

# CODEX ALIMENTARIUS

INTERNATIONAL FOOD STANDARDS



Food and Agriculture  
Organization of  
the United Nations



World Health  
Organization

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## STANDARD FOR TABLE OLIVES

CXS 66-1981

Adopted in 1981. Revised in 1987, 2013. Amended in 2022.

**2022 Amendment**

The following amendment was made to the text of the standard following decisions taken at the forty-fifth session of the Codex Alimentarius Commission in December 2022.

<b>Page</b>	<b>Location</b>	<b>Text in previous version</b>	<b>Text in amended version</b>
11	Section 8.2 Labelling of Non-Retail Containers	Information for non-retail containers 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, packer, distributor or importer, as well as storage instructions, shall appear on the container. However, lot identification, and the name and address of the manufacturer, packer, distributor or importer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.	The labelling of non-retail containers should be in accordance with the <i>General Standard for the Labelling of Non-Retail Containers of Foods</i> (CXS 346-2021).

## 1. SCOPE

This Standard applies to the fruit of the cultivated olive tree (*Olea europaea* L.), as defined in Section 2, which has been suitably treated or processed, and which is offered for direct consumption as table olives, including for catering purposes or olives packed in bulk containers which are intended for repacking into consumer size containers. It does not apply to the product when indicated as being intended for further processing.

## 2. DESCRIPTION

### 2.1 Product Definition

“Table olives” is the product:

- (a) prepared from the sound fruits of varieties of the cultivated olive tree (*Olea europaea* L.) having reached appropriate degree of development for processing that are chosen for their production of olives whose volume, shape, flesh-to-stone ratio, fine flesh, taste, firmness and ease of detachment from the stone make them particularly suitable for processing;
- (b) treated to remove its bitterness and preserved by natural fermentation, and/or by heat treatment, and/or by other means so as to prevent spoilage and to ensure product stability in appropriate storage conditions with or without the addition of preservatives;
- (c) packed with or without a suitable liquid packing medium in accordance with Section 3.1.3.

### 2.2 Product Designation

Table olives are classified in one of the following olive types and trade preparations / treatments.

#### 2.2.1 Types of Olives

Table olives are classified in one of the following types according to the degree of ripeness of the fresh fruits:

- (a) **Green olives:** Fruits harvested during the ripening period, prior to colouring and when they have reached normal size.
- (b) **Olives turning colour:** Fruits harvested before the stage of complete ripeness is attained, at colour change.
- (c) **Black olives:** Fruits harvested when fully ripe or slightly before full ripeness is reached.

#### 2.2.2 Trade Preparations

Olives shall undergo the following trade preparations and/or treatments:

- (a) **Treated olives:** Green olives, olives turning colour or black olives that have undergone alkaline treatment.
  - (a-1) Treated green olives;
  - (a-2) Treated olives turning colour;
  - (a-3) Treated black olives;
  - (a-4) Green ripe olives<sup>1</sup>.
- (b) **Natural olives:** Green olives, olives turning colour or black olives placed directly in brine in which they undergo complete or partial fermentation, preserved or not by the addition of acidifying agents:
  - (b-1) Natural green olives;
  - (b-2) Natural olives turning colour;
  - (b-3) Natural black olives.

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<sup>1</sup> Olives ranging in colour from yellowish green or other greenish cast which may be mottled. The olives are treated to remove bitterness, sufficiently processed by heat, in hermetically-sealed containers, are not oxidized and not treated with acidifying agents.

- (c) **Dehydrated and/or shrivelled olives:** Green olives, olives turning colour or black olives that have undergone or not mild alkaline treatment, preserved in brine or partially dehydrated in dry salt and/or by heating or by any other technological process:
- (c-1) Dehydrated and/or shrivelled green olives;
  - (c-2) Dehydrated and/or shrivelled olives turning colour;
  - (c-3) Dehydrated and/or shrivelled black olives.
- (d) **Olives darkened by oxidation:** Green olives or olives turning colour preserved in brine, fermented or not, and darkened by oxidation with or without alkaline medium. They shall be a uniform brown to black colour.
- Olives darkened by oxidation shall be preserved in hermetically sealed containers and subjected to heat sterilisation.
- (d-1) Black olives.
- (e) **Specialities:** Olives may be prepared by means distinct from, or additional to, those set forth above. Such specialities retain the name “olive” as long as the fruit used complies with the general definitions laid down in this Standard. The names used for these specialities shall be sufficiently explicit to prevent any confusion, in purchasers’ or consumers’ minds, as to the origin and nature of the products and, in particular, with respect to the designations laid down in this Standard.

