



United States
Department of
Agriculture

Agricultural
Marketing
Service

Fruit and
Vegetable
Programs

Processed
Products
Branch

Grading Manual for Canned Red Tart Pitted Cherries

Effective June 1977

PREFACE

These instructions are designed primarily for Processed Fruit and Vegetable Inspectors of the U.S. Department of Agriculture. They are not intended to be a comprehensive treatise on the subject but give background information and guidelines to assist in the uniform application and interpretation of USDA grade standards and other similar specifications.

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GENERAL INFORMATION

The largest growing area for red tart cherries is the Great Lakes region with Michigan leading all states. Other growing areas are: Washington, Oregon, California, Utah, Colorado, New York, and Wisconsin. Montmorency is the leading variety grown for processing.

Cherries are ready for harvest when the fruit is red and the stem detaches easily from the pit. Mechanical harvesting (shaking) has replaced hand picking. Harvesters shake the fruit from the tree onto a fabric apron. Mechanically harvested cherries contain immature fruit mixed with fully-ripened fruit. The sugar content of immature cherries is low. Since sugar retards oxidation, the poor color and character of immature cherries is noticeable in the finished product. After the cherries are removed from the tree they are placed in cold water to prevent scalding (discoloration). Cherries are delivered to the processing plant in water. For this reason, cherries are bought by volume.

Mechanically harvested cherries contain many attached stems. A stemming operation is necessary. Stems are classified as harmless extraneous material if they are included in the canned cherries. Incoming cherries receive some type of inspection prior to processing. The processor usually rejects cherries with maggot infestation.

Cherries are held in large soak tanks of cold water to firm the fruit prior to pitting and processing. Improperly firmed fruit is easily "pitter-torn." Cherries are flumed from the soaking tank to a sorting belt. Sorting personnel remove the most obvious defects, such as damaged fruit, loose pits, stems, and foliage. Electric-eye sorting equipment is used to reject defective cherries. However, the same machine cannot reject both dark and light-colored individual cherries at a given setting. Cherries usually go directly to the final container after pitting and sorting. Canned cherries are packed in consumer-size and institutional-size containers. They are used primarily for baking pies. Market demand determines the size of container.

SAMPLE UNIT

A sample unit is as follows:

1. The entire contents of a container; or
2. A portion of the contents of a container; or
3. A combination of the contents of two or more containers.

The U.S. standards specify a standard sample unit size. Each sample unit must contain 100 cherries and weigh at least 20 ounces. Prior to sampling small-size containers, it is necessary to determine the approximate count and drained weight of cherries in the container. When more than one container is required to obtain the sample unit size, take all of the containers from the same case until the sample unit size is reached. Mark each container in the sample unit to retain its identity. If only one container is required to meet the sample unit size, take only one container from each case selected for sampling.

GENERAL PROCEDURES

The acidity of canned ("hot pack") cherries requires that they be packed in enamel-lined metal containers. The cans are subject to "pinholing." Examine cans for the presence of this condition.

It is not necessary to determine the drained weight of each container in the sample when more than one container is used to make a standard sample unit size. Make only the number of drained weight determinations required by the sampling plan or other applicable instructions. It is not necessary to make drained weight determinations on the additional containers in the sample unit.

Two categories of drained weight recommendations are listed in the U. S. standards -- water and/or juice pack, and sweetened packing media. The cut-off point between water and/or juice and slightly sweetened packing media is often difficult to determine. Consider sample units meeting the following criteria as packed in "sirup" or "slightly sweetened" media:

1. Verified from inspection records; or
2. Brix readings of the packing media verify the applicant's or label declaration; or
3. Brix readings of "slightly sweetened" media are not below 14°.

GENERAL PROCEDURES (CONTINUATION)

Canned RTP cherries are usually packed in water or a mixture of water and cherry juice to be used for baking purposes. There is no minimum Brix requirement for water or juice; however, some buyers' specifications have minimum Brix requirements. Record enough Brix readings on the score sheet to enable certification of the product for special buyers.

ORDER OF SCORING QUALITY FACTORS IN A SAMPLE UNIT

As soon as possible after determining the drained weight, carefully pour the drained cherries from the sieve to a grading tray. Work quickly before the cherries oxidize. Be alert for HEM as cherries flow from the sieve to the tray. Adjust the sample unit to an even 20-ounces of drained cherries and score the quality factors as follows:

1. Select 100 cherries from the 20-ounces;
 - a. Score defects (other than HEM);
2. Use the entire 20-ounces;
 - a. Score color;
 - b. Score character;
 - c. Determine size;
 - d. Determine flavor;
 - e. Score pits; and
3. Use the entire contents of the container to score HEM.

COLOR

Determine the color score before cherries have discolored due to exposure to air. Canned cherries do not discolor as rapidly as frozen cherries but lengthy exposure prior to scoring the color is unfair to the product. The typical color of canned RTP cherries is different from fresh or frozen cherries. Heat processing destroys the bright, fresh, cherry-red appearance of the fruit. Heat also tends to equalize the color difference between lighter colored and darker cherries. The difference in the amount of heat used to cook various can sizes and the Brix of the packing media produce color variations in canned cherries. It is impractical to use a specific minimum color guide.

