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Branch

United States Standards for Grades of Canned Carrots

Effective August 3, 1998

This is the sixth issue of the United States Standards for Grades of Canned Carrots published in the **FEDERAL REGISTER** of July 2, 1998 (63 FR 36201) to become effective August 3, 1998 and amended April 2003. This issue supersedes the fifth issue, which has been in effect since June 24, 1985.

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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UNITED STATES STANDARDS FOR GRADES OF
CANNED CARROTS

EFFECTIVE AUGUST 3, 1998

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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. 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.

§52.671 Identity.

Canned carrots means the canned product properly prepared from the clean, sound root of the carrot plant as defined in the definitions and standards of identity for canned vegetables (21 CFR 155.200) issued pursuant to the Federal Food, Drug, and Cosmetic Act.

§52.672 Styles of canned carrots.

- (a) **Whole or whole carrots** means canned carrots consisting of whole carrots that retain the approximate original conformation of the whole carrot.
- (b) **Slices or sliced carrots** means canned carrots consisting of carrot slices produced by slicing whole carrots transverse to the longitudinal axis.
- (c) **Quarters or quartered carrots** means canned carrots consisting of quarters of carrots produced by cutting whole carrots longitudinally into four approximately equal units. Whole carrots cut longitudinally into six units approximating the size and appearance of the quartered carrots are also permitted in this style.
- (d) **Diced carrots** means canned carrots consisting of units produced by cutting whole carrots into cubes having edges, other than the rounded outer edges, measuring approximately 1/2 inch or less.
- (e) **Julienne, French style, or shoestring** means canned carrots consisting of strips of carrots.
- (f) **Cut** means canned carrots consisting of units which with respect to size or shape do not conform to any of the foregoing styles. Carrots which have been cut longitudinally into two approximately equal units are included in this style.
- (g) **Unit** means an individual carrot or portion of a carrot in canned carrots.

§52.673 Grades of canned carrots.

- (a) **U.S. Grade A or U.S. Fancy** is the quality of canned carrots that possess similar varietal characteristics; that possess a normal flavor and odor; that possess a good color; that are practically free from defects; that are tender; that are practically uniform in size and shape; and that score 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 carrots that possess similar varietal characteristics; that possess normal flavor and odor; that possess a fairly good color; that are fairly free from defects; that are fairly tender; that are fairly uniform in size and shape; and that score not less than 70 points when scored in accordance with the scoring system outlined in this subpart.
- (c) **Substandard** is the quality of canned carrots that fail to meet the requirements of U.S. Grade C or U.S. Standard.

§52.674 Recommended fill of container.

The recommended fill of container is not incorporated in the grade 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 of canned carrots be filled as full as practicable with carrots without impairment of quality and that the product and packing medium occupy not less than 90 percent of the total capacity of the container.

§52.675 Recommended minimum drained weight.

The minimum drained weight recommendations in Table No. 1 of this section are not incorporated in the grades of the finished product since drained weight, as such, is not a factor of quality for the purpose of these grades. The drained weight of canned carrots is determined by emptying the contents of the container upon a U.S. Standard No. 8 sieve of proper diameter so as to distribute the product evenly, inclining the sieve slightly to facilitate drainage and allowing to drain for two minutes. The drained weight is the weight of the sieve and the carrots less the weight of the dry sieve. A sieve 8 inches in diameter is used for the No. 2 2-1/2 size can (401 x 411) and smaller sizes; and a sieve 12 inches in diameter is used for containers larger than the No. 2 2-1/2 size can.

Table I. Recommended Minimum Drained Weights, in Ounces, of Carrots

Container size or designation	Container Dimensions ¹	Water Capacity @68°F ²	Style ³						
			Whole		Sliced		Diced	Quartered & Cut	Julienne
			Less than 1-1/2" diameter	1-1/2" in diameter & over	Less than 1-1/2" diameter	1-1/2" in diameter & over			
8-ounce tall	211x304	8.65	5.5	5.0	5.5	5.0	5.5	5.5	5.3
8-ounce jar	-----	8.53	5.5	5.0	5.5	5.0	5.5	5.5	5.3
No. 1 picnic	211x400	10.90	6.8	6.5	6.8	6.5	7.0	7.0	6.5
No. 300	300x407	15.20	8.8	8.3	9.0	8.6	9.5	9.5	8.1
No. 303	303x406	16.85	9.8	9.3	10.0	9.5	10.5	10.5	9.0
No. 303 jar	-----	17.68	9.8	9.3	10.0	9.5	10.5	10.5	9.0
No. 2	307x409	20.50	12.5	12.3	12.5	12.0	12.8	12.5	11.3
No. 2-1/2	401x411	29.75	19.5	19.0	19.0	18.5	19.0	18.5	18.3
No. 2-1/2 jar	-----	29.54	19.3	18.8	18.8	18.3	18.8	18.3	18.0
No. 10	603x700	109.45	67.0	66.0	67.0	66.0	70.0	68.0	64.0

1 The left figure represents the diameter of the container and the right figure represents the height. The first digit in each number represents whole inches and the second two digits represent fractions in sixteenths of an inch. Thus 303 is three and three-sixteenth inches.

