



**United States
Department of
Agriculture**

**Agricultural
Marketing
Service**

**Fruit and
Vegetable
Division**

**Fresh
Products
Branch**

United States Standards for Grades of Tomatoes for Processing

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United States Standards for Grades of Tomatoes for Processing ¹

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General

§51.3310 General.

(a) The standards contained in this subpart apply to an inspection procedure for determining the quality of tomatoes for processing based on two factors:

(1) Color measurement by use of an electronic colorimeter instrument or subjective visual color evaluation of individual fruit; and,

(2) Classification of defects. Calculation of percentages shall be on the basis of weight.

¹Packing of the products in conformity with the requirements 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.

Categories

§51.3311 Category A.

"Category A" consists of tomatoes which meet the following requirements:

- (a) Basic requirements:
 - (1) Firm; and,
 - (2) Color:
 - (i) Electronic color determination shall be as specified in §51.3317; or
 - (ii) Visual color analysis shall be as specified in §51.3317.
- (b) Free from:
 - (1) Any worm attached;
 - (2) Worm injury;
 - (3) Freezing;
 - (4) Stems over 1 inch in length;
 - (5) Mechanical damage when more than one locule is exposed or when causing a loss of more than 10 percent by weight, of the tomato;
 - (6) Mold or decay; and,
 - (7) Any other defect or combination of defects, the removal of which in the preparation for processing causes a loss of more than 10 percent, by weight, of the tomato.

§51.3312 Category B.

"Category B" consists of tomatoes which meet the following requirements:

- (a) Basic requirements:
 - (1) Fairly firm; and,
 - (2) Color:
 - (i) Electronic color determination shall be as specified in §51.3317; or
 - (ii) Visual color analysis shall be as specified in §51.3317.
- (b) Free from:
 - (1) Any worm attached;
 - (2) Worm injury;
 - (3) Freezing;
 - (4) Stems over 3 inches in length;
 - (5) Mechanical damage when more than two locules are exposed or when causing a loss of more than 20 percent by weight, of the tomato;
 - (6) Mold or decay; and,
 - (7) Any other defect or combination of defects, the removal of which in the preparation for processing causes a loss of more than 20 percent, by weight, of the tomato.

§51.3313 Category C.

"Category C" consists of tomatoes which meet the following requirements:

- (a) Basic requirements:
 - (1) Fairly firm; and,
 - (2) Color:
 - (i) Electronic color determination shall be as specified in §51.3317; or
 - (ii) Visual color analysis shall be as specified in §51.3317.
- (b) Free from:

- (1) Any worm attached;
- (2) Worm injury;
- (3) Freezing;
- (4) Stems over 3 inches in length;
- (5) Anthracnose when more than two spots or aggregating more than a circle three-eighths inch in diameter; and,
- (6) Other mold or decay, or a combination of other defects including mold or decay, the removal of which in the preparation for processing causes a loss of more than 20 percent, by weight, of the individual tomato; including therein not more than 10 percent resulting from mold or decay.

Culls

§51.3314 Culls.

"Culls" are tomatoes which fail to meet the requirements of Category C and, when color evaluation is determined by means of an electronic instrument, includes tomatoes which are completely green.

Percent Usable

§51.3315 Percent usable.

"Percent usable" is a calculation of total weight of tomatoes in Category A, plus 85 percent of the weight of tomatoes in Category B, plus 75 percent of the weight of tomatoes in Category C.

Percent Waste

§51.3316 Percent waste.

"Percent waste" is a calculation of total weight of Culls, plus 15 percent of the weight of tomatoes in Category B, plus 25 percent of the weight of tomatoes in Category C.

Color Evaluation

§51.3317 Color evaluation.

Color may be determined either by an electronic colorimeter or visually.

(a) Electronic color evaluation shall be the color value of a composite raw juice sample. The equipment used in such evaluation shall be properly calibrated, and the type of device and procedures utilized shall be specified in grower-processor contracts. The composite raw juice sample shall be extracted from tomatoes representative of the lot: Provided, that each tomato from which juice is extracted must show a definite change in surface color from green to tannish-yellow, pink, red, or a combination thereof.