### 2.3 Varietal Types

Any commercially cultivated variety (cultivar) suitable for processing.

### 2.4 Styles

Olives may be offered in one of the following styles:

#### 2.4.1 Whole Olives

- (a) **Whole olives:** Olives, with or without their stem, which have their natural shape and from which the stone (pit) has not been removed.
- (b) **Cracked olives:** Whole olives subjected to a process whereby the flesh is opened without breaking the stone (pit) which remains whole and intact inside the fruit.
- (c) **Split olives:** Whole olives that are split lengthwise by cutting into the skin and part of the flesh.

#### 2.4.2 Stoned (pitted) Olives

- (a) **Stoned (pitted) olives:** Olives from which the stone (pit) has been removed and which basically retain their natural shape.
- (b) **Halved olives:** Stoned (pitted) or stuffed olives sliced into two approximately equal parts, perpendicularly to the longitudinal axis of the fruit.
- (c) **Quartered olives:** Stoned (pitted) olives split into four approximately equal parts along and perpendicularly to the major axis of the fruit.
- (d) **Divided olives:** Stoned (pitted) olives cut lengthwise into more than four approximately equal parts.
- (e) **Sliced olives:** Stoned (pitted) or stuffed olives sliced into segments of fairly uniform thickness.
- (f) **Chopped or minced olives:** Small pieces of stoned (pitted) olives of no definite shape and practically devoid (no more than 5 per 100 of such units by weight) of identifiable stem-insertion units as well as of slice fragments.
- (g) **Broken olives:** Olives broken while being stoned (pitted) or stuffed. They may contain pieces of the stuffing material.

**2.4.3 Stuffed olives:** Stoned (pitted) olives stuffed either with one or more suitable products (pimiento, onion, almond, celery, anchovy, olive, orange or lemon peel, hazelnut, capers, etc.) or with edible pastes.

**2.4.4 Salad olives:** Whole broken or broken-and-stoned (pitted) olives with or without capers, plus stuffing material, where the olives are the most numerous compared with the entire product marketed in this style.

**2.4.5 Olives with capers or medley:** Whole or stoned (pitted) olives, usually small in size, with capers and with or without stuffing, packed with other edible pickled products such as pieces of onion, carrot, celery, pepper and other suitable ingredients, as defined by Section 3.1.2 where the olives are the most numerous compared with the entire product marketed in this style.

## 2.5 Other Styles

Any other presentation of the product should be permitted provided that the product:

- (a) is sufficiently distinctive from other forms of presentation laid down in the Standard;
- (b) meets all relevant requirements of the Standard, including requirements relating to limitations on defects, drained weight, and any other requirements which are applicable to that style which most closely resembles the style or styles intended to be provided for under this provision; and
- (c) is adequately described on the label to avoid confusing or misleading the consumer.

## 3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

### 3.1 Composition

#### 3.1.1 Basic Ingredients

Olives as defined in Sections 1 and 2, with or without liquid packing medium.

#### 3.1.2 Other Permitted Ingredients

Other ingredients may be used such as:

- (a) Water;
- (b) Food-grade salts as defined in *Standard for Food Grade Salt* (CXS 150-1985);
- (c) Vinegar;
- (d) Olive oil as defined in *Standard for Olive Oils and Olive Pomace Oil* (CXS 33-1981) or other edible vegetable oils as defined in *Standard for Named Vegetable Oils* (CXS 210-1999);
- (e) Sugars as defined by *Standard for Sugars* (CXS 212-1999) and/or other foodstuffs with sweetening properties such as honey (CXS 12-1981);
- (f) Any single or combination of edible material used as an accompaniment or stuffing such as, for example, pimiento, onion, almond, celery, anchovy, capers, or pastes thereof;
- (g) Spices and aromatic herbs or natural extracts thereof.

