



**United States  
Department of  
Agriculture**

**Agricultural  
Marketing  
Service**

**Fruit and  
Vegetable  
Division**

**Processed  
Products  
Branch**

# **United States Standards for Grades of Concentrated Tangerine Juice for Manufacturing**

**Effective date October 31, 1955**

This is the first issue, of the United States Standards for Grades of Concentrated Tangerine Juice for Manufacturing published in the **FEDERAL REGISTER** of September 30, 1955 (20 FR 7281) to become effective October 31, 1955.

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 processed fruits and vegetables, 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 standards also serve as a basis for the inspection and grading of commodities by the Federal inspection service, the only activity authorized to approve the designation of U.S. grades as referenced in the standards, as provided under the Agricultural Marketing Act of 1946. This service, available as on-line (in-plant) or lot inspection and grading of all processed fruit and vegetable products, is offered to interested parties, upon application, on a fee-for-service basis. The verification of some specific recommendations, requirements, or tolerances contained in the standards can be accomplished only by the use of on-line inspection procedures. In all instances, a grade can be assigned based on final product factors or characteristics.

In addition to the U.S. grade standards, grading manuals or instructions for inspection of several processed fruits and vegetables are available upon request for a nominal fee. These manuals or instructions contain detailed interpretations of the grade standards and provide step-by-step procedures for grading the product.

Grade standards are issued by the Department after careful consideration of all data and views submitted, and the Department welcomes suggestions which might aid in improving the standards in future revisions. Comments may be submitted to, and copies of standards and grading manuals obtained from:

Chief, Processed Products Branch  
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## United States Standards for Grades of Concentrated Tangerine Juice for Manufacturing

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| Authority: | Agricultural Marketing Act of 1946, Secs. 203, 205, 60 Stat. 1087, as amended, 1090, as amended (7 U.S.C. 1622, 1624). |

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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.

## §52.2931 Product Description.

Concentrated tangerine juice for manufacturing is the concentrated product obtained from sound, mature fruit of the Mandarin group (*Citrus reticulata*). The fruit is prepared by sorting and by washing prior to extraction of the juice and the extracted juice is concentrated. The concentrated tangerine juice is processed in accordance with good commercial practice; and may or may not require processing by heat or subsequent refrigeration to assure preservation of the product. The finished product does not contain any additives except that cold-pressed oil to standardize flavor and chemical preservatives permissible under provisions of the Federal Food, Drug, and Cosmetic Act may have been added.

- (a) The Brix value of the finished concentrate shall comply with the following for the dilution factors indicated:

| Dilution factor | Brix value of the finished concentrate |                    |
|-----------------|----------------------------------------|--------------------|
|                 | Minimum Brix value                     | Maximum Brix value |
|                 | Degrees                                | Degrees            |
| 1 plus 3 .....  | 38.0                                   | 41.0               |
| 1 plus 4 .....  | 46.0                                   | 49.0               |
| 1 plus 5 .....  | 53.3                                   | 56.3               |
| 1 plus 6 .....  | 60.3                                   | 63.3               |

- (b) Concentrated tangerine juice for manufacturing of other dilution factors than **1 plus 3 to 1 plus 6**, as indicated in paragraph (a) of this section, shall result in a Brix (upon reconstitution as prescribed by the processor or as prescribed by the label on the container, if labeled) of not less than 10.6 degrees.

## §52.2932 Grades of concentrated tangerine juice for manufacturing.

- (a) **U.S. Grade A for Manufacturing or U.S. Fancy for Manufacturing** is the quality of concentrated tangerine juice which shows no material gelation, reconstitutes properly, and of which the reconstituted juice possesses a good color; is practically free from defects; possesses a reasonably 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 for Manufacturing or U.S. Standard for Manufacturing** is the quality of concentrated tangerine juice which shows no material gelation, reconstitutes properly, and of which the reconstituted juice possesses a fairly good color; is fairly free from defects; possesses a fairly good flavor; and scores not less than 70 pounds when scored in accordance with the scoring system outlined in this subpart.

- (c) **Substandard for Manufacturing** is the quality of concentrated tangerine juice that fails to meet the requirements of U.S. Grade C for Manufacturing or U.S. Standard for Manufacturing.

**§52.2933 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 each container be filled with concentrated tangerine juice as full as practicable without impairment of quality.

