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# **UNECE STANDARD FFV-14**

concerning the marketing and  
commercial quality control of

## **CITRUS FRUIT**

**2023 EDITION**



**UNITED NATIONS**  
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## NOTE

### Working Party on Agricultural Quality Standards

The commercial quality standards developed by the Working Party on Agricultural Quality Standards of the United Nations Economic Commission for Europe (UNECE) help facilitate international trade, encourage high-quality production, improve profitability and protect consumer interests. UNECE standards are used by Governments, producers, traders, importers and exporters, and other international organizations. They cover a wide range of agricultural products, including fresh fruit and vegetables, dry and dried produce, seed potatoes, meat, cut flowers, eggs and egg products.

Any member of the United Nations can participate, on an equal footing, in the activities of the Working Party. For more information on agricultural standards, please visit our website <http://www.unece.org/trade/agr/welcome.html>.

The present revised Standard for Citrus Fruit is based on document ECE/CTCS/WP.7/2016/21, reviewed and adopted by the Working Party at its seventy-second session.

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# UNECE standard FFV-14 concerning the marketing and commercial quality control of citrus fruit

## I. Definition of produce<sup>1</sup>

This standard applies to citrus fruit of varieties (cultivars) grown from the following species to be supplied fresh to the consumer, citrus fruit for industrial processing being excluded:

- lemons grown from the species *Citrus limon* (L.) Burm. f. and hybrids thereof
- Persian limes grown from the species *Citrus latifolia* (Yu. Tanaka) Tanaka, a largefruited acid lime known also as Bearss or Tahiti and hybrids thereof
- Mexican limes grown from the species *Citrus aurantiifolia* (Christm.) Swingle, also known as sour limes and key limes and hybrids thereof
- Indian sweet limes, Palestine sweet limes grown from the species *Citrus limettioides* Tanaka and hybrids thereof
- mandarins grown from the species (*Citrus reticulata* Blanco), including satsumas (*Citrus unshiu* Marcow.), clementines (*Citrus clementina* hort. ex Tanaka), and common mandarins (*Citrus deliciosa* Ten.) and tangerines (*Citrus tangerina* Tanaka), grown from these species and hybrids thereof
- oranges grown from the species *Citrus sinensis* (L.) Osbeck and hybrids thereof
- grapefruit grown from the species *Citrus paradisi* Macfad. and hybrids thereof
- pummelos or Shaddock grown from the species *Citrus maxima* (Burm.) Merr. and hybrids thereof.

## II. Provisions concerning quality

The purpose of the standard is to define the quality requirements for citrus fruit after preparation and packaging.

However, if applied at stages following export/dispatch, products may show in relation to the requirements of the standard:

- a slight lack of freshness and turgidity
- for products graded in classes other than the “Extra” Class, a slight deterioration due to their development and their tendency to perish.

The holder/seller of products may not display such products or offer them for sale, or deliver or market them in any manner other than in conformity with this standard. The holder/seller shall be responsible for observing such conformity.

### A. Minimum requirements

In all classes, subject to the special provisions for each class and the tolerances allowed, the citrus fruit must be:

- intact
- free of bruising and/or extensive healed overcuts

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<sup>1</sup> All information on botanical names is taken from the GRIN database. See <https://npgsweb.ars-grin.gov>

- sound; produce affected by rotting or deterioration such as to make it unfit for consumption is excluded
- clean, practically free of any visible foreign matter
- practically free from pests
- free from damage caused by pests affecting the flesh
- free of signs of shrivelling and dehydration
- free of damage caused by low temperature or frost
- free of abnormal external moisture
- free of any foreign smell and/or taste.

The development and condition of the citrus fruit must be such as to enable it:

- to withstand transportation and handling
- to arrive in satisfactory condition at the place of destination.

## B. Maturity requirements

The citrus fruit must be sufficiently developed and display satisfactory maturity and/or ripeness, account being taken of criteria proper to the variety, the time of picking and the growing area.

Maturity of citrus fruit is defined by the following parameters specified for each species below:

- minimum juice content
- minimum total soluble solids content, i.e. minimum sugar content
- minimum sugar/acid ratio<sup>2</sup>
- colouring.

The degree of colouring shall be such that following normal development the citrus fruit reach the colour typical of the variety at their destination point.

