



**United States
Department of
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Agricultural
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Service

Fruit and
Vegetable
Division

Processed
Products
Branch

United States Standards for Grades of Canned Tomatoes

Effective April 13, 1990

This is the eighth issue of the United States Standards for Grades of Canned Tomatoes published in the **FEDERAL REGISTER** of March 14, 1990 (55 FR 9412) to become effective April 13, 1990.

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 TOMATOES**

EFFECTIVE APRIL 13, 1990

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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.

§52.5161 Product description.

The products to which these standards apply are defined in the Standards of Identity issued under the Federal Food, Drug, and Cosmetic Act as:

- (a) **Canned** tomatoes (21 CFR 155.190); and
- (b) **Canned** stewed tomatoes (21 CFR 155.190).

§52.5162 Styles.

- (a) **Whole** means tomatoes, peeled or unpeeled, of any size that are substantially whole or almost whole.
- (b) **Sliced** means tomatoes, peeled or unpeeled, that have been cut into units of approximately uniform thickness.
- (c) **Halves** means tomatoes, peeled or unpeeled, that have been cut into two approximately equal halves.
- (d) **Wedges** means tomatoes, peeled or unpeeled, that have been cut into approximate quarters or wedge-shaped sectors.
- (e) **Diced** means tomatoes, peeled or unpeeled, that have been cut into approximate cube-shaped units.

§52.5163 Type of pack.

Regular pack means tomatoes packed in a medium consisting of tomato juice, tomato puree, or tomato paste.

§52.5164 Definitions of terms.

- (a) **Character** means the degree of firmness normally found when tomatoes have been processed using good manufacturing practices as defined in 21 CFR Part 110. Canned and stewed tomatoes that, when fully cooked, are excessively soft or mushy are considered to lack character. Excessively soft is further defined for all styles and means that the unit may disintegrate upon handling, has evidence of sloughing (erosion of the tomato tissue) or has ragged edges, and has lost ability to retain shape. For the purposes of these grade standards, character is classified as good, reasonably good and fairly good. There is no substandard classification for the quality factor of character.

- (1) **Good character** in whole, halves, wedges, or sliced tomatoes is defined as tomatoes in which not more than 15 percent by count are excessively soft or mushy. Good character in diced tomatoes is defined as diced tomatoes in which not more than 15 percent by weight are excessively soft or mushy.
- (2) **Reasonably good character** in whole, halves, wedges, or sliced tomatoes is defined as tomatoes in which not more than 25 percent by count are excessively soft or mushy. Reasonably good character in diced tomatoes is defined as diced tomatoes in which not more than 25 percent by weight are excessively soft or mushy.
- (3) **Fairly good character** in whole, halves, wedges, or sliced tomatoes is defined as tomatoes in which more than 25 percent by count are excessively soft or mushy. Fairly good character in diced tomatoes is defined as diced tomatoes in which more than 25 percent by weight are excessively soft or mushy.

(b) **Color.**

- (1) **USDA Tomato Red** means the color of an USDA approved plastic color comparator.
- (2) **Minimum Red for Canned Tomatoes** means the equivalent of any of the colors produced by blending the combinations of the following Munsell Color discs of equal diameter when placed as indicated.

Red - Munsell 5 R 2.6/13 (glossy finish)
Yellow - Munsell 2.5 YR 5/12 (glossy finish)
Black - Munsell N 1/ (glossy finish)
Grey - Munsell N 4 (mat finish)

- (i) The discs are placed so that one-third of the area of the Red disc, and not more than one third of the area of the Yellow disc, are exposed. The exposed areas of the Black and Gray discs make up the remainder of the area.
- (ii) To determine U.S. Grade C Color for canned and stewed tomatoes, apply the test for strength and redness of color outlined in 21 CFR 155.190 (b).

