

Tomato Grader's Manual

EXTENSION BULLETIN E-767, October 1981

For easy reference, unfold this manual and fasten to the packinghouse wall.

COOPERATIVE EXTENSION SERVICE
MICHIGAN STATE UNIVERSITY

Limits of Defects in Michigan and U.S. Tomato Grades

AMOUNTS OF DEFECTS PERMITTED ARE BASED ON A TOMATO 2½ INCHES IN DIAMETER; SMALLER OR LARGER TOMATOES CAN HAVE PROPORTIONALLY MORE OR LESS AREA AFFECTED

GRADE FACTORS	GRADE					
	U. S. NO. 1	MICHIGAN NO. 1	U. S. NO. 2	MICHIGAN NO. 2	U. S. NO. 3	U. S. COMBINATION
	ALL PERCENTAGES ARE DETERMINED BY COUNT					
MAXIMUM ALLOWABLE TOLERANCES	10% DAMAGE INCLUDING 5% FOR VERY SERIOUS DAMAGE; OF THIS 5%, NOT MORE THAN 1% FOR SOFT OR DECAY	10% DAMAGE INCLUDING 1% FOR SOFT OR DECAY	10% SERIOUS DAMAGE INCLUDING 5% VERY SERIOUS DAMAGE; OF THIS 5%, NOT MORE THAN 1% FOR SOFT OR DECAY	10% SERIOUS DAMAGE INCLUDING 1% FOR SOFT OR DECAY	10% SERIOUS DAMAGE INCLUDING NOT MORE THAN 5% VERY SERIOUS DAMAGE BY INSECTS; OF THIS 5%, NOT MORE THAN 1% FOR SOFT OR DECAY	MUST CONTAIN AT LEAST 60% U.S. NO. 1 QUALITY. REQUIREMENTS AND TOLERANCES ARE SAME AS U.S. NO. 2
DIRT	Clean—practically free from dirt or other foreign material.	Free from damage.	Same as U. S. No. 1.	Free from serious damage.	Same as U. S. No. 1.	
MATURITY	Mature—2 or more seed cavities must contain some jelly-like consistency and seeds shall be well developed.	Mature—the seed cavities must have begun to develop a jelly-like consistency and the seeds shall be well developed.	Same as U. S. No. 1.	Same as Michigan No. 1.	Same as U. S. No. 1.	
FORM (SHAPE)	Fairly well formed—not more than moderately kidney-shaped, lopsided, angular, elongated or otherwise moderately deformed.	Fairly well formed—not decidedly kidney-shaped, lopsided, elongated, angular or otherwise deformed.	Reasonably well formed—not decidedly kidney-shaped, lopsided, angular, elongated or otherwise decidedly deformed.	Not badly misshapen or appearance not seriously affected.	May be misshapen—the tomato may be decidedly kidney-shaped, lopsided, elongated, angular or otherwise decidedly deformed: provided the appearance or edible quality is not very seriously affected.	
SMOOTHNESS	Fairly smooth—not conspicuously ridged or rough.	No requirement.	May be slightly rough—not decidedly ridged or grooved.	No requirement.	No requirement.	
DEVELOPMENT	Well developed—showing normal growth, not ridged or peaked at the stem end.	No requirement.	Same as U. S. No. 1.	No requirement.	Same as U. S. No. 1.	
SOFT, OVERRIPE, FREEZING AND DECAY	Must be free from these factors.	Same as U. S. No. 1.	Same as U. S. No. 1.	Same as U. S. No. 1.	Same as U. S. No. 1.	
SUNSCALD	Free from sunscald.	Not permitted if—damage materially affects the appearance, edible or shipping quality.	Free from sunscald.	Not permitted if: the appearance, edible or shipping quality is seriously affected.	Permitted except when: the appearance, edible or shipping quality is seriously affected.	
BRUISE, SUNBURN, DISEASE, INSECT, MECHANICAL OR OTHER MEANS	Not permitted when: the appearance, edible or shipping quality is materially affected or if any insect is present in the fruit.	Not permitted if—damage materially affects the appearance, edible or shipping quality.	Not permitted if: the appearance, edible or shipping quality is seriously affected or if any insect is present in the fruit.	Not permitted if: the appearance, edible or shipping quality is seriously affected or if there is a loss of more than 20% of the tomato in the ordinary process of trimming.	Permitted except when: the appearance, edible or shipping quality is very seriously affected or if any insect is present in the fruit.	
