

CODEX ALIMENTARIUS

INTERNATIONAL FOOD STANDARDS



Food and Agriculture
Organization of
the United Nations



World Health
Organization

E-mail: codex@fao.org - www.codexalimentarius.org

STANDARD FOR CERTAIN CANNED FRUITS

CODEX STAN 319-2015

Adopted in 2015.

This Standard supersedes individual standards for:

Canned Mangoes (CODEX STAN 159-1987)

Canned Pears (CODEX STAN 61-1981)

1. SCOPE

This Standard applies to certain canned fruits, as defined in Section 2 below and in the corresponding Annexes and offered for direct consumption, including for catering purposes or for repackaging if required. It does not apply to the product when indicated as being intended for further processing.

This Standard does not cover canned applesauce, canned berry fruits, canned citrus fruits, and canned stone fruits which are covered by other Codex standards.

2. DESCRIPTION

2.1 Product Definition

Canned fruits are the products:

- (1) prepared from substantially sound fruits, fresh, frozen, thermally processed, or processed by other physical methods, as defined in the corresponding Annexes, having reached appropriate maturity for processing. None of their essential characteristic elements are removed from them. They undergo operations such as washing, peeling, coring, stemming, grading, cutting, etc., depending on the type of product;
- (2) (a) packed with or without a suitable liquid packing medium including other optional ingredients as indicated in Section 3.1.2;
(b) vacuum packaged with packing medium that does not exceed 20% of the product's net weight and when the container is sealed in such conditions as to generate an internal pressure in accordance with good manufacturing practices¹; and
- (3) processed in an appropriate manner, before or after being hermetically sealed in a container, so as to prevent spoilage and to ensure product stability in normal storage conditions at ambient temperature.

2.2 Styles

In addition to the styles defined in the corresponding Annexes, any other styles should be permitted as indicated in Section 2.2.1.

2.2.1 Other Styles

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

- (1) is sufficiently distinctive from other forms of presentation laid down in the Standard;
- (2) 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
- (3) is adequately described on the label to avoid confusing or misleading the consumer.

2.3 Varietal Type

Any commercially cultivated variety or type suitable for canning may be used.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Composition

3.1.1 Basic Ingredients

Fruits as defined in Section 2 and the corresponding Annexes and liquid packing medium appropriate to the product as per Section 3.1.3 below.

3.1.2 Optional Ingredients

In accordance with the relevant provisions in the corresponding Annexes.

¹ High vacuum products typically have an internal pressure of approximately 300 millibars or more below atmospheric pressure (depending on container size and other relevant factors).

3.1.3 **Packing Media**

In accordance with the *Guidelines for Packing Media for Canned Fruits* (CAC/GL 51-2003).

The cut-out strength for any syrup packing medium shall be determined on average, but no container may have a soluble solids (°Brix) value beyond the next category of the medium °Brix.

3.2 **Quality Criteria**

3.2.1 **Colour, Flavour, Odour and Texture**

Canned fruits shall have normal colour, flavour and odour of canned fruits, corresponding to the type of fruits, packing medium, and added optional ingredients used and shall possess texture characteristic of the product.

3.2.2 **Uniformity of Size**

In accordance with the relevant provisions in the corresponding Annexes.

3.2.3 **Defects and Allowances**

Canned fruits should be substantially free from defects. Certain common defects should not be present in amounts greater than the limitations fixed in the corresponding Annexes.

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), 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 3.1.3 and 3.2 when:

- (1) 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 Acceptable Quality Level (AQL) of 6.5; and
- (2) the requirements of Sections 3.1.3 and 3.2, which are based on sample averages, are complied with.

4. **FOOD ADDITIVES**

4.1 Only those food additive classes listed below and in the corresponding Annexes are technologically justified and may be used in products covered by this Standard. Within each additive class only those food additives listed in the corresponding Annexes, or referred to, may be used and only for the functions, and within limits, specified.

4.2 Acidity regulators used in accordance with Tables 1 and 2 of the *General Standard for Food Additives* (CODEX STAN 192-1995) in food category 04.1.2.4 (Canned or bottled (pasteurized) fruit) or listed in Table 3 of the General Standard 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* (CODEX STAN 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 products covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of the *General Principles of Food Hygiene* (CAC/RCP 1-1969), *Code of Hygienic Practice for Canned Fruit and Vegetable Products* (CAC/RCP 2-1969), and other relevant Codex texts such as codes of hygienic practice and codes of practice.

