



United States  
Department of  
Agriculture

Agricultural  
Marketing  
Service

Fruit and  
Vegetable  
Program

Processed  
Products  
Division

# United States Standards for Grades of Grapefruit Juice

Effective September 26, 2012

This is the third issue, as amended, of the United States Standards for Grades of Grapefruit Juice published in the FEDERAL REGISTER of August 27, 2012 (77 FR 51750) to become effective September 26, 2012. This issue supersedes the second issue, which has been in effect since September 12, 1983.

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:

Director, Processed Products Division  
Fruit and Vegetable Program, AMS  
U.S. Department of Agriculture  
1400 Independence Avenue, SW, STOP 0240  
Washington, D.C. 20250

## United States Standards for Grades of Grapefruit Juice

Section	Page No.
§52.1221 Product description. ....	2
§52.1222 Styles. ....	2
§52.1223 Color. ....	2
§52.1224 Definitions of terms. ....	3
§52.1225 Recommended sample unit size. ....	5
§52.1226 Grades. ....	6
§52.1227 Factors of quality and analysis. ....	6
§52.1228 Requirements for grades. ....	7
§52.1229 Sample size. ....	12
§52.1230 Lot requirements.....	12

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.

**§52.1221 Product description.**

- (a) **Grapefruit juice** is the product represented as defined in the Standards of Identity for Grapefruit Juice (21 CFR 146.132), issued under the Federal Food, Drug, and Cosmetic Act.
- (b) **Grapefruit juice from concentrate** is the product represented as defined in the Standards of Identity for Grapefruit Juice from Concentrate (21 CFR 146.132), issued under the Federal Food, Drug, and Cosmetic Act.
- (c) **Frozen concentrated grapefruit juice** is the product processed by concentrating and preserving by freezing the product represented as defined in the Standards of Identity for Grapefruit Juice (21 CFR 146.132), issued under the Federal Food, Drug, and Cosmetic Act.
- (d) **Concentrated grapefruit juice for manufacturing** is the product processed by concentrating and preserving by physical means the product represented as defined in the Standards of Identity for Grapefruit Juice (21 CFR 146.132), issued under the Federal Food, Drug, and Cosmetic Act. The finished product may 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.
- (e) **Dehydrated grapefruit juice** is the product processed by concentrating and preserving by dehydration the product represented as defined in the Standards of Identity for Grapefruit Juice (21 CFR 146.132), issued under the Federal Food, Drug, and Cosmetic Act.

**§52.1222 Styles**

- (a) Unsweetened.
- (b) Sweetened (Sweetener added).

**§52.1223 Color**

- (a) White or amber.
- (b) Pink or red.

**§52.1224 Definitions of terms.**

In these U.S. standards, unless otherwise required by the context, the following terms shall be construed, respectively, to mean:

- (a) **Acid** means the percent, by weight, of total acidity (calculated as anhydrous citric acid).
- (b) **Appearance** means the physical properties of grapefruit juice which are evaluated by the human eye.
- (c) **Brix** means the total soluble solids as determined when tested with a Brix hydrometer and applying the applicable temperature correction. The Brix may be determined by any other method that gives equivalent results.
- (d) **Brix/Acid Ratio** means the ratio of the degrees Brix of the juice to the grams of anhydrous citric acid per 100 grams of the juice.
- (e) **Brix value** means 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. The Brix value is determined in accordance with the refractometric method outlined in the Official Methods of Analysis of the Association of Official Analytical Chemists.
- (f) **Brix value/Acid Ratio** means the ratio of the Brix value of the concentrate, in degrees Brix, to the grams of anhydrous citric acid per 100 grams of concentrate.
- (g) **Coagulation** means curdling of grapefruit juice.
- (h) **Color.**
  - (1) **Good color** means the grapefruit juice is representative of juice expressed from mature, well-ripened grapefruit; and the grapefruit juice may show fading and lack of luster.
  - (2) **Reasonably good color** means the color of grapefruit juice which may be slightly, but not materially, affected by scorching, oxidation, or caramelization.

