

C O D E X A L I M E N T A R I U S

INTERNATIONAL FOOD STANDARDS



Food and Agriculture
Organization of
the United Nations



World Health
Organization

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STANDARD FOR CERTAIN CANNED CITRUS FRUITS

CXS 254-2007

Adopted in 2007. Amended in 2013, 2022, 2023.

2022 Amendment

Following decisions taken at the Forty-fifth Session of the Codex Alimentarius Commission in December 2022, amendments were made in Section 8.3 Labelling of non-retail containers.

2023 Amendment

Following decisions taken at the Forty-sixth Session of the Codex Alimentarius Commission in December 2023, amendments were made in Section 9. Methods of analysis and sampling.

2023 editorial correction

An editorial correction was made to Section 2.1 (a) to read "*Citrus paradisi* Macfadyen)" instead of "*Citrus paradise* Macfadyen)".

1. SCOPE

This standard, which supersedes individual standards for canned grapefruit (CXS 15-1981) and canned mandarin oranges (CXS 68-1981), applies to certain canned citrus fruits, as defined in Section 2 below, and offered for direct consumption, including for catering purposes or for repacking if required. It does not apply to the product when indicated as being intended for further processing.

2. DESCRIPTION

2.1 Product definition

Canned citrus fruit is the product:

- (a) prepared from washed, sound and mature ripe grapefruit (*Citrus paradisi* Macfadyen), mandarin oranges (*Citrus reticulata* Blanco, including all the suitable commercial varieties for canning), sweet orange varieties (*Citrus sinensis* (L.), Osbeck, including all the suitable commercial varieties for canning) or pummelo (*Citrus Maxima* Merr. or *Citrus grandis* [L.]);
- (b) packed with water or other suitable liquid packing medium, sugars as defined in the *Standard for Sugars* (CXS 212-1999),¹ honey as defined in the *Standard for Honey* (CXS 12-1981),² suitable spices or flavouring ingredients appropriate to the product; and
- (c) processed by heat, in an appropriate manner, before or after being hermetically sealed in a container, so as to prevent spoilage. Before processing, the fruit shall have been properly washed and peeled and the membrane, seeds and core and fibre strands originating from albedo or core, shall have been substantially removed from the sections.

2.2 Colour types (canned grapefruit or canned pummelo only)

2.2.1 White – produced from white-fleshed grapefruit or pummelo.

2.2.2 Pink – produced from pink or red-fleshed grapefruit or pummelo.

2.2.3 Pale yellow – produced from pale yellow fleshed pummelo.

2.3 Styles

2.3.1 Definitions of styles

Product	Whole ⁱ	Broken	Twin	Pieces
Canned grapefruit	Not less than 75 % of original segment	Less than 75 % of original segment		
Canned sweet orange				
Canned pummelo	Not less than 50 % of original segment	Less than 50 % of original segment		Large enough to remain on a screen having 8 mm ² openings formed by a wire of 2 mm diameter
Canned mandarin orange	Not less than 75 % of original segment	Not less than 50 % of original segment but large enough to remain on a screen having 8 mm ² openings formed by wire of 2 mm diameter.	See definition for whole except two or three segments joined together, which have not been separated during processing.	

ⁱ A segment which is split in one place only and is not prone to disintegrate shall be considered whole, but parts of a segment joined by a “thread”, or by membrane only shall not be considered “whole”.

2.3.2 **Other styles** (canned grapefruit, mandarin oranges, sweet orange varieties and pummelos)

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.

2.4 **Sizes in whole segment style** (canned mandarin oranges only)

2.4.1 **Designation in accordance with size**

Canned mandarin oranges in whole segment style may be designated according to size in the following manner:

- (a) **Uniform single size**
 - (i) "Large" – 20 or less whole segments per 100 g of drained fruit.
 - (ii) "Medium" – 21 to 35 whole segments per 100 g of drained fruit.
 - (iii) "Small" – 36 or more whole segments per 100 g of drained fruit.
 - (iv) Single sizes shall also meet the uniformity requirements of Section 3.2.5.
- (b) **Mixed sizes** – A mixture of two or more single sizes.

3. **ESSENTIAL COMPOSITION AND QUALITY FACTORS**

3.1 **Composition**

3.1.1 **Basic ingredients**

Citrus fruit as defined in Section 2 and liquid packing media appropriate to the product.

3.1.2 **Packing media**

In accordance with the *Guidelines on Packing Media for Canned Fruits* (CXG 51-2003).³

3.1.3 **Other permitted ingredients** (canned grapefruit only)

- spices.