PUFFINESS (See pictures)	Not permitted if: open spaces in one or more locules materially affect the appearance when the tomato is cut crosswise through the center.	Same as U. S. No. 1.	Not permitted if: open spaces in one or more locules seriously affects the appearance, when the tomato is cut crosswise through the center.	Same as U. S. No. 2.	Permitted except when: open spaces in two or more locules very seriously affect the appearance when the tomato is cut crosswise through the center.	
HAIL	Not permitted if: not well healed and corked over or if rough or deep or more than ⅜ inch in diameter.	Not permitted if: appearance, edible or shipping quality is materially affected.	Not permitted if: not well healed and corked over, or if rough or deep or if more than 5/8 inch in diameter.	Not permitted if: appearance, edible or shipping quality is seriously affected.	Permitted except when: fresh or very deep or if more than 1 inch in diameter.	
CUTS	Not permitted if: not shallow or not well healed or more than ½ inch long or aggregating more than ⅜ inch in diameter.	Not permitted if: not shallow or not well healed or more than ½ inch in length.	Not permitted if: not shallow or not well healed or when more than ½ inch in length or aggregating more than ½ inch in diameter.	Not permitted: fresh cuts or holes through the tomato wall.	Permitted except when: fresh or very deep or extending through tomato wall or if appearance is very seriously affected.	
SCARS	Not permitted if: a scar has some depth or is greater than ⅜ inch in diameter.	Not permitted if: more than ¾ inch in diameter.	Not permitted if: a scar has some depth or is greater than ⅝ inch in diameter.	Not permitted if: the appearance, edible or shipping quality is seriously affected.	Permitted except when: a scar has some depth or is more than 1 inch in diameter.	
CATFACE	Not permitted if: rough or deep or if more than ½ inch in diameter or if channels are very deep or wide or extend into locules.	Not permitted if: rough or deep or if channels are very deep or wide or if more than ¾ inch in diameter.	Not permitted if: rough or deep or when channels are very deep or wide or extend into locules or if greater than ¾ inch in diameter.	Not permitted if: rough or deep or if greater than 1 inch in diameter.	Permitted except when: channels extend into locules or if slight pressure will cause tomato to leak or if greater than 1 inch in diameter.	
GROWTH CRACKS (See picture)	Not permitted if: not well healed or more than ¼ inch deep or when any radial crack extends more than ½ inch beyond stem scar or if all radial cracks exceed 1 inch in length.	Not permitted if: not well healed or when any radial crack exceeds ½ inch in length or if all radial cracks are more than 1½ inch in length.	Not permitted if: not well healed or more than ¼ inch deep or when any radial crack is more than ¾ inch long or if all radial cracks exceed 1¾ inches in length.	Not permitted if: not well healed or if any radial crack is more than 1 inch in length or if there are more than 3 cracks to the tomato.	Permitted except when: not well healed or if more than ¼ inch deep or if any radial crack exceeds 1 inch in length or if all radial cracks are more than 2⅞ inches in length.	