**§52.2934 Ascertaining the grade.**

- (a) **General.** The grade of concentrated tangerine juice for manufacturing is ascertained by examining the concentrate and the reconstituted juice; and in addition to considering other requirements outlined in the standards, the following quality factors are evaluated:

(1) **Factors not rated by score points:**

- (i) **Degree of gelation.**
- (ii) **Faculty of reconstituting properly.**

- (2) **Factors rated by score points.** The relative importance of each factor which is scored is expressed numerically on the scale of 100. The maximum number of points that may be given such factors are:

| <b>Factors</b>    | <b>Points</b> |
|-------------------|---------------|
| Color .....       | 40            |
| Defects .....     | 20            |
| Flavor .....      | <u>40</u>     |
| Total score ..... | 100           |

**§52.2935 Ascertaining the rating for the factors which are scored.**

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

**§52.2936 Color.**

- (a) **"A-Mfg" classification.** Concentrated tangerine juice of which the reconstituted juice possesses a good color may be given a score of 34 to 40 points. **Good color** means that the color is a reasonably bright yellow to yellow-orange color typical of properly processed and properly concentrated tangerine juice and is practically free from browning due to scorching, oxidation, caramelization, or other causes.
- (b) **"C-Mfg" classification.** If the reconstituted juice possesses a fairly good color, a score of 28 to 33 points may be given. Concentrated tangerine juice that falls into this classification shall not be graded above U.S. Grade C for Manufacturing or U.S. Standard for Manufacturing, regardless of the total score for the product (this is a limiting rule). **Fairly good color** means that the tangerine juice may possess a typical fairly bright yellow to yellow-orange color that is reasonably free from browning due to scorching, oxidation, caramelization, or other causes.
- (c) **"SStd-Mfg" classification.** Concentrated tangerine juice that fails to meet the requirements of paragraph (b) of this section may be given a score of 0 to 27 points and shall not be graded above Substandard for Manufacturing, regardless of the total score for the product (this is a limiting rule).

**§52.2937 Defects.**

- (a) **General.** The factor of defects refers to the degree of freedom from seeds and portions thereof, from excessive juice cells, from pulp, and from other defects.
  - (1) **Pulp** means particles of membrane, core, and peel.
- (b) **"A-Mfg" classification.** Concentrated tangerine juice of which the reconstituted juice is practically free from defects may be given a score of 17 to 20 points. **Practically free from defects** means that there may be present:
  - (1) Small seeds or portions thereof that are of such size that they could pass through round perforations not exceeding 1/8 inch in diameter, provided such seeds or portions thereof do not materially affect the appearance or edibility of the product.
  - (2) Juice cells and pulp that do not materially affect the appearance or edibility of the product; and
  - (3) Other defects that are not more than slightly objectionable.

- (c) **"C-Mfg" classification.** If the reconstituted juice is fairly free from defects a score of 14 to 16 points may be given. Concentrated tangerine juice that falls into this classification shall not be graded above U.S. Grade C for Manufacturing or U.S. Standard for Manufacturing, regardless of the total score for the product (this is a limiting rule). **Fairly free from defects** means that there may be present:
- (1) Small seeds or portions thereof that are of such size that they could pass through round perforations not exceeding 1/8 inch in diameter, provided such seeds or portions thereof do not seriously affect the appearance or edibility of the product;
  - (2) Juice cells and pulp that do not seriously affect the appearance or edibility of the product; and
  - (3) Other defects that are not materially objectionable.
- (d) **"SStd-Mfg" classification.** Concentrated tangerine juice that fails to meet the requirements of paragraph (c) of this section may be given a score of 0 to 13 points and shall not be graded above Substandard for Manufacturing, regardless of the total score for the product (this is a limiting rule).

**§52.2938 Flavor.**

- (a) **"A-Mfg" classification.** Concentrated tangerine juice of which the reconstituted juice possesses a reasonably good flavor may be given a score of 34 to 40 points. **Reasonably good flavor** means that the flavor is typical of reconstituted concentrated tangerine juice from properly processed and concentrated tangerine juice; that the flavor may range from high acidity to low acidity; is practically free from traces of scorching, caramelization, oxidation, or terpene; and is free from off-flavors of any kind. To score in this classification the ratio of the Brix value to acid shall be not less than 9 to 1 nor more than 18 to 1.
- (b) **"C-Mfg" classification.** If the reconstituted juice possesses a fairly good flavor, a score of 28 to 33 points may be given. Concentrated tangerine juice that falls into this classification shall not be graded above U.S. Grade C for Manufacturing or U.S. Standard for Manufacturing, regardless of the total score for the product (this is a limiting rule). **Fairly good flavor** means a normal flavor for reconstituted concentrated tangerine juice; and that the flavor may range from high acidity to low acidity, may have a slightly caramelized or slightly oxidized flavor or may possess traces of terpene but is free from off-flavors of any kind. To score in this classification the ratio of the Brix value to acid shall be not less than 9 to 1 nor more than 21 to 1.

- (c) **"SStd-Mfg" classification.** If the concentrated tangerine juice fails to meet the requirements of paragraph (b) of this section, a score of 0 to 27 points may be given. Concentrated tangerine juice that falls into this classification shall not be graded above Substandard for Manufacturing, regardless of the total score for the product (this is a limiting rule).

