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Vegetable
Programs

Processed
Products
Branch

Grading Manual for Frozen Peas

INSTRUCTIONS FOR INSPECTION
OF
FROZEN PEAS

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Frozen Peas
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PREFACE

I. A INFORMATION

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 guide-lines to assist in the uniform application and interpretation of USDA grade standards and other similar specifications.

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II PRODUCTION

A Importance

Peas rank among the highest in importance among frozen vegetables. The production in 1963 of approximately 357 million pounds was exceeded only by frozen potato products.

B Producing Areas

The most important producing area of frozen peas is the Pacific Northwest. Other important areas include the states of Minnesota, Wisconsin, New York, New Jersey, Maine, Maryland, Pennsylvania, Delaware, and California.

C Varieties and Types

Although the grade standards for frozen peas provide for both the Sweet type and Early (or Alaska) type peas, no distinction is made between the two types as is done in the grade standards for canned peas. The principal reason for this is that the Early type peas normally possess a slightly higher starch content when at the optimum stage of maturity for harvesting for freezing than the Sweet type peas. Consequently, the Sweet type peas are most desirable for freezing, principally from a flavor standpoint, than the Early type peas.

The Early type peas are frozen principally for reprocessing purposes such as in the manufacturing of soups or baby foods. Generally they are not processed for consumer use due to their slightly higher starch content as opposed to the sweet type and resultant lack of sweet flavor desirable in frozen peas.

The following are important varieties of peas for freezing:

Sweet type:

Alderman	Telephone
Freezonian W. R.	Thomas Laxton
Gradus	Wando
Dark Skin Perfection	Victory Freezer
Perfected Freezer	Freezer - 37 Strain

Early type:

Alaska

II PRODUCTION (continuation)

D Harvesting and Delivery

Harvesting begins in the Delaware, Maryland, and New Jersey areas about May 22 and lasts until about June 25. In the Pennsylvania, New York, Minnesota, and Wisconsin areas peas are ready for harvest about June 5 and will last until about August 7. In the Pacific Northwest harvesting begins about May 25 and will continue until about August 25. Harvesting begins in southern California about April 3 and lasts until about April 13, while in the central California area harvesting begins about April 20, lasting until May 10.

The pea vines are cut near the surface of the soil by mowing machines or special pea cutting equipment. The vines are loaded onto trucks and hauled to viner stations which are located near the fields or at the plant. Mobile viners or combines are also being used which cut and thresh the peas and deliver the shelled peas to lug boxes, large bins, or dump trucks for transporting to the plant.

If the viner stations are located in or near the fields, the shelled peas are air cleaned at the viner stations by passing them through a "clipper" type cleaner.

Shallow lug boxes with perforations or large wooden or steel bins holding 800 to 2000 pounds of shelled peas are generally used to transport the shelled peas from the field vining stations to the plant. In the event the distance is great or considerable time is involved in hauling, the peas should be hydrocooled in order to reduce the hazard of spoiled raw materials. The boxes may also be topped with crushed ice.

In cases where the viners are located at the plant, the peas are shelled and flumed directly into the plant for processing.

II PRODUCTION (continuation)

E Inspection of Raw Material

Upon arrival at the plant, the product is inspected for condition and then segregated by variety and quality according to the desires of the processor. Grower payments are often based on tenderness and determined by some texture measuring device or on U.S. Grades as determined by Federal-State Inspectors.

One of the most satisfactory of the texture measuring devices is the Tenderometer. To operate the machine a sample of clean peas free from weeds, pods, sticks or other foreign material is placed between the two grids and the cover closed. Closing the cover automatically engages an electric motor attached to the grid shaft. The upper grid rotates clockwise and exerts pressure on the peas which causes a weight-arm to be displaced from a vertical position. The movement of the weight-arm is registered on a calibrated dial by a pointer. When the force is sufficient to shear the peas, the weight ceases to move. As the peas are all sheared the weight-arm returns to its initial position, the pointer remaining on the scale at the point of maximum shearing force. This reading (pounds per square inch of grid space) is recorded by the operator and the pointer manually zeroed.

Tender peas having a high water content will shear easily and give a low reading whereas tough, nearly mature peas will offer greater resistance and consequently give a higher reading. The processor with the benefit of data on tenderometer readings and varietal characteristics can utilize the information not only as a basis for payment to the grower but also as a means of segregation of the product for quality.

Under ideal growing conditions, peas from non-irrigated areas which give a tenderometer reading of approximately 100 units or less generally may be processed field run without going through the brine quality separator and meet requirements for Grade A maturity. Peas from irrigated areas, which give a slightly higher reading, approximately 105 to 110 units, may also be run field run as previously explained and meet the requirements for Grade A maturity.

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II PRODUCTION (continuation)

E Inspection of Raw Material (continuation)

Generally, tender peas show tenderometer readings of approximately 110 or less. Reasonably tender peas give tenderometer readings of approximately 110 to 115. Readings of varying degrees of tenderness will change from one area to another. A reading of 110 in one area may mean the finished product will be Grade A maturity while the same reading in another area may mean the finished product will be Grade B maturity. These differences are generally recognized in processor-grower contracts.

III PREPARATION AND FREEZING

A Vining

In a typical operation where the viners are located at the plant, the pea vines are fed into the viners from the trucks. The viners remove the peas from the shells by the threshing action. The vines must be partially wilted before threshing to avoid breaking the pods from the vines.