Growth cracks are measured from the edge of stem scar. Cracks which are not well healed permitted if not leaking and tomatoes are at least turning in color.

INDIVIDUAL PACKAGES

When graded according to U.S. Grade Standards, contents of individual containers are subject to the following limitations, provided the average for the entire lot are within specified tolerances:

Individual packages containing more than 5 pounds, with a 10% or more tolerance, may not have more than 1½ times tolerance specified. Like packages, with a tolerance of less than 10%, cannot be more than double the tolerance specified—except one defective and one off size may be permitted. Packages containing 5 pounds or less shall have not more than 4 times the tolerance specified—except one tomato which is soft or affected by decay and one off size may be permitted, provided the average for the lot is within tolerance.

SIZE

United States and Michigan standards provide that not more than a total of 10% (by count) of the tomatoes in any lot may be smaller than the specified minimum diameter or larger than specified maximum diameter.

United States and Michigan standards provide that the size of tomatoes in any type of container may be specified in terms of minimum, or minimum and maximum, diameter in whole inches (or in whole inches and not less than 32nd-inch fractions thereof) in accordance with the facts. Such diameters shall be the largest diameter measured at right angles to a line from the stem to the blossom end.

SIZE DESIGNATIONS	MILLIMETERS		INCHES	
	Minimum diameter ¹	Maximum diameter ²	Minimum diameter ¹	Maximum diameter ²
Extra small	28	32	1 1/8	1 1/4
Small	40	32	1 1/2	1 1/4
Medium	48	32	1 7/8	1 1/4
Large	56	32	2 1/8	1 1/4
Extra large	64	32	2 1/2	1 1/4
Maximum large	72	32	2 7/8	1 1/4

¹ Will not pass through a round opening of the designated diameter when tomato is placed with the greatest transverse diameter across the opening.
² Will pass through a round opening of the designated diameter in any position.

UNCLASSIFIED

"Unclassified" is not a grade. It is a designation to show that the tomatoes have not been graded in conformance with established grades.

Lots of tomatoes not graded to conform with established grades may be marketed as "Unclassified" if not more than 3% of the tomatoes are affected by decay and/or an additional 5% by serious worm damage.

MARKINGS

All tomatoes offered for sale must conform to and be marked with either a U.S. or Michigan grade or be marked unclassified. In addition, all packages intended for sale must show the name and address of the packer, and net contents of the package.

PLUM & CHERRY TOMATOES

Small tomatoes are graded on the basis of the standards for other fresh market tomatoes. The defects listed are based on a 2½ inch tomato. Smaller sized tomatoes may have proportionately smaller defects. Example: A 1¼ inch tomato in the Michigan No. 1 Grade may have a growth crack not more than ¼ inch in length.

GRADE FACTORS

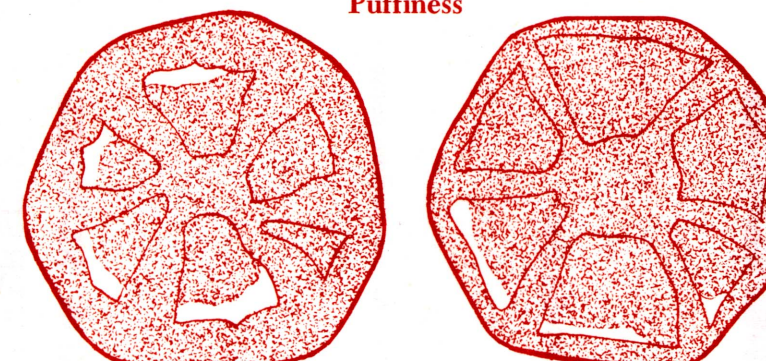
Variety

Both United States and Michigan Standards require that packages of graded tomatoes contain tomatoes of similar varietal characteristics. This means that they be alike in firmness of flesh and shade of color; that is, soft-fleshed, early maturing varieties are not to be mixed with firm-fleshed, mid-season or late varieties, or bright red varieties mixed with varieties having a purplish tinge. The simplest way to meet this requirement is to include only one variety in each graded lot.

*For color classification descriptions and definitions of terms used to describe damage see back of manual.

NOTE: For stages of ripeness commonly used in trade, refer to AM 2, Michigan Tomato Color Chart (45 cents, available from your county Extension office). A size conversion chart and net weight for most common containers is also shown on this chart.

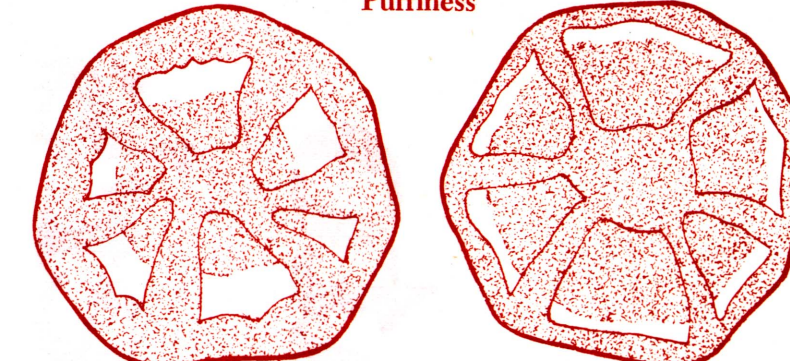
Puffiness



LOWER LIMIT U.S. NO. 1 & MICHIGAN NO. 1

The proportion of open space permitted is dependent upon the thickness of walls. Tomatoes with thicker walls than those in the above illustrations may have proportionately greater amounts of open space. Tomatoes with thinner walls than illustrated shall have proportionately lesser amounts of open space.