3.2 **Quality criteria**

The product shall have colour, flavour, odour and texture characteristic of the product.

3.2.1 **Colour**

The colour shall be typical of fruit which has been properly prepared and properly processed. The liquid packing medium shall be reasonably clear except when it contains fruit juice in compliance with the *General Standard for Fruit Juices and Nectars* (CXS 247-2005).⁴

3.2.2 **Flavour**

Canned grapefruit, canned mandarin oranges, canned sweet orange varieties and canned pummelo shall have a normal flavour and odour free from flavours or odours foreign to the product. Canned grapefruit with special ingredients shall have a flavour characteristic of that imparted by the grapefruit and the other substances used.

3.2.3 **Texture**

The texture shall be reasonably firm and characteristic for the canned product and reasonably free from dry cells or fibrous portions affecting the appearance or edibility of the product. Whole segments shall be practically free from signs of disintegration.

3.2.4 **Wholeness**

For canned grapefruit, canned pummelo or canned sweet orange varieties only – in the style of whole sections or segments, not less than 50 percent by weight of drained fruit shall be in whole segments.

3.2.5 Uniformity of size

For canned mandarin oranges (whole segment style – single sizes only) – in the 95 percent, by count, of units (excluding broken segments) that are most uniform in size, the weight of the largest unit shall be no more than twice the weight of the smallest unit.

3.2.6 Defects and allowances

(a) **For canned grapefruit, canned sweet orange varieties and canned pummelo:**

The finished product shall be prepared from such materials and under such practices that it shall be reasonably free from extraneous fruit matter such as peel or core or albedo and shall not contain excessive defects whether specifically mentioned in this standard or not. Certain common defects should not be present in amounts greater than the following limitations:

- (i) The total surface covered by membrane shall not exceed 20 cm² per 500 g of total contents.
- (ii) Developed seeds shall not exceed four per each 500 g of total contents. A developed seed is defined as a seed which measures more than 9 mm in any dimension.
- (iii) Not more than 15 percent by weight of the drained fruit may be blemished units. A blemished unit is a fruit section or any portion thereof which is damaged by lye peeling, by discolouration, or by any other visible injury.

(b) **For canned mandarin oranges:**

The product shall be substantially free from defects within the limits set forth as follows:

Defect	Maximum limit in the drained fruit
- Broken segments (as defined in 2.3.1) (whole segment style)	10% m/m
- Broken segments (as defined in 2.3.1) (twin segment style)	15% m/m
- Membrane (aggregate area)	7 cm ² /100 g (based on sample average)
- Fibre strands (aggregate length)	5 cm/100 g (based on sample average)
- Seeds (that measure more than 4 mm in any dimension)	1/100 g (based on sample average)

3.3 Classification of “defectives”

For canned grapefruit, canned mandarin oranges, canned sweet orange varieties and canned pummelo – a container that fails to meet one or more of the applicable quality requirements, as set out in Sections 2.4 and 3.2 (except those based on sample averages), should be considered as a “defective”.

3.4 Lot acceptance

(a) **For canned grapefruit, canned mandarin oranges, canned sweet orange varieties and canned pummelo:**

A lot should be considered as meeting the applicable quality requirements referred to in Sections 2.4 and 3.2 when 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.

(b) **For canned mandarin oranges:**

The lot must comply with requirements of Section 3.2.6(b) which are based on sample average.

4. FOOD ADDITIVES

Acidity regulators and firming agents used in accordance with Tables 1 and 2 of the *General Standard of Food Additives* (CXS 192-1995)⁵ in food category 04.1.2.4 (Canned or bottled (pasteurized) fruit) or listed in Table 3 of the *General Standard for Food Additives*⁵ are acceptable for use in foods conforming to this standard.

5. CONTAMINANTS

- 5.1 The product 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).⁶
- 5.2 The product 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* (CXC 1-1969),⁷ the *Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Canned Foods* (CXC 23-1979)⁸ 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* (CXG 21-1997).^{ii,9}

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 percent (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 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 minimum drained weight shall be as follows:ⁱⁱⁱ

- (a) **For canned grapefruit, canned sweet orange varieties and and pummelos** – the drained weight of the product shall be not less than 50 percent, calculated on the basis of the weight of distilled water at 20 °C which the sealed container will hold when completely filled.
- (b) **For canned pummelo** – the drained weight of the product shall be not less than 40 percent, calculated on the basis of the weight of distilled water at 20 °C which the sealed container will hold when completely filled.
- (c) **For canned mandarin oranges** – the drained weight of the product shall be not less than 56 percent, calculated on the basis of the weight of distilled water at 20 °C which the sealed container will hold when completely filled.