2 Avoirdupois oz. figures for glass containers were based on overflow capacity in fluid ounces, measured from the top of the container, see 21 CFR 130.12 . Exact capacities may vary with mold style.

3 Mixed sizes in whole or sliced styles are based on drained weight for predominant size of individual units.

Table IA. Recommended Minimum Drained Weights of Carrots, Metric System (System International)

Container size or designation	Container Dimensions Diameter x Height(mm)	Water Capacity @20°C (grams)	Style ¹						
			Whole		Sliced		Diced	Quartered & Cut	Julienne
			Less than 1-1/2" diameter	1-1/2" in diameter & over	Less than 1-1/2" diameter	1-1/2" in diameter & over			
8-ounce tall	68.3x82.6	245.2	155.9	141.8	155.9	141.8	155.9	155.9	150.3
8-ounce jar	-----	241.8	155.9	141.8	155.9	141.8	155.9	155.9	150.3
No. 1 picnic	68.3x101.7	309.0	192.8	184.3	192.8	184.3	198.5	198.5	184.3
No. 300	76.2x112.7	430.9	249.5	235.3	255.2	244.0	269.3	269.3	229.6
No. 303	81.0x111.1	477.7	277.8	263.7	283.5	269.3	297.7	297.7	255.2
No. 303 jar	-----	500.4	277.8	263.7	283.5	269.3	297.7	297.7	255.2
No. 2	87.3x115.9	581.2	354.4	348.7	354.4	340.2	362.9	354.4	320.4
No. 2-1/2	103.2x119.1	843.4	552.8	538.7	538.7	524.5	538.7	524.5	518.8
No. 2-1/2 jar	-----	837.5	547.2	533.0	533.0	518.8	533.0	518.8	510.3
No. 10	153.2x177.8	3102.9	1899.5	1871.1	1899.5	1871.1	1984.5	1927.8	1814.4

§52.676 Sizes of carrots in whole carrots.

The size of any carrot is determined by measuring the longest diameter through the center transverse to the longitudinal axis of the carrot.

§52.677 Sizes of carrot slices in sliced carrots.

The size of any slice in sliced carrots is determined by measuring the smallest diameter of the largest surface of the slice.

¹ Mixed Sizes in whole or sliced styles are based on drained weight for predominant size of individual units.

§52.678 Sizes of carrot quarters in quartered carrots.

The size of any quarter in quartered carrots with respect to diameter is determined by measuring the largest cut surface transverse to the longitudinal axis.

§52.679 Ascertaining the grade.

- (a) The grade of canned carrots is ascertained by considering, in conjunction with the requirements of the respective grade, the respective ratings for the factors of color, uniformity of size and shape, absence of defects, and texture.
- (b) 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 each such factor is:

Factors	Points
Color	25
Uniformity of size and shape	15
Absence of defects	30
Texture	30
Total Score	<u>100</u>

- (c) **Normal flavor and odor** means that the canned carrots are free from objectionable flavors and objectionable odors of any kind.

§52.680 Ascertaining the rating for the factors which are scored.

The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically. The numerical range for the rating of each factor is inclusive (for example **12 to 15 points** means 12, 13, 14, or 15 points).

§52.681 Color.

- (a) **"A" classification.** Canned carrots that possess a good color may be given a score of 21 to 25 points. **Good color** means that the canned carrots possess an orange-yellow color that is bright and typical of canned carrots, and that the presence of green units does not more than slightly affect the appearance or eating quality of the product.
- (b) **"C" classification.** If the canned carrots possess a fairly good color, a score of 18 to 20 points may be given. Canned carrots that fall 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 good color** means that the canned carrots possess the typical color of canned carrots, that such color may be slightly dull but not, off-color, and that the presence of green units does not materially affect the appearance or eating quality of the product.

- (c) **"SStd" classification.** Canned carrots that are off-color for any reason or that fail to meet the requirements of paragraph (b) of this section may be given a score of 0 to 17 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

§52.682 Uniformity of size and shape.