B Cleaning

The peas are conveyed from the viners to an even-feed hopper, which feeds them into a "clipper-type" cleaner. Extraneous material, such as leaves, pieces of pod, stems, and particles of dirt that passed through the viners are removed by air blowing through the product as it passes through the cleaner. Some processors use a "scalper" or vibrator following the clipper cleaner to aid in further removal of pods and dirt.

C Separating

After leaving the cleaner the peas are washed over a riffle-type washer into a separating reel where broken peas, and small pieces of extraneous material that may have passed through the cleaner are removed.

D Washing

The peas pass from the separating reel into a "flotation type" washer where such extraneous material as nightshade berries, thistle buds, pieces of pod, and leaves, as well as certain types of insects are removed. The flotation type of washer uses an emulsion of water, deodorized kerosene, and a detergent under agitation. The peas are fed into the top of the washer and the emulsified water-kerosene-detergent component floats off the extraneous material. The peas sink and are removed at the bottom of the washer.

III PREPARATION AND FREEZING (continuation)

E Sizing

It is not a general industry-wide practice to size peas for freezing; therefore, the grade standards do not provide for size as quality factor.

Under certain circumstances, generally through contract agreement between the packer and buyer, the peas are graded for size. In such cases the peas are transported by flume or surge pump from the flotation washer into the top of the size grader. One such grader consists of a series of superimposed screens containing holes through which the peas of a particular size will pass. A revolving cylindrical drum with perforations of varying sizes is also quite commonly used. The peas that fail to pass through the holes of the first screen are forced onto the next screen by a shaking action and so on until the largest size peas pass over the end of the screen. Each size or blend of sizes, depending upon the desires of the packer, are caught in storage hoppers to be held until they can be processed.

Generally, when frozen peas are sized, the designation and size for the designation is the same as that for canned peas.

F Blanching

The peas are conveyed by means of a flume, hydro-pump, or mechanical elevator either from the flotation washer or storage hoppers of the size grader, depending upon whether the peas have been graded for size, into the blancher. Various types of blanchers are used, the most common of which is the hot water tank type blancher, steam blancher, and the tube type blancher which also utilizes hot water. The peas are blanched sufficiently to inactivate the catalase and other enzymes which would otherwise cause development of off-flavors and loss of color and vitamins during cold storage. Blanching also fixes or sets the characteristic color of the peas.

III PREPARATION AND FREEZING (continuation)

G Cooling

A very important point in the operation is the cooling of the peas immediately after blanching. Improper cooling may result in discoloration due to overcooking, mushy peas, or bacterial spoilage. One method of cooling is by use of a cold water flume which transports the peas from the blancher to the quality grader while cooling them. Another method is by fog sprays of hydrocooled water over a mesh belt.

Water used for cooling and fluming the peas from place to place in the plant is often recirculated. In such cases, the recirculating system should be such that the recirculated water is always clean with a minimum of bacterial build-up to avoid contamination of the product.

H Quality Grading

Many packers pass the peas through quality graders each of which uses brines of different concentrations to separate peas of varying maturities. When properly operated these graders do a very good job of separating peas by maturity. Field run peas may, under ideal growing conditions and proper harvesting time, meet Grade A maturity. More commonly, however, there is a percentage of nearly mature peas in the raw stock and quality grading is very important. This is particularly important with frozen peas as the greatest demand is for high quality frozen peas with a much lighter demand for lower quality. It is not an uncommon practice to discard peas of advance maturity as they emerge from the grader rather than to use them in commercial packs. If there is a considerable volume of peas of advanced maturity, they may be frozen for reprocessing into soups or baby foods.

I Separating

The peas are transported from the quality grader to separating reels or blowers, which are located at the head of each inspection belt, by fresh water flumes where further removal of split peas and loose skins is performed. The reels are generally equipped with fresh water sprays which aid in rinsing the peas practically free from salt retained from the quality grader.

III PREPARATION AND FREEZING (continuation)

J Draining

After the peas leave the separating reels they are passed onto a short wire mech conveyor belt where the loose water is drained off. Adequate draining is important. An excessive amount of water in the cartons may be considered by the Federal Food and Drug Administration as adulteration. In the case of belt freezing, improper drainage will cause excessive clumping of the peas, forming large amounts of ice with the product which will cause loose skins and split peas as the frozen product passes through the cluster breaker prior to packing in bulk or smaller containers.

K Sorting and Packaging

The drained peas then pass over inspection belts where women pick out such defects as any extraneous material that may have passed through the operation, damaged and seriously damaged peas, and blond or cream-colored peas.

The peas may be packaged before or after freezing. Small containers of peas are usually filled by high speed filling machines similar to those used in canning. The institutional size containers are also usually filled by automatic fillers of lesser speed than the filling machine for consumer sized packages. The packages are then wrapped by automatic wrapping machines either with a plain wrap or lithographed label overwrap.

L Containers

The container sizes for consumer use ranges from 6 ounces to 16 ounce fiber cartons. In recent years pliofilm bags of 16, 24, and 32 ounce sizes have gained some popularity for both consumer and institutional packs. The 2-1/2 pound and 5 pound containers of 20 pounds have gained popularity in recent years for institutional use.

A considerable quantity of frozen peas is packed in "bulk" containers, principally in 50-pound bags in corrugated fiber cases. In recent years, larger bulk containers called "tote bins" have gained considerable popularity. These containers consist of large bins constructed of wood, fiber, or pressboard panels with metal frames and lined with a large plastic bag. The bins range in size from 3-1/2 x 3-1/2 x 2 feet to 4x4x5 feet. Bulk peas may be later packaged into consumer sized containers or used directly from the bulk containers in the manufacture of mixed vegetables, canned baby food, or canned soups.

