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United States Standards for Grades of Frozen Carrots

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This is a reprint of the United States Standards for Grades of Frozen Carrots (39 FR 2096) which have been in effect since February 28, 1974 and were updated to modify the format and make minor grammatical and spelling changes.

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.

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United States Standards for Grades of Frozen Carrots

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Product Description, Styles, and Grades

§52.701 Product description.

Frozen carrots are the clean and sound product prepared from the fresh root of the carrot plant (*Daucus carota*) by washing, sorting, peeling, trimming, and blanching, and are frozen in accordance with good commercial practice and maintained at temperatures necessary for the preservation of the product.

§52.702 Styles of frozen carrots.

- (a) **Whole** or **whole carrots** means carrots that retain the approximate conformation of a whole carrot.
- (b) **Halves** or **halved** means carrots cut longitudinally into two units.
- (c) **Quarters** or **quartered** means carrots cut longitudinally into four approximately equal units. Carrots cut longitudinally or cut longitudinally and crosswise into six or eight units approximating the size and appearance of quartered carrots are also permitted in this style.
- (d) **Slices** or **sliced** means carrots sliced transversely to the longitudinal axis.
- (e) **Diced** means carrots consisting of approximate cube-shaped units.
- (f) **Double-diced** means carrots that consist of approximate rectangular shapes which resemble the equivalent of two cube-shaped units.
- (g) **Strips** means carrots that consist of longitudinally-cut strips and includes such forms as French style (or shoestring).
- (h) **Chips** means carrots that consist of predominately small-sized units (such as less than one-half cube) and variously shaped pieces or slivers in which the longest-edge dimension approximates not more than one-half inch.
- (i) **Cut** means carrots consisting of cut units which do not conform to any of the forgoing styles.

§52.703 Grades of frozen carrots.

- (a) **U.S. Grade A** (or **U.S. Fancy**) is the quality of frozen carrots of any style other than chips that possess similar varietal characteristics; that possess a normal flavor and odor; that possess a good color; that are practically uniform in size and shape for the applicable style; that are practically free from defects; that are

tender; and that score 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. Extra Standard)** is the quality of frozen carrots of any style that possess similar varietal characteristics; that possess a normal flavor and odor; that possess a reasonably good color; that are reasonably uniform in size and shape for the applicable style; that are reasonably free from defects; that are reasonable tender; and that score not less than 80 points when scored in accordance with the scoring system outlined in this subpart.
- (c) **Substandard** is the quality of frozen carrots that fail to meet the requirements of U.S. Grade B.

Factors of Quality

§52.704 **Ascertaining the grade of a sample unit.**

- (a) **General.** In addition to considering other requirements outlined in the standards, the following quality factors are evaluated in ascertaining the grade of the product.

- (1) **Factors not rated by score points.**

- (i) Varietal characteristics.
 - (ii) Flavor and odor.

- (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 each such factor is:

Factors	Points
Color	20
Uniformity of size and shape	20
Absence of defects	30
Texture	<u>30</u>
Total score	100

- (b) **Evaluation of quality.** The score for the factors of color, uniformity of size and shape, and absence of defects in frozen carrots is determined immediately after thawing to the extent that the product is substantially free from ice crystals and can be handled as individual units. A representative sample of the product is cooked to determine texture and flavor and odor.

- (c) **Definition of normal flavor and odor.** **Normal flavor and odor** means a good characteristic flavor and odor of properly prepared frozen carrots that are free from objectionable flavors and objectionable odors of any kind, as evaluated after thawing and after cooking.

§52.705 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).

§52.706 Color.

