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United States Standards for Grades of Canned Tangerine Juice

Effective July 1, 1969

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This is a reprint of the United States Standards for Grades of Canned Tangerine Juice (34 FR 7860) which have been in effect since July 1, 1969 and were updated to modify the format and to correct and align the text as originally published in the CFR.

Voluntary U.S. grade standards are issued under the authority of the Agricultural Marketing Act of 1946, which provides for the development of official U.S. grades to designate different levels of quality. These grade standards are available for use by producers, suppliers, buyers, and consumers. As in the case of other standards for grades of fresh and processed fruits, vegetables, and specialty crops these standards are designed to facilitate orderly marketing by providing a convenient basis for buying and selling, for establishing quality control programs, and for determining loan values.

The U.S. grade standards and inspection instructions for all fresh and processed fruits, vegetables, and specialty crops are available on the internet and upon request at the address below. These documents provide detailed interpretations of the grade standards and provide step-by-step procedures for grading the product.

Grade standards are issued by the U.S. Department of Agriculture (USDA) after careful consideration of all data and views submitted during rulemaking. The Department welcomes suggestions for improving the standards in future revisions. Comments may be submitted to, and copies of standards and inspection instructions obtained from:

Director, Specialty Crops Inspection Division
Specialty Crops Program,
USDA, Agricultural Marketing Service
1400 Independence Avenue, SW, STOP 0240
Washington, D.C. 20250

Authority: 7 U.S.C. 1621-1627.

Note: Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act, or with applicable State laws and regulations.

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Product Description and Grades
§52.2071 Product Description.

Canned tangerine juice is the undiluted, unconcentrated, unfermented juice obtained from mature fresh fruit of the Mandarin orange (*Citrus reticulata*) which fruit has been properly washed; is packed with or without the addition of sweetening ingredients; is sufficiently processed by heat to assure preservation of the product; and is packed in containers which are hermetically sealed.

§52.2072 Grades of canned tangerine juice.

- (a) **U.S. Grade A or U.S. Fancy** is the quality of canned tangerine juice that shows no coagulation; that possesses a very good color; is practically free from defects; possesses a very good flavor; and scores not less than 85 points when scored in accordance with the scoring system outlined in this subpart.
- (b) **U.S. Grade C or U.S. Standard** is the quality of canned tangerine juice that may show slight coagulation; that possesses a good color; is fairly free from defects; possesses a good flavor; and scores not less than 70 points when scored in accordance with the scoring system outlined in this subpart.
- (c) **U.S. Grade D or Substandard** is the quality of canned tangerine juice that fails to meet the requirements of U.S. Grade C or U.S. Standard.

Fill of Container

§52.2073 Recommended fill of container.

The recommended fill of container is not incorporated in the grades of the finished product since fill of container, as such, is not a factor of quality for the purposes of these grades. It is recommended that the container be filled as full as practicable with tangerine juice and that the product occupy not less than 90 percent of the total capacity of the container.

Factors of Quality

§52.2074 Ascertaining the grade.

The grade of canned tangerine juice may be ascertained by considering in addition to the foregoing requirements of the respective grade, the respective ratings for the factors of color, absence of defects, and flavor. The relative importance of each factor is expressed numerically on the scale of 100. The maximum number of points that may be given for each factor is:

Factors	Points
Color	20
Absence of Defects	40
Flavor	40
Total Score	100

§52.2075 Ascertaining the rating of each factor.

The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically. The numerical range within each factor is inclusive (for example, **17 to 20 points** means 17, 18, 19, or 20 points).

§52.2076 Color.

- (a) **“A” classification.** Canned tangerine juice that possesses a very good color may be given a score of 17 to 20 points. **Very good color** means that the tangerine juice possesses a bright yellow to yellow-orange color typical of freshly extracted juice and is free from browning due to scorching, oxidation, caramelization, or other causes.
- (b) **“C” classification.** If the canned tangerine juice possesses a good color, a score of 14 to 16 points may be given. Canned tangerine juice that falls into this classification shall not be graded above U.S. Grade C or U.S. Standard, regardless of the total score for the product (this is a limiting rule). **Good color** means that the tangerine juice possesses a typical yellow to yellow-orange color that may be slightly amber or show evidence of slight browning, but is not off-color.
- (c) **“SStd” classification.** Canned tangerine juice that for any reason fails to meet the requirements of paragraph (b) of this section may be given a score of 0 to 13 points and shall not be graded above U.S. Grade D or Substandard, regardless of the total score for the product (this is a limiting rule).