III PREPARATION AND FREEZING (continuation)

M Freezing and Storing

A common method of freezing peas is by belt freezing. The loose peas pass through a freezing tunnel on a belt, the speed of which is geared to permit the peas to remain in the tunnel a sufficient length of time to become adequately frozen. As a safety precaution, magnets are generally placed over the freezing belt to remove metallic particles from the product. The temperature of the tunnel is maintained as minus 20° F. or lower. The frozen peas are then filled into cartons, bulk containers, or in large storage bins of approximately 750,000 to 1,000,000 pound capacity.

Some plants employ the "wet pack" method of freezing peas in consumer size containers. In this case the peas are conveyed from the sorting belt to automatic fillers where they are filled into cartons. The cartons are then wrapped in a plain or lithographed overwrap and placed on trays in a single layer. The trays are placed in racks which are wheeled into freezing tunnels where the temperature is maintained at minus 20° F. or lower.

In both the belt freezing and tray freezing methods, the tunnels are equipped with large fans which circulate the air around the product and greatly speeds up the removal of heat from peas.

Plate freezers are used for freezing peas by some packers. In this method, the packaged peas are placed in a single layer on special trays. The trays are placed in the freezer rack on plates equipped with freezing coils. The plate just above the filled tray is lowered so that it comes in contact with the filled packages. After the freezing rack is filled with trays of packaged peas, the doors are closed and the peas remain in sufficient length of time to become adequately frozen.

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III PREPARATION AND FREEZING (continuation)

M Freezing and Storing (continuation)

A new freezing process, known as "flowfreeze", has recently been introduced into the frozen foods industry. The freezing unit is compact and requires only a matter of minutes to solid-freeze a product. It consists of a metal trough through which air at sub-zero temperatures is blown through a bed of product as it flows from one end of the unit to the other. This process shows great potential because of the compactness of the equipment and the capability of maintaining individual unit characteristics in the finished product. A four inch bed of peas going in at 40° F. may be frozen in individual units coming out at 0° F. in about seven minutes.

After the peas are completely frozen, the packaged peas are cased, stacked on pallets and placed in the cold storage room. In the case of belt frozen peas or peas frozen in tunnels on screens, the peas are dumped into a large hopper and run through a cluster breaker which breaks up the frozen chunks, and removes loose ice and snow prior to packaging. Bulk peas are run directly from the freezing belt or breaker into bulk containers or large storage bins. The bulk containers are then placed in the cold storage room. The temperature of the cold storage room and storage bin is maintained at 0 degrees F. or lower.

IV INSPECTION OF THE PRODUCT

A General

The United States Standards for Grades of Frozen Peas describes and establishes requirements for the quality factors and should be followed in the inspection of the product, except when another specification is specifically requested.

Inspectors should be familiar with current general instructions regarding preliminary preparations for inspecting and grading frozen fruits and vegetables.

File Code 130 contains such general information as arranging samples and recording pertinent information, determining and recording net weights, and noting conditions of the raw product.

IV INSPECTION OF THE PRODUCT (continuation)

B Minimum Equipment and Inspection Material

The following list comprises the minimum equipment and inspection material needed for the inspection of frozen peas:

Scale, preferably in 0.1 ounce graduations.

Trays - small white, shallow laboratory trays for 16-ounce containers and smaller.

Trays - large white, shallow laboratory trays for containers larger than 16 ounces

No. 10 or No. 12 size cans for thawing the product.

Sauce pan.

Gas burner or electric hot plate.

Sieve - U. S. Standard No. 8 for draining the peas.

United States Standards - applicable issue, or other applicable specifications.

Commodity handbook instructions and any supplemental instructions on the product, such as cooking instructions, inspection aids, and enzyme tests.

Inspection documents (such as requests for inspection and certificate of sampling)

Score sheets.

Brine - 13 percent, 15 percent, and 16 percent NaCl solutions.

Suitable vegetable dyes of red and blue colors to mix with brine solutions.

250 ml. beakers.

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IV INSPECTION OF THE PRODUCT (continuation)

B Minimum Equipment and Inspection Material (continuation)

Accurately calibrated Salometer to measure brine strength.

Glass cylinder - 2 inch diameter and 15 inch height.

Thermometer.

Tea strainer or other suitable strainer for draining brined peas.

Special equipment and reagents: Pea sizers and other equipment and reagents as may be necessary to perform any tests or analyses (enzyme inactivation) required by the specification, requested by the applicant, or deemed necessary to properly certify the product.

C Thawing the Product

Except when the determination of the drained weight is necessary, the product is thawed as follows:

Remove the peas from the container and place in a No. 10 or No. 12 can or deep tray and thaw in water at a temperature not exceeding 86 degrees F. Water in excess of this temperature and prolonged soaking in the thawing water will have a tendency to leach the carbohydrates from the peas which will affect the brine determination. However, the peas should be permitted to reach as close to room temperature as possible as this, too, will have an effect on the determination for maturity. Thawing may be accelerated by gentle stirring of the peas in the water. The thawing water may be changed two or three times during the thawing process to speed up the time required for the peas to reach room temperature. Inspection should be made as soon as possible after the peas are completely thawed and at proper temperature.

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IV INSPECTION OF THE PRODUCT (continuation)

C Thawing the Product (continuation)

Frozen peas should not be air thawed for inspection purposes. A certain amount of dehydration of the peas will occur during the time required for the peas to become completely thawed and come up to approximately room temperature which will affect the color of the peas as well as the determination for maturity.