- (a) **General.** The evaluation of color shall be determined on the thawed product. The color is based upon the uniformity and the brightness of the typical exterior yellow to orange-yellow color of the units. The presence of green, white, or orange-brown units are scored under this factor when the over-all color is affected.
- (b) **“A” classification.** Frozen carrots that possess a good color may be given a score of 18 to 20 points. **Good color** means that the frozen carrots possess an orange-yellow color that is bright and typical of frozen carrots and that the presence of green, white, or orange-brown units does not more than slightly affect the appearance or eating quality of the product.
- (c) **“B” classification.** If the frozen carrots possess a reasonably good color, a score of 16 to 17 points may be given. Frozen carrots that fall 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 frozen carrots possess a typical color of frozen carrots and such color may be slightly dull but not off color and that the presence of green, white, or orange-brown units does not materially affect the appearance or eating quality of the product.
- (d) **“SStd” classification.** Frozen carrots that fail to meet the requirements of paragraph (c) of this section 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).

§52.707 Uniformity of size and shape.

(a) Ascertaining dimensions. Size dimensions of the various units are measured as follows:

- (1) Diameter of whole carrots.** The diameter of a whole carrot is the shortest diameter at the greatest circumference measured at right angles to the longitudinal axis of the carrot.
- (2) Width of halved carrots.** The width of a half is the widest cut surface measured at right angles to the length.
- (3) Width of quartered carrots.** The width of a quarter is the widest cut surface measured at right angles to the length.
- (4) Diameter and thickness of sliced carrots.** The diameter of a slice is the shortest diameter of the larger of the two cut surfaces of the slice. The thickness of a slice is measured at its thickest portion.
- (5) Size of diced carrots.** The size of a dice is the length of the edge (other than rounded outer edges) which is the most representative of the cube's size.

(b) Definitions of shapes and sizes.

- (1) Other shapes and sizes** with respect to all styles include, but are not limited to, noticeably large units much in excess of normal size units for the style and large, irregularly-shaped units not normal for the style; and with respect to diced and double-diced styles include units of irregular shapes which are noticeably smaller than the equivalent of one-half the volume of an average size cube or double-diced cube, as the case may be.
- (2) Very small pieces** with respect to diced style means pieces smaller than the equivalent of one-fourth the volume of an average size cube, and with respect to double-diced style means pieces smaller than the equivalent of one-fourth the volume of an average size double-diced unit.

(c) “A” classification. Frozen carrots of styles other than **chips** that are practically uniform in size and shape may be given a score of 18 to 20 points. **Practically uniform in size and shape** means that:

- (1) The carrots comply with the measurement, shape, and uniformity requirements for “A” classification in Table I of this subpart; and, in addition**

- (2) The over-all appearance of the product for the applicable style is not materially affected by sizes and shapes other than that of normal-shaped units which may vary moderately in shape.
- (d) **“B” classification.** If the frozen carrots of any style are reasonably uniform in size and shape, a score of 16 or 17 points may be given. Frozen carrots that fall 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 uniform in size and shape** means that:
 - (1) The carrots comply with the measurement, shape, and uniformity requirements for “B” classification in Table I of this subpart; and, in addition
 - (2) The overall appearance of the product for the applicable style is not seriously affected by sizes and shapes other than that of normal-shaped units which may vary considerably in shape.
- (e) **“SStd” classification.** Frozen carrots that fail to meet the requirements of paragraph (d) of this section 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).

Table I – Uniformity of Size and Shape Requirements for Frozen Carrots

“A” Classification

Styles	Measurement and/or shape of individual units	Uniformity of units of product, excluding 10%, by count, that vary to an extreme.
Whole	1½-inch maximum diameter.	Unit with largest diameter, or width, is not more than twice that of unit with smallest diameter, or width.
Halved	1½ inch maximum width.	Unit with largest diameter, or width, is not more than twice that of unit with smallest diameter, or width.
Quartered	1¼-inch maximum width.	Unit with largest diameter, or width, is not more than twice that of unit with smallest diameter, or width.
Sliced	2-inch maximum diameter. Approximate ¾-inch maximum thickness.	Unit with largest diameter is not more than twice that of unit with smallest diameter and uniformity of thickness does not vary markedly.
Diced	Approximate cube-shapes ½ inch or less in size.	10%, by weight, maximum may be other shapes and sizes. ¹
Double-diced	Approximate double-cube shapes, 1 inch or less long; ½ inch or less in cross-section diameter.	12%, by weight, maximum may be other shapes and sizes. ¹
Strips	Approximate french-cut shapes, with flat-parallel or corrugated-parallel surfaces, ½ inch or more in length.	12%, by weight, maximum may be less than ½ inch long.
Cuts	Units may vary considerably in size and shape provided over-all appearance is not materially affected.	
Chips	(Limited to Grade B or lower)	