- (c) **Defects** refer to objectionable core material, tomato peel, extraneous vegetable material (EVM), blemished areas, and discolored portions that affect the appearance and eating quality of the product as further described below.
- (1) **Blemished areas** are abnormal areas on the tomatoes which contrast strongly in color and/or texture with normal tomato tissue. Blemished areas may show objectionable discoloration ranging from light to dark discoloration. Blemished areas include but are not limited to scarred, raised, scabby tissue; darkened, tough areas which remain around the core area; internal or external dark tissue around blossom ends of the tomatoes; or any other areas that are objectionable or unsightly.
- (2) **Discolored portions** are imperfections of the tomato tissue which may not be of strong contrasting color with respect to the tomato tissue but which detract slightly from the appearance of the product. Examples include sunburned areas, internal browning or tobacco mosaic, cloudy spots or ghost spots.
- (3) **Extraneous vegetable material (EVM)** is vegetable material that is not harmful and includes, but is not limited to, whole or parts of stems, calyx bracts, tomato leaves or portions thereof, sprouted seeds, and other similar vegetable material which may not be part of the tomato plant.
- (4) **Objectionable core material** is tomato material associated with the core of the tomato which detracts from the appearance or edibility of the product and includes tough fibers and tough or slightly discolored tomato tissue.
- (5) **Peel** means the loose or attached skin of the tomato.
- (d) **Drained tomatoes** means all of the tomato material that remains on the sieve after draining as prescribed in 21 CFR 155.190.
- (e) **Flavor and odor.**
- (1) **Normal flavor and odor** means a typical characteristic flavor and odor of mature tomatoes.

(2) **Off-flavor and off-odor** means any flavor or odor other than typical characteristic flavor and odor of mature tomatoes that is objectionable.

(f) **Whole or almost whole**, for whole style only, regardless of size, means that:

- (1) The contour of the tomato is not materially affected by coring, trimming, or other means;
- (2) The tomato may be cracked or split but not to the extent that there is material loss of seeds or placenta (gelatinous mass filling the seed cavity); and
- (3) The tomato units may be restored to their approximate original shape during handling.

§52.5165 Fill of container.

The standard of fill of container for canned tomatoes [21 CFR 155.190 (c)] requires that the product occupy not less than 90 percent of the water capacity of the container.

§52.5166 Minimum drained weight averages.

- (a) The average minimum drained weight requirements for U.S. Grades are listed in Table I in §52.5170.
- (b) The drained weight must not be less than 50 percent of the weight of water required to fill the container.
- (c) The minimum drained weight averages are based on equalization of the product 15 days or more after the product has been canned.
- (d) The method for ascertaining drained weight for all styles of canned and stewed tomatoes is found in 21 CFR 155.190 except that the U.S. Standard Number 8 circular sieve is used in lieu of a U.S. Standard Number 2 circular sieve for "sliced" and "diced" styles of canned and stewed tomatoes.

(e) **Meeting drained weight averages.** A lot of canned tomatoes is considered as meeting the minimum drained weight averages if the following criteria are met:

(1) The average of the drained weights from all the containers in the sample meets the average drained weight in Table I in §52.5170.

(2) The drained weights from the individual containers which do not meet the minimum are:

(i) For No. 2 1/2 can size and smaller, **all styles except diced:** not more than 0.7 ounce lower than the minimum average.

(ii) For No. 2 1/2 can size and smaller, **diced style:** not more than 0.5 ounce lower than the minimum average.

(iii) For No. 10 cans, **all styles:** not more than 2.0 ounces below the minimum average; and

(3) The number of containers in the sample which do not meet the requirements of paragraph (e)(2) of this section, does not exceed the acceptance number prescribed for the sample size in 7 CFR 52.38, Table I.

§52.5167 Sample unit sizes.

(a) For "whole", "halves", and "wedges" styles, the sample unit size is the amount of product specified to be used for inspection in 7 CFR 52.38, Table 1.

(b) For "sliced" and "diced" styles, the sample unit size is the same as indicated in paragraph (a) of this section EXCEPT in containers Number 10 (No. 10) can size and larger, an optional sample unit size of 32 ounces per container (drained weight) is permitted.

§52.5168 Grades.

(a) **U.S. Grade A** is the quality of canned tomatoes that meets the applicable requirements of Tables I, II, III, IV, and V of §52.5170, and scores not less than 90 points.

- (b) **U.S. Grade B** is the quality of canned tomatoes that meets the applicable requirements of Tables I, II, III, IV, and V of §52.5170, and scores not less than 80 points.
- (c) **U.S. Grade C** is the quality of canned tomatoes that meets the applicable requirements of Tables I, II, III, IV, and V of §52.5170, and scores not less than 70 points.
- (d) **Substandard** is the quality of canned tomatoes that fails the requirements for U.S. Grade C.

§52.5169 Factors of quality.