When drained weight determinations are necessary the peas used for drained weight determinations are used for grade evaluation.

IV INSPECTION OF THE PRODUCT (continuation)

D Drained Weight

Ordinarily, under normal inspection procedure, drained weights are not taken. However, when specifically requested, or if the samples appear to definitely contain an excessive ice condition, drained weights should be determined and recorded.

In making a drained weight determination, use the following method unless the applicant or specification involved calls for some other method:

After removing all wrappings or packaging materials, place the frozen peas into a pliable bag, such as Cry-O-Vac, Pliofilm, or Polyethylene. Evacuate the air from the bag, by sucking the air out by mouth or by suitable vacuum pump, carefully tie or seal the bag, and completely thaw the peas in a water bath held at temperatures of not more than 86 degrees F.

The completely thawed peas are emptied from the bag upon a U. S. Standard No. 8 circular sieve of proper diameter containing 8 meshes to the inch (0.0937 inch, \pm 3 percent, square openings) so as to distribute the product evenly. Incline the sieve slightly to facilitate draining and allow to drain for exactly two minutes. At the end of one minute, the tilt of the sieve is reversed so as to release water which may be held on the small flange. The drained weight is the weight of the sieve and peas less the weight containers or smaller, and a sieve 12 inches in diameter is used for packages larger than the equivalent of one pound net weight. The peas may then be used to complete the inspection.

IV INSPECTION OF THE PRODUCT (continuation)

E Product Description

At the present time there are no established minimum standards of identity or quality for frozen peas under the Federal Food, Drug, and Cosmetic Act. However, the overall requirements of the Act with respect to labeling, deceptive fill, and freedom from deleterious and objectionable substances are applicable.

F Sample Size for Grade Determination

1 Color and Defects

Except for harmless extraneous vegetable material, use the entire sample unit or a 10 ounce sub-sample, whichever is less.

For harmless extraneous vegetable material, use the entire sample unit or a 30 ounce sub-sample, whichever is less.

Sub-samples must be representative of the entire sample unit from which it is taken.

2 Tenderness and Maturity

Either a single sampling plan or the multiple sampling plan and scoring guide contained in Inspection Aid 45, revised, in this instruction is applicable for the determination of maturity when applying the U. S. Standards.

When the single sampling plan is used, not less than 100 peas per sample unit must be brine tested to ascertain the grade for maturity.

When the multiple sampling plan is used, the scoring guide accompanying the plan is to be used in assigning score points for the factor of tenderness and maturity. Do not use this scoring guide in conjunction with the single sampling plan.

IV INSPECTION OF THE PRODUCT (continuation)

G Flavor

The grade standards specify that flavor is determined after the product has reached room temperature and after cooking. To more thoroughly evaluate this factor, the product must be checked for objectionable (or off) odors in the frozen state as well as in the thawed and cooked state.

Refer to Memorandum A-179 for cooking instructions for frozen peas, filed under "General Instructions" Frozen Fruits and Vegetables.

The grade standards provide for a define two degrees of flavor – "good flavor" and "fairly good flavor".

Good flavor is defined as a "a good characteristic flavor and odor of frozen peas for the maturity, being free from objectionable flavors and objectionable odors of any kind." This means that even though peas of different maturities may have slightly different flavors due to the differences in starch content, the flavor should be considered as good provided it is a characteristic pea flavor for the particular maturity and there are no objectionable flavors or objectionable odors present.

Fairly good flavor is defined as "lacking good flavor but is free from objectionable flavors and objectionable odors of any kind." Peas that possess only a fairly good flavor cannot be classified above Grade B, even though all other factors fall into the A classification.

Peas that possess objectionable flavors or objectionable odors of any kind, whether such flavors or odors are detected in the frozen, thawed, or cooked state, as applicable, cannot be classified above Substandard.

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Inspection Aid 45
 Revised, November 1964

PROZEN PRAS
 DETERMINATION OF TENDRINESS AND MATURITY
 Multiple Sampling Plan and Scoring Guide

No	GRADE A 13% Brims			GRADE B 15% Brims			GRADE C 16% Brims			
	Multiple Sampling Plan	Scoring Guide	Score Points	Multiple Sampling Plan	Scoring Guide	Score Points	Multiple Sampling Plan	Scoring Guide	Score Points	
25	0	0	40 <u>U</u>	0	0	35 <u>U</u>	1	7	0	31 <u>U</u>
	5	0	39	6	0	34			0-1	30
50	2	1	39	3	1-2	34	5	12	2-3	30
	8	2	38	9	3	33			4-5	29
75	5	3	38	7	4-6	33	9	16	6-8	29
	11	4-5	37	13	7	32			9	28
100	8	6-7	37	10	8	33	13	19	10-11	29
	13	8	36	16	9-10	32			12-13	28
125	13	9-13	36	15	11-15	32	20	21	14-20	28

U A top score for the applicable grade classification is assigned only under the conditions prescribed in these instructions. Do not use the single plan when testing has begun on the multiple plan and vice versa.

IV INSPECTION OF THE PRODUCT (continuation)

G Flavor (continuation)

Some reasons for classifying frozen peas other than good flavor include: blandness or lacking flavor, saltiness, hay or straw flavor, sourness, and other changes that may be due to enzymatic action. The degree to which the flavor is affected will determine which grade classification the product is assigned. For example: approximately 1 percent, by count, of the peas may possess a sour flavor but if this amount is no more than slightly noticeable when the peas are eaten in mass in the usual manner, the product would be considered as having only a fairly good flavor. If a sour flavor is more noticeable, regardless of percentage of peas affected that may be present, the product should not be classified above Substandard.

