



**United States
Department of
Agriculture**

**Agricultural
Marketing
Service**

**Fruit and
Vegetable
Division**

**Processed
Products
Branch**

United States Standards for Grades of Frozen Concentrated Sweetened Grape Juice

Effective date November 1, 1957

This is the first issue of the United States Standards for Grades of Frozen Concentrated Sweetened Grape Juice published in the **FEDERAL REGISTER** of August 2, 1957 (22 FR 6077) to become effective November 1, 1957.

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:

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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).

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).

§52.2451 Product description.

Frozen concentrated sweetened grape juice is prepared from unfermented single-strength grape juice from sound properly mature fresh grapes which, with or without aging, or depectinization, is then concentrated. Single-strength grape juice or natural grape essence or a combination of single-strength grape juice and natural grape essence may be mixed to the concentrate, and packed with the addition of nutritive sweetening ingredient and with or without ascorbic acid. Edible fruit acid may be added to adjust the flavor. The product is then frozen in accordance with good commercial practice and maintained at temperatures necessary for the preservation of the product.

§52.2452 Types of frozen concentrated sweetened grape juice.

- (a) **Type I.** Frozen concentrated sweetened grape juice prepared from grapes of the slip-skin varieties of the Concord type of the Labrusca species. Not less than 50 percent of the total soluble solids of the finished concentrate shall be derived from the grapes.
- (b) **Type II.** Frozen concentrated sweetened grape juice prepared from a mixture of Type I with one or more varieties other than Type I. Not less than 50 percent of the total soluble solids of the finished concentrate shall be derived from the grapes, of which, not less than one-half shall be derived from Type I grapes.

§52.2453 Styles of frozen concentrated sweetened grape juice.

Brix value of the finished concentrate (including added sweetening ingredient) shall be not less than the following for the respective dilution factor of frozen concentrated sweetened grape juice:

Dilution factor	Minimum Brix value of finished concentrate including added sweetening ingredient
	Degrees
1 plus 1	24.8
1 plus 2	35.5
1 plus 3	45.4
1 plus 4	54.5
1 plus 5	62.8
1 plus 6	70.7

§52.2454 Grades of frozen concentrated sweetened grape juice.

- (a) U.S. Grade A or U.S. Fancy** is the quality of frozen concentrated sweetened grape juice which reconstitutes properly and of which the reconstituted product possesses a good color; is practically free from defects; possesses a 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 B or U.S. Choice** is the quality of frozen concentrated sweetened grape juice which reconstitutes properly and of which the reconstituted product possesses a reasonably good color; is reasonably free from defects; possesses a reasonably good flavor; and scores not less than 70 points when scored in accordance with the scoring system outlined in this subpart.
- (c) Substandard** is the quality of frozen concentrated sweetened grape juice that fails to meet the requirements of U. S. Grade B or U. S. Choice.

§52.2455 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 purpose of these grades. It is recommended that the container be filled with frozen concentrated sweetened grape juice as full as practicable without impairment of quality.

§52.2456 Ascertaining the grade.

- (a)** The grade of frozen concentrated sweetened grape juice is ascertained by considering the factors of quality which are not scored and those which are scored as follows:

 - (1) Factors which are not scored.** Ease of mixing into grape juice beverage.
 - (2) Factors which are scored.** 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:

Factors	Points
Color	40
Defects	20
Flavor	<u>40</u>
Total score	100

- (b) The scores for the factors of color, defects, and flavor are determined immediately after the grape juice beverage has been prepared by thoroughly mixing the frozen concentrate with a specific volume of water as directed by the manufacturer.

§52.2457 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).

§52.2458 Color

- (a) **"A" classification.** Frozen concentrated sweetened grape juice of which the prepared grape juice beverage possesses a good color may be given a score of 34 to 40 points. **Good color** has the following meanings with respect to the types of frozen concentrated sweetened grape juice.