6.2 The products 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* (CAC/GL 21-1997).

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. This provisions does not apply to vacuum packaged fruits.

7.1.2 *Classification of “Defectives”*

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

7.1.3 *Lot Acceptance*

A lot should be considered as meeting the requirement 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 Drained Weight*

7.1.4.1 The drained weight of the product should be not less than the percentages indicated in the corresponding Annexes, calculated on the basis of the weight of distilled water at 20°C which the sealed container will hold when completely filled.²

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 there is no unreasonable shortage in individual containers.

8. LABELLING

8.1 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 (CODEX STAN 1-1985). In addition, the following specific provisions apply:

8.2 Name of the Product

8.2.1 The names of the canned fruits shall be those defined in the corresponding Annexes.

8.2.2 When the fruits are sized, the size (or sizes when sizes are mixed), as defined in the corresponding Annexes, may be declared as part of the name or in close proximity to the name of the product.

8.2.3 The name of the product shall include the indication of the packing medium as set out in Section 2.1.2 (a). For canned fruits packaged in accordance with Section 2.1.2 (b) the words “vacuum packaged” shall be affixed to the commercial designation of the product or in close proximity.

8.2.4 The name of the product shall the include indication of the style as set out in Section 2.2.

8.2.5 *Other styles* - If the product is produced in accordance with the other styles provision (Section 2.2.1), 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.

8.2.6 If an added ingredient, as defined in Section 3.1.2, alters the flavour characteristic of the product, the name of the food shall be accompanied by the term “flavoured with X” or “X flavoured” as appropriate.

8.2.7 The name of the product may include the varietal type.

8.3 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.

² 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.

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
Soluble solids	ISO 2173:2003 (Codex general method for processed fruit and vegetables) AOAC 932.14C	Refractometry	I

**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)

NET WEIGHT IS EQUAL TO OR LESS THAN 1 KG (2.2 LB)		
Lot Size (N)	Sample Size (n)	Acceptance Number (c)
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
NET WEIGHT IS GREATER THAN 1 KG (2.2 LB) BUT NOT MORE THAN 4.5 KG (10 LB)		
Lot Size (N)	Sample Size (n)	Acceptance Number (c)
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
NET WEIGHT GREATER THAN 4.5 KG (10 LB)		
Lot Size (N)	Sample Size (n)	Acceptance Number (c)
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 (Inspection Level II, AQL = 6.5)

NET WEIGHT IS EQUAL TO OR LESS THAN 1 KG (2.2 LB)		
Lot Size (N)	Sample Size (n)	Acceptance Number (c)
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
NET WEIGHT IS GREATER THAN 1 KG (2.2 LB) BUT NOT MORE THAN 4.5 KG (10 LB)		
Lot Size (N)	Sample Size (n)	Acceptance Number (c)
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
NET WEIGHT GREATER THAN 4.5 KG (10 LB)		
Lot Size (N)	Sample Size (n)	Acceptance Number (c)
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

ANNEX ON CANNED MANGOES

In addition to the general provisions applicable to canned fruits,
the following specific provisions apply:

1. DESCRIPTION

1.1 Product Definition

Canned mango is the product conforming to the characteristics of the fruits of *Mangifera indica* L and from which peel has been removed.

1.2 Styles

The product shall be prepared from peeled fruit for all the following styles:

1.2.1 Whole – whole fruit with or without stone.

1.2.2 Halves - cut into two approximately equal parts along the stone from stem to apex.

1.2.3 Slices - long, slender pieces cut lengthwise or crosswise.

1.2.4 Pieces - (or mixed pieces or irregular pieces) - pitted and comprising irregular shapes and sizes.

1.2.5 Diced - flesh cut into cube-like pieces.

2. ESSENTIAL COMPOSITION AND QUALITY FACTORS

2.1 Composition

2.1.1 Optional Ingredients

Spices and aromatic plants (in accordance with the relevant Codex standards for spices and culinary herbs),
spice oils.

2.2 Quality Criteria

2.2.1 Colour

Canned mangoes containing optional ingredients shall be considered to be of characteristic colour when there is no abnormal discolouration of the respective ingredient used.