	<i>Minimum juice content (per cent)</i>	<i>Minimum sugar content (°Brix)</i>	<i>Minimum sugar/acid ratio</i>	<i>Colouring</i>
Lemons	20			Must be typical of the variety. Fruit with a green (but not dark green) colour is allowed, provided it satisfies the minimum requirements as to juice content
Limes				
Persian lime	42			The fruit should be green but may show yellow patches up to 30% of its surface for Persian limes and up to 20% for Mexican and Indian limes
Mexican and Indian sweet limes	40			
Satsumas, clementines, other mandarin varieties and their hybrids				
Satsumas	33		6.5:1	
Clementines	40		7.0:1	

<sup>2</sup> Calculated as described in the OECD guidance on objective tests, available at: [www.oecd.org/dataoecd/32/47/19515719.pdf](http://www.oecd.org/dataoecd/32/47/19515719.pdf)

	<i>Minimum juice content (per cent)</i>	<i>Minimum sugar content (°Brix)</i>	<i>Minimum sugar/acid ratio</i>	<i>Colouring</i>
Other mandarin varieties and their hybrids	33		7.5:1	Must be typical of the variety on at least one third of the surface of the fruit
<b>Oranges</b>				
Blood oranges	30		6.5:1	Must be typical of the variety. However, fruit with light green colour not exceeding one fifth of the total surface area of the fruit is allowed, provided it satisfies the minimum requirements as to juice content. Oranges produced in areas with high temperatures and high relative humidity conditions during the developing period having a green colour exceeding one fifth of the surface area of the fruit are allowed, provided they satisfy the minimum requirements as to juice content.
Navels group	33		6.5:1	
Other varieties	35		6.5:1	
Mosambi, Sathgudi and Pacitan with more than one fifth green colour	33			
Other varieties with more than one fifth green colour	45			
<b>Grapefruit and hybrids</b>				
All varieties and hybrids	35			Must be typical of the variety. Fruit with a greenish colour (green in Oroblanco) is allowed, provided it satisfies the minimum requirements as to juice content
Oroblanco	35	9		
Pummelos (Shaddock) and hybrids		8		Must be typical of the variety on at least two thirds of the surface of the fruit

Citrus fruit meeting these maturity requirements may be “degreened”. This treatment is only permitted if the other natural organoleptic characteristics are not modified.

### C. Classification

Citrus fruit is classified in three classes, as defined below:

#### (i) "Extra" Class

Citrus fruit in this class must be of superior quality. It must be characteristic of the variety and/or commercial type.

It must be free from defects, with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

#### (ii) Class I

Citrus fruit in this class must be of good quality. It must be characteristic of the variety and/or commercial type.

The following slight defects, however, may be allowed, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package:

- a slight defect in shape

- slight defects in colouring, including slight sunburn
- slight progressive skin defects, provided they do not affect the flesh
- slight skin defects occurring during the formation of the fruit, such as silver scurfs, russets or pest damage
- slight healed defects due to a mechanical cause such as hail damage, rubbing or damage from handling
- slight and partial detachment of the peel (or rind) for all fruit of the mandarin group.

**(iii) Class II**

This class includes citrus fruit that does not qualify for inclusion in the higher classes but satisfies the minimum requirements specified above.

The following defects may be allowed, provided the citrus fruit retains its essential characteristics as regards the quality, the keeping quality and presentation:

- defects in shape
- defects in colouring, including sunburn
- progressive skin defects, provided they do not affect the flesh
- skin defects occurring during the formation of the fruit, such as silver scurfs, russets or pest damage
- healed defects due to a mechanical cause such as hail damage, rubbing or damage from handling
- superficial healed skin alterations
- rough skin
- a slight and partial detachment of the peel (or rind) for oranges and a partial detachment of the peel (or rind) for fruit of the mandarin group.

### III. Provisions concerning sizing

Size is determined by the maximum diameter of the equatorial section of the fruit or by count.

#### A. Minimum size

The following minimum sizes apply:

<i>Fruit</i>	<i>Diameter (mm)</i>
Lemons	45
Persian limes	42
Mexican and Indian sweet limes	25
Satsumas, other mandarin varieties and hybrids	45
Clementines	35
Oranges	53
Grapefruit and hybrids	70
Pummelos and hybrids	100

#### B. Uniformity

Citrus fruit may be sized by one of the following options:

- (a) To ensure uniformity in size, the range in size between produce in the same package shall not exceed:
- 10 mm, if the diameter of the smallest fruit (as indicated on the package) is < 60 mm

- 15 mm, if the diameter of the smallest fruit (as indicated on the package) is  $\geq 60$  mm but  $< 80$  mm
- 20 mm, if the diameter of the smallest fruit (as indicated on the package) is  $\geq 80$  mm but  $< 110$  mm
- there is no limitation of difference in diameter for fruit  $\geq 110$  mm.