#### 3.1.3 Packing Media (packing brines)

This term applies to solutions of food grade salts as defined in *Standard for Food Grade Salt* dissolved in potable water, with or without the addition of all or some of the ingredients listed under Section 3.1.2.

Brine shall be clean, free from foreign matter, have characteristic colour flavour and odour and shall comply with the hygiene rules laid down in Section 6.

Fermented olives held in a packing medium may contain micro-organisms used for fermentation, notably lactic acid bacteria and yeasts.

Physico-chemical characteristics of the packing brine, or the juice from the pulp after osmotic balance, depending on the applied conservation treatment and according to Section 2.1 (b), shall be as follows:

**Table 1**

Type and preparation	Minimum sodium chloride content	Maximum pH limit
Treated olives	5.0%	4.3
Natural olives	6.0%	4.3
Pasteurized treated and natural olives	GMP	4.3
Dehydrated and/or shrivelled olives	8.0%	GMP
Darkened by oxidation with alkaline treatment and green ripe olives	GMP	GMP

GMP: Good manufacturing practice

Trade preparations of table olives not complying with the above physico–chemical characteristics should be appropriately processed to ensure that they comply with the general food safety recommendations as set out in Section 6.

The presence of propionic acid and its salts may be observed in table olive trade preparations that have undergone fermentation in conformity with good manufacturing practice.

### 3.2 Quality Factors

Table olives should have normal colour, flavour, odour and texture characteristic of the finished product.

The olives and brine shall be devoid of any microbiological deterioration and extraneous taste and smell caused by anomalous fermentation.

Table olives in whole, stoned (pitted) and stuffed styles shall comply with the minimum quality requirements in the second category in the Table 3 of Section 3.2.4. Other styles shall comply with Table 4 in Section 3.2.4.

#### 3.2.1 Trade Categories

Classification of table olives is optional; however, if classified, the following designations apply:

##### 3.2.1.1 “Extra” or “Fancy” or “A”

The high-quality olives endowed to the maximum extent with the characteristics specific to the variety and trade preparation are considered as belonging to this category. Notwithstanding, and providing this does not affect the overall favourable aspect or organoleptic characteristics of each fruit, they may have very slight colour, shape, flesh-firmness or skin defects.

Whole, split, stoned (pitted) and stuffed olives of appropriate varieties may be classified in this category.

##### 3.2.1.2 “First”, “1<sup>st</sup>”, “Choice” or “Select” or “B”

This category covers good quality olives with a suitable degree of ripeness and endowed with the characteristics specific to the variety and trade preparation. Providing this does not affect the overall favourable aspect or individual organoleptic characteristics of each fruit, they may have slight colour, shape, skin or flesh-firmness defects.

All the types, preparations and styles of table olives may be classified in this category, except for chopped or broken olives.

##### 3.2.1.3 “Second”, “2<sup>nd</sup>” or “Standard” or “C”

This category includes good quality olives which, although they cannot be classified in the two previous categories, comply with the general conditions defined for table olives under this section.

#### 3.2.2 Uniformity of Size

Table olives shall be uniform in size. If they are size-graded the following scale may be applied. Different scales or size designations may nevertheless be applied according to agreements between the parties concerned. The olives are size-graded by count of the number of fruits per kilogramme as in the table below.

**Table 2**

60/70	101/110	161/180	261/290
71/80	111/120	181/200	291/320
81/90	121/140	201/230	321/350
91/100	141/160	231/260	351/380
			381/410*

\*Above 410, the interval is 50 fruits.

Solely where stuffed olives are concerned, as from size 201/220 the interval is 20 fruits up to size 401/420.

Size-grading may be applied for olives in the whole, stoned (pitted) and stuffed styles.

In the case of stoned (pitted) olives or stuffed olives (after removing the stuffing), the size shown shall be the one corresponding to the original whole olive. For the purpose of checking, the number of stoned (pitted) olives in one kilogramme shall be multiplied by a coefficient set by each producing country.

Within each size as defined above, it is stipulated that after having removed from a sample of 100 olives, the olive having the largest horizontal diameter and the olive having the smallest horizontal diameter, the difference between the horizontal diameters of the remaining olives may not exceed 4 mm. Alternatively, the maximum permitted tolerance shall be

- 10% of over or under sizes for sizes with a 10 fruit interval;
- 5% of over or under sizes for sizes with a 20 fruit interval;
- 2% of over or under sizes for sizes with a 30 or more fruit interval.