2.2.2 Flavour

Canned mangoes with optional ingredients shall have the characteristic flavour of the mangoes and the other substances used.

2.2.3 Texture

The mangoes shall have degree of fleshiness and fibre characteristic of the variety. They may be variable in tenderness but shall neither be mushy nor excessively firm in regular pack, and shall not be excessively firm in solid packs.

2.2.4 Uniformity of Size

2.2.4.1 Halves styles - Most of the units shall be reasonably uniform in size. Where a unit has broken within the container, the combined broken pieces are considered as a single unit.

Tolerances for uniformity of size for halves

	Regular packs	Solid packs
Non uniformity of size for halves	Less than 30% by count	Less than 30% by count

2.2.6 Definition of Defects

- (a) **Blemishes** - surface discolouration and spots arising from physical, pathological, insect or other agents that definitely contrast with the overall colour, and which may penetrate into the flesh. Examples include bruises, scab and dark discolouration.
- (b) **Crushed or mashed** - means a unit which has been crushed to the extent that it has lost its normal shape (not due to ripeness) or has been severed into definite parts. Partially disintegrated halves are not counted as broken. All portions that collectively equal the size of a full size unit are considered one unit in applying the allowance herein.
- (c) **Peel** - considered as a defect. It refers to peel adhering to the pulp of the mango or found loose in the container.
- (d) **Pit (or stone) material/fragment** - considered a defect in all styles except Whole. In Whole mangoes, the whole stone may be present inside the fruit but no loose or broken fragments shall be present beyond the allowances in the table under Section 2.2.7.
- (e) **Harmless extraneous material** - means any vegetable substance (such as, but not limited to a leaf or portion thereof or a stem or portion thereof) that is harmless but which tends to detract from the appearance of the product.
- (f) **Trim** - considered a defect only in halved and sliced canned mangoes in regular packs. The trimming must be excessive and includes serious gouges (whether due to physical trimming or other means) on the surface of the units which definitely detract from the appearance.

2.2.7 Allowances for Defects

The product shall be reasonably free from defects such as harmless extraneous material, pit (stone) material, blemished and trim, crushed or mashed, peel and spotted slices or chunks to the extent indicated below:

Defects	Regular packs	Solid packs
Blemishes and trim	30% by count	3 units per 500 g
Crushed or mashed	5% by weight	not applicable
Peel and or chunks	not more than 6 cm ² aggregate area per 500 g	not more than 12 cm ² aggregate area per 500 g
Pit or pit material (average) ¹	1/8 stone or equivalent per 500 g	1/8 stone or equivalent per 500 g
Harmless extraneous material	2 pieces per 500 g	3 pieces per 500 g

¹ Whole pit is not considered for defects.

3. FOOD ADDITIVES

3.1 Antioxidants, and firming agents used in accordance with Tables 1 and 2 of the *General Standard for Food Additives* (CODEX STAN 192-1995) in Food Category 04.1.2.4 (Canned or bottled (pasteurized) fruit) or listed in Table 3 of the General Standard are acceptable for use for foods conforming to this Annex.

3.2 Colours

Only the colours listed below is permitted for use in canned mangoes.

INS No	Name of the Food Additive	Maximum Level
160a(i),a(iii),e, f	Carotenoids	200 mg/kg
160a(ii)	Carotene beta - vegetable	1,000 mg/kg
120	Carmines	200 mg/kg

4. WEIGHTS AND MEASURES

4.1 Minimum Drained Weight

(a) Regular packs	50%
(b) Solid pack	70%

ANNEX ON CANNED PEARS

In addition to the general provisions applicable to canned fruits, the following specific provisions apply:

1. DESCRIPTION

1.1 Product Definition

Canned pear is the product conforming to the characteristics of the fruit of *Pyrus communis* or *Pyrus sinensis*, which are peeled or unpeeled, cored, and stemmed, except that whole pears may not need to be peeled, cored, or stemmed and half pears may not need to be peeled.

1.2 Styles

1.2.1 **Whole** - "peeled stemmed" or "unstemmed" or "unpeeled stemmed" or "unstemmed" with cores removed "cored" or left in "not cored".

1.2.2 **Halves** - peeled or unpeeled, with stems and cores removed, and cut into two approximately equal parts.

