



United States Department of Agriculture

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United States Standards for Grades of Grapefruit Juice and Orange Juice (or Orange Juice and Grapefruit Juice)

Effective November 1, 1972

Corrected and Reprinted July 14, 2026

This is a reprint of the United States Standards for Grades of Grapefruit Juice and Orange Juice (or Orange Juice and Grapefruit Juice) (37 FR 21155) which have been in effect since November 1, 1972 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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United States Standards for Grades of Grapefruit Juice and Orange Juice

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Product Description, Types, Styles, and Grades

§52.1281 Product description.

- (a) Grapefruit Juice and Orange Juice (or Orange Juice and Grapefruit Juice), hereinafter referred to as Grapefruit Juice and Orange Juice, is prepared from a combination of unfermented juices obtained from mature fresh grapefruit (*Citrus paradisi*) and mature sweet oranges (*Citrus sinensis*). The juice of oranges from the mandarin group (*Citrus reticulata*), however, may be added in such quantities that not more than 10 percent, by volume, of the orange juice ingredient consists of juice from *Citrus reticulata*. It is recommended that the minor juice ingredient (either orange or grapefruit) provide not less than 25 percent, by weight, of the total soluble fruit solids present in the finished product.
- (b) The fruit is prepared and the juice extracted and processed in a manner to assure a clean and wholesome product.
- (c) Soluble solids, insoluble solids, Brix-acid ratios, and flavor may be adjusted by suitable manufacturing procedures.
- (d) The product is processed by appropriate physical means to assure its preservation through normal marketing channels. Such means include, but are not limited to:
 - (1) **Canning.** Processing with heat so as to assure the preservation of the juice in hermetically sealed containers.
 - (2) **Refrigerating.** Reducing the temperature of the product so as to extend its market life. The juice may or may not have been subjected to heat prior to refrigerating. It may or may not be packed in hermetically sealed containers.

§52.1282 Types.

The product may be identified as one of the following types:

- (a) **Single strength type.** Composed of single strength grapefruit juice and orange juice, with or without added grapefruit juice concentrate and/or orange juice concentrate.
- (b) **Reconstituted type.** Composed of grapefruit juice concentrate and orange juice concentrate and water, with or without added single strength grapefruit juice and/or single strength orange juice.

§52.1283 Styles.

- (a) Unsweetened.

(b) Sweetened.

§52.1284 Grades.

(a) **U.S. Grade A (or U.S. Fancy)** is the quality of grapefruit juice and orange juice that:

- (1) Shows no coagulation;
- (2) Has a good color;
- (3) Is practically free from defects;
- (4) Has a good flavor; and
- (5) Scores not less than 90 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 grapefruit juice and orange juice that:

- (1) May show only a slight coagulation;
- (2) Has a reasonably good color;
- (3) Is reasonably free from defects;
- (4) Has a reasonably good flavor; and
- (5) Scores not less than 80 points when scored in accordance with the scoring system outlined in this subpart.

(c) **Substandard** is the quality of grapefruit juice and orange juice that fails to meet the requirements of U.S. Grade B.

Fill of Container

§52.1285 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 as full of grapefruit juice and orange juice as practicable and that the product occupy not less than 90 percent of the volume capacity of the container.

Factors of Quality

§52.1286 Ascertaining the grade.

- (a) **General.** Consideration is given to the degree of coagulation, the ratings for the factors which are scored, and the limiting rules which may apply.
- (b) **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	20
Defects	40
Flavor	40
Total Score	100

§52.1287 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, **18 to 20 points** means 18, 19, or 20 points).

§52.1288 Color.

- (a) **“A” classification.** Grapefruit juice and orange juice that has a good color may be given a score of 18 to 20 points. **Good color** means that the juice mixture has a yellow-orange color that is bright and typical of the freshly extracted juice of oranges and either white fleshed grapefruit or red or pink fleshed grapefruit, and is free from browning due to scorching, oxidation, caramelization, or other causes.
- (b) **“B” classification.** Grapefruit juice and orange juice that has a reasonably good color may be given a score of 16 or 17 points. Juice that falls into this classification shall not be graded above U.S. Grade B, regardless of the total score for the product (this is a limiting rule). **Reasonably good color** means that the juice has a fairly typical color that may range from light yellow to light amber, may be dull or show evidence of slight browning, but is not off color.
- (c) **“SStd” classification.** Grapefruit juice and orange juice that fails the color requirements of U.S. Grade B may be given a score of 0 to 15 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

§52.1289 Defects.

- (a) **General.** The factor of defects concerns the degree of freedom from small seeds and seed portions; from discolored specks, harmless extraneous material, and other similar defects; from juice sacs and particles of membrane, core, and peel in excess of that normally present in grapefruit juice and orange juice; and from free and suspended pulp.
- (b) **“A” classification.**
 - (1) Grapefruit juice and orange juice that is practically free from defects may be given a score of 36 to 40 points.
 - (2) **Practically free from defects** means that the juice may not contain more than 12 percent free and suspended pulp as determined by the method outlined in this subpart, and that any other defects present may no more than slightly detract from the appearance or drinking quality of the juice.
- (c) **“B” classification.**
 - (1) Grapefruit juice and orange juice that is reasonably free from defects may be given a score of 32 to 35 points. Such product shall not be graded above U.S. Grade B, regardless of the total score for the product (this is a limiting rule).
 - (2) **Reasonably free from defects** means that the juice may not contain more than 18 percent free and suspended pulp as determined by the method outlined in this subpart, and that any other defects present may no more than materially detract from the appearance or drinking quality of the juice.
- (d) **“SStd” classification.** Grapefruit juice and orange juice that fails to meet the requirements of U.S. Grade B may be given a score of 0 to 31 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

§52.1290 Flavor.