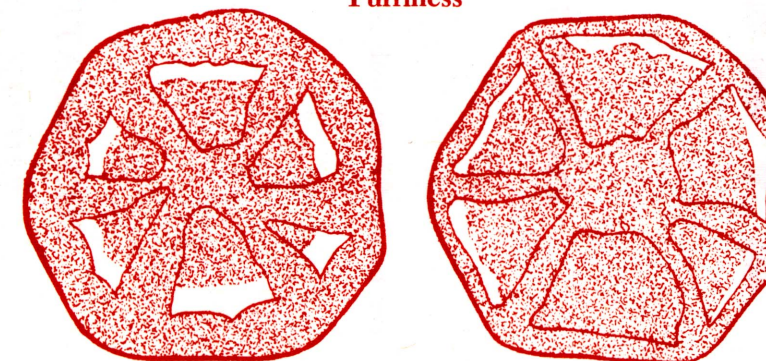
Puffiness



LOWER LIMIT U.S. NO. 3

The proportion of open space permitted is dependent upon the thickness of walls. Tomatoes with thicker walls than those in the above illustrations may have proportionately greater amounts of open space. Tomatoes with thinner walls than illustrated shall have proportionately lesser amounts of open space.

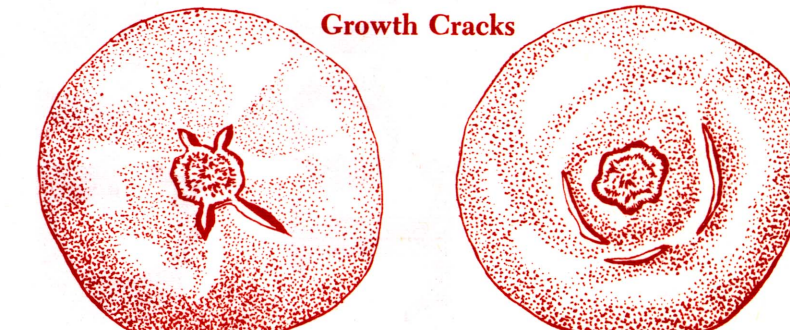
Puffiness



LOWER LIMIT U.S. NO. 2 & MICHIGAN NO. 2

The proportion of open space permitted is dependent upon the thickness of walls. Tomatoes with thicker walls than those in the above illustrations may have proportionately greater amounts of open space. Tomatoes with thinner walls than illustrated shall have proportionately lesser amounts of open space.

Growth Cracks



Maximum aggregate length of radial growth cracks permitted on 2½ inch tomato in U.S. No. 1 grade.

Concentric growth cracks which affect appearance to same extent as maximum aggregate length of radial growth cracks permitted in U.S. No. 1 grade.

The above limitations apply in all stages of maturity.

DEFINITIONS

Damage — any defect which materially affects the appearance, or the edible or shipping quality of the tomato.

Soft — the tomato yields readily to slight pressure.

Serious damage — any defect which seriously affects the appearance, or the edible or shipping quality of the tomato.

Very serious damage — any defect which very seriously affects the appearance, or the edible or shipping quality of the tomato.

COLOR CLASSIFICATIONS

The following terms may be used in describing the color of any lot of tomatoes of a red fleshed variety.

Green — completely green in color.

Breakers — a definite change in color from a green to a tannish-yellow, pink or red on not more than 10% of the surface.

Turning — more than 10% but not more than 30% of the total surface shows a definite color change from green to tannish-yellow, pink, red or a combination thereof.

Pink — more than 30% but not more than 60%, of the total surface shows pink or red.

Light red — more than 60% of the total surface shows pinkish-red or red, provided that not more than 90% of the surface is red.

Red — more than 90% of the total surface shows red color.

Tolerance for color — a total of not more than 10% by count in any lot may fail to meet the color specified, providing not more than 5% are green.

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