1.2.3 **Quarters** - peeled or unpeeled and cut into four approximately equal parts.

1.2.4 **Sliced** - peeled and cut into wedge-shaped sectors.

1.2.5 **Diced** - peeled and cut into cube-like parts.

1.2.6 **Pieces or Irregular Pieces** - peeled and comprising irregular shapes and sizes.

2. ESSENTIAL COMPOSITION AND QUALITY FACTORS

2.1 Composition

2.1.1 Optional Ingredients

- (a) Lemon juice (single strength or concentrated) added as an acidulant or flavour enhancer; and
- (b) Spices and aromatic plants (in accordance with the relevant Codex standards for spices and culinary herbs), spice oils.

2.2 Quality Criteria

2.2.1 Colour

Canned pears shall have normal colour (except for coloured pears as listed in Section 4 of the Standard). A slight pink discoloration should not be regarded as a defective.

2.2.2 Uniformity of Size

"Whole", "halves", "quarters" - 95% by count of units that are most uniform in size, the weight of the largest unit should be no more than twice the weight of the smallest unit, but if there are less than 20 units, one unit may be disregarded. Where a unit has broken in the container, the broken pieces are reassembled to approximate a single unit of the appropriate style.

2.2.3 Definition of Defects

- (a) **Blemished and trimmed pear units** - blemished units with surface discoloration and spots that definitely contrast with the overall colour and which may penetrate into the flesh, such as bruises, scab, and dark discoloration. Trimmed units that have deep gouges, whether due to physical trimming or other means, and which definitely detract from the appearance; trimmed units are considered defects only in whole, halved, and quartered styles.
- (b) **Broken** - a unit severed in two or more parts should be considered as one unit when reassembled to the approximate size and shape of an average unit in the container.
- (c) **Core material** - consisting of the seed cell, whether loose or attached, with or without seeds. For the purposes of calculating the defects allowance, all pieces of a core in the sample should be aggregated and pieces totalling approximately one-half of a core should be counted as one unit.
- (d) **Harmless plant material** - stems or stalks and leaf (or similar vegetable material).
- (e) **Peel** - peel that adheres to pear flesh or is found loose in the container.
- (f) **Seeds** - any one pear seed or the equivalent in pieces of one seed that are not included in core material.

2.2.4 Allowances for Defects

The product should be substantially free from defects such as harmless plant material, peel (in peeled styles), core material, blemished and trimmed units, seeds and broken units to the extent indicated below:

Defects		Maximum Limits
(a) Blemished and trimmed pear units		(i) Total, 20% by count; or 3 units per container when count is less than 10; provided the sample average is no more than 20% - but limited to - (ii) 20% by count blemished; or 2 units per container when count is less than 10; provided the sample average is no more than 10% for blemished.
(b) Broken - in "whole", "halves", and "quartered" styles only.		20% by count; or 2 units per container when count is less than 10; provided the sample average is no more than 10%.
(c) Core material (average) - except in "whole-not-cored" styles.		2 units per kg of total contents.
(d) Harmless plant material	(i) Stems or stalks (in styles in which the stem is customarily removed)	3 pieces per 3 kg of total contents.
	(ii) Leaf (or similar vegetable material)	
(e) Peel (Average) - except in "unpeeled" styles.		10 cm ² (10 sq. cm.) aggregate area per kg of total contents.
(f) Seeds (average) - except in "whole-not-cored" styles.		8 per kg of total contents.

3. FOOD ADDITIVES

3.1 Colours (permitted only in special holiday packs) used in accordance with Tables 1 and 2 of the *General Standard for Food Additives* (CODEX STAN 192-1995) in Food Category 04.1.2.4 (Canned or bottled (pasteurized) fruit) or listed in Table 3 of the General Standard are acceptable for use for foods conforming to this Annex.

3.2 Flavourings used in products covered by this Annex should comply with the *Guidelines for the Use of Flavourings* (CAC/GL 66-2008).

4. WEIGHTS AND MEASURES

4.1 Minimum Drained Weight

Style	Containers smaller than and/or equal to 425 ml	Containers greater than 425 ml
(a) Whole style	46%	50%
(b) Halves, quarters, slices, pieces	46%	53%
(c) Diced	50%	56%