### 3.2.3 Definitions of Defects

- (a) **Harmless extraneous material:** Any vegetable matter not injurious to health, nor aesthetically undesirable, for example leaves, separated stems, but not including substances the addition of which has been authorised in the Standard.
- (b) **Blemished fruit:** Olives with marks or stains on the skin that are more than 9 mm<sup>2</sup> in surface area and that may or may not penetrate through to the flesh which singly or in the aggregate, materially affect the appearance or eating quality of the olives.
- (c) **Mutilated fruit:** Olives damaged by tearing the epicarp affecting the flesh to such an extent that a portion of the mesocarp becomes visible.
- (d) **Broken fruit:** Olives damaged to such an extent as to affect their normal structure.
- (e) **Shrivelled fruit:** Olives that are so abnormally wrinkled as to affect their appearance. The slight superficial wrinkles displayed by certain trade preparations shall not be considered a defect.
- (f) **Abnormal texture:** Olives which are excessively or abnormally flabby or tough in comparison with the trade preparation in question and with the average of a representative sample of the lot.
- (g) **Abnormal colour:** Olives the colour of which is distinctly different from the characteristic colour of the trade preparation in question and from the average of a representative sample of the lot.
- (h) **Stems:** Stems attached to the olives and which measure more than 3 mm in length when measured from the shoulder of the olive. Not considered a defect in whole olives presented with stem attached.
- (i) **Defective stuffing:** Olives presented in the stuffed olive style which are totally or partly empty in comparison with the trade preparation in question and with the average of a representative sample of the lot.
- (j) **Stone (pit) or stone (pit) fragments (except for whole olives):** Whole stones (pits), or stone (pit) fragments measuring more than 2 mm along their longest axis.
- (k) **“Soft”** – Units lacking the firmness that is characteristic for a particular variety.
- (l) **“Excessively Soft”** – Units shall be considered excessively soft when the olives appear to be spongy or watery. Units that have the apparent shape of whole units, but appear to have disintegrated flesh and water texture shall be considered excessively soft. In addition, a unit shall be considered excessively soft if the pit can be felt when applying moderate pressure.

### 3.2.4 Defects and Allowances

The maximum defect tolerances for each trade category, for each type of olive are as follows:

Defect limits for **whole, stoned (pitted) or stuffed olives** are as follows:

**Table 3**

Trade preparations	Extra category			First category			Second category		
	Green olives a-1 and a-4	Olives darkened by oxidation d-1	Olives turning colour and black olives remaining trade preparations	Green olives a-1 and a-4	Olives darkened by oxidation d-1	Olives turning colour and black olives remaining trade preparations	Green olives a-1 and a-4	Olives darkened by oxidation d-1	Olives turning colour and black olives remaining trade preparations
<b>Only for Stoned (pitted) or stuffed olives</b>									
<u>Maximum tolerances as% of fruit:</u>									
Stones (pits) and/or stone (pit) fragments	1	1	2	1	1	2	1	1	2
Broken fruit	3	3	3	5	5	5	7	7	7
Defective stuffing									
– place-packed	1	1	1	2	2	2	5	5	5
– random-packed	3	3	3	5	5	5	7	7	7
<b>Whole olives, stoned (pitted) or stuffed</b>									
<u>Maximum tolerance as% of fruit:</u>									
Blemished fruit	4 <sup>2</sup>	4	6	6	6	8	10	6	12
Mutilated fruit	2	2	3	4	4	6	8	8	10
Shrivelled fruit	2	2	4	3	3	6	6	6	10
Abnormal texture	4	4	6	6	6	8	10	10	12
Abnormal colour	4	4	6	6	6	8	10	10	12
Stems	3	3	3	5	5	5	6	6	6
Cumulative maximum of tolerances for these defects	12	12	12	17	17	17	22	22	22
<u>Maximum tolerance as units per kg or fraction:</u>									
Harmless extraneous material	1	1	1	1	1	1	1	1	1

<sup>2</sup> In addition, at least 30% of the fruits shall be practically free from any blemishes.