¹ Provided, presence of very small pieces does not materially affect appearance of product.

Table I – Uniformity of Size and Shape Requirements for Frozen Carrots
(Continuation)

“B” Classification

Styles	Measurement and/or shape of individual units	Uniformity of units of product, excluding 10%, by count, that vary to an extreme.
Whole	2¼-inch maximum diameter.	Unit with largest diameter, or width, is not more than twice that of unit with smallest diameter, or width.
Halved	1¾-inch maximum width.	Unit with largest diameter, or width, is not more than twice that of unit with smallest diameter, or width.
Quartered	1¾-inch maximum width.	Unit with largest diameter, or width, is not more than twice that of unit with smallest diameter, or width.
Sliced	2½-inch maximum diameter. Approximate ¾-inch maximum thickness.	No limits as to uniformity between largest and smallest diameters but variations in diameters and thickness do not seriously affect over-all appearance
Diced	Approximate cube-shapes, ½ inch or less in size.	20%, by weight, maximum may be other shapes and sizes. ²
Double-diced	Approximate double-cube shapes of varying sizes and shapes.	25%, by weight, maximum may be other shapes and sizes. ²
Strips	Approximate french-cut shapes, with flat-parallel or corrugated-parallel surfaces, ½ inch or more in length.	25%, by weight, maximum may be less than ½ inch long.
Cuts	Units may vary considerably in size and shape provided over-all appearance is not seriously affected.	
Chips	Units are small (such as less than ½ cube), individually reasonably uniform in weight, may be variously shaped, approximating not more than ½ inch in longest-edge dimension.	

² Provided, presence of very small pieces does not seriously affect appearance of product.

§52.708 Absence of defects.

- (a) **General.** The factor of absence of defects refers to the degree of freedom from defective units or defects. **Defective units** or **defects** are units damaged by mechanical injury or other means; unpeeled units; units blemished or seriously blemished by brown or black internal or external discoloration, sunburn, or green or white colored units, pathological injury or insect injury; and units blemished or seriously blemished by other means.
- (b) **Definitions of defective units and defects.**
- (1) **Damaged by mechanical injury or other means** include crushed, broken, or cracked units; units with excessively frayed edges and surfaces; excessively or poorly trimmed units; or damaged by other similar means to an extent that the appearance or eating quality of the unit is seriously affected.
- (2) **Unpeeled areas** are considered defects when on whole, halved, or quartered units the unpeeled area is greater than the area of a circle three-eighths inch in diameter; and on smaller units the unpeeled area is greater than the area of a circle one-eighth 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.
- (c) **“A” classification.** Frozen carrots that are practically free from defects may be given a score of 27 to 30 points. **Practically free from defects** means that:
- (1) The limits for allowable defects or defective units in the applicable styles do not exceed the maximum limits for “A” classification in Table II of this subpart; and
- (2) Notwithstanding the applicable allowances in Table II the defects or defective units (whether or not specifically defined), individually or collectively, do not materially affect the appearance or edibility of the product.
- (d) **“B” classification.** If the frozen carrots are reasonably free from defects, a score of 24 to 26 points may be given. Frozen carrots that fall 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 free from defects** means that:

- (1) The limits for allowable defects or defective units in the applicable styles do not exceed the maximum limits for “B” classification in Table II of this subpart; and
 - (2) Notwithstanding the applicable allowances in Table II the defects or defective units (whether or not specifically defined), individually or collectively, do not seriously affect the appearance or edibility of the product.
- (e) **“SStd” classification.** Frozen carrots that fail to meet the requirements of paragraph (d) of this section may be given a score of 0 to 23 points and shall not be graded above Substandard, regardless of the total score of the product (this is a limiting rule).

