United States Department of Agriculture

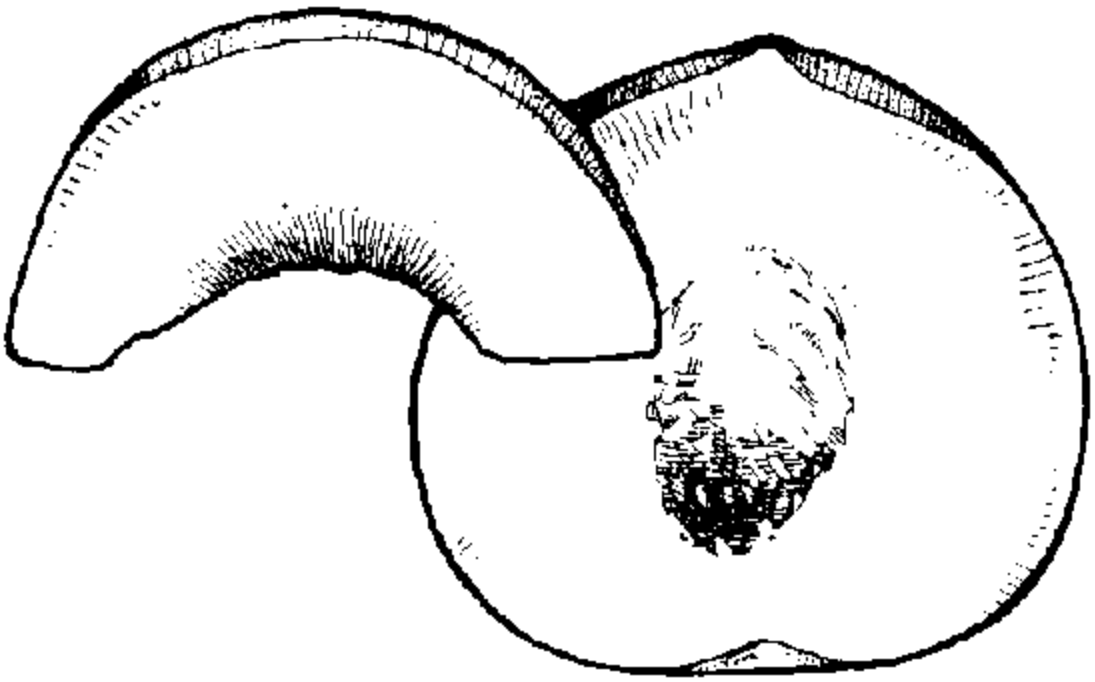
Agricultural Marketing Service

Fruit and Vegetable Division

Processed Products Branch

Grading Manual for Canned Clingstone Peaches

Effective November 1998



This manual is designed for Processed Products Branch Personnel of the U.S. Department of Agriculture (USDA). Its purpose is to give background information and guidelines to assist in the uniform application and interpretation of U.S. grade standards, other similar specifications and special procedures.

The citation of any data, criteria, techniques, illustrations, copyrighted material, or pictorial representation accredited to private authorship is used with the permission of the individuals or sources cited. Unless a specific reference is cited, the information in this manual has been compiled or developed from sources available to the public as well as from technical knowledge of personnel in the Department.

Following the suggested guidelines in this manual does not excuse failure to comply with the Federal Food, Drug, and Cosmetic Act or any other applicable Federal or State laws or regulations.

Except for official USDA inspection aids or devices and color guides (or standards) produced under license of the Department, the mention of any supplier, patented device, product, brand name or equipment does not imply endorsement by the Department over any other similar, or equally effective material.

Address inquires to:

Chief, Processed Products Branch
Fruit and Vegetable Programs, AMS
U.S. Department of Agriculture
South Building, Rm. 0709
STOP 0247, P.O. Box 96456
Washington, DC 20090-6456

TABLE OF CONTENTS

PRODUCTION AREAS

The production and canning of Yellow Clingstone Peaches is confined mostly to the state of California. Smaller quantities are also canned in Michigan, New York and Virginia.

VARIETAL TYPES

There are two types of Canned Clingstone Peaches, the Yellow Clingstone and the White Clingstone. Most of the canned peaches packed in the United States are of the yellow type.

The flesh of the Clingstone is firm and adheres tenaciously to the pit. The general appearance, color, firmness, texture and flavor of the peach varies considerably, often due to varietal characteristics. Numerous varieties are grown for canning in California. These varieties are chosen, among other reasons, for their date of harvest. They are usually classed by the industry as: extra early, early mid-summer, late midsummer, and extra late. The object of the various ripening dates is to obtain as even a harvest spread over the season as possible. See Table I for approximate ripening dates.

Approximate Ripening Dates	Extra Early July 15 - Aug. 1	Early Mid-Summer Aug.1 - Aug. 15	Late Mid-Summer Aug. 15 - Sept. 1	Extra Late Sept. 1 - Sept. 30
Variety	Carson, Loadel, Shasta, Fortuna, Vivian, Dixon	Andora, Cortez, Howard, Walton Paloro, Peak, Johnson	Carolyn, McKnight, Stanford Williams, Sims. Gaume, Halford, Zolezzi	Corona Giblin, Gomes, Sowell, Starn, Stuart, Sullivan #4, Wiser

HARVESTING AND DELIVERY

Clingstone peaches for canning should be harvested when "firm and ripe"; that is, when they have a "springy" feel yet are hard enough to transport and run through canning machinery without excessive bruising. "Firm ripe" peaches are not quite ripe enough for table use but are full size and have considerable flavor. Too soft peaches are not satisfactory for commercial canning as there is a great loss in peeling and the units are easily bruised in handling. Furthermore, they are often "cooked to pieces" in processing, or at least the edges become excessively frayed and the packing medium becomes cloudy.

The proper picking time for any one variety in a producing area is limited to a few days. However, the daily needs of a cannery can usually be supplied by a well timed harvesting schedule between districts that varies slightly in dates the fruit reaches desired maturity.

Clingstone peaches in tote-bins are moved to the canning plants for immediate processing. Storage doesn't seem to improve the flavor and increases the tendency of bruising. Some varieties show considerable discoloration and breakdown after storage.

INSPECTION OF RAW PRODUCT

Processed Products Inspectors should make general observation of the quality and condition of the raw product delivered to the plant for processing. However, they should not attempt to establish the grade of the raw product or enter into a discussion between the processor and the grower regarding raw product quality.

Some examples of defects to look for during a general observation are presence of green fruit, brown rot, and bruises or otherwise damaged fruit. With a general knowledge of the condition of the raw product, the inspector will have a better idea as to what to expect in his evaluation of quality of the finished product. In addition, when product quality levels decline below the intended level, the inspector is in a better position to realize causes and make appropriate recommendations for possible correction.

PREPARATION AND CANNING

The following description of a canned peach operation is generally typical. The order, methods, and equipment will vary from plant to plant.

RECEIVING, WASHING AND SIZE-GRADING

The bins of peaches are set on a conveyor belt and carried to an automatic bin dumper which overturns them. The peaches are conveyed or flumed to an overhead height of approximately ten feet. The fruit is then size-graded into several sizes (to accommodate the pitting machines) by diverging rollers.

PITTING

After size-grading, the fruit is conveyed to the pitting machines where it goes into small hoppers heading each machine. Generally, the machines are arranged in banks, each bank serving a particular size group of fruit. The peaches roll out of the hoppers into automatic pitting machine feeders. This consists of a cup attached to an endless chain. A small spinning rod located in the bottom of each cup positions the

peach for the pitting machine. The rod rotates the peach while in route to the pitter until the stem end is down and the suture is facing forward in line with the pitting machine knife. Two metal fingers attached to the pitter take the peach from the feeder and place it on a small curved knife on the suture of the peach.

Two types of pitting machines are used. One type uses the torque principal which twists the peach halves from the pit. The other cuts the pit from the cavity of the peach.

TORQUE PITTER

This pitter is referred to as the "Filper Pitter". After the peach has been positioned on the knife of the machine, the knife pierces the peach and clasps the pit as it cuts around the suture. Rubber "fingers" grasp each half and twists them from the pit with a quick counter-rotation. The two pitted peach halves and the loose pit are then dropped onto a conveyor belt or flume which takes them to a shaker device which separates the halves from the pit. The pit drops through holes in the shaker onto a conveyor belt where they are discharged to garbage.

When pitted by the torque pitter, it is no longer necessary to scoop out a portion of the peach flesh in order to pit the clingstone peach. This affords a substantial saving of peach flesh and a better appearing product.

FOOD MACHINERY PITTER

Another type of pitter removes the pit by a cutting action. This machine is referred to as the "Food Machinery Pitter" principally because it is manufactured by the Food Machinery Corporation. The peach is held firmly on each side by two shallow cups fastened to an endless belt which moves the peach into a knife consisting of two parallel wires. As the peach moves forward the wire knife cuts into the peach, the pit separates the two wires such that they cut around the pit taking a small amount of flesh from the pit cavity and then completely cuts through the peach. The two halves and the pit drop onto a belt or flume which conveys them to a shaker device where the pit is removed as explained for the Filper Pitter.

