  
19 or without fins (flaps).
- 20 d) Fillet – squid/cuttlefish tube with a lateral cut along the body.
- 21 e) Head – squid/cuttlefish heads with or without tentacles and arms; eyes, beak and ink  
22 sac removed.
- 23 f) Tentacles and arms – squid/cuttlefish ten circumoral appendages only.
- 24 g) Fins (flaps) – squid/cuttlefish pair of muscular flaps that arise along the dorsolateral  
25 surface of the mantle; with or without skin.
- 26 h) Rings – cut along the muscular grain from the tube to produce rings of at least 5 mm  
27 thick.

##### 4.1.2 Octopus

- 31 a) Whole round – octopus with complete organs.
- 32 b) Octopus ink off – octopus with only the ink sac removed; with or without eyes and  
33 beak.
- 34 c) Octopus gutted – octopus with skin; without internal organs; with or without eyes and  
35 beak.

##### 4.2 Process description

39 4.2.1 Cephalopods should not be exposed to direct sunlight or to the drying effects of winds,  
40 or any other harmful effects of the elements, but should be carefully cleaned and cooled down  
41 to temperatures of 0°C to 4°C, as quickly as possible.

43 4.2.2 Cephalopods should be frozen immediately to prevent deterioration of the product and  
44 a resulting reduction in shelf-life caused by microbial growth and chemical reactions. The  
45 time/temperature parameters developed should ensure immediate freezing of product and  
46 should take into consideration the type of freezing equipment, capacity, the size and shape of  
47 the product, and production volume.

1 The quick freezing process shall not be regarded as complete unless and until the product  
2 temperature has reached  $-18^{\circ}\text{C}$  or lower at the thermal center after thermal stabilization. The  
3 product shall be kept deep frozen so as to maintain the quality during transportation, storage  
4 and distribution.

## 5. Essential composition and quality factors

### 5.1 Basic ingredients

#### 5.1.1 Raw material (cephalopods)

12 Only fresh cephalopods, as defined in Section 3.5, shall be used. Only octopus weighing 500  
13 grams and above shall be used.

#### 5.1.2 Water

17 Water for washing, cleaning, glazing and cooling shall be potable as defined in Section 3.10.

### 5.2 Optional ingredients

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

### 5.3 Final product

26 5.3.1 The final product shall meet the requirements of this standard when lots examined in  
27 accordance with Section 12 and comply with the provisions set out in Section 11. Products  
28 shall be examined by the methods given in Section 10.

30 5.3.2 The final product should have complete characteristics of its types and forms as  
31 described in Sections 4.1.1 and 4.1.2;

33 5.3.3 The final product should have the quality attributes described in Annex B.

35 5.3.4 The final product should have a moisture content of not more than 85%.

37 5.3.5 The final product shall conform to the following microbiological quality requirements  
38 in Table 1.

## 6 Food additives

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

## 7 Contaminants

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

Table 1 – Microbiological quality requirements

Test/Microorganism	n	c	M	M
1. APC/SPC, cfu/g	5	3	$5 \times 10^5$	$10^7$
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	$10^3$	$10^4$
6. <i>Vibrio cholera</i>	5	0	0	-
7. <i>V. parahaemolyticus</i> , cfu/g	5	2	$10^2$	$10^3$
8. <i>Listeria monocytogenes</i>	5	0	0	-

Legend:

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

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

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

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

## 8 Hygiene and handling

8.1 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: Development of Quality Standards for Handling and Grading of Cephalopods (Squid, Cuttlefish and Octopus), 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), section on cephalopods.

## 9 Packaging and labeling

### 9.1 Packaging

The product shall be packed in appropriate food grade containers. The individual retail or bulk container shall contain only one species.