The grade of canned tomatoes is based on the following quality factors:

- (a) Drained weight;
- (b) Character;
- (c) Color;
- (d) Wholeness ("whole style" only);
- (e) Flavor and odor; and
- (f) Defects.

§52.5170 Requirements for grades.

TABLE I
MINIMUM DRAINED WEIGHT AVERAGES
FOR CANNED TOMATOES AND STEWED TOMATOES
ALL GRADES, ALL STYLES
[English (avoirdupois) weights]

Container	Container Dimensions <u>1/</u>	Average drained weight (ounces)	
		U.S. Grade A and B	U.S. Grade C
8 oz Tall	211 X 304	5.0	4.3
No. 300	300 X 407	8.8	7.6
No. 303	303 X 406	9.8	8.5
No. 2	307 X 409	11.9	10.3
No. 2-1/2	401 X 411	17.3	14.9
No. 10	603 X 700	63.5	54.7

1/ The first figure in this column represents the diameter of the container and the second figure represents the height. The first digit in each number represents inches and the second two digits represent sixteenths of an inch. Thus 307 is three and seven-sixteenths inches.

TABLE II
MAXIMUM DEFECTS PERMITTED IN EACH GRADE
ALL STYLES

		In a single container		
	Defect (aggregate area)	In cans of less than 2 pounds total contents (in any container)	In cans of 2 or more pounds total contents (equivalent amount per pound of contents of any container).	In total sample representing a lot; in cans of any size [per pound of total contents of all containers (average)].
Grade A	Peel	2 square inches.	1 square inch.	1/2 square inch.
	Blemished areas	1/8 square inch.	1/16 square inch.	1/16 square inch.
	Discolored portions	1/2 square inch.	1/4 square inch.	1/4 square inch.
Grade B	Peel	3 square inches.	2 square inches.	1.06 square inches.
	Blemished areas	1/4 square inch.	1/8 square inch.	1/8 square inch.
	Discolored portions	1 square inch.	1/2 square inch.	1/2 square inch.
Grade C	Peel	No limit.	No limit.	1.06 square inches.
	Blemished areas	1/2 square inch.	1/4 square inch.	1/4 square inch.
	Discolored portions	1-1/2 square inches.	3/4 square inch.	3/4 square inch.

**TABLE III - QUALITY REQUIREMENTS
FOR CANNED TOMATOES AND STEWED TOMATOES 1/
WHOLE STYLE**

FACTOR	Grade A	Grade B	Grade C
<u>Average</u> <u>Drained weight:</u>	See Table I	See Table I	See Table I
<u>Character:</u> (by count)	Good character	Reasonably good character	Fairly good character
Score	18 - 20 points	16 - 17 points <u>2/</u>	14 - 15 points <u>3/</u>
<u>Color:</u> (by surface area)	At least 90% USDA Tomato Red, but not more than 5% less red than Minimum Red for Canned Tomatoes or yellow, and none may be vivid green.	At least 50% USDA Tomato Red, but not more than 10% less red than Minimum Red for Canned Tomatoes or yellow, and none may be vivid green.	Meets FDA requirements for strength and redness of color [21 CFR 155.190 (b)].
Score	27 - 30 points	24 - 26 points <u>2/</u>	21 - 23 points <u>3/</u>
<u>Wholeness:</u>	80% by weight whole or almost whole.	70% by weight whole or almost whole.	Less than 70% whole or almost whole.
Score	18 - 20 points	16 - 17 points <u>4/</u>	14 - 15 points <u>3/</u>
<u>Flavor:</u>	Normal	Normal	Normal

1/ Stewed tomatoes are graded excluding other vegetable ingredients.

2/ Cannot be graded above U.S. Grade B, regardless of the total score.

3/ Cannot be graded above U.S. Grade C, regardless of the total score.

4/ Can be graded U.S. Grade A, if the total score requirement is met.

**TABLE III - QUALITY REQUIREMENTS
FOR CANNED TOMATOES AND STEWED TOMATOES 1/
WHOLE STYLE**

(Continued)

FACTOR	Grade A	Grade B	Grade C
<u>Defects:</u>			
Core material	Trace	Slight	Moderate
EVM	Trace	Slight	Moderate
Peel	See Table II	See Table II	See Table II
Blemished areas	See Table II	See Table II	See Table II
Discolored portions	See Table II	See Table II	See Table II
Score	27 - 30 points	24 - 26 points <u>2/</u>	21 - 23 points <u>3/</u>
Total Score	90 - 100 points	80 - 89 points	70 - 79 points

1/ Stewed tomatoes are graded excluding other vegetable ingredients.