- (1) **Type I.** A bright reddish-purple color characteristic of a grape juice beverage properly prepared from Concord type grape juice and, in addition, the grape juice beverage prepared conforms to the following requirements:

Minimum absorbency at **520** millimicrons 4.0 1/

Minimum absorbency ratio 1.5 1/

(2) **Type II.** A bright color characteristic of a grape juice beverage properly prepared from Type I juice and from varietal type or varietal types of juice other than Type I and, in addition, the grape juice beverage prepared conforms to the following requirements:

Minimum absorbency at **520** millimicrons 4.0 1/

Minimum absorbency ratio 1.5 1/

1/ Determined according to Instructions §52.2462.

(b) **"B" classification.** If the prepared grape juice beverage possesses a reasonably good color a score of 28 to 33 points may be given. Frozen concentrated sweetened grape juice that falls into this classification shall not be graded above **U.S. Grade B** or **U.S. Choice**, regardless of the total score for the product (this is a limiting rule). **Reasonably good color** has the following meanings with respect to the types of frozen concentrated sweetened grape juice:

(1) **Type I.** A reddish-purple color characteristic of a grape juice beverage prepared from Concord type grape juice and which color may be slightly dull but which is not off color for any reason.

(2) **Type II.** A color that reflects to a reasonable extent the appearance characteristic of a grape juice beverage prepared from Type I juice and from any varietal type or varietal types of juice other than Type I and which color may be slightly dull but not off color for any reason.

(c) **"SStd" classification.** Frozen concentrated sweetened grape 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, regardless of the total score for the product (this is a limiting rule).

§52.2459 Defects

(a) **General.** The factor of defects refers to the degree of freedom from sediment and other residue, from tartrate crystals, from particles of skin, particles of seed, and from other defects.

- (b) **"A" classification.** Frozen concentrated sweetened grape juice of which the prepared grape juice beverage 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 not more than a slight amount of sediment and residue; is practically free from tartrate crystals; and is free from particles of skin, particles of seed, and from other defects.
- (c) **"B" classification.** If the prepared grape juice beverage is reasonably free from defects a score of 14 to 16 points may be given. Frozen concentrated sweetened grape juice that falls into this classification shall not be graded above **U. S. Grade B** or **U. S. Choice**, regardless of the total score for the product (this is a limiting rule). **Reasonably free from defects** means that there may be present not more than a moderate amount of sediment and residue; may possess a slight amount of tartrate crystals; may possess not more than a trace of particles of skin, particles of seed, and other defects.
- (d) **"SStd" classification.** If the prepared grape juice beverage fails to meet the requirements of paragraph (c) of this section, a score of 0 to 13 points may be given. Frozen concentrated sweetened grape juice that falls into this classification shall not be graded above **Substandard**, regardless of the total score for the product (this is a limiting rule).

§52.2460 Flavor.

- (a) **"A" classification.** Frozen concentrated sweetened grape juice of which the prepared grape juice beverage possesses a good flavor may be given a score of 34 to 40 points. **Good flavor** means that the flavor is a fine distinct and normal flavor, typical of well-matured grapes for the variety or varieties and is free from any objectionable flavors and objectionable odors of any kind. To score in this classification the prepared grape juice beverage and concentrate shall meet the following additional requirements:

BEVERAGE:

(1) **Type I.** **Brix** - not less than 13.0 degrees.

Acid - not less than 0.40 gram per 100 milliliters nor more than 0.65 gram per 100 mL, calculated as tartaric acid.

Brix-acid ratio - the ratio of Brix value to acid is not less than 20 to 1 nor more than 34 to 1.

CONCENTRATE:

Methyl anthranilate 1/ (naturally occurring) - not less than the following for the respective dilution factor of frozen concentrated sweetened grape juice.

Dilution factor	Minimum methyl anthranilate (naturally occurring) (mg/L)
1 plus 1	0.4
1 plus 2	0.8
1 plus 3	1.2
1 plus 4	1.6
1 plus 5	1.6
1 plus 6	1.6

1/ Determined according to instructions §52.2462

BEVERAGE:

(2) Type II. Brix - not less than 13.0 degrees.

Acid - not less than 0.40 gram per 100 milliliters nor more than 0.65 gram per 100 mL, calculated as tartaric acid.

Brix-acid ratio - the ratio of Brix value to acid is not less than 20 to 1 nor more than 34 to 1.