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.

ⁱⁱ For products that are rendered commercially sterile in accordance with the *Code of Hygienic Practice for Low-Acid 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.

ⁱⁱⁱ 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.

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* (CXS 1-1985).¹⁰ In addition, the following specific provisions apply:

8.2 Name of the product

8.2.1 The name of the product shall be “grapefruit”, “mandarin oranges”, “pummelo” or “oranges”, as defined in Section 2.1.

8.2.2 *For canned grapefruit, sweet orange varieties, and canned pummelo*

- (a) The style shall be included as part of the name or in close proximity to the name of the product as in Section 2.3.1.
- (b) The packing medium shall be included as part of the name or in close proximity to the name of the product as in Section 3.1.2.
- (c) The colour for grapefruit or pummelo if “pink”, the colour type “pink” shall be included as part of the name or in close proximity to the name of the product.

8.2.2.1 If an added ingredient, as defined in Section 3.1.3, 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.

8.2.3 *For canned mandarin oranges*

- (a) The style, as appropriate, shall be declared as a part of the name or in close proximity to the name of the product, as follows:
 - (i) **whole segments** – a size classification for whole segments style may be stated on the label if the pack complies with the appropriate requirements of Section 2.4.1 of this standard. In addition, the number of units present in the container may be shown by a range of count, e.g. “(number) to (number) whole segments”; and
 - (ii) **broken segments**.
- (b) In the case of sizes, size designation may be declared in close proximity to the style designation, e.g. “mixed sized whole segments”.
- (c) The packing medium shall be declared as part of the name or in close proximity to the name as in Section 3.1.2.

8.2.4 **Other styles** – if the product is produced in accordance with the other styles provision (Section 2.3.2), 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.

8.3 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).¹¹

9. METHODS OF ANALYSIS AND SAMPLING

For checking compliance with this standard, the methods of analysis and sampling contained in the *Recommended Methods of Analysis and Sampling* (CXS 234-1999)¹² relevant to the provisions in this standard shall be used.

NOTES

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- ¹ FAO and WHO. 1999. *Standard for Sugars*. Codex Alimentarius Standard, No. CXS 212-1999. Codex Alimentarius Commission. Rome.
- ² FAO and WHO. 1981. *Standard for Honey*. Codex Alimentarius Standard, No. CXS 12-1981. Codex Alimentarius Commission. Rome.
- ³ FAO and WHO. 2003. *Guidelines on Packing Media for Canned Fruits*. Codex Alimentarius Guideline, No. CXG 51-2003. Codex Alimentarius Commission. Rome.
- ⁴ FAO and WHO. 2005. *General Standard for Fruit Juices and Nectars*. Codex Alimentarius Standard, No. CXS 247-2005. Codex Alimentarius Commission. Rome.
- ⁵ FAO and WHO. 1995. *General Standard of Food Additives*. Codex Alimentarius Standard, No. CXS 192-1995. Codex Alimentarius Commission. Rome.
- ⁶ FAO and WHO. 1995. *General Standard for Contaminants and Toxins in Food and Feed*. Codex Alimentarius Standard, No. CXS 193-1995. Codex Alimentarius Commission. Rome.
- ⁷ FAO and WHO. 1969. *General Principles of Food Hygiene*. Codex Alimentarius Code of Practice, No. CXC 1-1969.
- ⁸ FAO and WHO. 1979. *Code of Hygienic Practice for Low-Acid and Acidified Low-Acid Canned Foods*. Codex Alimentarius Code of Practice, No. CXC 23-1979. Codex Alimentarius Commission. Rome.
- ⁹ FAO and WHO. 1997. *Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods*. Codex Alimentarius Guideline, No. CXG 21-1997. Codex Alimentarius Commission. Rome.
- ¹⁰ FAO and WHO. 1985. *General Standard for the Labelling of Pre-packaged Foods*. Codex Alimentarius Standard, No. CXS 1-1985. Codex Alimentarius Commission. Rome.
- ¹¹ FAO and WHO. 2021. *General Standard for the Labelling of Non-Retail Containers of Foods*. Codex Alimentarius Standard, No. CXS 346-2021. Codex Alimentarius Commission. Rome.
- ¹² FAO and WHO. 1999. *Recommended Methods of Analysis and Sampling*. Codex Alimentarius Standard, No. CXS 234-1999. Codex Alimentarius Commission. Rome.