(b) Visual analysis requires that each tomato be "fairly well colored" which means that at least two-thirds of the flesh of the tomato has good red color: Provided, that a tomato having flesh of a lighter shade of red shall be considered as "fairly well colored" if a sufficient amount of the flesh has a red color equivalent to that of a tomato with two-thirds good red color.

Extraneous Material

§51.3318 Extraneous material.

(a) Extraneous material is loose stems, vines, and dirt, adhering dirt, stones, trash, and other foreign material.

(b) The amount of extraneous material in any lot may be specified in connection with these standards.

Definitions

§51.3319 Firm.

"Firm" means that the tomato is not water-soaked to the extent that it is so soft, shriveled or puffy that it will lose more than 10 percent of its weight during the peeling or washing process.

§51.3320 Fairly firm.

"Fairly firm" means that the tomato is not water-soaked to the extent that it is so soft, shriveled or puffy that it will lose more than 20 percent of its weight during the peeling or washing process.

§51.3321 Worm injury.

"Worm injury" means any worm injury that has penetrated through the outer wall of the tomato.

§51.3322 Mold or decay.

"Mold or decay" means breakdown, disintegration or fermentation of the flesh of the tomato caused by bacteria or fungi.

§51.3323 Freezing.

"Freezing" means that the tomato is frozen or shows evidence of having been frozen.

§51.3324 Green.

"Green" means that the surface of the tomato is completely green in color. The shade of green color may vary from light to dark.

§51.3325 Mechanical damage.

"Mechanical damage" means that the tomato is bruised, crushed or ruptured.

§51.3326 Defect classification guide.

Defect	Waste	
	More than 10 percent	More than 20 percent
Sunburn (thin superficial type).....	When extending more than 3/4 inch from stem scar, and more than 3/4 of the circumference of 2-1/2 inch tomato.	When extending more than 1 inch from stem scar, and around the circumference of a 2-1/2 inch tomato.
(Type which penetrates outer wall)..	When extending more than 3/4 inch from stem scar, and more than 1/2 of the circumference of a 2-1/2 inch tomato.	When extending more than 3/4 inch from stem scar, and around the circumference of a 2-1/2 inch tomato.
Worms and worm injury.....	Tomatoes with worms attached or with worm injury that has penetrated through the outer wall, or attached cocoons, shall be classed as "Culls". Worms on the fruit but not attached, and loose worms shall be ignored.	
Insects.....	Grasshoppers, crickets, spiders, or other insects on the tomatoes shall be disregarded, but tomatoes injured by such insects shall be evaluated on a waste basis.	
Growth cracks.....	Badly discolored cracks which are not affected by mold or decay shall be evaluated on a waste basis. Cracks affected by mold or decay which has penetrated the fleshy wall of the tomato shall be classed as "Category C", unless additional defects make them "Culls".	
Gray wall, virus mottling, cloudy spot, ghost spot, internal browning and irregular ripening.....	Fruit affected by such conditions shall not be handled on a waste basis. Presence of such factors shall be evaluated from the standpoint of their effect on color. (See §51.3317.)	

Blossom end rot.....	The initial stage of development, occurring as brown or silver discoloration of the skin, shall not be considered as decay. However, if the fleshy wall of the tomato is affected it shall be classed as decay.
Sunscald.....	Affected areas showing a darkened, soft watery condition of the flesh or areas slightly sunken with a tough outer wall which has a whitish yellow appearance, shall be evaluated on a waste basis.
Freezing.....	Fruit affected by freezing injury develop a wide range of symptoms. Chief symptom of freezing injury is a glassy or water-soaked appearance of the fruit. Tomatoes affected by any amount of freezing injury shall be classed as "Culls".
Mold or decay.....	Tomatoes affected by mold or decay which has penetrated the flesh shall be classed as "Category C" or "Culls" depending upon the amount of waste.

Metric Conversion Table
§51.3327 Metric conversion table.

Inches:	Millimeters (mm)
1/8 equals	3.2
1/4 equals	6.4
3/8 equals	9.5
1/2 equals	12.7
5/8 equals	15.9
3/4 equals	19.1
7/8 equals	22.2
1 equals	25.4
1-1/2 equals	38.1
2 equals	50.8
2-1/2 equals	63.5