The tolerances shall be assessed in a minimum sample of 200 olives taken in accordance with the appropriate sampling plan with an acceptable quality level (AQL) of 6.5.

Defect limits for **Broken, Chopped, Minced, Sliced and Other Segmented Styles of Olives** are as follows:

**Table 4**

Defects	Green olives	Olives darkened by oxidation	Olives turning colour and black olives
Harmless Extraneous Material (unit)	2	2	2
Stems (unit)	4	6	5
Blemishes and wrinkles (percentage)	25	25	25
Pit or pit fragments (average unit)	1.0	1.0	1.0
Soft and Excessive soft (percentage)	10/5	10/5	12/6
Broken pieces among Segmented/Sliced Olives (percentage)	50	50	50

The tolerances shall be assessed in a minimum sample of 300 g olives taken in accordance with the appropriate sampling plan with an AQL of 6.5.

### 3.3 Classification of “Defectives”

A container that fails to meet one or more of the applicable quality requirements, as set out in Section 3.2 (except those based on sample averages)<sup>3</sup>, should be considered as a “defective”.

### 3.4 Lot Acceptance

A lot should be considered as meeting the applicable quality requirements referred to in Section 3.2 when:

- (a) for those requirements which are not based on averages, the number of “defectives”, as defined in Section 3.3, does not exceed the acceptance number (c) of the appropriate sampling plan with an AQL of 6.5; and
- (b) the requirements of Section 3.2, which are based on sample averages, are complied with.

## 4. FOOD ADDITIVES

Acidity regulators, antioxidants, colour retention agents<sup>4</sup>, firming agents, flavour enhancers, preservatives, and thickeners<sup>5</sup> used in accordance with Tables 1 and 2 of the *General Standard for Food Additives* (CXS 192-1995) in Food Category 04.2.2.3 (Vegetables (including mushrooms and fungi, roots and tubers, pulses and legumes, and aloe vera), and seaweeds in vinegar, oil, brine, or soybean sauce) or listed in Table 3 of the *General Standard for Food Additives* are acceptable for use in foods conforming to this Standard.

## 5. CONTAMINANTS

**5.1** The products covered by this Standard shall comply with the maximum levels of the *General Standard for Contaminants and Toxins in Food and Feed* (CXS 193-1995).

**5.2** The products covered by this Standard shall comply with the maximum residue limits for pesticides established by the Codex Alimentarius Commission.

## 6. HYGIENE

**6.1** It is recommended that the product covered by this Standard be prepared and handled in accordance with the appropriate sections of the *General Principles of Food Hygiene* (CXC 1-1969), the *Code of Hygienic Practice for Low and Acidified Low-Acid Canned Foods* (CXC 23-1979), *Code of Hygienic Practice for Canned Fruit and Vegetable Products* (CXC 2-1969), and other relevant Codex texts such as codes of hygienic practice and

<sup>3</sup> These acceptance criteria do not apply to non-retail containers.

<sup>4</sup> Table olives darkened with oxidation.

<sup>5</sup> Table olives with stuffing.

codes of practice.

- 6.2** The product should comply with any microbiological criteria established in accordance with the *Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods* (CXG 21-1997)<sup>6</sup>.

## **7. WEIGHTS AND MEASURES**

### **7.1 Fill of Container**

#### **7.1.1 Minimum Fill**

The container should be well filled with the product (including packing medium) which should occupy not less than 90% (minus any necessary head space according to good manufacturing practices) of the water capacity of the container. The water capacity of the container is the volume of distilled water at 20°C which the sealed container will hold when completely filled.

#### **7.1.2 Classification of “Defectives”**

A container that fails to meet the requirements for minimum fill of Section 7.1.1 should be considered a “defective”.

#### **7.1.3 Lot Acceptance**

A lot will be considered as meeting the requirements of Section 7.1.1 when the number of “defectives” as defined in Section 7.1.2 does not exceed the acceptance number (c) of the appropriate sampling plan with an AQL of 6.5.

#### **7.1.4 Minimum Net Drained Weight**

The drained weight of the product should be not less than the following percentages, calculated on the basis of the weight of distilled water at 20°C which the sealed container will hold when completely filled<sup>7</sup>.