- (a) **"A" classification.** Canned carrots that are practically uniform in size and shape may be given a score of 12 to 15 points. **Practically uniform in size and shape** has the following meanings with respect to the various styles of canned carrots:

- (1) **Whole carrots.** The size of the individual carrot is not more than 1-3/4 inches in diameter, measured as aforesaid; the carrots may vary moderately in shape and the diameter of the largest unit is not more than 50 percent greater than the diameter of the second smallest unit.
- (2) **Quartered carrots.** The carrots from which the quarters have been prepared were of a size not more than 2-1/2 inches in diameter, measured as aforesaid, and the diameter of the largest quarter is not more than 50 percent greater than the diameter of the second smallest quarter, and the length of the longest quarter is not more than 50 percent greater than the length of the second shortest quarter.
- (3) **Sliced carrots.** The individual slice is not more than 3/8 inch in thickness when measured at the thickest portion; the diameter of each slice is not more than 2-1/2 inches, measured as aforesaid; and of all the slice carrots, in the 90 percent, by count, that are most uniform in diameter, the diameter of the slice with the greatest diameter does not exceed the diameter of the slice with the smallest diameter by more than 50 percent: **Provided**, that the overall appearance of the product is not materially affected.
- (4) **Diced carrots.** The units are practically uniform in size and shape with edges, other than the rounded outer edges, measuring approximately 1/2 inch or less; and the aggregate weight of all units of irregular shape which are noticeably smaller than one-half the volume of an average size cube and of all noticeable large and large irregular shaped units does not exceed 12 percent of the weight of all the units.
- (5) **Julienne, French style, or shoestring.** The strips of carrots are practically uniform in size and shape, with cross sections measuring approximately 3/16 inch, and the aggregate weight of all strips less than 1/2 inch in length does not exceed 12 percent of the weight of all the strips.

- (6) **Cut.** The individual units weigh not less than 1/4 ounce and the largest unit is not more than four times the weight of the second smallest unit. When cut longitudinally into two approximately equal units, the carrots from which the units have been prepared were of a size not more than 2-1/2 inches in diameter, measured as aforesaid, and the weight of the largest unit is not more than 50 percent greater than the weight of the second smallest unit.
- (b) **"C" classification.** If the canned carrots are fairly uniform in size and shape a score of 8 to 11 points may be given. Canned carrots that fall 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 uniform in size and shape** has the following meanings with respect to the various styles of canned carrots:
- (1) **Whole carrots.** The size of the individual carrot is not more than 2-1/4 inches in diameter, measured as aforesaid; the carrots may vary considerably in shape and the diameter of the largest unit is not more than twice the diameter of the second smallest unit.
- (2) **Quartered carrots.** The carrots from which the quarters have been prepared were of a size not more than 2-1/2 inches in diameter, measured as aforesaid, and the diameter of the largest quarter is not more than twice the diameter of the second smallest unit, and the length of the longest quarter is not more than twice the length of the second shortest quarter.
- (3) **Sliced carrots.** The individual slice is not more than 3/8 inch in thickness when measured at the thickest portion; the diameter of each slice is not more than 2-1/2 inches, measured as aforesaid; and of all the slice carrots, in the 90 percent, by count, that are most uniform in diameter, the diameter of the slice with the greatest diameter is not more than twice the diameter of the slice with the smallest diameter: **Provided**, that the overall appearance of the product is not seriously affected.
- (4) **Diced carrots.** The units are fairly uniform in size and shape with edges, other than the rounded outer edges, measuring approximately 1/2 inch or less; and the aggregate weight of all units of irregular shape which are noticeably smaller than one-half the volume of an average size cube and of all noticeable large and large irregular shaped units does not exceed 25 percent of the weight of all the units.
- (5) **Julienne, French style, or shoestring.** The strips of carrots are fairly uniform in size and shape, with cross sections measuring approximately 3/16 inch, and the aggregate weight of all strips less than 1/2 inch in length does not exceed 25 percent of the weight of all the strips.
- (6) **Cut.** The individual units weigh not less than 1/8 ounce and the largest unit is not more than twelve times the weight of the second smallest unit. When cut longitudinally into two approximately equal units, the carrots from which the units have been prepared were of a size not more than 2-1/2 inches in diameter, measured as aforesaid, and the weight of

the largest unit is not more than twice the weight of the second smallest unit.

- (c) **"SStd" classification.** Canned carrots that fail to meet the requirements of paragraph (b) of this section may be given a score of 0 to 7 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

§52.683 Absence of defects.

- (a) **General.** The factor of absence of defects refers to the degree of freedom from defective units. Defective units are units damaged by mechanical injury, unpeeled units, units blemished or seriously blemished by brown or black internal or external discoloration, sunburn, or green colored units, pathological injury or insect injury, and units blemished or seriously blemished by other means.

- (1) **Damaged by mechanical injury** means crushed, broken, or cracked units, units with excessively frayed edges and surfaces, excessively trimmed units, or damaged by other means.
- (2) **Unpeeled unit** means any unit possessing an unpeeled area greater than the area of a circle 1/4 inch in diameter.
- (3) **Blemished** means any unit blemished to the extent that the appearance or eating quality is materially affected.
- (4) **Seriously blemished** means any unit blemished to the extent that the appearance or eating quality is seriously affected.