§52.2077 Absence of defects.

- (a) **General.** The factor of absence of defects refers to the degree of freedom from free and suspended pulp, recoverable oil, seeds or seed particles, or other defects.
 - (1) **Free and suspended pulp** means particles of membrane, core, skin, and other similar extraneous material in canned tangerine juice.
- (b) **“A” classification.** Canned tangerine juice that is practically free from defects may be given a score of 34 to 40 points. **Practically free from defects** means

that the juice may contain not more than 7 percent free and suspended pulp and that there may be present not more than 0.025 percent by volume of recoverable oil; and does not contain seeds or seed particles or other defects that more than slightly affect the appearance of the product.

- (c) **“C” classification.** If the canned tangerine juice is fairly free from defects, a score of 28 to 33 points may be given. Canned tangerine juice that falls into this classification shall not be graded above U.S. Grade C or U.S. Standard, regardless of the total score for the product (this is a limiting rule). **Fairly free from defects** means that the juice may contain not more than 10 percent free and suspended pulp and that there may be present not more than 0.035 percent by volume of recoverable oil; and does not contain seeds or seed particles or other defects that materially affect the appearance of the product.
- (d) **“SStd” classification.** If the canned tangerine juice fails to meet the requirements of paragraph (c) of this section, a score of 0 to 27 points may be given. Canned tangerine juice that falls into this classification shall not be graded above U.S. Grade D or Substandard, regardless of the total score for the product (this is a limiting rule).

§52.2078 Flavor.

(a) **“A” classification.**

- (1) Canned tangerine juice that possesses a very good flavor may be given a score of 34 to 40 points. **Very good flavor** means a fine, distinct canned tangerine juice flavor which is free from traces of scorching, caramelization, oxidation, or terpene; is free from off flavors of any kind; and meets the following requirements:

	Minimum	Maximum
Brix (degrees)	10.5	--
Acid (per 100 grams)	0.65	1.35
Brix-acid Ratio	10.5:1	19:1

- (2) Canned tangerine juice is considered **sweet** if the juice possesses a very good flavor and falls within the range of the following requirements:

Requirement	Minimum	Maximum
Brix (degrees)	12.5	--
Acid (per 100 grams)	0.65	1.35
Brix-acid Ratio If less than 16° Brix	11.5:1	19:1
If 16° Brix or more	No minimum	19:1

(b) **“C” classification.**

- (1) If the canned tangerine juice possesses a good flavor, a score of 28 to 33 points may be given. Canned tangerine juice that falls into this classification shall not be graded above U.S. Grade C or U.S. Standard, regardless of the total score for the product (this is a limiting rule). **Good flavor** means a good, normal canned tangerine juice flavor which may have a slightly caramelized or slightly oxidized flavor but is free from off flavors of any kind and meets the following requirements:

	Minimum	Maximum
Brix (degrees)	10.0	--
Acid (per 100 grams)	0.55	1.50
Brix-acid Ratio	9.5:1	--

- (2) Canned tangerine juice is considered sweet if the juice possesses a good flavor and falls within the range of the following requirements:

	Minimum	Maximum
Brix (degrees)	12.5	--
Acid (per 100 grams)	0.60	1.50
Brix-acid Ratio If less than 16° Brix	11.5:1	--
If 16° Brix or more	No minimum	--

- (c) **“SStd” classification.** Canned tangerine juice that fails to meet the requirements of paragraph (b) of this section, is off flavor, or is unpalatable for any reason may be given a score of 0 to 27 points and shall not be graded above U.S. Grade D or Substandard, regardless of the total score for the product (this is a limiting rule).

Explanations and Methods of Analysis

§52.2079 Definitions of terms.

- (a) **Brix** means the degrees Brix of canned tangerine juice when tested with a Brix hydrometer calibrated at 20 degrees C. (68 degrees F.). If used in testing juice at a temperature other than 20 degrees C. (68 degrees F.) the applicable temperature correction shall be made to the reading of the scale as prescribed in **Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists**. The degrees Brix of canned tangerine juice may be determined by any other method which gives equivalent results.
- (b) **Acid** means grams of total acidity calculated as anhydrous citric acid per 100 grams of juice. Total acidity is determined by titration with standard sodium hydroxide solution using phenolphthalein as indicator.
- (c) **Brix-acid ratio** is the ratio of the degrees Brix of the canned tangerine juice to the grams of anhydrous citric acid per 100 grams of the juice.