**Table 5**

<b>Styles</b>	<b>Minimum drained weight</b>
Whole olives <sup>8</sup>	50%
Stoned (pitted) and stuffed olives	40%

- 7.1.4.1 Classification of Defectives** The tolerance concerning the net drained weight mentioned on the container shall not exceed the following percentage scale, providing the sample’s mean net drained weight is equal to, or in excess of, said declared weight:

**Table 6**

(a) Containers with drained weight less than 200 g	5%
(b) Containers with drained weight between 200 and 500 g	4%
(c) Containers with drained weight between 500 and 1,500 g	3%
(d) Containers with drained weight in excess of 1,500 g	2%

Any container that fails to meet these tolerances shall be considered a “defective” for the purposes of this section.

#### **7.1.4.2 Lot Acceptance**

The requirements for minimum drained weight should be deemed to be complied with when the average drained weight of all containers examined is not less than the minimum required, provided that the number of

<sup>6</sup> For products that are rendered commercially sterile in accordance with the *Code of Hygienic Practice for Low and Acidified Low-Acid Canned Foods* (CXC 23-1979), microbiological criteria are not recommended as they do not offer benefit in providing the consumer with a food that is safe and suitable for consumption.

<sup>7</sup> For non-metallic rigid containers such as glass jars, the basis for the determination should be calculated on the weight of distilled water at 20°C which the sealed container will hold when completely filled less 20 ml.

<sup>8</sup> For sizes below 110 units/kg the minimum drained weight does not apply.

“defectives” as defined in Section 7.1.4 does not exceed the appropriate acceptance number (c) of the Sampling Plan with an AQL of 6.5.

## 8. LABELLING

### 8.1 Labelling of Retail Containers

The products covered by the provisions of this Standard shall be labelled in accordance with the *General Standard for the Labelling of Pre-packaged Foods* (CXS 1-1985). In addition, the following specific provisions apply:

#### 8.1.1 Name of the Product

**8.1.1.1** The name of the product shall be “olives” or “table olives”.

**8.1.1.2** The following shall be included as part of the name of the product or shall appear in close proximity thereto:

**8.1.1.2.1** The type of olive as described in Section 2.2.1. This may be replaced by the terms in use in the country of retail sale. This declaration shall not be compulsory on transparent packs.

**8.1.1.2.2** The trade preparation as described in Section 2.2.2. This may be replaced by the trade preparation in use in the country of retail sale.

**8.1.1.2.3** The style as described in Section 2.4. This declaration may be limited to the declarations in use in the country of retail sale; it may be omitted on glass jars and plastic sachets. In the case of stuffed olives the style of stuffing shall be specified:

- “olives stuffed with ...” (single or combination of single ingredients);
- “olives stuffed with ... paste” (single or combination of ingredients).

**8.1.1.2.4** If the olives are presented in accordance with the provisions on other styles (Section 2.5), the label should contain in close proximity to the name of the product such additional words or phrases that will avoid misleading or confusing the consumer.

**8.1.1.2.5** The size of “whole”, “stoned (pitted)”, “stuffed” and “halved” olives. The size may be declared according to existing practice in the country of retail sale; this declaration shall not be compulsory on transparent packs.

**8.1.1.2.6** The trade category (Optional).

**8.1.1.2.7** The name of the variety (Optional).

### 8.2 Labelling of Non-Retail Containers

The labelling of non-retail containers should be in accordance with the *General Standard for the Labelling of Non-Retail Containers of Foods* (CXS 346-2021).

## 9. METHODS OF ANALYSIS AND SAMPLING

Provision	Method	Principle	Type
Drained weight	AOAC 968.30 (Codex general method for processed fruits and vegetables)	Sieving Gravimetry	I
Fill of containers	CAC/RM 46-1972 (for glass containers) (Codex general method for processed fruit and vegetables) and ISO 90.1:1999 (for metal containers) (Codex general method for processed fruit and vegetables)	Weighing	I
pH of brine	NMKL 179:2005 (Codex general method for processed fruits and vegetables)	Potentiometry	II

Provision	Method	Principle	Type
	AOAC 981.12 (Codex general method for processed fruits and vegetables)		III
	ISO 1842:1991 (Codex general method for processed fruits and vegetables)		IV
	AOAC 971.27 (Codex general method)		II
Salt in brine	ISO 3634:1979 "chloride expressed as sodium chloride" (Codex general method for processed fruits and vegetables)	Potentiometry	III
Lead	AOAC 972.25 (Codex general method)	AAS (Flame absorption)	III
Tin	AOAC 980.19 (Codex general method)	AAS	II

**DETERMINATION OF WATER CAPACITY OF CONTAINERS  
(CAC/RM 46-1972)**

**1. SCOPE**

This method applies to glass containers.