(b) When size codes are applied, the codes and ranges in the following tables must be respected:

	<i>Size code</i>	<i>Diameter (mm)</i>
<b>Lemons</b>		
	0	79 - 90
	1	72 - 83
	2	68 - 78
	3	63 - 72
	4	58 - 67
	5	53 - 62
	6	48 - 57
	7	45 - 52
<b>Limes</b>		
Persian limes	1	58 - 67
	2	53 - 62
	3	48 - 57
	4	45 - 52
	5	42 - 49
Mexican and Indian sweet limes	1	> 45
	2	40.1 - 45
	3	35.1 - 40
	4	30.1 - 35
	5	25 - 30
<b>Satsumas, clementines, and other mandarin varieties and hybrids</b>		
	1 - XXX	78 and above
	1 - XX	67 - 78
	1 or 1 - X	63 - 74
	2	58 - 69
	3	54 - 64
	4	50 - 60
	5	46 - 56
	6 <sup>3</sup>	43 - 52
	7	41 - 48
	8	39 - 46
	9	37 - 44
	10	35 - 42
<b>Oranges</b>		
	0	92 - 110
	1	87 - 100
	2	84 - 96
	3	81 - 92
	4	77 - 88
	5	73 - 84
	6	70 - 80
	7	67 - 76
	8	64 - 73

<sup>3</sup> Sizes below 45 mm refer to clementines only.

	<i>Size code</i>	<i>Diameter (mm)</i>
	9	62 – 70
	10	60 – 68
	11	58 – 66
	12	56 – 63
	13	53 – 60
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<b>Grapefruit and hybrids</b>		
	0	>139
	1	109 – 139
	2	100 – 119
	3	93 – 110
	4	88 – 102
	5	84 – 97
	6	81 – 93
	7	77 – 89
	8	73 – 85
	9	70 - 80
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<b>Pummelos and hybrids</b>		
	0	>170
	1	156 – 170
	2	148 – 162
	3	140 – 154
	4	132 – 146
	5	123 – 138
	6	116 – 129
	7	100 – 118

Uniformity in size is achieved by the above-mentioned size scales, unless otherwise stated as follows:

For fruit in bulk bins and fruit in sales packages of a maximum net weight of 5 kg, the maximum difference must not exceed the range obtained by grouping three consecutive sizes in the size scale.

(c) For fruit sized by count, the difference in size should be consistent with (a).

## IV. Provisions concerning tolerances

At all marketing stages, tolerances in respect of quality and size shall be allowed in each lot for produce not satisfying the requirements of the class indicated.<sup>4</sup>

### A. Quality tolerances

#### (i) "Extra" Class

A total tolerance of 5 per cent, by number or weight, of citrus fruit not satisfying the requirements of the class but meeting those of Class I is allowed. Within this tolerance not more than 0.5 per cent in total may consist of produce satisfying the requirements of Class II quality.

<sup>4</sup> A conformity check shall be made by assessing primary or composite samples. It is based on the principle of presumption that the quality of the randomly taken samples is representative of the quality of the lot. The OECD Operating Rules for Conformity Checks are recommended for application – also by operators – at the stages of dispatch as well as in wholesale and distribution centres and storerooms of food retail.



**(ii) Class I**

A total tolerance of 10 per cent, by number or weight, of citrus fruit not satisfying the requirements of the class but meeting those of Class II is allowed. Within this tolerance not more than 1 per cent in total may consist of produce satisfying neither the requirements of Class II quality nor the minimum requirements, or of produce affected by decay.

**(iii) Class II**

A total tolerance of 10 per cent, by number or weight, of citrus fruit satisfying neither the requirements of the class nor the minimum requirements is allowed. Within this tolerance not more than 2 per cent in total may consist of produce affected by decay.

**B. Size tolerances**

For all classes: a total tolerance of 10 per cent, by number or weight, of citrus fruit corresponding to the size immediately below and/or above that (or those, in the case of the combination of three sizes) mentioned on the package is allowed.

In any case, the tolerance of 10 per cent applies only to fruit not smaller than the following minima:

<i>Fruit</i>	<i>Diameter (mm)</i>
Lemons	43
Persian limes	40
Mexican and Indian sweet limes	Not applicable
Satsumas, other mandarin varieties and hybrids	43
Clementines	34
Oranges	50
Grapefruit and hybrids	67
Pummelos and hybrids	98

**V. Provisions concerning presentation****A. Uniformity**

The contents of each package must be uniform and contain only citrus fruit of the same origin, variety or commercial type, quality and size, and appreciably of the same degree of ripeness and development.

In addition, for "Extra" Class, uniformity in colouring is required.

However, a mixture of citrus fruit of distinctly different species may be packed together in a sales package, provided they are uniform in quality and, for each species concerned, in variety or commercial type and origin. However, in case of those mixtures uniformity in size is not required.

The visible part of the contents of the package must be representative of the entire contents.