PEELING

The halved peaches may be conveyed by flume, belt or pumped in a stream of water. The pitted fruit travels over a shaker device which turns the halves cup-down, and through a lye-peeler. Two general types of lye-peelers are widely used; the spray type which involves the use of overhead sprays; and the cascade type in which the peaches pass under a series of sheets or miniature "waterfalls" of solution. In both types of peelers the fruit moves on web or mesh belts that permit the liquids to pass through. The

loose peelings are screened from the liquid. The liquids are recirculated and reused.
The lye peeler may be divided into three basic sections:

1) The first section subjects the fruit to sprays, or sheets of hot water which may contain a special detergent to facilitate the forthcoming action of the caustic.

2) The second section exposes the peaches to sprays or sheets of hot lye solution in concentrations of usually 1 to 2½ percent for approximately ½ to 1½ minutes. Considerably weaker solutions of lye are permitted when used in conjunction with a good detergent. Ripe fruit requires less solution-strength and exposure time than green fruit.

3) The third section quickly removes the lye and residue from the peeled peach halves with sprays or sheets of cold water.

Some factors affecting the efficiency of the peeling operation are:

1) Use of a detergent or wetting agent;

2) Concentration of lye and contact time;

3) Temperature of lye solution; and

4) Maturity of fruit.

A properly peeled clingstone peach has no peel or greenish-colored sub-peel on its back. It is smooth and slick. A unit that has been exposed to excessive lye-peeling has a slightly rough back because some of the flesh has been eaten away by the lye.

Next, the peach halves travel through another shaker device which turns the halves in a "cup-up" position and onto an inspection belt where any halves with split-pits or pit fragments are hand-sorted and placed on a belt which conveys them to the repitting operation. Clingstone peaches are fed into special machines and the pit or pit-half is scooped out by means of a curved blade.

The peach units then are returned to the line by means of belts. In some plants, halves with split-pits are not sorted out until after they are lye-peeled. Usually, because of the difference in pit cavity appearance, the repitted units are destined to be included with the lower quality peach pack or to be diced.

SIZING AND SORTING

The fruit moves over an inspection belt where badly bruised or blemished fruit is also removed. Poorly peeled fruit is also removed and may be returned to pass through the lye peeler again.
Next, the fruit passes over a size grader. There are two principle types of size graders used by peach canners. One consists of a series of screens mounted on a shaker device. Each successive screen possesses holes of different diameter, the smallest holes in the screens at the top where the fruit enters the grader and becoming progressively larger in the direction of the lower end. As the fruit passes over the grader, the peach halves fall through the holes of the screens onto its particular sorting belt where it is further inspected and sorted.

SLICING

Fruit that is to be sliced passes through a "cup-down" device, since any halves that pass through the slicers in cup-up position will emerge as slabs.

Slicing is accomplished by machines equipped with a number of sharp revolving discs which converge almost together just above the belt surface. The cup-down halves are carried through the blades of the slicer by a moving belt.

Many canners prefer not to include side-slices with their higher quality packs of sliced peaches. A cross-belt passes under the slicer and carries the side slices either onto a lower quality line of sliced fruit, to a solid-pack line, or a "mixed pieces" line.

FILLING

Halves. Usually these are filled into cans from straight-line fillers. Empty cans can pass under a slot in a metal table. The fruit halves are sheared from the conveyor belt and slide down an inclined metal plane onto the table. They are then slid through the slot into the awaiting empty cans. Some plants also use a circular type filler as described for slices and mixed pieces.

Slices and mixed pieces. Generally these units are filled by circular-type fillers. The tables are shaped, circular pieces of stainless steel with numerous round holes around the outside edge. Each hole is slightly smaller than the diameter of the can size for which the filler is designed. The empty cans enter the filler and are positioned under the holes by a timed disc. The peach units drop from a conveyor belt directly onto the circular table, where they fall into the cans with the operator's help.

Another type filler which fills the cans by a tumbling action is also used for slices. This filler consists of a revolving drum that is open at both ends. As the cans are conveyed through the drum, the rotating action of the drum creates a constant cascade flow of peach slices inside the drum which causes the slices to fall into the cans.

Solid pack. The fruit is usually pre-heated in a steam-jacketed, horizontal heater, through which it is moved by means of a screw conveyor. The heated mass is then filled into cans by means of a circular-type filler, sealed, cooked, and cooled.

SIRUPING

With the exception of solid-pack peaches, which have practically no added liquid media, the cans of fruit are moved under appropriate sirupers by means of a can distribution belt(s). Several types of sirupers are in use by the industry:

Vacuum siruper. This type is probably most widely used. The vacuum siruper also automatically fills the containers to a previously determined level and while doing so exerts a vacuum upon each individual can, excluding air from the interstices of the fruit units. Any water that may be present in the can is also sucked out. Occasionally, a fruit unit in a container will be drawn forward by the vacuum action and physically block all or part of the incoming sirup which may cause the container to be below label weight or even slack filled.

Displacement type. It automatically fills the cans of fruit with sirup to a pre-determined level by a mechanical device.

Stream fillers. Stream fillers may still used by some canners. The cans of fruit pass under constant streams of sirup until the desired liquid level is attained.

Judge Fillers. They usually are a combination of the displacement type siruper and the stream filler. The displacement type siruper places a small amount of highly concentrated sirup into the container which then passes through a steam exhaust box and, immediately upon merging, moves under streams of hot water where the can is filled to the proper level.

EXHAUSTING

In most peach operations exhausting through steam exhaust boxes is limited to No. 10 cans. The filled containers travel through an exhaust box equipped with steam jets. The steam heats the contents of the container to the extent that trapped air is driven out of the product which aids in obtaining a vacuum after sealing. In cases where steam closing machines are used for sealing the containers exhausting in this manner is not necessary.

SEALING, COOKING, AND COOLING

The filled containers next pass on to the seaming machines where they are sealed. Containers that were

not previously exhausted are sealed with a closing machine with a steam flow head. A jet of steam is blown across the top of the container which displaces the air in the headspace a split second before the lid is positioned and the container sealed. The product is then heat processed, generally in continuous atmospheric cookers, and then cooled to approximately 110 degrees F. The cooling temperature is important since the product must be cooled sufficiently to stop the cooking process, yet the temperature must be maintained high enough so that the wet containers will air dry promptly to avoid corrosion.

SAMPLING PROCEDURES

1. Lot.

Follow---------->	Regulations (109-A-1) Sampling Procedures (120-A-1) Minimum Sampling Rates (120-A-9) Inspection Aid No. 42 Condition of Container (125-A-1)

2. On-Line.

Follow---------->	Regulations (109-A-1) Time Sampling (120-A-4) In-plant Inspection (160-A-1, 162-A-1) and (120-B-2) Variables (140-A-1) Fill Weights (140-A-3) Condition of Containers (125-A-1)

NONQUALITY PROCEDURES

Follow---------->	1. Regulations (109-A-1) 2. Sampling Procedures (120-A-1) 3. Time Sampling (120-A-5) 4. Good Commercial Practice - Net Weights (128-A-10) 5. Good Commercial Practice - Vacuum (128-A-20) 6. Good Commercial Practice - Drained Weights (128-A-30) 7. Good Commercial Practice - Fill of Container (128-A-40)--->(130-A-1) 8. Good Commercial Practice - Counts (128-A-60) 9. Good Commercial Practice - Brix (128-A-50 and 160-A-5)

FOOD AND DRUG ADMINISTRATION REQUIREMENTS

Canned clingstone peaches are included in the Food and Drug Administration (FDA) Standards of Identity, Quality, and Fill for Canned Peaches §145.170 and §145.171. These standards define what may be called "Canned Clingstone Peaches" and establish labeling, quality, and fill-of-container requirements which must be met in order for a product labeled "Canned Clingstone Peaches" to enter interstate commerce. The USDA inspector should be familiar with the FDA Standards of Identity, Quality, and Fill for Canned Peaches so as to be able to recognize product which does not comply with the FDA standards. See Table I for an abridged version of the FDA Standards of Quality for canned peaches.

The FDA Standards of Quality for Canned Peaches also establish minimum weight requirements for individual units of halves and quarters styles and define the maximum variation in diameter allowed between the largest diameter unit and the smallest diameter unit in a container for halves, quarters, and whole styles. The FDA standards of quality establish requirements covering product maturity (character) and defects. These standards of quality requirements are for the finished product. See page one of Appendix for the FDA requirements.

FOOD AND DRUG STANDARDS OF IDENTITY, QUALITY, AND FILL

The FDA standards are attached to the U. S. Standards for Clingstone Peaches. These standards are also applicable to canned freestone peaches. The inspector should thoroughly familiarize himself with them before attempting to grade the product.