CONCENTRATE:

Methyl anthranilate 1/ (naturally occurring) - not less than the following for the respective dilution factor of frozen concentrated sweetened grape juice.

Dilution factor	Minimum methyl anthranilate (naturally occurring) (mg/L)
1 plus 1	0.2
1 plus 2	0.4
1 plus 3	0.6
1 plus 4	0.8
1 plus 5	0.8
1 plus 6	0.8

1/ Determined according to instructions §52.2462

(b) "B" classification. If the prepared grape juice beverage possesses a reasonably good flavor a score of 28 to 33 points may be given. Frozen concentrated sweetened grape juice that falls into this classification shall not be graded above **U.S. Grade B or U.S. Choice**, regardless of the total score for the product (this is a limiting rule). **Reasonably good flavor** means a reasonably typical flavor of reasonably well matured grapes for the varietal type or varietal types and is free from objectionable flavors and objectionable odors of any kind. To score in this classification the prepared grape juice beverage shall meet the following additional requirements:

(1) Type I. Brix - not less than 13.0 degrees.

Acid - not less than 0.30 gram per 100 milliliters nor more than 0.65 gram per 100 milliliters, calculated as tartaric acid.

Brix-acid ratio - the ratio of Brix value to acid is not less than 18 to 1 nor more than 36 to 1.

(2) **Type II.** **Brix** - not less than 13.0 degrees.

Acid - not less than 0.30 gram per 100 milliliters nor more than 0.65 gram per 100 milliliters, calculated as tartaric acid.

Brix-acid ratio - the ratio of Brix value to acid is not less than 18 to 1 nor more than 36 to 1.

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

§52.2461 Definition of terms used in these standards.

- (a) Brix means the degrees Brix of the reconstituted grape juice beverage when tested with a Brix hydrometer calibrated at 20 degrees C. (68 degrees F.). If used in testing grape juice beverage 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 Methods of Analysis of the Association of Official Analytical Chemists**. The degrees Brix of grape juice beverage may be determined by any other method which gives equivalent results.
- (b) **Acid** means the grams of acid (calculated as tartaric acid) per 100 milliliters of the reconstituted grape juice beverage determined by titration with standard sodium hydroxide solution using phenolphthalein as an indicator.
- (c) **Brix-acid ratio** means the ratio between the degrees Brix as determined in this section and the acid in grams per 100 milliliters of reconstituted grape juice beverage.
- (d) **Dilution factor** is the ratio of the volumes of water to the volume of concentrate. This factor is provided by the manufacturer's directions for preparing the desired grape juice beverage (i.e., 3 plus 1 implies 3 volumes of water to one volume of concentrate).
- (e) **Absorbency ratio** means the ratio of absorbency reading at 520 millimicrons to the absorbency reading at 430 millimicrons.

§52.2462 Methods of analysis.

(a) Methyl anthranilate.

(1) Reagents.

- (i) Hydrochloric acid** - dilute 81 milliliters (mL) of HCl to 100 mL with 100 mL H₂O.
- (ii) Sodium nitrite solution** - dissolve 3 grams (g) of NaNO₂ in 200 mL of H₂O.
- (iii) Hydrazine sulfate solution** - dissolve 5 g of N₂H₄-H₂SO₄ in 200 mL of H₂O.
- (iv) Sodium carbonate solution** - dissolve 50 g of Na₂CO₃ in 150 mL of H₂O.
- (v) Sodium- α -naphthol-2-sulfonate solution** - dissolve 4.7 g of the sulfonate in 100 mL of H₂O.
- (vi) Standard solution of methyl anthranilate** - dissolve 0.25 g of methyl anthranilate in 60 mL of 95 percent ethyl alcohol and dilute with H₂O to 500 mL.

(2) Apparatus.

Kjeldahl distillation apparatus and steam generator recommended by committee on micro-chemical apparatus, Div. Anal. Chem., A.C.S. Illustrated 8th Edition, 1955, f1g. 77 and 78, A.O.A.C. or equals may be used.

(3) Standard curve.