2/ Cannot be graded above U.S. Grade B, regardless of the total score.

3/ Cannot be graded above U.S. Grade C, regardless of the total score.

**TABLE IV - QUALITY REQUIREMENTS
FOR CANNED TOMATOES AND STEWED TOMATOES 1/
HALVES AND WEDGES STYLES**

FACTOR	Grade A	Grade B	Grade C
<u>Average Drained weight:</u>	See Table I	See Table I	See Table I
<u>Character:</u> (by count)	Good character	Reasonably good character	Fairly good character
Score	18 - 20 points	16 - 17 points <u>2/</u>	14 - 15 points <u>3/</u>
<u>Color:</u> (by surface area)	At least 90% USDA Tomato Red, but not more than 5% less red than Minimum Red for Canned Tomatoes or yellow, and none may be vivid green.	At least 50% USDA Tomato Red, but not more than 10% less red than Minimum Red for Canned Tomatoes or yellow, and none may be vivid green.	Meets FDA requirements for strength and redness of color [21 CFR 155.190 (b)].
Score	27 - 30 points	24 - 26 points <u>2/</u>	21 - 23 points <u>3/</u>
<u>Flavor:</u>	Normal	Normal	Normal
<u>Defects:</u>			
Core material	Trace	Slight	Moderate
EVM	Trace	Slight	Moderate
Peel	See Table II	See Table II	See Table II
Blemished areas	See Table II	See Table II	See Table II
Discolored portions	See Table II	See Table II	See Table II
Score	27 - 30 points	24 - 26 points <u>2/</u>	21 - 23 points <u>3/</u>
Total Score <u>4/</u>	90 - 100 points	80 - 89 points	70 - 79 points

1/ Stewed tomatoes are graded excluding other vegetable ingredients.

2/ Cannot be graded above U.S. Grade B, regardless of the total score.

3/ Cannot be graded above U.S. Grade C, regardless of the total score.

4/ For **Halves** and **Wedges** styles, the final total score is adjusted by dividing the total score by 80 then multiplying by 100 to allow for the absence of the factor of wholeness.

**TABLE V - QUALITY REQUIREMENTS
FOR CANNED TOMATOES AND STEWED TOMATOES 1/
SLICED AND DICED STYLES**

FACTOR	Grade A	Grade B	Grade C
<u>Average Drained weight:</u>	See Table I	See Table I	See Table I
<u>Character:</u> Sliced: by count Diced: by weight Score	Good character 18 - 20 points	Reasonably good character 16 - 17 points <u>2/</u>	Fairly good character 14 - 15 points <u>3/</u>
<u>Color:</u> (by surface area) Score	At least 90% USDA Tomato Red, but not more than 5% less red than Minimum Red for Canned Tomatoes or yellow, and none may be vivid green. 27 - 30 points	At least 50% USDA Tomato Red, but not more than 10% less red than Minimum Red for Canned Tomatoes or yellow, and none may be vivid green. 24 - 26 points <u>2/</u>	Meets FDA requirements for strength and redness of color [21 CFR 155.190 (b)]. 21 - 23 points <u>3/</u>
<u>Flavor:</u>	Normal	Normal	Normal
<u>Defects:</u> Core material EVM Peel Blemished areas Discolored portions Score	 Trace Trace See Table II See Table II See Table II 27 - 30 points	 Slight Slight See Table II See Table II See Table II 24 - 26 points <u>2/</u>	 Moderate Moderate See Table II See Table II See Table II 21 - 23 points <u>3/</u>
Total Score <u>4/</u>	90 - 100 points	80 - 89 points	70 - 79 points

1/ Stewed tomatoes are graded excluding other vegetable ingredients.

2/ Cannot be graded above U.S. Grade B, regardless of the total score.

3/ Cannot be graded above U.S. Grade C, regardless of the total score.

4/ For **Sliced** and **Diced** styles, the final total score is adjusted by dividing the total score by 80 then multiplying by 100 to allow for the absence of the factor of wholeness.

§52.5171 Determining the grade of a lot.

The grade of a lot of canned tomatoes covered by these standards is determined by the procedures found 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).

Dated: March 9, 1990.

/s/
Kenneth C. Clayton
Acting Administrator