FDA STANDARD OF IDENTITY

The legal definition of canned peaches is called the "Standard of Identity." It states the ingredients which comprise the product of canned peaches and further stipulates how the product is to be labeled. Canned clingstone peaches is the product represented as defined in the Standards of Identity for Canned Peaches (21 CFR 145.170 and 145.171) issued under the Federal Food, Drug and Cosmetic Act. For the purposes of the manual and unless the text indicates otherwise, the terms, **canned peaches** or **canned clingstone peaches** include **canned yellow clingstone peaches, canned spice yellow clingstone peaches, canned solid-pack yellow clingstone peaches** and **canned artificially sweetened yellow clingstone peaches** as defined in the Standards of Identity.

Styles.

(a) **Halves or Halved** canned peaches are peeled and pitted peaches, cut approximately in half along the suture from stem to apex.

(b) **Quarters or Quartered** canned peaches are halved peaches cut into two

approximately equal parts.

(c) **Slices or Sliced** canned peaches are peeled and pitted peaches cut into sectors smaller than quarters.

(d) **Dice or Diced** canned peaches are peeled and pitted peaches cut into approximate cubes.

(e) **Whole** canned peaches are peeled, unpitted, whole peaches with or without stems removed.

(f) **Mixed pieces of irregular sizes and shapes** are peeled, pitted, and cut units of canned peaches that are predominantly irregular in size and shape which do not conform to a single style of halves, quarters, slices, or dice and which may consist of:

(1) Units (commonly called **salad cuts** or **salad pieces**) which may have been prepared originally as peach halves but which are irregular in size and shape in that more than one-fourth of the unit appears to have been removed at the outer curved surface and which have been cut further into pieces;

(2) Units which may have been prepared originally as peach slices but which are irregular in size and shape in that they have been cut further into pieces;

(3) Mixtures of two or more of the following styles which may or may not be of normal shape: Halves, quarters, slices, or diced.

Optional Seasoning Ingredients.

TABLE I

	OPTIONAL INGREDIENT	REQUIRED LABEL STATEMENTS
1.	Spice	"Spiced," "With Added Spice," or "Spice Added," or in lieu of the word "Spice," the common name of the spice.
2.	Flavoring, other than artificial flavoring.	"With Added Flavoring," "Flavoring Added," or in lieu of the word "Flavoring," the common name of the flavoring.

3.	Vinegar, lemon juice, organic acids	"Seasoned with Vinegar," or "Seasoned with ____," the word showing the kind of acid used.
4.	Peach pits, except in the case of whole peaches, in a quantity not more than 1 peach pit to each 8 oz. of finished canned peaches.	"Seasoned with Peach Pits."
5.	Peach kernels, except in the case of whole peaches and when peach pits are used as seasoning.	"Seasoned with Peach Kernels."
6.	Ascorbic acid in any amount no greater than necessary to preserve color.	"Ascorbic acid added to preserve color" or "Ascorbic acid added to protect color."

Optional packing media (non-artificial).

All canned clingstone peaches, except "artificially sweetened" clingstone peaches, must be in one of the packing media shown below, to comply with the FDA Standard of Identity.

TABLE II

OPTIONAL PACKING MEDIA AND APPROPRIATE LABEL STATEMENT 1/	Brix Measurement 2/
"Extra heavy sirup;" or "Extra heavily sweetened fruit juice(s) and water;" or Extra heavily sweetened fruit juice(s)."	22 degrees or more but not more than 35 degrees
"Heavy sirup;" or "Heavily sweetened Fruit juice(s) and water;" or "Heavily sweetened fruit juice(s)."	18 degrees or more but not more than 22 degrees
"Light sirup;" or "Lightly sweetened fruit juice(s) and water;" or "Lightly sweetened fruit juice(s)."	14 degrees or more but not more than 18 degrees
"Slightly sweetened water;" or "Extra light sirup;" or "Slightly sweetened fruit juice(s) and water;" or "Slightly sweetened fruit juice(s)."	10 degrees or more but not more than 14 degrees

"In water"	
"In fruit juice(s) and water"	Not applicable
"In fruit juice(s)	
"Artificially sweetened"	

Artificially sweetened packing media.

Certain artificial sweetening ingredients are included as optional packing media under the FDA Standard of Identity for Canned Peaches. The packing medium used is water artificially sweetened with saccharin, sodium saccharin, or a combination of both. Such packing medium may be thickened with pectin and may contain any mixture of any edible organic salt or salts and any edible organic acid or acids as a flavor-enhancing agent, in a quantity not more than is reasonably required for that purpose.

The label statement for the name of the food is to be specified as "Artificially Sweetened ....." the blank being filled in with the name prescribed for canned peaches having the same optional peach ingredient.

Example: "Artificially Sweetened Yellow Cling Peach Halves."

If the packing medium is thickened with pectin, the label shall bear the statement "thickened with Pectin". When any organic salt or acid or any mixture of two or more of these is added, the label shall bear the common or usual name of each such ingredient.

FDA STANDARD IN FILL OF CONTAINER.

Containers must be filled with the maximum quantity of the peach units which can be sealed in the container and processed by heat to prevent spoilage, without crushing or breaking such ingredient. Canned clingstone peaches that do not meet this requirement are to be labeled "Below Standard in Fill."

FDA STANDARD OF QUALITY

The following minimum standards of quality are specifically set forth by FDA. They are listed in Table III under quality factor headings to relate the FDA minimum standards with the USDA quality factors. Proper label statements are included with each item and should be used when the quality of the canned peaches falls below that particular standard.

Such statement shall immediately and conspicuously precede or follow, without intervening written, printed, or graphic matter, the name "Peaches" and any words or statements required or authorized to appear with such name.

TABLE III
RESUME OF FDA STANDARD OF QUALITY

Factor	Styles	Quality Requirements	Label Statement if Product Fails
SIZE	Quarters	Minimum weight not less than 3/10 ounce.	"Below Standard in Quality--Small Quarters"
	Halves	Minimum unit weight not less than 3/5 ounce.	"Below Standard in Quality--Small Halves"
	Quarters, Halves or Whole	Diameter (width) of the largest unit is not more than 15 mm (0.6 inch) greater than the diameter (width) of the smallest unit.	"Below Standard in Quality-- Mixed Sizes"
		Note: In containers, with 20 or more units, 2 units may be disregarded.	
DEFECTS	ALL(Peeled)	Not more than 1 square inch peel per pound net weight.	"Below Standard in Quality-- Not Well Peeled"
	ALL	Not more than 20% of units in container blemished.	"Below Standard in Quality-- Blemished"
	Slices, Quarters, Halved and Whole	ALL units untrimmed or so trimmed to preserve normal shape	"Below Standard in Quality-- Unevenly Trimmed"
	ALL(except Mixed Pieces)	Containers with less than 20 units: Not more than one unit per container crushed or broken. Containers with 20 or more units: Not more than 5% of units in container are crushed or broken. (Unit which has lost normal shape because of ripeness, bearing no marks of crushing, not considered crushed or broken.)	"Below Standard in Quality-- Partly Crushed or Broken"
CHARACTER	ALL	All units pierced by 300 grams weight with method prescribed in Code of Federal Regulations Title 21, § 145.170(b)(2).	"Below Standard in Quality-- Not Tender"

INSPECTION OF THE PRODUCT

The U.S. Standards for Grades of Canned Clingstone Peaches establishes requirements for the quality factors and should be followed in the inspection of the product, except when another specification is specifically requested.

MINIMUM EQUIPMENT AND INSPECTION MATERIAL

The following list comprises minimum equipment and supplies needed for the inspection of canned peaches:

Scale (preferably graduated to 0.1 ounces)

Tares (for net weights and drained weights)

Sieves 8 mesh: 8-inch diameter for containers equal to or smaller than a No. 3 size (404 x 414) can; 12-inch diameter for container size larger than a No. 3 can.

Trays white, laboratory, shallow type for No. 2-1/2 cans and smaller; deep type for cans larger than No. 2-1/2 size.

Brix measurement apparatus.

Hydrometer method.

(a) Glass cylinders (approximately 1-1/4" diameter; 10" tall)

(b) Set of Brix Hydrometers in graduations of 0.1 and ranging from 13 through 35 Brix. Thermometer and temperature correction chart for correction of Brix hydrometer readings.

Simulated equalization method.

(a) Waring Blender, or similar comminutor, with bowl size adequate to blend contents of an entire No. 2-1/2 can.

(b) Waring Blender, or similar comminutor, with bowl size adequate to blend contents of an entire No. 10 can.

(c) Bowls for the above-mentioned blenders. One for each sirup range designation encountered if desired.

(d) Refractometer equipped with thermometer.

(e) Temperature correction chart for use with refractometer sugar-scale.

(f) Plastic (or rubber) spoon or spatula.

(g) Suitable material for filtering blended material that will not affect the refractometer reading. Such material includes but is not limited to: Toilet paper, gauze, Kim-wipe, Kleenex or other similar tissue, and filter paper.

Vacuum Gauge.

Headspace Gauge.

Can opener.

Supplies, other than inspection equipment.

(a) A folder containing -- This grading manual and any supplemental instructions on the product or related subjects; United States Standards for Grades of Canned Clingstone Peaches.

(b) Inspection papers, such as -- Applicant's information; Contract instructions; Score sheets and applicable work sheets for preparing certificates for typing.