- (i)** Dilute 20 mL of standard solution of methyl anthranilate to 1 liter with H₂O (equivalent to 10 micrograms per mL).
- (ii)** Prepare series of solutions for standard curve by transferring 0-5 mL of solution (i) into 100 mL volumetric flask. Dilute to ca. 80 mL with H₂O.

- (iii) Then add as follows:
- (A) 1 mL HCl and 1 mL sodium nitrite solution. Invert flask and let stand 2 minutes.
 - (B) 3 mL hydrazine sulfate solution. Invert flask and let stand 1 minute.
 - (C) 2 mL sodium-a-naphthol-2-sulfonate solution. Invert flask.
 - (D) Immediately add 3 mL sodium carbonate solution, dilute to 100 mL volume with H₂O, let stand 10 minutes.
 - (E) Adjust and maintain temperature of solution at 25° ±1° C.
 - (F) Read absorbency at 490 millimicrons, in a spectrophotometer or colorimeter, against a blank, carried through entire procedure, set at zero absorbency.
- (iv) Plot standard curve of concentration (microgram per 100 mL of final solution) of methyl anthranilate against absorbency of standard solutions.
- (4) **Determination.** Use a 100 mL volumetric flask as receiver. Add 5 mL of water to just cover or seal end of extended condenser tube. Transfer 15-25 mL of sample concentrate into distillation flask. Collect about (ca.) 80 mL of distillate. Treat as under subparagraph (3) (iii) of this paragraph. Obtain concentration (micrograms/100 mL of final solution) of methyl anthranilate from standard curve (see subparagraph (3) (iv) of this paragraph).

$$\text{Methyl anthranilate (mg/liter)} = \frac{\text{micrograms per 100 mL of final solution}}{\text{mL of concentrate sample}}$$

(b) **Absorbency and absorbency ratio.** Absorbency and absorbency ratio shall be obtained as follows:

- (1) The concentrate shall be reconstituted as for beverage purposes at 25 degrees C., using Macllavaine's pH 3.2 buffer as the diluent. (The Macllavaine's buffer should be absolutely clear and show no turbidity whatsoever.)
- (2) 5 mL aliquot of reconstituted sample (1) shall be further diluted to 100 mL with Macllavaine's pH 3.2 buffer.
- (3) Filter 50 mL of solution (2) through sintered glass crucible 4-cm diameter, 4.5-cm height, medium porosity.
- (4) Read absorbency of filtrate on a spectrophotometer at 520 millimicron wavelength with a 0.025 mm width slit and at 430 millimicron wavelength with a 0.05 mm width slit.

Absorbency = $2 - \log T$, where T = percentage transmittance

Corrected absorbency = $\frac{\text{observed absorbency} \times 20}{\text{thickness of cell (in cm)}}$

Absorbency ratio = $\frac{\text{Corrected absorbency at 520 millimicrons}}{\text{Corrected absorbency at 430 millimicrons}}$

§52.2463 Ascertaining the grade of a lot.

The grade of a lot of frozen concentrated sweetened grape 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).

§52.2464 Score sheet for frozen concentrated sweetened grape juice.

Size and kind of container			
Container marks or identification			
Label (including dilution factor)			
Net contents (fluid ounces)			
Type (Concord, blended)			
Brix of the reconst. beverage			
Acid (as tartaric) (g/100 mL)			
Brix-acid ratio			
Factors		Score Points	
Color	40	"A" 34-40	
		"B" 28-33 <u>1/</u>	
		"SStd" 0-27 <u>1/</u>	
Defects	20	"A" 17-20	
		"B" 14-16 <u>1/</u>	
		"SStd" 0-13 <u>1/</u>	
Flavor	<u>40</u>	"A" 34-40	
		"B" 28-33 <u>1/</u>	
		"SStd" 0-27 <u>1/</u>	
Total Score	100		
Grade			

1/ Indicates limiting rule.

Effective time. The United States Standards for Grades of Frozen Concentrated Sweetened Grape Juice (which is the first issue) contained in this subpart shall become effective November 1, 1957.

Dated: July 29, 1957.

/s/
 Roy W. Lennartson,
 Deputy Administrator,
 Agricultural Marketing Service.