- (l) **Defects** refer to juice cells, seeds or portions of seeds, specks, particles of membrane, core, peel, or any other distinctive features that adversely affect the appearance or drinking quality of grapefruit juice.
  - (1) **Practically free from defects** means defects in excess of that normally expected in grapefruit juice are not present.
  - (2) **Reasonably free from defects** means the presence of defects does not seriously affect the appearance or drinking quality of grapefruit juice.
- (j) **Flavor.**
  - (1) **Good flavor** means flavor of:
    - (i) **Grapefruit juice** that is typical of freshly extracted juice from mature, well-ripened grapefruit. The grapefruit juice may be slightly affected by processing, packaging or storage conditions.
    - (ii) **Grapefruit juice from concentrate** that is typical of juice from mature, well-ripened grapefruit. The grapefruit juice may be slightly affected by processing, packaging, or storage conditions.
    - (iii) **Frozen concentrated grapefruit juice** that is typical of freshly extracted juice from mature, well-ripened grapefruit; and does not have more than a slight trace of bitterness.
    - (iv) **Concentrated grapefruit juice for manufacturing** that is practically free from traces of scorching, caramelization, oxidation, and terpene.
    - (v) **Dehydrated grapefruit juice** that is free from terpene, caramelization, oxidation, and rancid flavors.
  - (2) **Reasonably good flavor** means flavor of:
    - (i) **Grapefruit juice** that is materially but not seriously affected by bitterness, terpene, processing, storage, or container flavors.
    - (ii) **Grapefruit juice from concentrate** that is materially but not seriously affected by bitterness, terpene, processing, storage, or container flavors.

- (iii) **Frozen concentrated grapefruit juice** that is fairly typical of freshly extracted grapefruit juice, no more than slightly affected by bitterness, and is free from abnormal flavors of any kind.
- (iv) **Concentrated grapefruit juice for manufacturing** that is no more than slightly affected by scorching, caramelization, or oxidation. It may have a trace of terpene, but is free from any other abnormal flavors.
- (v) **Dehydrated grapefruit juice** that is no more than slightly affected by scorching, caramelization, oxidation, or terpene flavors, but is free from any other abnormal flavors.
  
- (k) **Reconstituted juice** means the product obtained by thoroughly mixing the concentrate with the amount of water prescribed on the label or other appropriate directions.
- (l) **Reconstitutes properly** means, that upon mixing with water, the concentrate dissolves readily and has no material coagulation or separation.
- (m) **Recoverable oil** means the volume of oil that may be recovered from grapefruit juice as determined by the Official Methods of Analysis of the Association of Official Analytical Chemists.
- (n) **Sample unit** means a portion of grapefruit juice used for grading.
- (o) **Terpene** means a specific flavor found in oils and resins.

**§52.1225 Recommended sample unit size.**

The requirements for all factors of quality are based on the following:

- (a) The entire contents of a container;
- (b) A representative portion of the contents of a container;
- (c) A combination of the contents of two or more containers; or
- (d) A portion of unpacked product.

**§52.1226 Grades.**

- (a) **U.S. Grade A** is the quality of grapefruit juice that meets the applicable requirements of Tables I through V.
- (b) **U.S. Grade B** is the quality of grapefruit juice that meets the applicable requirements of Tables I through V.
- (c) **Substandard** is the quality of grapefruit juice that fails to meet the requirements for U.S. Grade B.

**§52.1227 Factors of quality and analysis.**

The grade for a lot of product is based on observation and analysis of grapefruit juice and reconstituted grapefruit juice for the following quality and analytical factors:

**(a) Quality:**

- (1) Appearance;
- (2) Coagulation;
- (3) Color;
- (4) Defects;
- (5) Flavor; and
- (6) Reconstitution.

**(b) Analytical:**

- (1) Brix measurement or Brix value measurement;
- (2) Brix/acid ratio or Brix value/acid ratio; and
- (3) Recoverable oil.

§52.1228 Requirements for grades.