- (b) **"A" classification.** Canned carrots that are practically free from defects may be given a score of 26 to 30 points. **Practically free from defects** has the following meanings with respect to the various styles of canned carrots:

- (1) **Whole carrots.** The aggregate weight of all defective units does not exceed 15 percent of the weight of all the units, and of such 15 percent not more than 1/2 thereof or one carrot, whichever weighs more, may consist of blemished units and seriously blemished units: **Provided**, that not more than 1 percent, by weight, of all the units may be seriously blemished and that the presence of blemished and seriously blemished units does not more than slightly affect the appearance or eating quality of the product.
- (2) **Sliced, quartered, and cut carrots.** The aggregate weight of all defective units does not exceed 15 percent of the weight of all the units, and of such 15 percent not more than 1/2 thereof or one slice, quarter or cut, whichever weighs more, may consist of blemished units and seriously blemished units: **Provided**, that not more than 1 percent, by weight, of all the units may be seriously blemished, and that the presence of blemished and seriously blemished units does not more than slightly affect the appearance or eating quality of the product.
- (3) **Diced, Julienne, French Style, shoestring carrots.** The aggregate

weight of all defective units does not exceed 10 percent of the weight of all the units and of such 10 percent not more than 1/2 thereof may consist of blemished units and seriously blemished units: **Provided**, that not more than 1 percent, by weight, of all the units may be seriously blemished, and that the presence of blemished and seriously blemished units does not more than slightly affect the appearance or eating quality of the product.

- (c) **"C" classification.** Canned carrots that are fairly free from defects may be given a score of 22 to 25 points. Canned carrots that fall 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** has the following meanings with respect to the various styles of canned carrots:
- (1) **Whole carrots.** The aggregate weight of all defective units does not exceed 25 percent of the weight of all the units, and of such 25 percent not more than 1/2 thereof may consist of blemished units and seriously blemished units: **Provided**, that not more than 2 percent, by weight, of all the units may be seriously blemished and that the presence of blemished and seriously blemished units does not seriously affect the appearance or eating quality of the product.
 - (2) **Sliced, quartered, and cut carrots.** The aggregate weight of all defective units does not exceed 25 percent of the weight of all the units, and of such 25 percent not more than 1/2 thereof may consist of blemished units and seriously blemished units: **Provided**, that not more than 2 percent, by weight, of all the units may be seriously blemished, and that the presence of blemished and seriously blemished units does not seriously affect the appearance or eating quality of the product.
 - (3) **Diced, Julienne, French Style, shoestring carrots.** The aggregate weight of all defective units does not exceed 20 percent of the weight of all the units and of such 20 percent not more than 1/2 thereof may consist of blemished units and seriously blemished units: **Provided**, that not more than 2 percent, by weight, of all the units may be seriously blemished, and that the presence of blemished and seriously blemished units does not seriously affect the appearance or eating quality of the product.
- (d) **"SStd" classification.** Canned carrots that fail to meet the requirements of paragraph (c) of this section may be given a score of 0 to 21 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

§52.684 Texture.

- (a) **General.** The factor of texture refers to the tenderness of the carrots and the degree of freedom from coarse and fibrous units.
- (b) **"A" classification.** Canned carrots that possess a tender texture may be given a score of 26 to 30 points. **Tender texture** means that the carrots are tender and firm but not fibrous, and possess a practically uniform texture.
- (c) **"C" classification.** If the canned carrots possess a fairly tender texture, a score of 22 to 25 points may be given. Canned carrots that fall 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 tender texture** means that the carrots are fairly tender, may be variable in texture but not soft or mushy, tough or hard, and there may be present a few units which possess a coarse or fibrous texture.
- (d) **"SStd" classification.** Canned carrots that fail to meet the requirements of paragraph (c) of this section may be given a score of 0 to 21 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

§52.685 Ascertaining the grade of a lot.

The grade of a lot of canned carrots 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).

§52.686 Score sheet for canned carrots.

Number, size and kind of container			
Container marks or identification			
Label			
Net weight (ounces)			
Vacuum (inches)			
Drained weight (ounces)			
Style			
Size of whole carrots (count)			
Size of sliced carrots (diameter)			
Factors		Score Points	
Color	25	"A" 21-25 "C" 18-20 <u>1/</u> "SStd" 0-17 <u>1/</u>	
Uniformity of size and shape	15	"A" 12-15 "C" 8-11 <u>1/</u> "SStd" 0-07 <u>1/</u>	
Absence of defects	30	"A" 26-30 "C" 22-25 <u>1/</u> "SStd" 0-21 <u>1/</u>	
Texture	<u>30</u>	"A" 26-30 "C" 22-25 <u>1/</u> "SStd" 0-21 <u>1/</u>	
Total Score	100		
Normal flavor and odor			
Grade			

1/ Indicates limiting rule

/s/ _____

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