H Similar Varietal Characteristics

Peas used for freezing usually have similar characteristics. However, in the event the frozen peas are of noticeably dissimilar varieties, such as Sweets and Earlies, they would be classified as Substandard because these are not similar varietal types.

I Size Requirements (Compliance with specifications)

Certain buyers' specifications for frozen peas contain size requirements. Generally, such documents specify that the peas shall be "predominantly" of 3 or 4 adjacent sizes - such as 3, 4, and 5 sieve sizes, or 4, 5, and 6 sieve sizes.

Since sizes for frozen peas have not been standardized, the same sizes as for canned peas, Table I of this instruction, apply to the designations used.

* Change.

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Frozen Peas
March, 1974

IV INSPECTION OF THE PRODUCT (continuation)

I Size Requirements (Compliance with specifications) (continuation)

TABLE I

Recommended Sizes for Frozen Peas

Size Designation	Diameter of Circular Openings in Inches	
	Will Not Pass Through	Will Pass Through
No. 1	—	9/32
No. 2	9/32	10/32
No. 3	10/32	11/32
No. 4	11/32	12/32
No. 5	12/32	13/32
No. 6	13/32	14/32
No. 7	14/32	—

In the absence of compliance criteria for size in the buyers' specification which contains size requirements inspectors should be guided by the following to ascertain compliance with size for sample units and for the sample:

- 1 Not less than 85 percent, by count, of all the peas in the sample unit must be of the specified sizes;
- 2 The number of deviants does not exceed the acceptance number for the applicable sample size in the single sampling plan in the "Regulations" governing processed fruit and vegetable inspection.

IV INSPECTION OF THE PRODUCT (continuation)

J Color

1 General

The grade standards specify that the factor of color is determined immediately after the product has reached room temperature or immediately after thawing so that the product is free from ice crystals.

To more fully evaluate this factor, however, consideration must be given to the degree to which dehydration of the product, if present, affects the over-all appearance of the product in the frozen state as well as in the thawed state.

Compliance with other requirements for the factor of color is determined when the product is in the thawed state and still moist. Consideration must be given to the brightness and uniformity of the over-all color appearance as well as whether the product possesses a good green color that is typical for the variety.

Provision is made in each grade classification for: the degree which peas that vary markedly from such typical color may affect the over-all color appearance; specific allowances for blond or cream colored peas; and peas that seriously detract from the over-all color appearance.

IV INSPECTION OF THE PRODUCT (continuation)

J Color (continuation)

2 Color Guides

USDA Color Guides for Frozen Peas are supplied to each field office and are to be used as an aid in evaluating the factor of color with respect to peas that vary markedly from the over-all color appearance. The color guides are numbered from 1 thru 6 and range in color from dark green (USDA 1) to light green (USDA6). The color guides are to be applied as follows:

Conditions for Use of Guides

The evaluation of color should be made under adequate lighting conditions, preferably under constant laboratory lighting that approximates diffused north daylight (about 7500 degrees Kelvin).

Care of Color Guides

The color guides are made of a plastic material and should be handled with care to avoid scratching. They should be cleansed by rinsing in clear, warm water and dried with a soft cloth immediately after using. No abrasive cleaner should be used. They should be stored in a cool, dark place when not in actual use.

3 Making Color Comparisons

The evaluation of color of the peas should be made as soon as possible after the product has thawed or when the peas have reached room temperature, in accordance with the following procedure:

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IV . INSPECTION OF THE PRODUCT (continuation)

J Color (continuation)

3 Making Color Comparisons (continuation)

Select the color guide which most nearly matches the predominant color of the mass of peas in the sample unit.

Consider as "markedly variable" those peas on which approximately one-fourth or more of the surface area is as light as or lighter than, or is as dark as or darker than, the second color from that selected as the predominant color. Allowances for peas that vary markedly are specified in Table II of this instruction.

Example

If color guide No. 3 is selected as that which most nearly matches the predominant color of the mass of peas in the sample unit, then peas (approximately 1/4 or more of the surface area) as light as or lighter than color guide No. 5; or as dark as or darker than color guide No. 1 would be scoreable as peas that "vary markedly."

Peas that are blond, cream-colored, or otherwise seriously discolored are classified separately from peas that "vary markedly" under the color guides.

CAUTION: Compliance with requirements for peas that vary markedly does not excuse failure to comply with other requirements for the factor of color. The grade standards provide for 5 specific requirements for this factor which are:

- a the peas possess a good, green color;
- b the peas are bright;
- c the peas are practically uniform;
- d peas that vary markedly do not more than slightly, materially, seriously (as applicable for the grade) detract from the appearance;
- e allowances for blond or cream colored.

— continued on next page—

IV INSPECTION OF THE PRODUCT (continuation)

J Color (continuation)

3 Making Color Comparisons (continuation)

TABLE II (continuation)

SUMMARY OF ALLOWANCES FOR COLOR

-
- 1/ Peas that score 16 points shall not be graded above Grade B, regardless of the total score for the product.
- 2/ Peas that score 14 or 15 points shall not be graded above Grade B, regardless of the total score for the product.
- 3/ Peas that score 0-13 points shall not be graded above Sub-standard, regardless of the total score for the product.

IMPORTANT NOTE: The allowances in Table II are not included in the grade standards. The "Instructions for Using USDA Frozen Pea Color Guides" along with the aforementioned allowances have been distributed to interested persons in the industry with and without the USDA Color Guides.