**B. Packaging**

The citrus fruit must be packed in such a way as to protect the produce properly.

The materials used inside the package must be clean and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications, is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

Stickers individually affixed to the produce shall be such that, when removed, they neither leave visible traces of glue, nor lead to skin defects. Information lasered on single fruit should not lead to flesh or skin defects.

If the fruit is wrapped, thin, dry, new and odourless<sup>5</sup> paper must be used.

The use of any substance tending to modify the natural characteristics of the citrus fruit, especially in taste or smell<sup>4</sup>, is prohibited.

Packages must be free of all foreign matter. However, a presentation where a short (not wooden) twig with some green leaves adheres to the fruit is allowed.

## VI. Provisions concerning marking

Each package<sup>6</sup> must bear the following particulars, in letters grouped on the same side, legibly and indelibly marked, and visible from the outside:

### A. Identification

Packer and/or dispatcher/exporter:

Name and physical address (e.g. street/city/region/postal code and, if different from the country of origin, the country) or a code mark officially recognized by the national authority<sup>7</sup> if the country applying such a system is listed in the UNECE Code Mark Registry<sup>8</sup>. In the case where there is no street address available, the physical address can be made up of the name of the farm or facility, the nearest village, town, region, and postal code; or GPS coordinates and a PO Box address together with nearest town, region and country shall be accepted as a physical address.<sup>9</sup>

### B. Nature of produce<sup>10</sup>

- “Lemons”, “Limes”, “Persian limes”, “Mexican limes”, “Indian sweet limes”/ “Palestine sweet limes”, “Mandarins”, “Oranges”, “Grapefruit”, “Pummelos”/ “Shaddock” if the produce is not visible from the outside
- “Mixture of citrus fruit” or equivalent denomination and common names of the different species, in case of a mixture of citrus fruit of distinctly different species
- for oranges: the name of the variety and/or the respective variety group in the case of “Navels” and “Valencias”
- for “Satsumas” and “Clementines”: the common name of the species is required and the name of the variety is optional;

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<sup>5</sup> The use of preserving agents or any other chemical substance liable to leave a foreign smell on the skin of the fruit is permitted where it is compatible with the regulations of the importing country.

<sup>6</sup> These marking provisions do not apply to sales packages presented in packages bearing these particulars. However, they do apply to sales packages (pre-packages) presented individually.

<sup>7</sup> The national legislation of a number of countries requires the explicit declaration of the name and address. However, in the case where a code mark is used, the reference “packer and/or dispatcher (or equivalent abbreviations)” has to be indicated in close connection with the code mark, and the code mark should be preceded by the ISO 3166 (alpha-2) country/area code of the recognizing country, if not the country of origin.

<sup>8</sup> See <http://www.unece.org/trade/agr/codemarkregistry.html>.

<sup>9</sup> Reservation by the United States of America on the use of a PO Box address, as it may not allow facility inspections or rapid intervention in case of recalls, and is not part of its national labelling requirement related to packer and/or dispatcher/exporter.

<sup>10</sup> An informative, non-exhaustive list of varieties and their respective synonyms, trademarks and/or variety groups is available at the Specialized Section’s meeting website.

- for other mandarins and hybrids thereof: the name of the variety is required

For all other species: the name of the variety is optional.

The name of a variety can be replaced by a synonym. A trade name<sup>11</sup> can only be given in addition to the variety or the synonym.

- flesh colour “white”, “pink” or “red” for grapefruit and pummelos where appropriate
- “seeded” in case of clementines with more than 10 seeds.
- “seedless”: (optional, seedless citrus fruit may occasionally contain seeds).

### **C. Origin of produce**

- Country of origin<sup>12</sup> and, optionally, district where grown, or national, regional or local place name
- In the case of a mixture of citrus fruit of distinctly different species of different origins, the indication of each country of origin shall appear next to the name of the species concerned.

### **D. Commercial specifications**

- Class
- Size expressed as:
  - Minimum and maximum size (in mm) or
  - Size code(s) followed, optionally, by a minimum and maximum size or
  - Count
- Post-harvest treatment (optional, based on the national legislation of the importing country).

### **E. Official control mark (optional)**

Adopted 1963

Last revised 2016

Aligned with the Standard Layout 2023

The OECD Scheme for the Application of International Standards for Fruit and Vegetables has published an explanatory illustrated brochure on the application of this standard. The publication may be obtained from the OECD bookshop at: [www.oecdbookshop.org](http://www.oecdbookshop.org).

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<sup>11</sup> A trade name can be a trademark for which protection has been sought or obtained or any other commercial denomination.

<sup>12</sup> The full or a commonly used name should be indicated.