ARRANGING SAMPLES AND RECORDING PERTINENT IDENTIFICATION MARKS

The individual containers are arranged in a manner to facilitate evaluation of data. Generally, code marks that are identical are grouped together; likewise, they are normally arranged in ascending numerical order if the marks so indicate. Any continuity with respect to individual lots must be retained.

The code marks (including any ring-marks), together with label nomenclature and a brief description of the container, are recorded in the appropriate spaces of the score sheet. There is always a possibility that the inspection documents may be introduced as evidence in court. A complete, well kept score sheet, signed by the inspector, should be executed.

NET WEIGHTS

The net weight of each sample should be entered in the space provided in the score sheet. Weigh and record to the nearest one-tenth of an ounce. Any low weights should be encircled so as to stand out. Inspectors under in-plant inspection should consult plant management for desired net weights. The required net weight will be that which will appear on the label.

Compliance with net weight requirements is based on the sample average provided no individual is below good commercial practice. If, however, the word "minimum" accompanies the net weight statement, each container is required to be not less than the stated net weight.

VACUUMS

Using proper equipment and technique, vacuums should be determined and recorded. Minus vacuums (pressures) and low vacuums should be encircled so as to stand out on the score sheet.

HEADSPACES AND FILL OF CONTAINER

After removing the lid of the container, observe for any excessive headspace.
The quality control department of most plants under in-plant inspection prefer to have the headspace recorded for all containers opened for inspection. Under lot inspection the head-space should be recorded for all low net weight containers. Maximum head-space recommendations are not included in the United States Standards.

The head-space measurement is a practical means of determining compliance with the recommended fill of container for "Solid-Pack" peaches.

DRAINED WEIGHTS

One method of determining compliance with proper fill with respect to the fruit ingredient is the drained weight method. Recommended minimum drained weights are provided in the grade standards for canned clingstone peaches.

The drained weight values are based on equalization 30 days after packing. Generally, canned peaches will tend to pick up in weight over a period of time after processing due to the equalization of the sugar concentration in the fruit and that in the syrup. The many variables will determine the amount of pick-up when drained weight are determined prior to 30 days after processing.

The minimum sample size for determining drained weights for lot inspection as well as under in-plant

inspection must be not less than that specified for the single sampling plan in the Regulations Governing Inspection and Certification of Processed Fruits, Vegetables, and Related Products.

FILL WEIGHTS

A second and more reliable method of determining the amount of fruit in the containers is by the fill weight procedure. This method however, is restricted to in-plant inspection. It is advantageous over the drained weight procedure for several principle reasons among which are:

(1) Since it employs non-destructive sampling, a much larger sample than for drained weights is possible which reduces sampling error;

(2) Fewer variables are involved making test results more reliable.

(3) It provides continuous information to plant personnel during processing of the progress of the filling operation which permits adjustments in the fill weights when necessary.

(4) The packer may be informed as to acceptance or rejection of a lot the same day of pack rather than having to wait until a later date.

U.S. Standards for Inspection by Variables, File Code 140-A-1, and U.S. Standards for Determination of Fill Weights, File Code 140-A-3, contain information regarding application of the fill weight procedure. It is important to know the statistical symbols as well as their meanings as contained in the document.

FILL WEIGHT AND DRAINED WEIGHT BASED ON SPECIFIC COUNTS

The grade standards and applicable instructions and specifications for these canned fruits provide lower drained weights for the larger-sized fruit in certain styles and can sizes. In order that a lot may qualify for the lower fill weight, compliance with the applicable maximum count designation must be met. If the packer's count designation is known to be such that will require the lot to meet the higher fill weight or drained weight specified for the style and can size, this procedures may be disregarded.

Determination of Maximum Counts for Large Sizes:

Fill Weights.

(1) Count the units in each of at least two containers from each subgroup used to determine the fill weights. However, when the alternate fill weight procedure is used for lots consisting of 100 cases or less that require more than 4 hours to run, count the units in each container used to determine the fill weights.

(2) When more than 1 sample unit is drawn at a time for line check quality determination, at least 2 of these sample units may be used for count determinations in lieu of, or in addition to, the forgoing. However, if counts are determined on sample units used for quality determinations in lieu of a) above, a minimum of 20 sample units per item for each shift must be used for count determinations.

(3) Record the number of units for each container either on the control chart in such a manner as to associate the counts with the subgroup from which they were taken; or on the $\overline{X}$ and **R** data sheets in the space provided for counts.

Drained Weights.

Count the units in each of the containers used to determine drained weights.

Criteria For Compliance With Maximum Counts:

For a lot to be eligible for the lower fill weights or drained weights for the applicable style and can size, the following criteria must be met with respect to maximum counts:

The average count of units from all the containers in the sample may be not more than the maximum count specified for the lower fill weight or drained weight acceptance level.

(1) If the calculated count average is less than 0.5 in excess of the maximum count, drop the fraction (6.4 to 6.0) and the lower fill weight or drained weight acceptance level will be applicable.

(2) If the calculated average count is 0.5 or more in excess of the maximum count, increase to the next higher whole number (6.5 = 7.0) and the higher fill weight or drained weight acceptance level is applicable.

No individual container may exceed the maximum count specified for the lower fill weight or drained weight by more than 1 unit in the case of No. 2-1/2 cans, or by more than 2 units in

the case of No. 10 cans. The higher fill weight and drained weight acceptance levels will be applicable when individual sample units exceed this criteria for maximum counts.

BRIX MEASUREMENT

Brix is measured and recorded for all samples of canned peaches to which a liquid media has been added, whether such media is fruit juice(s), water, syrup, or artificially sweetened.

For dietetic packs known to contain artificial sweeteners or additives, record the facts concerning such sweeteners or additives for subsequent certification.

Do not use composite samples for making Brix determinations on canned peaches.

Too determine the Brix of sample units follow instructions in "Brix Measurement" (File Code 135-A-3) and In-Plant Inspection Procedures - Sirup Designations (File Code 160-A-5).

Consult File Code 128-A-50 when low or high Brix measurements are found. Brix is usually not measured on samples of "solid-pack" peaches.

COUNTS

Refer to File Code 128-A-60.

STYLE

The style of the product should be recorded on the scoresheet(s) and appear on the Certificate of Quality and Condition as mentioned in the U.S. standards. Solid-pack should be certified as to halves, quarters, diced, or mixed pieces of irregular sizes and shapes.

Mixed pieces of irregular sizes and shapes style is not subject to certain requirements of trimming, broken units, and size. Many times an inspector will be in doubt as to whether a sample unit, or the entire lot, of peaches qualify as “Mixed Pieces of Irregular sizes and Shapes.”

(1) **Style with respect to individual containers.** A single container may be designated “Mixed Pieces of Irregular Sizes and Shapes” if not more than two-thirds (**b**), by weight, of the units present are one of the defined styles.

(2) **Style with respect to lots.** A lot will be considered as complying with the style “Mixed Pieces of Irregular Sizes and shapes” if the number of sample units which fail

the requirement for an individual container does not exceed the applicable acceptance number indicated in the single sampling plan of the Regulations. These “style deviants” are not to be combined with deviants that affect the lot quality grade.

Chips: During the manufacturing process of dicing peaches, peach "chips" are often separated from the more uniform dices. A market demand exists for these chips and, at times, USDA certification is requested. Peach chips are to be certified under the style designation: "Mixed Pieces of Irregular Sizes and Shapes -- Chips" (the word "Chopped" may be substituted for the word "Chips"). If the chips are a “Solid Pack” product, then the above terminology should be amended to read: “Mixed Pieces of Irregular Sizes and Shapes – Chips (Solid Pack).”

The terminology described in the previous paragraph should also appear on the container labels.

FLAVOR AND ODOR

U.S. Grades A, B, C, D, and C-SP (U.S. Grade C for Solid Pack) for canned clingstone peaches require the product to have a "normal flavor and odor;" therefore, peaches with a definite off-flavor or off-odor are graded "Substandard" or "Substandard Solid Pack", as applicable, regardless of the quality factor score point total.

Off-flavors and **off-odors** include objectionable flavors and odors foreign to canned peaches. Examples of these include flavors and/or odors identified as resulting from chemical decomposition, being of medicinal origin, oil origin, or exhibiting a "flat sour" flavor.

The reason for which an off-flavor or off-odor evaluation is given should be stated on the scoresheet. General terms, which have a positive meaning, should be used in this statement. For example, use the statement, "Substandard account medicinal-like flavor" (instead of "phenolic flavor") or "Substandard account oily flavor" (instead of "machine oil flavor").

Artificially sweetened products: Allowance for a slightly unique flavor and odor should be made when artificial sweetening ingredients have been added to a canned clingstone peach product; however, any use of artificial sweetening ingredients which imparts an extremely "bitey" and/or objectionable flavor should not be considered "normal" and should be graded "Substandard" or "Substandard Solid Pack" as applicable.