**2. DEFINITION**

The water capacity of a container is the volume of distilled water at 20°C which the sealed container will hold when completely filled.

**3. PROCEDURE**

**3.1** Select a container which is undamaged in all respects.

**3.2** Wash, dry and weigh the empty container.

**3.3** Fill the container with distilled water at 20°C to the level of the top thereof, and weigh the container thus filled.

**4. CALCULATION AND EXPRESSION OF RESULTS**

Subtract the weight found in 3.2 from the weight found in 3.3. The difference shall be considered to be the weight of water required to fill the container. Results are expressed as ml of water.

**SAMPLING PLANS**

The appropriate inspection level is selected as follows:

- Inspection level I - Normal Sampling**  
**Inspection level II - Disputes, (Codex referee purposes sample size), enforcement or need for better lot estimate**

**SAMPLING PLAN 1  
(INSPECTION LEVEL I, AQL = 6.5)**

<b>NET WEIGHT IS EQUAL TO OR LESS THAN 1 KG (2.2 LB)</b>		
<b>Lot Size (N)</b>	<b>Sample Size (n)</b>	<b>Acceptance Number (c)</b>
4,800 or less	6	1
4,801 - 24,000	13	2
24,001 - 48,000	21	3
48,001 - 84,000	29	4
84,001 - 144,000	38	5
144,001 - 240,000	48	6
more than 240,000	60	7
<b>NET WEIGHT IS GREATER THAN 1 KG (2.2 LB) BUT NOT MORE THAN 4.5 KG (10 LB)</b>		
<b>Lot Size (N)</b>	<b>Sample Size (n)</b>	<b>Acceptance Number (c)</b>
2,400 or less	6	1
2,401 - 15,000	13	2
15,001 - 24,000	21	3
24,001 - 42,000	29	4
42,001 - 72,000	38	5
72,001 - 120,000	48	6
more than 120,000	60	7
<b>NET WEIGHT GREATER THAN 4.5 KG (10 LB)</b>		
<b>Lot Size (N)</b>	<b>Sample Size (n)</b>	<b>Acceptance Number (c)</b>
600 or less	6	1
601 - 2,000	13	2
2,001 - 7,200	21	3
7,201 - 15,000	29	4
15,001 - 24,000	38	5
24,001 - 42,000	48	6
more than 42,000	60	7

**SAMPLING PLAN 2**  
**(INSPECTION LEVEL II, AQL = 6.5)**

<b>NET WEIGHT IS EQUAL TO OR LESS THAN 1 KG (2.2 LB)</b>		
<b>Lot Size (N)</b>	<b>Sample Size (n)</b>	<b>Acceptance Number (c)</b>
4,800 or less	13	2
4,801 - 24,000	21	3
24,001 - 48,000	29	4
48,001 - 84,000	38	5
84,001 - 144,000	48	6
144,001 - 240,000	60	7
more than 240,000	72	8
<b>NET WEIGHT IS GREATER THAN 1 KG (2.2 LB) BUT NOT MORE THAN 4.5 KG (10 LB)</b>		
<b>Lot Size (N)</b>	<b>Sample Size (n)</b>	<b>Acceptance Number (c)</b>
2,400 or less	13	2
2,401 - 15,000	21	3
15,001 - 24,000	29	4
24,001 - 42,000	38	5
42,001 - 72,000	48	6
72,001 - 120,000	60	7
more than 120,000	72	8
<b>NET WEIGHT GREATER THAN 4.5 KG (10 LB)</b>		
<b>Lot Size (N)</b>	<b>Sample Size (n)</b>	<b>Acceptance Number (c)</b>
600 or less	13	2
601 - 2,000	21	3
2,001 - 7,200	29	4
7,201 - 15,000	38	5
15,001 - 24,000	48	6
24,001 - 42,000	60	7
more than 42,000	72	8