### 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

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

- a) The name of the product shall be “fresh or frozen” and the corresponding English or common/local name, e.g. Fresh Squid/Cuttlefish/Octopus or Frozen *Pusit/Kulambutan/Pugita*. The products may be labeled with the following types and forms as presented in Sections 4.1.1 and 4.1.2. The products may be called by other common/local names provided that such names are accepted in the country of distribution;
- b) The net content by weight in the metric system (grams or kilograms) and/or number of pieces. The net weight based on other systems of measurement required by importing countries shall appear in parenthesis after the metric net weight;
- c) The label shall state that the product must be stored under conditions to maintain the best quality during transport, storage and distribution (e.g. keep frozen; keep chilled; store at temperature not exceeding 4<sup>0</sup>C if chilled or -18<sup>0</sup>C if frozen);
- d) The name and address of either of the following: manufacturer, packer, distributor, importer, exporter or vendor;
- e) The lot identification code/number;
- f) The words “Product of the Philippines” or the country of origin if imported; and
- g) The pictorial presentation (optional). Pictorial presentation of the product on the label should not mislead the consumer with respect to the product so illustrated.

### 9.2.2 Non-retail container

Information on the above provisions 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, the 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.

## 10 Methods of sampling, examination and analysis

### 10.1 Method of sampling

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

### 10.2 Method of sensory and physical examinations

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

### 10.3 Method of analysis

#### 10.3.1 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.

#### 10.3.2 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 moisture content

The moisture content shall be analyzed in accordance with the latest recommended AOAC Method or its 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°C or lower. Thawing is completed when the product can be readily separated without tearing. Internal fish temperature should not exceed 7°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°C + 1.5°C. Thawing is completed when the product can be easily separated without tearing. Internal fish temperature should not exceed 7°C.

1 10.3.6.3 Other methods as appropriate.  
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## 3 **11 Definition of defectives** 4

5 The sample unit shall be considered as defective when it exhibits any of the properties defined  
6 below.  
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### 8 **11.1 Freezer burn**

9 More than 10% of the declared weight of the frozen cephalopods is affected by dehydration  
10 evident in more than 10% of the surface area.  
11

### 12 **11.2 Foreign matter**

13 The presence in the sample unit of any matter which has not been derived from cephalopod  
14 (excluding packing material), does not pose a threat to human health, and is readily recognized  
15 without magnification or is present at a level determined by any method including  
16 magnification that indicates non-compliance with good manufacturing and sanitation  
17 practices.  
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### 19 **11.3 Odor**

20 Presence of persistent and distinct objectionable odor (ammoniacal, putrid, rancid, sour, etc)  
21 upon thawing.  
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### 23 **11.4 Texture**

24 Textural breakdown of the flesh, characterized by soft and mushy muscle structure.  
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## 26 **12 Lot of acceptance** 27

28 A lot shall be considered as meeting the requirements of this standard when:  
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- 30 a) the total number of defective sample units as classified according to Section 11 does  
31 not exceed the acceptance number (c) of the appropriate sampling plan (AQL-6.5);  
32 b) the average net weight of all sample units is not less than the declared weight, provided  
33 there is no unreasonable shortage in any individual container; and  
34 c) the essential composition and quality factors, food additives, contaminants, hygiene  
35 and handling, and labeling requirements of Sections 5, 6, 7,8 and 9, respectively, are  
36 met.  
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## Annex A

Table 2 – Cephalopods species in the Philippines

English name	Common name	Scientific name
1. Squid	Tagalog: <i>Pusit, Bankutan choko, Chokon glumot</i> Visaya: <i>Nocos, Locos</i> Ilocano: <i>Bomagto</i>	<i>Loliolus (Nipponloligo)sumatrensis</i> <i>Sepiotheutislessoniana</i> <i>Uroteuthis (Uroteuthis)bartschi</i> <i>Uroteuthis (Photololigo)edulis</i> <i>Uroteuthis (Photololigo)chinensis</i> <i>Uroteuthis (Photololigo)duvaucelii</i> <i>Uroteuthis (Photololigo)singhalensis</i> <i>Uroteuthis (Photololigo)vossi</i> <i>Uroteuthisreesi</i>
2. Cuttlefish	Tagalog: <i>Kulambutan, Bankuta</i> Visaya: <i>Bagolan,</i>	<i>Sepia pharaonis</i> <i>Sepia aculeata</i> <i>Sepia andreana</i>
3. Octopus	Tagalog: <i>Pugita</i> Visaya: <i>Kugita</i> Ilocano: <i>Curita</i>	<i>Octopus mebraneceous</i> <i>Octopus aegina</i> <i>Octopus cyaneus</i>

## Sources:

Development of Quality Standards for Handling and Grading of Cephalopods (Squid, Cuttlefish and Octopus).  
ASEAN-CANADA Fisheries, Post-Harvest Technology Project Phase II.