- (a) **“A” classification.**
 - (1) Grapefruit juice and orange juice that has a good flavor may be given a score of 36 to 40 points.
 - (2) **Good flavor** means the following with respect to the method of preservation used:

- (i) **Refrigerated juice** or juice not subjected to high temperatures prior to refrigerating: **Good flavor** means a flavor that is fine, distinct, and substantially typical of freshly extracted grapefruit juice and orange juice which is free from off flavors and off odors of any kind;
- (ii) **Canned juice** or juice that has been subjected to high temperatures: **Good flavor** means a fine, distinct grapefruit juice and orange juice flavor which is free from off flavors and off odors of any kind; and
- (iii) The flavor of all juices may be affected only slightly by the process, the packaging, or storage conditions and the juice complies with the analytical limits listed in Table I.

Table I – Analytical Requirements – U.S. Grade A

Type Style	Single Strength		Reconstituted	
	Unsweetened	Sweetened	Unsweetened	Sweetened
Brix (Degrees) Minimum	10.0°	11.5°	11.0°	12.5°
Brix-Acid Ratio –				
If Brix is less than 11.5°:				
Minimum	9.5:1	-----	9.5:1	-----
Maximum	18.0:1	-----	18.0:1	-----
If Brix is 11.5° or more:				
Minimum	8.5:1	10.5:1	9.5:1	10.5:1
Maximum	18.0:1	18.0:1	18.0:1	18.0:1
Oil – Maximum Percent by Volume	0.035	0.035	0.035	0.035

(b) “B” classification.

- (1) Grapefruit juice and orange juice that has a reasonably good flavor may be given a score of 32 to 35 points. Grapefruit juice and orange juice of this flavor shall not be graded above U.S. Grade B, regardless of the total score for the product (this is a limiting rule).
- (2) **Reasonably good flavor** means a flavor less desirable than **good flavor** because of excess bitterness, terpenic, processing, storage, or container flavors but is not seriously objectionable and is free from off flavors and off odors of any kind. Such juice complies with the analytical limits listed in Table II.

Table II – Analytical Requirements – U.S. Grade B

Type Style	Single Strength		Reconstituted	
	Unsweetened	Sweetened	Unsweetened	Sweetened
Brix (Degrees) Minimum	9.5°	11.5°	11.0°	12.5°
Brix-Acid Ratio:				
Minimum	8.0:1	10.5:1	9.0:1	10.5:1
Maximum	None	None	None	None
Oil – Maximum Percent by Volume	0.055	0.055	0.055	0.055

- (c) **“SStd” classification.** Grapefruit juice and orange juice that fails the requirements of the U.S. Grade B classification may be given a score of 0 to 31 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

Explanations and Methods of Analysis

§52.1291 Definitions of terms and methods of analysis.

- (a) **Brix.** **Brix** means the degrees Brix of the juice when tested with a Brix hydrometer calibrated at 20° C (68° F) and to which any applicable temperature correction has been made. The degrees Brix may be determined by any other method which gives equivalent results.
- (b) **Acid.** **Acid** means the 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.** **Brix-Acid ratio** is the ratio of the degrees Brix of the grapefruit juice and orange juice to the grams of anhydrous citric acid per 100 grams of the juice.
- (d) **Free and suspended pulp.** **Free and suspended pulp** means the percentage of pulp determined by the following method: Graduated centrifuge tubes with a capacity of 50 ml. are filled with juice and placed in a suitable centrifuge. The speed is adjusted, according to diameter, as indicated in Table No. III, and the juice is centrifuged for exactly 10 minutes. As used in this subparagraph, **diameter** means the overall distance between the bottoms of opposing centrifuge tubes in operation 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 III

Diameter (<i>inches</i>)	Approximate 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
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

- (e) **Recoverable oil.** **Recoverable oil** means the percent of oil by volume, determined by the Bromate titration method as described in the current issue of the Official Methods of Analysis of the Association of Analytical Chemists¹

¹ Copies may be obtained from this Association at Box 540, Benjamin Franklin Station, Washington, D.C. 20044.

Lot Compliance

§52.1292 Ascertaining the grade of a lot.

The grade of a lot of grapefruit juice and orange 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** (§§ 52.1 through 52.87).

Score Sheet

§52.1293 Score sheet.

Size and kind of container			
Container Mark			
	Cans		
or	Cases		
Identification			
Label (including ingredient statement, if any)			
Liquid measure (fluid ounces)			
Vacuum (inches)			
Style			
Brix (degrees)			
Acid (grams/100gms: calculated as anhydrous citric acid)			
Brix-acid ratio (:1)			
Pulp (free and suspended) (%)			
Recoverable oil (% by Volume)			
Degree of coagulation (None), (Slight), or (Serious)			
Scoring Factors		Score Points	
Color	20	"A"	18-20
		"B"	16-17 <u>1/</u>
		"SStd"	0-15 <u>1/</u>
Defects	40	"A"	36-40
		"B"	32-35 <u>1/</u>
		"SStd"	0-15 <u>1/</u>
Flavor	40	"A"	36-40
		"B"	32-35 <u>1/</u>
		"SStd"	0-31 <u>1/</u>
Total Score	100		
Grade			

1/ Indicates limiting rule.