VARIETAL CHARACTERISTICS

U.S. Grades A, B, and C require that canned clingstone peaches in any inspected lot possess similar

varietal characteristics. U.S. Grades D, C-Solid Pack, Substandard, and Substandard Solid Pack do not require peaches in a given lot to possess similar varietal characteristics. Normally the inspector does not certify variety of canned peaches. Occasionally an applicant may request that the variety be shown on the certificate. If such a request is made, it is permissible to make a statement under "Remarks" in accordance with the following example:

> The "written statement from packer indicates the product covered by this certificate is of the _____ variety."

TYPE OF PACK

It is necessary to determine and record the type of pack of the product. If the product is packed in a liquid medium, the designation should be noted, for example "packed in light sirup " or "packed in fruit juice," etc. If the product is packed as "solid-pack," no packing medium is added to the container and the only pack designation necessary are the words "solid-pack" and the style of the peach units. Halves, quarters, sliced, diced, and mixed pieces of irregular sizes and shapes can each be certified as "solid-pack" when so packed.

COLOR

The color score for any particular sample unit of canned clingstone peaches should be determined as soon as possible after the peaches have been aligned on the grading tray. If the surfaces of the peach units are allowed to dry, the color of the units may change rapidly. Recoating the sample units with sirup will not return them to their original color. Canned clingstone peaches packed in the heavier sirups often appear to have more luster than those in lighter sirups. Color should be judged without regard to the luster created by the sirup.

> **Exception for spiced peaches:** As indicated in the U.S. grade standards, the factor of color for "spiced" peaches is not based on detailed requirements and is not assigned a score point value. Instead, the grade standards require only that the sample color be normal for canned "spiced" clingstone peaches. Normal color for spiced peaches should include any coloration resulting from the spice(s) used.
>
> Any abnormal discoloration that may be due to oxidation, pit pigmentation, or other causes should cause the spiced peaches to be down-graded for color. Discoloration due to serious bruises or other blemishes should be considered under the factor of "Absence of Defects", not under the factor of "Color".
>
> **Note:** To compensate for the deletion of the 20 score points for the factor of "Color" when grading spiced peaches, sum the score points for the other three scoreable factors (Uniformity

of Size and Symmetry, Character, and Absence of Defects), multiply this value by 100, and then divide by 80 to yield an adjusted score point total.

Color requirements. The requirements for color in the various grade classifications in the grade standards are expressed in subjective terms. In order to provide for uniformity in the interpretation of these requirements, color guides or models are provided and available. These models are designated as follows:

CLA - Minimum color level for "Grade A";
CLB - Minimum color level for "Grade B"; and
CLC - Minimum color level for "Grade C".

Please refer to the U.S. Standards for Grades of Canned Clingstone Peaches for the specified "partial limiting" and "limiting" rules for units that deviate from the various color limits in each grade classification. The U.S. standards permit sample units that score into the "Grade B" range for color to be classified as "Grade A" provided the total score is not less than 90 points. Sample units that score 16 points for color, will seldom qualify for "Grade A" due to total score point. Table IV provides guidance for assigning score points for the factor of color.

TABLE IV

INTERPRETATIVE GUIDE FOR COLOR REQUIREMENTS

<table>
<tr><th>Grade</th><th>Individual Peach Units</th><th>Score Points</th><th>Color in Sample Unit</th></tr>
<tr><td rowspan="3">A</td><td rowspan="3">Are Bright.

Are free from oxidation or discoloration from any other cause.
Are free from any green color.

Appear to possess as much yellow-orange as CLA.</td><td>20</td><td>All peach units are definitely more orange-yellow than CLA.</td></tr>
<tr><td>19</td><td>All peach units are slightly more orange-yellow than CLA.</td></tr>
<tr><td>18</td><td>* All are equal to, or better than CLA except that: 10% maximum may be CLB but no CLC.</td></tr>
<tr><td rowspan="2">B</td><td rowspan="2">Are reasonably Bright.

Are free from any green color.

Appear to possess as much light orange-yellow as CLB.</td><td>17</td><td>* 90% or more of the peach units are better than CLB (more orange than CLB but slightly less than CLA). No CLC. All are free from oxidation or other discoloration.</td></tr>
<tr><td>16</td><td>* All are equal to, or better than CLB except that: 10% maximum may be CLC. No SStd.</td></tr>
<tr><td colspan="4">Any slight discoloration due to oxidation or other causes may not materially affect the color appearance of the peach units or the sample unit.</td></tr>
<tr><td rowspan="2">C</td><td rowspan="2">Appear to possess no more green color than CLC.</td><td>15</td><td>Better than CLC but not as good as CLB.</td></tr>
<tr><td>14</td><td>* All equal to or better than CLC, except that: 10% maximum may fail CLC.</td></tr>
<tr><td colspan="4">Any slight discoloration due to oxidation or other causes may not materially affect the color appearance of the peach units or the sample unit.</td></tr>
</table>

SSTD	Appear to possess no more green color than CLC.	13	Fails criteria for 14 points.
		0	
Any discoloration due to oxidation or other causes that materially affect the color appearance of the peach units or the sample unit.			

* - Percents(%) are by count in the styles of: WHOLE, HALVED, QUARTERED, SLICED.
Percents(%) are by weight in all other styles.

UNIFORMITY OF SIZE AND SYMMETRY

A. "Mixed Pieces" and "Solid-Pack".

"Mixed Pieces of Irregular Sizes and Shapes" and "Solid-Pack" peaches are not graded for the factor of uniformity of size and symmetry.

B. Determination ("Whole, Halved, and Quartered" Styles).

General.

Before evaluating the score for this factor, remove any units which are not of "normal shape" for the variety and style and consider these units under the factor "Absence of Defects". "Normal shape" means that the units retain their original conformation although there is evidence of trimming. Units that possess deep gouges in the back or sides and halves and quarters with holes through the units are not of normal shape. Table V contains a guide for scoring the factor of uniformity of size and symmetry for whole, halved, and quartered canned peaches.

Thickness and Symmetry.

In considering the thickness and symmetry, both sides of peach halves and peach quarters should be examined. When they are lying with the cup-side down, the uniformity of dimensions and contour should be noted. This can be done while evaluating color. With the units lying cup-side up, thickness and symmetry should be noted. For example, variations in symmetry may range from slight (peach halves with pit cavities that are well centered with even shoulders) to considerable variation (peach halves with pit cavities that are off-center and with shallow shoulders).

Thickness is considered under size and symmetry only as it affects off-centered pit cavities as in the previous example. In relation to the fleshiness of the peach unit, thickness is considered under the factor of character, not under size and symmetry.

Off-Suture Cuts, Detached or Partially Detached Pieces.

(1) Off-Suture Cuts.

Halves and quarters are evaluated for off-suture cuts from the outside surface when the units are in a cup-side down position. Units that may have been cut off-suture, but the suture line is not visible from the outside surface should not be considered as an off-suture cut. The units should not be turned over and viewed from the cup-side up to determine whether an off-suture cut exists.

(2) Detached or Partially Detached Pieces.

Definitions and allowances for detached and partially detached pieces are provided in the grade standards of canned clingstone peaches as shown below:

(a) A detached piece is a unit, in the styles of halves and quarters, which has the appearance of a slice resulting from an off-suture cut or improper cutting and that is completely separated from the half or quarter from which cut.

(b) A partially detached piece is a unit, in the styles of halves and quarters, which has the appearance of a slice resulting from an off-suture cut or improper cutting and is detached more than one-third of the length of the half or quarter along the suture or approximately parallel with the suture.

The following allowances for off-suture cuts, detached or partially detached pieces are applicable for canned clingstone peaches:

"A" Classification - 10 percent, by count, of the units may possess off-suture cuts or detached or partially detached pieces or any combination thereof.

"B" Classification - 20 percent, by count, of the units may possess off-suture cuts or detached or partially detached pieces or any combination thereof.

"C" Classification - 40 percent, by count, of the units may possess off-suture cuts or detached or partially detached pieces or any combination thereof. Sample units that score into this classification may not be classified above "Grade B" regardless of total score.

"Sstd" Classification - Fails to meet Grade C for off-suture cuts, and/or detached or partially detached pieces. Sample units that score into this classification may not be

classified above substandard regardless of total score.

(3) Food and Drug Requirements.

The Food and Drug Minimum Standards of Quality provide for minimum requirements with respect to weight of individual units and for maximum diameter (width) variation allowance between the largest and smallest units. These FDA requirements are based on the finished product.

The Branch has provided inspection guides with respect to recommended minimum individual unit weights based on the raw product which are slightly higher than the Food and Drug minimum weight requirements. These weights are recommended solely to expedite inspection in plants under continuous or other in-plant inspection.

Considerable variation in the weight retention of the fruit within a plant, and from plant to plant, may be expected. Therefore, when the recommended raw fruit weights are used to ascertain compliance with the Food and Drug minimum requirements for individual unit weights, it will be necessary to check the finished product frequently (after equalization) to determine whether the raw fruit weights are high enough.

Table V contains the USDA administratively recommended minimum raw fruit individual unit weights, the Food and Drug minimum requirements for individual unit weights, and the Food and Drug maximum diameter (width) variation allowance between the largest and smallest units.