FAO 2010. FAO Species Catalogue for Fishery Purposes No. 4, Vol. 2.



## Annex B

Table 3—Quality attributes of cephalopods

	Squid	Cuttlefish	Octopus
1. Eyes	<ul style="list-style-type: none"> <li>firm, full, bright, not sunken</li> </ul>	<ul style="list-style-type: none"> <li>sheen characteristic present, translucent</li> <li>light gray brown, deep purple brown, yellowish orange</li> </ul>	<ul style="list-style-type: none"> <li>sheen bright, translucent to slightly dull, off-white</li> <li>brick red to light gray</li> </ul>
2. Exterior surface (Skin color)	<ul style="list-style-type: none"> <li>sheen characteristic present</li> <li>orange to purple</li> </ul>		<ul style="list-style-type: none"> <li>skin intact, no bruises</li> </ul>
3. Texture (Mantle)	<ul style="list-style-type: none"> <li>firm, rubbery, smooth and silky</li> </ul>	<ul style="list-style-type: none"> <li>firm smooth, silky, elastic</li> </ul>	<ul style="list-style-type: none"> <li>firm, rubbery and smooth</li> </ul>
4. Odor (Mantle)	<ul style="list-style-type: none"> <li>characteristic of the species</li> </ul>	<ul style="list-style-type: none"> <li>characteristic of the species</li> </ul>	<ul style="list-style-type: none"> <li>characteristic of the species</li> </ul>
5. Inside (Mantle)	<ul style="list-style-type: none"> <li>sheen characteristic present with no stain or discoloration</li> </ul>	<ul style="list-style-type: none"> <li>glossy, off-white, opaque with no stain of discoloration, mucus clear</li> </ul>	

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## Annex C

Table 4 – Acceptable levels of heavy metals in cephalopods

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)

## Annex D

## Guidelines on Pre-Cooling/Chilling of Cephalopods

Lower the temperature of the raw material as quickly as possible close to 0°C, to reduce the rate of spoilage.

Reason:

Pre-cooling the cephalopods after capture is necessary wherever possible on the vessel to prevent spoilage. The best method to pre-cool the catch is to use a chilled seawater (CSW) container. The cephalopods may be held in the CSW at 0°C for up to 5-8 hours, this will help the cephalopods to retain its glossiness and firmness. Occasionally stirring of the ice slurry is necessary to maintain uniformity of the water temperature in the CSW tank. The minimum mixture of ice to water to cephalopods is one part of ice, one part of water and one part of cephalopods.

Pre-chilling is the first important step to maintain its quality. Pre-cooling at 0°C on chilled seawater (CSW) is necessary to attain the glossiness and desired color.

Direct icing for squid and cuttlefish cannot be considered a suitable method of preservation and maintaining high quality. Although spoilage is retarded, the textural attributes and appearance is adversely affected such as tearing of the skin and bursting of ink sac, which causes extreme discoloration of the mantle and are the manifestations of poor quality.

Octopus (*O. algina*), in direct icing is excellent for 2 days. This is manifested by firm texture, glossiness and sheen of the skin and the color is characteristic of the fresh species e.g. orange-brown to grayish white and still acceptable until three days.

Source:

*Development of Quality Standards for Handling and Grading of Cephalopods (Squid, Cuttlefish and Octopus). ASEAN-CANADA Fisheries, Post-Harvest Technology Project Phase II.*

## Fresh and frozen cephalopods

Final Draft 03-18-2014

## 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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Ozalp, B. and Karakaya, M. 2009. Determination of Some Functional and Technological Properties of Octopus, Calamary, Mussel and Cuttlefish Meats. ([www.fisheriessciences.com](http://www.fisheriessciences.com))

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