§52.2080 Explanation of analyses.

- (a) Free and suspended pulp is determined by the following method:
- (1) Graduated centrifuge tubes with a capacity of 50 ml. are filled with canned tangerine juice and placed in a suitable centrifuge. The speed is adjusted according to diameter, as indicated in Table No. I, and the juice is centrifuged for exactly 10 minutes. As used in this section, **diameter** means the over-all distance between the bottoms of opposing centrifuge tubes in operating position. After centrifuging, the milliliter reading at the top of the layer of pulp in the tube is multiplied by 2 to give the percentage of pulp.

TABLE NO. I

Diameter (<i>inches</i>)	Revolutions per Minute
10	1,609
10-1/2	1,570
11	1,534
11-1/2	1,500
12	1,468
12-1/2	1,438
13	1,410
13-1/2	1,384

Diameter (inches)	Revolutions per Minute
14	1,359
14-1/2	1,336
15	1,313
15-1/2	1,292
16	1,271
16-1/2	1,252
17	1,234
17-1/2	1,216
18	1,199
18-1/2	1,182
19	1,167
19-1/2	1,152
20	1,137

(b) Recoverable oil is determined by the following method:

METHOD

(1) Reagents.

Standard bromide-bromate solution – prepared and standardized to 0.099N in accordance with Chapter 42, Standard Solutions in the current edition of the AOAC¹. For 1 use, add 1 volume of standard solution to 3 volumes of water to make 0.0247N solution. 1 ml. of 0.0247N solution supplies bromine to react with 0.00085g., or 0.0010 ml., of *d*-limonene. The solutions are stable for 6 months.

2-Propanol – Reagent grade ACS (American Chemical Society).

Dilute hydrochloric acid – prepared by adding 1 volume of concentrated acid to 2 volumes of water.

Methyl orange indicator – 0.1 percent in water.

¹ "AOAC" refers to the Official Methods of Analysis published by the Association of Official Analytical (formerly Agricultural) Chemists. Copies may be obtained from this Association at Box 540, Benjamin Franklin Station, Washington, D.C. 20044

(2) Apparatus.

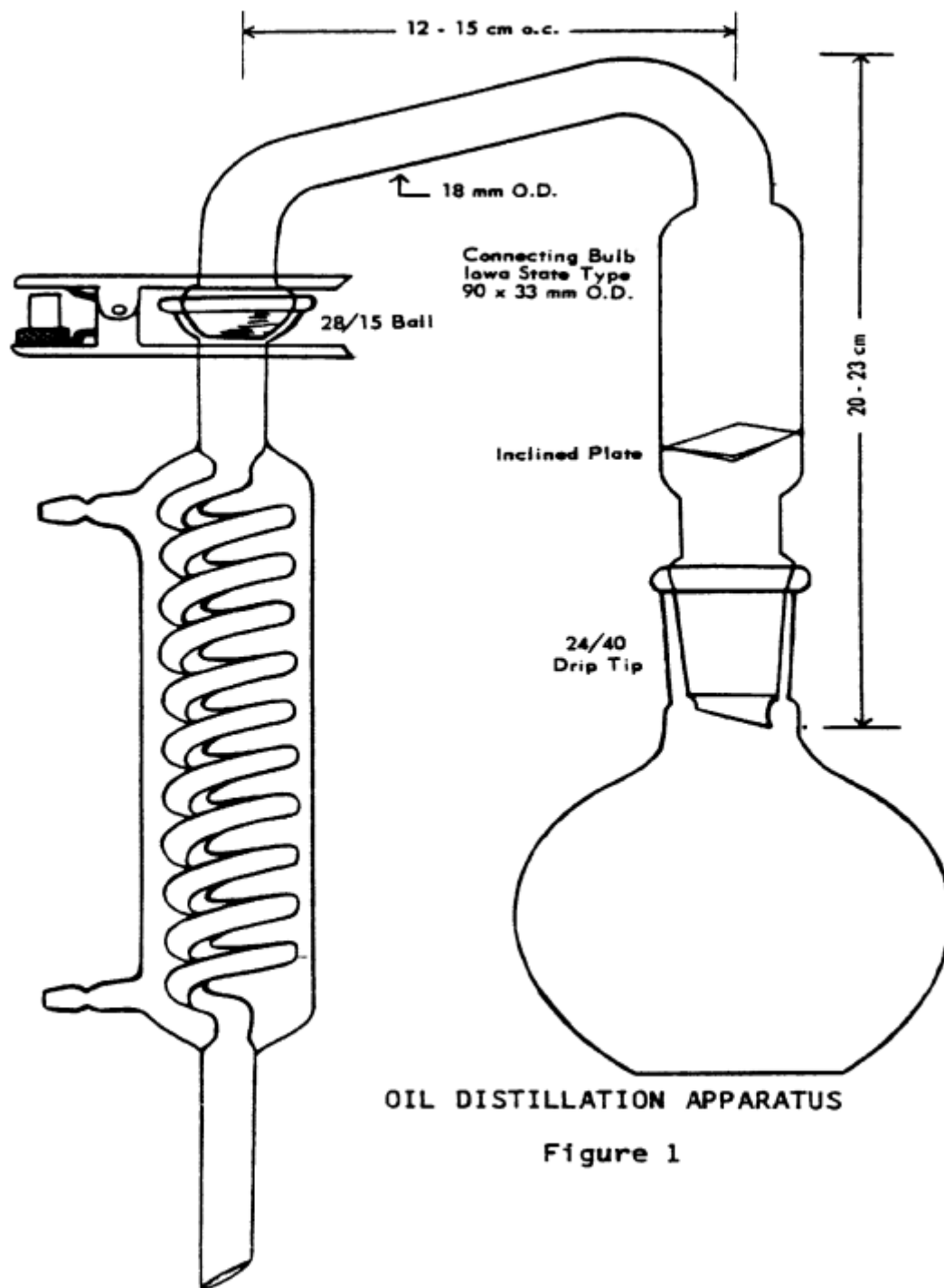
Electric heater – with recessed refractory top, 500-750 watts.