**§52.2939 Explanation of terms and analyses.**

- (a) **Reconstituted juice** means the product obtained by mixing thoroughly one part by volume of the concentrated tangerine juice with a stated volume of water. For example, a dilution factor of **1 plus 6** means that to one part by volume of concentrated tangerine juice 6 parts by volume of water are added to produce a reconstituted juice. In the absence of any declared dilution factor the product is diluted with water to a Brix of between 10.6 and 11.6 degrees. Distilled water is used in reconstituting the product for testing flavor.
- (b) **Reconstitutes properly** means that the concentrate mixes readily into a tangerine juice which shows no graininess and that the reconstituted juice shows no material separation of colloidal or suspended matter after standing four hours at a temperature of not less than 68 degrees Fahrenheit in a clear glass tube or cylinder of approximately 250 millimeter capacity and approximately 1 1/4 inches in diameter.
- (c) **Acid** means the percent by weight of acid (calculated as anhydrous citric acid) in concentrated tangerine juice and is determined by titration with standard sodium hydroxide solution using phenolphthalein as indicator.
- (d) **Brix value** of the concentrate is the refractometric sucrose value determined in accordance with the International Scale of Refractive Indices of Sucrose Solutions and to which the applicable correction for acid is added. (See Table I for corrections.)

Table No. 1

| Citric acid,<br>anhydrous<br>(percent<br>by weight) | Correction to<br>be added to<br>refractometer<br>sucrose<br>value to<br>obtain<br>degree<br>Brix value |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 2.0 .....                                           | 0.39                                                                                                   |
| 2.2 .....                                           | 0.43                                                                                                   |
| 2.4 .....                                           | 0.47                                                                                                   |
| 2.6 .....                                           | 0.51                                                                                                   |
| 2.8 .....                                           | 0.54                                                                                                   |
| 3.0 .....                                           | 0.58                                                                                                   |
| 3.2 .....                                           | 0.62                                                                                                   |
| 3.4 .....                                           | 0.66                                                                                                   |
| 3.6 .....                                           | 0.70                                                                                                   |
| 3.8 .....                                           | 0.74                                                                                                   |
| 4.0 .....                                           | 0.78                                                                                                   |
| 4.2 .....                                           | 0.81                                                                                                   |
| 4.4 .....                                           | 0.85                                                                                                   |
| 4.6 .....                                           | 0.89                                                                                                   |
| 4.8 .....                                           | 0.93                                                                                                   |
| 5.0 .....                                           | 0.97                                                                                                   |

- (e) The **Brix** of reconstituted juice means the degree Brix as determined by a Brix hydrometer calibrated at 20 degrees Centigrade (68° Fahrenheit), and to which any applicable temperature correction has been applied.

**§52.2940     Ascertaining the grade of a lot.**

The grade of a lot of concentrated tangerine juice 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** (7 CFR 52.1 through 52.83).

**§52.2941 Score sheet for concentrated tangerine juice for manufacturing.**

| Size and kind of container .....<br>Container mark or identification .....<br>Label (including reconstitution factor) .....<br>Liquid measure (fluid ounces) .....<br>Net weight .....<br>Brix value of concentrate (corrected for acid) .....<br>Anhydrous citric acid in concentrate (percent by weight) .....<br>Brix value to acid ratio .....<br>Recoverable oil (mL/100 grams) .....<br>Reconstitutes properly: (Yes) (No) ..... |            |                                                                         |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|--|
| Factors                                                                                                                                                                                                                                                                                                                                                                                                                                |            | Score Points                                                            |  |
| Color .....                                                                                                                                                                                                                                                                                                                                                                                                                            | 40         | (A-Mfg) 34-40<br>(C-Mfg) <u>1</u> / 28-33<br>(SStd-Mfg) <u>1</u> / 0-27 |  |
| Defects .....                                                                                                                                                                                                                                                                                                                                                                                                                          | 20         | (A-Mfg) 17-20<br>(C-Mfg) <u>1</u> / 14-16<br>(SStd-Mfg) <u>1</u> / 0-13 |  |
| Flavor .....                                                                                                                                                                                                                                                                                                                                                                                                                           | 40         | (A-Mfg) 34-40<br>(C-Mfg) <u>1</u> / 28-33<br>(SStd-Mfg) <u>1</u> / 0-27 |  |
| Total Score .....                                                                                                                                                                                                                                                                                                                                                                                                                      | <u>100</u> |                                                                         |  |
| Grade for manufacturing .....                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                                                         |  |

1/ Indicates limiting rule.

Effective time. The United States Standards for Grades of Concentrated Tangerine Juice (which is the first issue) contained in this subpart shall become effective 30 days after publication hereof in the Federal Register. 1969.

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