Table I - Grapefruit Juice

Factors		Grade A		Grade B	
<b>Quality:</b>					
<b>Appearance</b>		<b>Fresh Grapefruit Juice</b>		<b>Fresh Grapefruit Juice</b>	
<b>Coagulation</b>		<b>None</b>		<b>Slight</b>	
<b>Color</b>		<b>Good</b>		<b>Reasonably Good</b>	
<b>Score Points</b>		<b>18-20</b>		<b>16-17</b>	
<b>Defects</b>		<b>Practically Free</b>		<b>Reasonably Free</b>	
<b>Score Points</b>		<b>18-20</b>		<b>16-17</b>	
<b>Flavor</b>		<b>Good</b>		<b>Reasonably Good</b>	
<b>Score Points</b>		<b>54-60</b>		<b>48-53</b>	
<b>Analytical:</b>					
	<b>Unsweetened</b>	<b>Sweetened</b>	<b>Unsweetened</b>	<b>Sweetened</b>	
<b>Brix:</b>					
<b>Minimum</b>	<b>9.0°</b>	<b>11.5°</b>	<b>9.0°</b>	<b>11.5°</b>	
<b>Brix\Acid Ratio:</b>					
<b>Minimum</b>	<b>8.0:1</b>	<b>9.0:1</b>	<b>7.0:1</b>	<b>9.0:1</b>	
<b>Maximum</b>	<b>14.0:1</b>	<b>14.0:1</b>	<b>None</b>	<b>None</b>	
<b>Recoverable Oil (percent by volume):</b>					
<b>Maximum</b>	<b>0.020</b>		<b>0.025</b>		

**Table II - Grapefruit Juice from Concentrate**

Factors		Grade A		Grade B	
<b>Quality:</b>					
<b>Appearance</b>		<b>Fresh Grapefruit Juice</b>		<b>Fresh Grapefruit Juice</b>	
<b>Coagulation</b>		<b>None</b>		<b>Slight</b>	
<b>Color</b>		<b>Good</b>		<b>Reasonably Good</b>	
<b>Score Points</b>		<b>18-20</b>		<b>16-17</b>	
<b>Defects</b>		<b>Practically Free</b>		<b>Reasonably Free</b>	
<b>Score Points</b>		<b>18-20</b>		<b>16-17</b>	
<b>Flavor</b>		<b>Good</b>		<b>Reasonably Good</b>	
<b>Score Points</b>		<b>54-60</b>		<b>48-53</b>	
<b>Analytical:</b>					
	<b>Unsweetened</b>	<b>Sweetened</b>	<b>Unsweetened</b>	<b>Sweetened</b>	
<b>Brix:</b>					
<b>Minimum</b>	<b>10.0°</b>	<b>11.5°</b>	<b>10.0°</b>	<b>11.5°</b>	
<b>Soluble Grapefruit Solids, exclusive of sweeteners (percent by weight):</b>					
<b>Minimum</b>	.....	<b>10.0</b>	.....	<b>10.0</b>	
<b>Brix\Acid Ratio:</b>					
<b>Minimum</b>	<b>8.0:1</b>	<b>9.0:1</b>	<b>7.0:1</b>	<b>9.0:1</b>	
<b>Maximum</b>	<b>14.0:1</b>	<b>14.0:1</b>	<b>None</b>	<b>None</b>	
<b>Recoverable Oil (percent by volume):</b>					
<b>Maximum</b>	<b>0.020</b>		<b>0.025</b>		

**Table III - Frozen Concentrated Grapefruit Juice**

Factors		Grade A		Grade B	
<b>Quality: <u>1</u>/</b>					
<b>Appearance</b>		<b>Fresh Grapefruit Juice</b>		<b>Fresh Grapefruit Juice</b>	
<b>Color</b>		<b>Good</b>		<b>Reasonably Good</b>	
<b>Score Points</b>		<b>18-20</b>		<b>16-17</b>	
<b>Defects</b>		<b>Practically Free</b>		<b>Reasonably Free</b>	
<b>Score Points</b>		<b>18-20</b>		<b>16-17</b>	
<b>Flavor</b>		<b>Good</b>		<b>Reasonably Good</b>	
<b>Score Points</b>		<b>54-60</b>		<b>48-53</b>	
<b>Reconstitution</b>		<b>Reconstitutes Properly</b>		<b>Reconstitutes Properly</b>	
<b>Analytical:</b>					
	<b>Unsweetened</b>	<b>Sweetened</b>	<b>Unsweetened</b>	<b>Sweetened</b>	
<b>Concentrate:</b>					
<b>Brix value:</b>					
<b>Minimum</b>	<b>38.0°</b>	<b>38.5°</b>	<b>38.0°</b>	<b>38.5°</b>	
<b>Brix\Acid Ratio:</b>					
<b>Minimum</b>	<b>9.0:1</b>	<b>10.0:1</b>	<b>7.0:1</b>	<b>8.0:1</b>	
<b>Maximum</b>	<b>14.0:1</b>	<b>13.0:1</b>	<b>16.0:1</b>	<b>13.0:1</b>	
<b>Reconstituted Juice:</b>					
<b>Brix:</b>					
<b>Minimum</b>	<b>10.6°</b>	.....	<b>10.6°</b>	.....	
	<b>Unsweetened</b>	<b>Sweetened</b>	<b>Unsweetened</b>	<b>Sweetened</b>	
<b>Minimum Soluble Grapefruit Solids, exclusive of Sweeteners (percent by weight)</b>	.....	<b>10.6</b>	.....	<b>10.6</b>	
<b>Recoverable Oil (percent by volume):</b>					
<b>Maximum</b>	<b>0.020</b>		<b>0.025</b>		
<b>Seeds and portions of seeds that:</b>					
<b>Pass through round perforations 3.2mm (0.125 in.)</b>	<b>No more than slightly detract</b>		<b>No more than materially detract</b>		
<b>Fail to pass through round perforations - 3.2mm (0.125 in.)</b>	<b>Practically none</b>				