Still, all glass – 500 ml. distillation flask with 24/40 standard taper neck; 200 mm. Graham condenser with 28/15 receiving socket and drip tip; connecting bulb and adapter as shown in Figure 1.

Burette – 10 ml. or 25 ml. graduated to 0.1 ml., with easily controllable flow to permit both rapid and dropwise titration.

(3) Determination.

- (i) Pipette 25 ml. of well-mixed sample (juice or reconstituted juice) into the distillation flask containing carborundum chips or glass beads, and add 25 ml. of 2-Propanol.
- (ii) Distill into a 150 ml. beaker. Continue distilling until solvent ceases to reflux then remove the flask from the heater.
- (iii) Add 10 ml. of dilute hydrochloric acid and 1 drop of indicator. (An alternative method would be to prepare a solution containing 5 ml. of indicator and 1,000 ml. of dilute hydrochloric acid – then add 10 ml. of this acid-indicator mix to the 150 ml. beaker.)
- (iv) Titrate with the dilute bromate solution while stirring. The major portion of the titrant may be added rapidly, but the endpoint must be approached at about 1 drop per second. Disappearance of color indicates the endpoint.
- (v) Determine the reagent blank by titrating three separate mixtures of 25 ml. 2-Propanol and 10 ml. of dilute hydrochloric acid with indicator – without refilling the burette. Divide the total ml. of titrant used by three to obtain the average blank. Subtract the average blank thus obtained from the ml. of the titrant used to titrate the distillate.
- (vi) Multiply the remainder by 0.004 to obtain the percent recoverable oil by volume in the juice sample.



Lot Inspection and Certification

§52.2081 Ascertaining the grade of a lot.

The grade of a lot of the processed product covered by these standards is determined by the procedures set forth in the **Regulations Governing Inspection and Certification of Processed Fruits and Vegetables, Processed Products Thereof, and Certain Other Processed Food Products** (§§ 52.1 to 52.87).

Score Sheet

§52.2082 Score sheet for canned tangerine juice.

Size and kind of container			
Container mark or identification			
Label			
Liquid measure (fl. ounces)			
Vacuum (in inches)			
Brix (degrees)			
Acid (anhydrous citric: grams/100 grams)			
Brix-acid ratio			
Pulp (free and suspended: percent)			
Recoverable oil (percent by volume)			
Factors		Score Points	
Color	20	"A"	17-20
		"C"	14-16 $\frac{1}{2}$
		"SStd"	0-13 $\frac{1}{2}$
Absence of defects	40	"A"	34-40
		"C"	28-33 $\frac{1}{2}$
		"SStd"	0-27 $\frac{1}{2}$
Flavor	40	"A"	34-40
		"C"	28-33 $\frac{1}{2}$
		"SStd"	0-27 $\frac{1}{2}$
Total Score		100	
Grade			

1/ Indicates limiting rule.