IV INSPECTION OF THE PRODUCT (continuation)

J Color (continuation)

3 Making Color Comparisons (continuation)

A sample unit or lot of frozen peas may be down-graded for failure to comply with any one or any combination of these requirements.

TABLE II

SUMMARY OF ALLOWANCES FOR COLOR

Grade Classification	Score Points	Peas that vary markedly, Blond cream-colored, and otherwise seriously discolored		Blond, Cream-colored, and otherwise seriously discolored	Other Requirements
		(by count)	(by count)		
A	20	1/2%		0	Possess good, green color; bright; practically uniform
	19	1%	But no more than	1/4%	
	18	2%		1/2%	
B	17	3%	But no more than	3/4%	Reasonably bright; reasonably uniform green color
	16 <u>1/</u>	5%		1-1/2%	
C	15 <u>2/</u>	7%	But no more than	1-3/4%	Fairly uniform green color, dull but not off color
	14 <u>2/</u>	10%		2%	
SSStd.	0-13 <u>3/</u>	Fails to meet requirements for Grade C classification			

See next page for footnotes: 1/, 2/, and 3/.

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IV INSPECTION OF THE PRODUCT (continuation)

J Color (continuation)

4 Dehydration

In addition to the allowances for color characteristics specified in Table II of this instruction, the degree to which dehydration affects the over-all color appearance must also be considered.

An administrative guide for various degrees of dehydration is provided in Table III of this instruction.

Definitions of terms degrees of dehydration

Insignificant - Dehydration that is not readily noticeable, and does not affect the over-all color appearance.

Slight - Dehydration that is no more than slightly noticeable, has a slight whitish, mottled appearance, and may no more than slightly affect the over-all appearance.

Moderate - Dehydration that is materially noticeable, has a definite whitish, mottled appearance, and not more than materially affects the over-all color appearance.

Severe - Dehydration that is very noticeable, has a definite white cast and dried appearance, and seriously affects the over-all color appearance of the product.

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IV INSPECTION OF THE PRODUCT (continuation)

J Color (continuation)

4 Dehydration (continuation)

Consideration of occurrence of dehydration

Consideration must be given to the different ways by which dehydration may occur in the product and may affect the over-all color appearance to some degree.

Two of the most common ways that dehydration may produce the same effect on the over-all color appearance are:

Surface dehydration - generally occurs after packaging; usually confined to outside layer(s) of peas, but may extend to peas under surface layers, depending upon extent of exposure to air.

Interspersed dehydration - generally occurs prior to packaging, during belt freezing or while being held in bulk containers. In this case it is possible to have a few peas that may be affected by severe dehydration interspersed in the package but the number of peas so affected may not affect the over-all color appearance beyond the limitations for A classification for the factor of color.

In any case, inspectors must use good judgment when ascertaining the degree to which the over-all color appearance is affected by the presence of dehydration.

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IV INSPECTION OF THE PRODUCT (continuation)

J Color (continuation)

4 Dehydration (continuation)

TABLE III

ADMINISTRATIVE GUIDE FOR EVALUATING COLOR
WITH RESPECT TO DEHYDRATION

Grade Classification	Frozen	Thawed	Cooked
A	Insignificant	Insignificant	None
B 17 points 16 points	Slight Moderate	Insignificant Slight	None Insignificant
C	Moderate	Moderate	Slight
SStd	Severe	-----	-----

K Defects

1 General

The grade standards define the various kinds of defects most commonly encountered in frozen peas.

Allowances for the various defects are classified both objectively and subjectively. Even though the product may meet the objective requirements in a particular grade classification, it is possible that the appearance or eating quality may be affected to a greater degree than the allowances might indicate. For example, a sample unit may contain the maximum (A) allowance for seriously blemished peas and contain no other defects, but due to the nature and extent of the defects (such as black or very dark discoloration) the appearance or eating quality may be more than slightly affected.

IV INSPECTION OF THE PRODUCT (continuation)

K Defects (continuation)

1 General (continuation)

In the A classification any defects present may not more than slightly affect the appearance and eating quality of the product while in the B classification the appearance and eating quality may not be materially affected. There is a zone between being “slightly affected” and “not materially affected” in which the appearance and eating quality may fall. This means that the appearance and eating quality of the product may be more than slightly affected but not materially affected in the B classification.

In the C classification the appearance and eating quality of the product may be materially, but not seriously affected.

Follow Inspection Aid 47 – “Scoring Guide and Summary of Maximum Allowances for Defects for Frozen Peas” – when assigning score points to a sample unit under the factor of defects for the objective allowances.

2 Harmless Extraneous Vegetable Material

Three separate groups of harmless extraneous vegetable material are provided for under the factor of defects. Under the B and C classifications two separate allowances for each classification are provided. One allowance is applicable when only one group is present in a sample unit. The second allowance is applicable when a combination of any two groups is present in a sample unit. Note especially that when a combination of any two groups is present in a single sample unit, the allowances provided for each group is less than that when only a single group is present.

– continued on next page –

IV INSPECTION OF THE PRODUCT (continuation)

K Defects (continuation)

2 Harmless Extraneous Vegetable Material (continuation)

Allowances for harmless extraneous vegetable material are based on 30 ounces of frozen peas. For sample units of less than 30 ounces the full 30 ounce allowance will be permitted for the respective grade classification provided the average of such defects in the entire sample does not exceed such allowances.

Example

In a sample of 6-10 ounce cartons, two cartons may contain the maximum allowance provided for 30 ounces in the A classification; provided four cartons contain no harmless extraneous vegetable material. In this case each of the six sample units would be scored in the A range: Provided, That all other defect allowances are met for the grade, and the presence of such material does not more than slightly affect the appearance of the sample units.