TABLE V

Minimum Values for Individual Units

Style	Food and Drug Requirement (Finished Product)		Raw Fruit (Recommended)			
			Extra Heavy Sirup		Any Other Packing Medium	
	Ounces	Grams	Ounces	Grams	Ounces	Grams
Halves	0.6	17.0	0.64	18.1	0.62	17.6
Quarters	0.3	8.5	0.32	9.1	0.31	8.8
Whole, halves, and quarters	The diameter (width) of the largest unit is not more than 15 mm (0.6 inch) greater than the diameter (width) of the smallest unit.					

(4) Inspection Guide for Size Variation (By Weight and By Diameter)

In addition to maximum allowances for off-suture cuts and detached or partially detached pieces, the grade standards provide requirements for maximum variation in size (by weight) allowed between the largest and smallest unit for whole, halves, and quarters. Allowances are also made for variations from the maximum variation in size (by diameter) and minimum weight requirements under good commercial practice. These guides are intended to allow for small deviations and not to permit a packer to circumvent requirements in the grade standards or Food and Drug regulations.

(a) Weight Comparison -- Percentage Calculations.

After considering the symmetry of the units, a comparison should be made of the largest unit and the smallest unit on a weight basis. To quickly and accurately determine the difference, in terms of percent between the lightest and heaviest units in the container, use Inspection Aid No. 88 or No. 89, both dated February 1970. The smallest and largest units are freed of excess packing media and individually weighed on a scale. The Inspection Aid chart is used to compare the results and the percent difference is obtained. Percent weight variations may also be calculated as follows:

The percentage by which the largest unit exceeds the smallest may be computed by subtracting the smallest unit weight from the largest, dividing the remainder by the weight of the smallest unit, and multiplying by 100.

Example:

Weight of largest unit - 48 grams
Weight of smallest unit - 30 grams
Remainder - 18 grams

$$\frac{18 \text{ grams}}{30 \text{ grams}} \times 100 = 60\%$$

An alternative procedure is available for inspectors working in an in-plant assignment. When grading on-line samples using the standard sample size, the instructions and guidelines in file code 120-B-2, Standard Sample Unit Procedure In-Plant, can be used to determine scorepoints. Specifically, pages 7.2a, 7.2b, 7.2c, 7.2d, and 7.2e, dated April 1976, can be used to satisfy the weight comparison requirement.

(b) Diameter/Width Comparison -- FDA Requirement.

Diameter (width) of the largest unit is not more than 15 mm (0.6 inch) greater than the diameter (width) of the smallest unit.

In containers with more than 20 units, 2 units may be disregarded in making the determination.

(i) Officially Drawn Samples.

Sample units which fail after the application of the above guide are classified as "U.S. Grade D - Mixed Sizes"; or "U.S. Grade D - Small Halves (or Quarters)".

(ii) Unofficially Submitted Samples.

No deviation from the requirements in the grade standards or from Food and Drug requirements is permitted. The units within each container must comply with the limits stated in the grade standards and FDA regulations.

TABLE VI
SCORING GUIDE FOR UNIFORMITY OF SIZE & SYMMETRY

WHOLE, HALVED, and QUARTERED STYLES				
Grade	Score Point	Maximum Weight Variation Between Units	Detached or Partially Detached Pieces and/or Off-Suture Cuts (by count)	Minimum Weight of Halves and Quarters
A	20	10%	0%	Halves - 3/5 ounce Quarters - 3/10 ounce
	19	20%	5%	
	18	Not more than 40%	10%	
B	17	50%	15%	Halves - 3/5 ounce Quarters - 3/10 ounce
	16	Not more than 60%	20%	
C	15	75%	30% 1/	Halves - 3/5 ounce Quarters - 3/10 ounce
	14	Not more than 100%	40% 1/	
Peaches falling into this classification shall not be graded above U.S. Grade B or U.S. Choice.				
D	13	More than 100% weight variation and/or diameter (width) variation between units of 15 mm (0.6 inch), "Below Standard in Quality-Mixed Sizes" (Except Solid Pack). 2/	More than 40%	Halves less than 17 grams (3/5 ounce) "Below Standard in Quality - Small Halves". Quarters less than 8.5 grams (3/10 ounce) "Below Standard in Quality - Small Quarters." 2/

1/ Provided presence of such units does not give appearance of "Mixed Pieces of Irregular Sizes and Shapes" or " Unevenly Trimmed."

2/ Peaches that fall into the D classification account "Maximum Weight and/or Diameter Variation Between Units" and "Minimum Weight of Halves and

Quarter" shall not be graded above U.S. Grade D.

C. Determination (Sliced Style).

Partial slices, slivers, and slabs are separated. The percentage of slabs, and the combined percentage of partial slices, slivers, and slabs is determined.

(1) "Slivers" in Sliced Peaches.

Attention is directed to the definition of a "sliver" in the U.S. standards. A unit may actually weigh more than 3 grams and yet qualify as a "sliver" if it is substantially smaller than the general size of slices in the container. The weight of a sliced unit, when determining if it is a "sliver", is the drained weight of the unit ascertained within a reasonable time after the drained weight of the sample unit has been determined.

The balance of units in the container are examined for uniformity of size, thickness, and symmetry. They are classified solely on an appearance basis, as to whether the variation affects the appearance slightly ("Grade A"), not materially ("Grade B"), or noticeably ("Grade C"). Slices should not be classified below "Grade C" account variability. Use Table VII below, as a guide for scoring the factor of "Uniformity of Size and Symmetry" for sliced canned clingstone peaches.

TABLE VII
SCORING GUIDE FOR UNIFORMITY OF SIZE AND SYMMETRY(SLICES)

Grade	Score Points	Combination of Partial Slices, Slivers and Slabs (by count)	Slabs	Variation in Remainder of Units
A		Maximum	Maximum	May Slightly Affect Appearance
	20	NONE	NONE	
	19	2%	1%	
	18	5%	2 1/2%	
B	17	7%	3%	May Not Materially Affect Appearance
	16	10%	5%	
C	15	15%	7$	No Limit
	14	20%	10%	
Peaches that fall into this classification shall not be graded above U.S. Grade B.				
D 1/	13 Or Less	More Than 20%	More Than 10%	No Limit

1/ Sliced peaches that fail to meet the requirements for Grade C account partial slices, slivers and slabs, may

not be graded above U.S. Grade D.

D. Determination (Diced Style).

(1) Size requirements for Diced Units.

The grade standards for canned clingstone peaches provide for a maximum as well as a minimum dimensional requirement for diced peaches under the factor of Uniformity of Size and Symmetry. The grade standards for canned freestone peaches provide only for a minimum dimensional requirement.

Approximate diamond-shape units which meet the requirements for the respective grade standard are considered diced units, but units which appear to be chopped or irregularly-shaped chips are considered poorly shaped units in otherwise Diced Style.

Dice joined together account not completely severed are measured as one unit and are included in the portion failing to meet measurement requirements if the greatest edge dimension is more than 3/4-inch in the case of clingstone peaches.

(2) Method for Determination of Size of Diced Units.

The manual sorting of small chips or dice that will pass through a 5/16-inch square opening is a slow process. This separation can be duplicated within reasonable limits, and for practicable inspection purposes, by the procedure which follows.

Use an 8-inch diameter sieve with a wire-cloth screen of 5/16-inch (or 0.312-inch) square openings. This sieve will nest between two standard 8-inch diameter, 8-mesh, sieves used for drained weight determinations.

Place approximately 10 to 15 ounces, if grading on-line using standard sample size use 22 ounces, of product on the 5/16-inch square mesh sieve; nest this sieve between the 8-inch diameter, 8-mesh sieves.

Submerge the nested screens in water and gently float the chips through. Avoid any sudden breaking of the surface of the water with the screen during this process. Allow enough time to permit all chips to get through the screen. After washing the small chips through on to the 8-mesh sieve, pick out any poorly shaped units, and in the case of clingstone peaches, all dice over 3/4-inch in any edge dimension, and add to the chips. Use the following table (Table VIII) as a guide for scoring the factor of "Uniformity of Size and Symmetry" for diced canned clingstone peaches.

TABLE VIII
SCORING GUIDE FOR UNIFORMITY OF SIZE AND SYMMETRY(DICES)

Grade	Score	Oversized, Undersized, and Poorly Shaped Units, as Applicable (by weight) Maximum
A	20	None
	19	5%
	18	10%
B	17	12%
	16	15%
C	15	17%
	14	20%
	Peaches falling into this classification shall not be graded above U.S. Grade B.	
D	13 or less	More than 20%
	Peaches falling into this classification shall not be graded above U.S. Grade D.	

ABSENCE OF DEFECTS

Defects commonly found in canned clingstone peaches are harmless extraneous material (HEM), blemished peach units, crushed or broken peach units, peel or pit material. The U.S. Standards for Grades of Canned Clingstone Peaches establish general categories under which defects can be classified. For assistance in the uniform interpretation of the grade standards, follow File Code 120-A-2 when applicable.

Definition and Types of Defects.

(A) **Blemished peach units:** The U.S. grade standards state that, in order for an abnormality to be classified as a "blemish," it must **materially** affect the appearance or edibility of a peach unit. The following are examples of some types of blemishes.