COLOR (CONTINUATION)

Some of the variations from good, typical color are as follows:

1. Scald and oxidation (usually an overall yellowish-light brown cast of the least red fruit). Scald causes mottling or blotching of mature, dark-red cherries;
2. A mixture of dark-red and light-red cherries. This is sometimes accompanied by a yellowish cast;
3. A bleached color caused by a reaction between the cherries and the metal of the can. Chlorine in the packing media may also cause bleaching. This condition may not emerge until several months after packing. Some buyers' specifications set maximum chlorine limits on water used in the packing media;
4. Excessive cooking;
5. Cherries abused by mechanical harvesting equipment;
6. Sort-out cherries. Some processors remove undercolored cherries from fruit selected for freezing and can the sort-out cherries. These cherries are recognized by the total lack of pink coloring in the flesh; and
7. Cherries held from a previous year's pack.

Equalization.

The color of canned RTP cherries is dissimilar among units in the same container immediately after processing. If the cherries are graded within 7 days after packing, assign a probable grade to the sample unit. After about 10 days, examine additional sample units to establish the color score and final grade. The above procedure is usually followed for in-plant inspection. Processors who request lot inspection usually wait until the cherries have equalized before requesting inspection.

COLOR (CONTINUATION)

Color of the packing media.

Canned cherries packed in sirup have more luster than those packed in water. Disregard brightness created by the sirup in scoring color. Consider only the brightness of the cherries. The color of the packing liquid is an indication of the ripeness of the cherries. The packing liquid is more highly colored from properly ripened cherries than from poorly ripened cherries. Sort-out cherries, for instance, impart little color to the liquid. Use packing liquid color as general indicator of ripeness. It is not a color requirement.

Color requirements.

Grade A. The flesh of the cherries has considerable redness and this color is present in the packing liquid. The overall color is attractive and free from dullness.

Grade B. The flesh of the cherries has some redness. The overall color may be affected by a slight amount of oxidation and scald.

Grade C. The flesh of the cherries has little or no redness. The overall color may be affected by oxidation and scald. Bleaching may be apparent but units are not devoid of all color.

Substandard. Off-color or totally bleached.

CHARACTER

Consider the physical characteristics of the flesh of the cherries (toughness, hardness, firmness, and meatiness), in evaluating character. Maturity is directly related to character. Very small, thin-fleshed, immature cherries do not have good character. Hard, immature cherries may be softened by cooking but some of the characteristics of immature cherries are retained. Immature cherries usually lack pink color in the flesh.

CHARACTER (CONTINUATION)

Character requirements.

Grade A. Score character grade A when cherries are prepared from thick-fleshed, well-ripened cherries.

Grade B. Score character grade B when cherries are prepared from fruit which is lacking in fleshiness but is not thin-fleshed. Some softness is permitted but not totally soft cherries.

Grade C. Score character grade C when the cherries lose their texture; are soft and flabby; are very thin-fleshed; or are tough but can be chewed without difficulty. Overpacked cherries have excessive drained weight and collapsed or flattened cherries.

Substandard. Score character Substandard when the cherries are disintegrated, mushy, not chewable, or totally immature.

SIZE

Small cherries are removed with a size grading device. Small cherries are uncommon unless the growing season has been affected by bad weather. Size is a prerequisite to all grades above grade C. Determine size only on "suspect" cherries. "Plump-out" the pitted cherry to its approximate original shape. Measure the diameter at right angles to the pitter axis. Do not force cherries through circular openings in the measuring plate. Determine whether the "plumped-out" cherry does or does not fill the opening in the plate. Don't count questionable cherries.

Sample units that fail size requirements for grade A, but are acceptable for grade B, are considered with other quality deviants and allowed in a grade A sample in accordance with the "Regulations."

Sample units that fail size requirements for grade B, are considered with other quality deviants and allowed in a grade B sample in accordance with the "Regulations." Sample units that fail size requirements for grade B are "worse-than-a-deviant" in a grade A sample.

FLAVOR AND ODOR

Normal flavor and odor is a prerequisite to all grades above Substandard. Grade "off-flavor," but edible, sample units Substandard. Include deviants to normal flavor and odor with other quality deviants. Consider inedible sample units as "worse-than-a-deviant."

DEFECTS

The factor of defects is an evaluation of the cherries' growing season, harvest, and preparation for processing (workmanship). Bad weather during the growing and ripening season, abuse during the harvest, and poor processing affect the amount of defective fruit. The U. S. standards allow a specified number of defects in each grade classification. The standards do not include an overall sample unit appearance requirement with respect to defects. A defect is either scoreable against the allowance provided in Table IV of the U. S. standards or it is not considered. Do not downgrade the sample unit because of numerous insignificant defects.

Minor blemished cherry.

A skin blemish, 9/32-inch or less in diameter, is either scoreable or insignificant. Score the blemish if it "more than slightly" affects the appearance of the cherry, consider small, lightcolored skin blemishes insignificant.

Aggregate area.