1/ Reconstituted prior to grading

**Table IV - Concentrated Grapefruit Juice for Manufacturing**

Factors	Grade A	Grade B
<b>Quality: <u>1/</u></b>		
<b>Color</b>	<b>Good</b>	<b>Reasonably Good</b>
<b>Score Points</b>	<b>18-20</b>	<b>16-17</b>
<b>Defects</b>	<b>Practically Free</b>	<b>Reasonably Free</b>
<b>Score Points</b>	<b>18-20</b>	<b>16-17</b>
<b>Flavor</b>	<b>Good</b>	<b>Reasonably Good</b>
<b>Score Points</b>	<b>54-60</b>	<b>48-53</b>
<b>Reconstitution</b>	<b>Reconstitutes Properly</b>	
<b>Analytical:</b>		
<b>Brix value/Acid Ratio:</b>		
<b>Minimum</b>	<b>6.0:1</b>	<b>5.5:1</b>
<b>Seeds and portions of seeds that: <u>1/</u></b>		
<b>Pass through round perforations 3.2mm (0.125 in.)</b>	<b>No more than slightly detract</b>	<b>No more than materially detract</b>
<b>Fail to pass through round perforations - 3.2mm (0.125 in.)</b>	<b>Practically none</b>	

1/ Reconstituted prior to grading

**Table V - Dehydrated Grapefruit Juice 1/**

Factors	Grade A		Grade B	
<b>Quality: <u>1/</u></b>				
<b>Appearance</b>	<b>Fresh Grapefruit Juice</b>		<b>Fresh Grapefruit Juice</b>	
<b>Color</b>	<b>Good</b>		<b>Reasonably Good</b>	
<b>Score Points</b>	<b>18-20</b>		<b>16-17</b>	
<b>Defects</b>	<b>Practically Free</b>		<b>Reasonably Free</b>	
<b>Score Points</b>	<b>18-20</b>		<b>16-17</b>	
<b>Flavor</b>	<b>Good</b>		<b>Reasonably Good</b>	
<b>Score Points</b>	<b>54-60</b>		<b>48-53</b>	
<b>Reconstitution</b>	<b>Reconstitutes Properly</b>			
<b>Analytical:</b>				
	<b>Unsweetened</b>	<b>Sweetened</b>	<b>Unsweetened</b>	<b>Sweetened</b>
<b>Brix:</b>				
<b>Minimum</b>	<b>10.0°</b>	<b>11.5°</b>	<b>10.0°</b>	<b>11.5°</b>
<b>Brix\Acid Ratio::</b>				
<b>Minimum</b>	<b>8.0:1</b>	<b>9.0:1</b>	<b>7.0:1</b>	<b>9.0:1</b>
<b>Maximum</b>	<b>14.0:1</b>	<b>14.0:1</b>	<b>None</b>	<b>None</b>
<b>Recoverable Oil (percent by volume):</b>				
<b>Maximum</b>	<b>0.020</b>		<b>0.025</b>	

1/ Reconstituted prior to grading

**§52.1229 Sample size.**

The sample size to determine acceptance with the requirements of these standards shall be as specified in the sampling plans and procedures 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).

**§52.1230 Lot requirements.**

A lot of grapefruit juice is considered as meeting the requirements for quality if:

- (a) The requirements specified in Tables I, II, III, IV, and V, as applicable, are met; and
- (b) The sampling plans and procedures in 7 CFR 52.1 through 52.83 are met.