(1) **Bruises** are probably the most common blemish; however, minor bruises can diminish significantly, often to the point of no longer being scoreable as blemishes, within a short time after processing. Inspectors performing in-plant inspection should be aware of this

and frequently check verification samples to develop a frame of reference for evaluating minor, "borderline" bruises.

(2) **Gummosis** is a process which produces a clear-to-slightly-yellow-colored gelatinous mass within a peach unit. This mass forces its way to the surface of the unit and can be considered a blemish if it materially affects the appearance and/or edibility of the peach unit.

(3) **Oxidation** can be considered as a blemish and scored under "absence of defects" if the unit(s) exhibiting oxidation seriously affects (very dark) the appearance of the sample. Under most circumstances, the presence of oxidation is scored under the factor of "Color".

(4) **Discoloration and black spots** resulting from insect damage should be considered as "blemishes" unless the areas affected are minute. Abnormally discolored (very dark) pit cavities in units, other than whole style, are considered under the factor of absence of defects.

(5) A **scab** may cause a unit to be classified as "blemished" depending upon the hardness, color, and surface area of the scab.

(B) Shape-Related Abnormalities Considered Defects[1] in Whole, Halved, Quartered, and Sliced styles.

(1) **Gouges** that are of sufficient size to detract from the appearance of the product but are not serious enough to destroy the normal configuration of the unit are considered defects in canned clingstone peaches. The presence of numerous small gouges (or pitting) in a peach unit, such as the condition which can remain after brown rot removal, is similarly classified as a defect.

(2) **Corrugations or ripple-like surfaces** on peach units are usually caused by the surface of the primary containers. This condition is considered a defect when the ripples are so extensive that they materially affect unit appearance.

(3) **Trim** can be classified as a defect when a unit is significantly trimmed even though its normal shape may not have been destroyed. An **unevenly trimmed** unit, which appears to be trimmed to a serious extent whereby normal shape has been destroyed, is classified as a defect.

---

[1] **Considered under "Other Defects" in File Code 120-B-2, page 7.1.**

(C) Harmless Extraneous Material (HEM): HEM in canned clingstone peaches can be defined as peach vegetative material. HEM is divided into three categories based on size: large pieces, small pieces, and short stems.

(1) **Large pieces** of HEM are long stems and twigs which are over two inches in length, or, leaf material aggregating over one square inch. A large piece of HEM should only be allowed on an **accidental** basis in all quality grades except Substandard. Specific guidelines defining "practically free", "reasonable free" and "fairly free" are listed below.

(2) **Small pieces** of HEM are long stems and twigs which are no longer than two inches in length, or, leaf material aggregating no more than one square inch.

(3) **Short stems** are woody stems, 1/8 inch to 3/8 inch in length, which connect peaches to tree twigs. Dark brown woody stems less than 1/8 inch in length are also considered "short stem" HEM.

Note: The small "collar" sometimes remaining on the stem-end of a peach should not be considered as HEM unless the overall appearance of the sample unit is definitely affected.

The following guide is intended only for **small pieces** of HEM and **short stems**.

Practically free means there may be present not more than an average of 1 small piece of HEM per 200 ounces net weight, plus not more than an average of 1 short stem per 100 ounces net weight.

Reasonably free means there may be present not more than an average of 1 small piece of HEM per 100 ounces net weight, plus not more than an average of 2 short stem per 100 ounces net weight.

Fairly free means there may be present not more than an average of 1 small piece of HEM per 30 ounces net weight, plus not more than an average of 1 short stem per 30 ounces net weight.

(D) **Pit Material:** The U.S. Standards for Grades of Canned Clingstone Peaches require that peaches receiving a U.S. grade above Substandard be "practically free from pit material". "Pit material" is any whole pit in all styles other than whole style or any portion of a pit, regardless of size, except when whole peach pits or peach kernels are permitted as seasoning ingredients in other than whole style. Pieces of pit material are classified as **large** or **small pieces of pit material** when the product is graded. Specific guidelines defining "practically free from pit material " are presented on page six of the Appendix.

(1) **Large piece of pit material** is any portion of pit material which is definitely hard and is 3/8 inch, or greater, in any dimension. A peach unit to which one or more large pieces

of pit are attached or to which a combination of large pieces of pit and small pieces of pit are attached is considered as one unit affected by large pieces of pit. Each large piece of pit that is not attached to a peach unit is considered as one large piece of pit.

(2) **Small piece of pit material** is any portion of pit material which is less than 3/8 inch and not less than 1/16 inch in any dimension. A peach unit having one or more small pieces attached, or a peach unit having three or more pieces of pit material smaller than 1/16 inch in each dimension attached, is considered as one unit affected by small pieces of pit. Any piece of pit less than 3/8 inch that is not attached to a peach unit is considered one small piece of pit.

Use the following tables (Table IX) as a guide for scoring the factor of "Absence of Defects" for canned clingstone peaches.

TABLE IX - SCORING GUIDE FOR DEFECTS

CANNED CLINGSTONE PEACHES - ALL STYLES

Kind of Defects			Maximum Defects Permissible for Respective Grade and Score **1/**										
			A				**B***			**C***			**D***
			30	29	28	27	26	25	24	23	22	21	C - Solid Pack
PIT MATERIAL	Units affected by, or loose, pits and large pieces of pits **2/**	No 10 cans	0	Maximum - 2 per can. Average - not more than 1 per 200 ounces.									
		Cans smaller than No. 10	0	Maximum - 1 per can. Average - not more than 1 per 200 ounces.									
	Units affected by, or loose, small pieces of pits **3/**	No. 10 cans	0	Maximum - 9 per can. Average - not more than 3 per 100 ounces.									
		No. 3 cyl. cans	0	Maximum - 5 per can. Average - not more than 3 per 100 ounces.									
		No. 2 ½ cans	0	Maximum - 3 per can. Average - not more than 3 per 100 ounces.									
		Cans smaller than No. 2 ½	0	Maximum - 2 per can. Average - not more than 3 per 100 ounces.									
HARMLESS EXTRANEOUS MATERIAL			**"Practically Free"**				**"Reasonably Free"**			**"Fairly Free"**			
PEEL - (Average of all containers - square inch per pound of total contents)			0	1/8 or less			More than 1/8 to ½			More than ½ to 1 inch			
CRUSHED OR BROKEN UNITS - (percent by count)			0	0	5 or less								Any amount
					If the average of all containers is not more than 5%, allow 1 unit in containers of less than 20 units								
BLEMISHED UNITS - (percent by count)			0	0	5 or less		6 to 10			11 to 20 **4/**			
					If the avg. of all containers is not more than 5%, allow 1 unit in containers of less than 20 units		If the avg. of all containers is not more than 10%, allow 1 unit in containers of less than 10 units			If the average of all containers are not more than 20%, allow 1 unit in containers less than 5 units			
ANY DEFECTS NOT SPECIFICALLY MENTIONED (such as unevenly trimmed products and gouges) that affect the appearance or edibility of the product			**"Practically Free"** Not more than 5% (by count)				**"Reasonably Free"** Not more than 10% (by count)			**"Fairly Free" 5/** Not more than 20% (by count)			

***** **Limiting rule.**

1/ If sample meets requirement for more than one numerical score, the lowest of such score points will be assigned.

2/ **"Large piece of pit"** is any portion of a pit that is definitely hard and which is 3/8" or larger in any dimension. A unit of peach to which one or more large pieces of pit are attached or to which a combination of "large pieces of pit" and "small pieces of pit" are attached is considered as 1 unit affected by large pieces of pit. Each large piece of pit that is not attached to a unit of peach is considered as 1 large piece of pit.

3/ **"Small piece of pit"** is any portion of a pit that is definitely hard and which is less than 3/8" but not less than 1/16", in any dimension. A unit having one or more small pieces, or a unit having three or more pieces less than 1/16", attached are considered as one unit affected by small pieces of pit. Any piece of pit less than 3/8" that is not attached to a peach unit is considered one small piece of pit.

4/ Applicable to “D” classification only. Allowance for C-Solid Pack is 2 blemishes for each pound of total contents.

5/ For “D” classification, must be fairly free for defects that materially affect appearance or edibility.

CHARACTER.

The quality factor of "Character" is defined in the U.S. grade standards as referring to the degree of ripeness, the texture, and the tenderness of the product. The desirable maturity level for clingstone peaches is when the fruit is firm and ripe. Processing fruit at this level of maturity helps maintain the texture of the fruit. Adverse processing temperatures, and under-mature or over-mature fruit can lead to a product with less than desirable character. "Rubbery" units may result from slight under-cooking, especially indicated if the units possess ripe color. Product, that is cooked too long or at high temperatures, may be so soft as to disintegrate upon handling during inspection and therefore merit scoring in the Grade "D" or "Substandard" classification.

The most desirable maturity level for peaches for canning is when the fruit is "firm/ripe" (when the fruit has attained full size and nearly full flavor but is not entirely ripe enough for table use. Fruit received by the processor at a less mature stage than firm/ripe (immature) is generally held for two or three days to ripen before processing. Peaches that have reached the maximum maturity level or are slightly over-ripe will tend to be soft or may fray after normal processing unless the processor attempts to "cook" character into it, in which case it will tend to be softer than is desirable for a high quality product.