The allowances in the various grade classification for Group I - Flat Material are based on two separate conditions. The allowances expressed in terms of area for this group are to be applied when more than one piece is present in a sample unit. When only one piece is present in a sample unit, the area allowances do not apply, and the one piece is permitted, regardless of size: Provided, That the appearance of the sample unit is not affected beyond the degree permitted for the grade.

Allowances for Group III are expressed in linear measurement and apply to a single piece as well as to the aggregate length of more than one piece.

The grade standards do not provide for such substances or material as peat, puncture vine, burr clover buds or other burrs, barley barbs, wood splinters, stones or any other material that may seriously affect the eating quality of the product. Such substances or material are not considered as "harmless extraneous vegetable material" and are covered under "foreign material" of this instruction.

IV INSPECTION OF THE PRODUCT (continuation)

K Defects (continuation)

3 Pieces of Peas

Pieces of peas or broken peas are defined in the grade standards. Allowances are provided in each of the grade classifications on a percent, by count, basis. When determining the number of pieces of peas, consider the following as one piece of pea:

A whole pea from which a cotyledon or a large portion thereof has become separated;

Two detached cotyledons - any two separated cotyledons may be placed together as one piece;

Pieces of cotyledon aggregating the equivalent of an average size cotyledon - more weight has been put on this category than "two detached cotyledons" because broken pieces have more of an adverse affect on the appearance of the product;

A whole detached skin or portions of detached skin aggregating the equivalent of an average size whole skin.

When assigning the grade classification to a sample unit of frozen peas, keep in mind the partial limiting rule provided in each of the grade classifications for pieces of peas. Consideration must be given to the over-all appearance of the product, when applying the partial limiting rule.

4 Blemished Peas

Peas that are affected by small areas (approximately 1/8 of the total area or less) of light to dark brown discoloration and which do not materially affect the appearance or eating quality of the pea would be considered in this category. Blemished peas are not considered in the over-all appearance when ascertaining the rating for the factor of color.

IV INSPECTION OF THE PRODUCT (continuation)

K Defects (continuation)

5 Seriously Blemished Peas

Peas that are affected by light to dark brown areas which cover more than approximately 1/8 of the total surface area and peas that are affected by very dark or black discoloration or insect injury accompanied by discoloration regardless of area as well as hard shriveled and spotted peas are considered in this category.

Also considered as seriously blemished are peas that are off-color, such as brown, gray or black peas. Such discolored peas are also considered under the factor of color and included in the allowances for peas that seriously affect the over-all color appearance of the product.

6 Dusty or Dirty Peas

Occasionally, field conditions are such that the vines and pods become muddy or dusty. During the vining operation the viners may break the skins of the peas and small particles of dirt or dust may lodge in between the skin and cotyledon. The extensive cleaning and washing the peas undergo prior to packaging seems to have little or no effect on the removal of such dirt or dust. Upon cooking the product, a dirt residue may be observed in the water and the appearance of the affected product may vary from a slightly noticeable to a very noticeable dirty appearance, depending upon the amount of dirt or dust present.

To provide for uniform classification of the product when dirt or dust is present, the following administrative guide applies:

– continued on next page –

IV INSPECTION OF THE PRODUCT (continuation)

K Defects (continuation)

6 Dusty or Dirty Peas (continuation)

Grade A

- None may be present that affects the appearance or eating quality of the product.

Grade B and C

- A trace may be present that no more than slightly affects the appearance or eating quality of the product.

This guide is intended to provide for only minute or insignificant amounts of dirt or dust in the finished product that will not lower the quality level for the classification as specified in the grade standards.

7 Scoring Guide for Defects

Inspection Aid No. 47 provides a scoring guide and summary of allowances for defects.

When applying the scoring guide, each container in the sample is scored on its own merit with respect to blemished peas, seriously blemished peas, and pieces of peas.

With respect to harmless extraneous vegetable material, for containers less than 30 ounces, all the containers in the sample are assigned the score point applicable for the average amount, per 30 ounces, net weight, that is present, provided no single container has more than the allowance for 30 ounces for the grade classification.

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
FRUIT AND VEGETABLE DIVISION