Table II – Maximum Allowances for Defects or Defective Units in Frozen Carrots

Defects (For styles, as indicated)	“A” Classification	“B” Classification
Whole, halved, quartered:		
Total all defects, including blemished and seriously blemished.	15%, by count, of all units.	25%, by count, of all units.
Blemished and seriously blemished.	Limitations ¹ – 7½%, by count, but no more than 2%, by count, seriously blemished.	Limitations ² – 12½%, by count, but no more than 4%, by count, seriously blemished.
Sliced, cut:		
Total all defects, including blemished and seriously blemished.	15%, by weight, of all units.	25%, by weight, of all units.
Blemished and seriously blemished.	Limitations ¹ – 7½%, by weight, but no more than ¾ of 1%, by weight, seriously blemished.	Limitations ² – 12½%, by weight, but no more than 1½%, by weight, seriously blemished.
Diced, Double-diced, strips:		
Total all defects, including blemished and seriously blemished.	10%, by weight, of all units.	16%, by weight, of all units.
Blemished and seriously blemished.	Limitations ¹ – 5%, by weight, but no more than ¾ of 1%, by weight, seriously blemished.	Limitations ² – 8%, by weight, but no more than 1½%, by weight, seriously blemished.
Chips:		
Total all defects, including blemished and seriously blemished.	Limited to Grade B or lower classification.	16%, by weight, of all units.
Blemished and seriously blemished.	—	Limitations ² – 8%, by weight, but no more than 1½%, by weight, seriously blemished.

¹ Provided such blemished and/or seriously blemished units do not materially affect the appearance or edibility of the product.

² Provided such blemished and/or seriously blemished units do not seriously affect the appearance or edibility of the product.

§52.709 Texture.

- (a) **General.** The factor of texture refers after cooking to the tenderness and freedom from mushiness of the carrots and the degree of freedom from coarse or fibrous units.
- (b) **“A” classification.** Frozen carrots that possess a tender texture may be given a score of 27 to 30 points. **Tender texture** means that the carrots are tender, not fibrous nor mushy, and possess a practically uniform texture.
- (c) **“B” classification.** If the frozen carrots possess a reasonably tender texture, a score of 24 to 26 points may be given. Frozen carrots that fall 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 tender texture** means that the carrots are reasonably tender, may be variable in texture but not generally tough, hard, nor mushy, and there may be present a few units which possess a coarse, fibrous, or mushy texture.
- (d) **“SStd” classification.** Frozen carrots that fail to meet the requirements of paragraph (c) of this section may be given a score of 0 to 23 points and shall not be graded above Substandard, regardless of the total score for the product (this is a limiting rule).

Lot Inspection and Certification

§52.710 Ascertaining the grade of a lot.

The grade of a lot of frozen carrots covered by these standards is determined by 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 52.87).

Score Sheet

§52.711 Score sheet for frozen carrots.

Size and kind of container			
Container marks or identification			
Label			
Net weight (ounces)			
Style			
Factors	Score Points		
Color	20	“A” “B” “SStd”	18-20 16-17 ¹ 0-15 ¹
Uniformity of size and shape	20	“A” “B” “SStd”	18-20 ² 16-17 ¹ 0-15 ¹
Absence of defects	30	“A” “B” “SStd”	27-30 24-26 ¹ 0-23 ¹
Texture	30	“A” “B” “SStd”	27-30 24-26 ¹ 0-23 ¹
Total score	100		
Grade			
Flavor and odor			

¹ Indicates limiting rule.

² Limits style of **chips** to Grade B or lower.