Over-mature fruit will tend to be soft (mushy) or fray after normal processing. Within the "Character" section in the standards, there are references to varying degrees of "fraying" as a factor to be scored under "Character". Fraying refers to the degree to which the edges of peach units in halves, quarters, and sliced styles are broken down, mushy, stringy, and/or have lost a firmly defined edge. Use the following tables (Table X, XI and XII) as a guide for scoring the factor of "Character" for canned clingstone peaches

> **FDA maturity requirements:** Canned clingstone peaches which do not meet the FDA Standards of Quality for the maturity (21-CFR-145.170) shall be graded Substandard regardless of the total score for the product. Also, except for solid-pack, canned clingstone peaches shall be certified with the additional statement "Below Standard in Quality -Not Tender".

TABLE X - SCORING GUIDE FOR CHARACTER

CANNED CLINGSTONE PEACHES

HALVED, QUARTERED, SLICED and MIXED PIECES of IRREGULAR SIZES and SHAPES STYLES

Grade	Texture, Variation Between Units	Appearance or Eating Quality	Firm, Frayed or Mushy Units (percent)	Character Description (percent)
A (27 to 30 pts.)	Tender, Pliable, Fleshy,	Not more than slightly affected by one unit possessing "reasonably good character"	"Insignificant Fraying",**4/,** Reasonably well-defined, Not more than 10% may possess "Slight Fraying".**1/**	Units possess "Good Character", One unit per container of "Reasonably Good Character" if unit exceeds the allowance of 10%. **1/**
B (24 to 26 pts.)	Variable tenderness in units.	Not materially affected by one unit possessing "fairly good character"	"Slight Fraying",**5/** slightly firm or soft, not more than 10% maybe "Frayed".**1/**	Units possess "Reasonably Good Character", One unit per container of "Fairly Good Character" if unit exceeds the allowance of 10%. **1/**
C (21 to 23 pts.)	Units of variable fleshiness no uniform tenderness.	Materially affected, moderate but not excessively. Units of "Fairly Good Character".	"Frayed"units,**6/** not more than 10% of units are mushy or are so firm as to be "not tender".**2/**	Units posses "Fairly Good Character", firm or soft, but not excessively as to be objectionable.
Peaches falling into this classification shall not be graded above U.S. Grade C regardless of total score for product.**3/**				
D (0 to 20 pts.)	Noticeably variable texture, not tender.	Appearance eating quality of units are seriously affected.	"Excessively Frayed" units, not more than 25% may consist of mushy units.**2/**	Character of units is excessively firm or soft as to be slightly objectionable.
Peaches falling into this classification shall not be graded above U.S. Grade D regardless of total score for product.**3/**				

1/ Percent by count.

2/ Percent by weight.

3/ Limiting rule.

4/ In halves style, fraying cannot affect more than 1/4 of the circumference of the cut edge of individual peach units. In quarters and sliced styles, fraying cannot affect more than the equivalent of ½ of the length of one cut edge per unit.

5/ In halves style, fraying cannot affect more than ½ of the circumference of the cut edge of individual peach units. In quarters and sliced styles, fraying cannot affect more than one cut edge of individual peach units.

6/ In halves style, fraying may affect up to the entire circumference of the cut edge of individual peach units. In quarters and sliced styles, fraying may affect up to the entire lengths of both cut edges of individual peach units.

TABLE XI - SCORING GUIDE FOR CHARACTER

CANNED CLINGSTONE PEACHES - DICED STYLE

Grade	Texture Variation Between Units	Appearance or Eating Quality	Firm, Frayed or Mushy Units (percent)	Character Description (percent)
A (27 to 30 pts.)	Tender, Pliable, Fleshy,	Not more than slightly affected by one unit possessing "reasonably good character"	"Insignificant Fraying", Reasonably well-defined, Not more than 3% may be excessively frayed or mushy **2/**	Units possess "Good Character", and reasonably free from crushed units.
B (24 to 26 pts.)	Variable tenderness in units.	Not materially affected by one unit possessing "fairly good character"	"Slight Fraying", slightly firm or soft, not more than 5% may be excessively frayed or mushy.**2/**	Units possess "Reasonably Good Character", and reasonably free from crushed units.
C (21 to 23 pts.)	Units of variable fleshiness no uniform tenderness.	Materially affected, moderate but not excessively. Units of "Fairly Good Character".	"Frayed"units, not more than 10% of units are excessively frayed or mushy.**2/**	Units possess "Fairly Good Character", and fairly free from crushed units.
Peaches falling into this classification shall not be graded above U.S. Grade C regardless of total score for product.**3/**				
D (0 to 20 pts.)	Noticeably variable texture, not tender.	Appearance eating quality of units are seriously affected.	"Excessively Frayed" units, not more than 25% may consist of mushy units.**2/**	Character of units is excessively firm or soft as to be slightly objectionable.
Peaches falling into this classification shall not be graded above U.S. Grade D regardless of total score for product.**3/**				

1/ Percent by count.

2/ Percent by weight.

3/ Limiting rule.

TABLE XII - SCORING GUIDE FOR CHARACTER

CANNED CLINGSTONE PEACHES - WHOLE STYLE

Grade	Texture Variation Between Units	Appearance or Eating Quality	Firm, Frayed or Mushy Units (percent)	Character Description (percent)
A (27 to 30 pts.)	Tender, Pliable, Fleshy	Not more than slightly affected by one unit possessing "Reasonably Good Character"	Uniformly intact and firm, not more than 10% may possess "Reasonably Good Character".**1/**	Units possess "Good Character", One unit per container of "Reasonably Good Character" if unit exceeds the allowance of 10%.**1/**
B (24 to 26 pts.)	Variable tenderness in units.	Not materially affected by one unit possessing "Fairly Good Character"	Slightly firm or soft, but not mushy, and not more than 10% may possess "Fairly Good Character".**1/**	Units possess "Reasonably Good Character", One unit per container of "Fairly Good Character", if unit exceeds the allowance of 10%.**1/**
C (21 to 23 pts.)	Units of variable fleshiness no uniform tenderness.	Materially affected, moderate but not excessively. Units of "Fairly Good Character".	Markedly firm or soft, not more than 10% of units are mushy or are so firm as to be "not tender".**1/**	Units possess "Fairly Good Character",One unit per container may be mushy or "not tender,"if unit exceeds the allowance of 10%, and that such units do not exceed 10% of all units of all sample containers.**1/**
Peaches falling into this classification shall not be graded above U.S. Grade C regardless of total score for product.**3/**				
D (0 to 20 pts.)	Noticeably variable texture, not tender.	Appearance eating quality of units are seriously affected.	Excessively ragged units, not more than 25% may consist of mushy units.**2/**	Character of units is excessively firm or soft as to be slightly objectionable.
Peaches falling into this classification shall not be graded above U.S. Grade D regardless of total score for product.**3/**				

1/ Percent by count.

2/ Percent by weight.

3/ Limiting rule.

FOREIGN MATERIAL

Foreign material of various types may be found in canned peaches from time to time. The discussion that follows includes only the most common types encountered.

Brown Rot.

Brown rot in peaches is caused by the species *Sclerotinia Cinerea* of the Ascomycetes group of fungi. This fungi develops rapidly on bruised or soft fruit, especially in wet, warm weather. Moisture from the containers also contributes to its growth on peaches in storage.

Reproduction is by spores. Being saprophytic, the brown rot fungus mycelium, which is septate, grows into the flesh of the fruit. In the earlier stages a small spot on the peach, such as a bruised spot, becomes infected. As the mycelium develops in the flesh, a core is formed which generally is removed in the lye peeling process, leaving a gouge or hole in the peach. At this stage, the surrounding area generally unaffected. In the later stages of development, a mold-like mycelium growth develops over the surface of the peach. This growth spreads rapidly from peach to peach.

The presence of the brown rot fungus may be verified by microscopic examination of suspected tissue on scrapings from suspected areas.

Insects.

There are several different types of insects that attack peaches and peach trees. Most of these, however, are not found in the canned product.

Of major concern is the drosophila fly. Unless plants exercise appropriate control measures, this pest may gain entrance into the plant and contaminate the finished product. Inspectors should be constantly alert as to the presence of the drosophila fly and encourage plants to exercise maximum control measures against it.

Occasionally, the larvae of a fruit moth may be found in the finished product. The larvae may be found in the flesh of the peach or, in the case of whole peaches, next to the pit in the pit cavity. Peach units with worm holes should be cut along the channel to determine if the larvae is still present.

Other Foreign Material.

Other foreign material that may contaminate canned peaches include glass, wood splinters, nails or pieces of metal, pipe scale, paint flecks, and fermented syrup.

Fermented syrup generally is derived from holding reclaim syrup too long prior to reclaiming processes or prior to use as a packing media.

No provision has been made for the presence of foreign material in the U.S. grade standards for canned peaches.