The U.S. standards include "aggregate area" in both "minor blemished cherry" and "blemished cherry." Interpret "aggregate area" as all of the blemished areas on each individual cherry and their relationship to the area of a circle 9/32-inch in diameter.

Scald.

Discoloration and oxidation attributed to scald are not scoreable as defects. Score scald under the factor of color.

Mutilated cherry.

Don't count a cherry that is pitter-torn and held together as one unit by a thin piece of flesh or skin. Score only cherries with the entire pit cavity exposed.

DEFECTS (CONTINUATION)

Foreign material.

Cherries are susceptible to damage from insects and decay. Visible decay is ordinarily removed during sorting. Maggots are much more difficult to find and it is difficult to remove them. Examine canned RTP cherries for presence of maggot infestation and decay. Consider these two types of defects twice. First, as blemished cherries. Second, as unavoidable defects in processed cherries (File Code 172).

Harmless extraneous material.

Examine the entire contents of each container in the sample. HEM is not limited to the 20-ounce sample unit. Evaluate compliance with the allowance for HEM on the basis of all of the HEM in the sample. Evaluate all of the sample units in the sample for HEM and total the weight (cumulative) of all of the sample units. Divide the number of pieces of HEM (total pieces in the entire sample) into the cumulative weight of all of the sample units in the sample. This figure represents the average HEM found in the sample. Apply it to the allowance in Table IV of the U.S. standards.

When the average HEM is 1 piece per 60-ounces or more, no conversion is necessary. When the average HEM is less than 1 piece per 60-ounces, convert by dividing the average into 60-ounces. This represents the average HEM per 60-ounces.

Example.

1 piece per 50-ounces -- 60 divided by 50 equals 1.2

1 piece per 40-ounces -- 60 divided by 40 equals 1.5

1 piece per 30-ounces -- 60 divided by 30 equals 2

1 piece per 20-ounces -- 60 divided by 20 equals 3

DEFECTS (CONTINUATION)

Assigning score points for HEM.

- adjust
1. Sample units free of HEM. Assign the score point value to each sample unit which does not contain HEM, based on all defects other than HEM. Do not this score point value regardless of the HEM average for the total sample.
 2. Sample units which contain HEM. Leave the defect score blank on each sample unit which contains HEM until the sample is averaged. Then assign 26 points if HEM fails the requirements of grade A or 23 points if it fails grade B. If the average meets grade A give 27 points or bottom A.
 3. Grade of a lot. The relationship of total HEM vs total sample, not the number of deviants, determines the grade of the lot, unless downgraded by other factors.

Ascertaining score points for defects other than HEM.

Total defects (Mutilated + minor blemished + blemished)	Blemished	Score points
0-1-2-3	0	30
4-5	1	29
6-7-8	2	28
9-10	3	27
11-12	4	26
13-14	5-6	25
15	7	24
16-17	8-9-10	23
18-19	11-12-13	22
20	14-15	21
21 or more	16 or more	20 or less

PITS

The allowances for pit material is based on a 20-ounce sample unit of drained cherries and not on the total contents of the container. Evaluate compliance with the allowance for pit material on the basis of all of the 20-ounce sample units in the sample. Do not score individual sample units which contain pits lower than sample units which contain no pits. Each sample unit must be examined for Pit material. Use the following procedure:

1. Arrange cherries in a single layer on the grading tray;
2. Press each cherry with the finger tips, or suitable device, to detect all pit material;
3. Repeat "1" and "2" (above) until all pit material is found; and
4. Record the pit material on the score sheet.

Pitting deviants.

Sample units that contain not more than 2 pits are allowed in grade A. Not more than 3 pits are allowed in grade B. And any number of pits are allowed in grade C. The sample average must meet the allowance for the specific grade classification.

Sample units that fail the individual allowance for grade A, but are acceptable for grade B, are considered with other quality deviants and allowed in a grade A sample in accordance with the "Regulations."

Sample units that fail the individual allowance for grade B, are considered with other quality deviants and allowed in a grade B sample in accordance with the "Regulations. "

Any number of pits are allowed in a grade C sample unit. A grade C sample unit is "worse-than-a-deviant" in a grade A sample.

PITS (CONTINUATION)

Assigning score points for pits.

Examine all of the sample units for pit material. Determine the score point value for the sample and assign the same score point value to each sample unit (assign the same score to pitting deviants as other sample units). Assign score points for pit material as follows:

<u>Score points</u>	<u>Maximum number of pits in the total sample</u>
20	1 per 120-ounces or over
19	1 per 80-ounces
18	1 per 40-ounces
17	1 per 35-ounces
16	1 per 30-ounces
15	1 per 25-ounces
14	1 per 20-ounces
13 or less	1 per 19-ounces or less

Use the scoring guide as follows:

1. Determine the number of pits in the total sample and find this point on the vertical axis;
2. Determine the number of 20-ounce sample units in the total sample and find this point on the horizontal axis; and
3. Assign the score point where lines from the points on two axes intersect. Give a borderline sample the higher score point.

Example.

<u>Pits</u>	<u>Number of sample units</u>	<u>Score points</u>
5	38	20
1	3	18
11	21	17