SCORING GUIDE AND SUMMARY OF MAXIMUM ALLOWANCES FOR DEFECTS
FROZEN PEAS

GRADE CLASSIFICATION	SCORE POINTS	BLEMISHED PEAS (% by count)	SERIOUSLY BLEMISHED PEAS (% by count)	PIECES OF PEAS (% by count)	MAXIMUM ALLOWANCES 1/				COMBINATION OF ANY 3 GROUPS			
					Group I - Flat (max)	Group II - Spinal (max)	Group III - Hydrolyzed (max)	Group IV - Spines (max)				
A	40	0	0	1%	0	0	0	0	Group I - Flat (max)	Group II - Spines (max)	Group III - Hydrolyzed (max)	Group IV - Spines (max)
	39	0.5% including 0.1%		3%	1/16 sq. in.	0	0	0	1 or more pieces 3/16 lin. or less			
	38	1.0% including 0.2%		4%	2/16 sq. in.	0	0	0	1 or more pieces 3/16 lin. or less			
	37	1.5% including 0.3%		5%	3/16 sq. in.	0	0	0	1 or more pieces 3/16 lin. or less			
	36	2.0% including 0.5%		7%	4/16 sq. in. or 3 pieces any size	0	0	0	1 or more pieces 3/16 lin. or less			
	35	2.5% including 0.6%		8%	5/16 sq. in. or 1 piece any size	0	0	0	1 or more pieces 3/16 lin. or less			
B	34	3.0% including 0.7%		8%	6/16 sq. in. or 3 pieces any size	0	0	0	1 or more pieces 3/16 lin. or less			
	33	3.5% including 0.8%		9%	7/16 sq. in. or 1 piece any size	0	0	0	1 or more pieces 3/16 lin. or less			
	32	4.0% including 1.0%		10%	8/16 sq. in. or 3 pieces any size	0	0	0	1 or more pieces 3/16 lin. or less			
	31	4.5% including 1.1%		11%	10/16 sq. in. or 1 piece any size	0	0	0	1 or more pieces 3/16 lin. or less			
C	30	5.0% including 2.0%		12%	12/16 sq. in. or 3 pieces any size	0	0	0	1 or more pieces 3/16 lin. or less			
	29	5.5% including 2.1%		13%	14/16 sq. in. or 1 piece any size	0	0	0	1 or more pieces 3/16 lin. or less			
	28	6.0% including 3.0%		15%	1 sq. in. or 1 piece any size	0	0	0	1 or more pieces 3/16 lin. or less			
	27	6.5% including 3.0%		15%	1 sq. in. or 1 piece any size	0	0	0	1 or more pieces 3/16 lin. or less			
SS1d	6-27	Fails to meet requirements for grade C classification except for pieces of peas that exceed 11% by count, but do not exceed 30% by count.										

NOT PERMITTED IN COMBINATION

1/ Limiting rule is applicable to all types of defects except for pieces of peas as stated.
2/ Area and piece measurements are made on the aggregate of all the pieces present in a sample unit or in the sample as applicable.

IV INSPECTION OF THE PRODUCT (Continuation)

L Tenderness and maturity

1 General

The grade standards specify two separate methods for the determination of tenderness and maturity.

The brine flotation method is used for determining compliance with a specific maturity level by the peas that sink in the brine for that level. Since the requirements are based on only one brine concentration in each grade classification this test does not reflect the maturity level of the sinkers. Furthermore, this test is not applicable for the detection of tough skins.

Thus, it is necessary to also test the cooked peas organoleptically to evaluate the product more fully for this factor.

* NOTE: There is evidence to indicate that in some cases the freezing process will affect results of the brine flotation test, in that, peas tested immediately after freezing may show a higher maturity score than the same peas immediately before freezing. This difference may also decrease with time after freezing. Inspectors, particularly those in in-plant situations and those attempting to up-date a certificate or re-grade product, should be aware of this phenomenon. The score and grade assigned must be the one determined at the time the product is graded anytime after freezing.

It is the intent of the grade standards that if the brine flotation test indicates that frozen peas are of fancy maturity, they should also taste like fancy peas with respect to the degree of starchiness. In cases of lots that are borderline fancy with respect to maturity by the brine flotation method, occasionally it has been found that the peas did not appear to be fancy upon eating because of the presence of 8 or 10 percent, by count, of very mature peas which reflected a much higher degree of starchiness than would be expected of fancy peas.

Tough skins must also be taken into consideration in the organoleptic evaluation of this factor. Peas that possess tough skins should not be classified above Grade B, regardless of the brine flotation results.

Inspectors should be very cautious in down-grading frozen peas when such a classification would be contradictory to the brine flotation test. Concurrence of the supervisor should be obtained for the proper classification of the product when a contradiction between the brine flotation test and the organoleptic test is encountered.

THIS INSTRUCTION DOES NOT ESTABLISH
A NEW OR REVISED SUBSTANTIVE RULE

*Added September 1972

IV INSPECTION OF THE PRODUCT (continuation)

L Tenderness and Maturity (continuation)

2 Explanation of the Brine Flotation Test

The brine flotation test utilizes the principle that an object will float in a liquid of higher specific gravity than the object. When a handful of peas is placed in a brine of about the same specific gravity as the peas, the more starchy or mature peas (those with higher specific gravity than the brine) will sink, whereas the less mature peas (those with lower specific gravity than the brine) will float. The peas, then, will have undergone a brine separation into groups of slightly differing maturities. This principle is used in commercial brine separators and in many laboratory tests.

3 Preparing the Test Brines

The brines used are percentages of salt, by weight – not volume. For example, a 13% salt solution could be made by combining 130 grams of pure salt and 870 grams of distilled water. A more practical method of preparing solutions is to prepare a large container of saturated stock solution containing considerably more salt than will go into solution.

This stock solution at 68 degrees F. will contain approximately 26% salt, by weight. Kiln dried, half ground rock salt, or any other salt which, when dissolved in water, does not produce an excessively cloudy appearance is suitable. Iodized salt generally will cause the brines to be cloudy.

It is customary to label or mark the stock bottles and beakers with the appropriate salt brine concentrations. Plant or office personnel inspecting large quantities of peas will require many beakers to perform the tests. In many instances, several people will be testing peas simultaneously and the beakers and brine solutions could easily get mixed. Furthermore, different quality levels in the lots of peas being inspected will require different brines and considerable time is lost in changing the beaker labels each time a different brine is used.

No Change in the Text

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IV INSPECTION OF THE PRODUCT (continuation)

L Tenderness and Maturity (continuation)

3 Preparing the Test Brines (continuation)

The stock solutions can be colored with a suitable vegetable dye to indicate the respective concentration. It would be desirable to use a red dye for 13% brine, a blue dye for 15% and clear brine for 16%. Each employee using such brines must be familiar with the color key in order to select the proper brine. This color identification affords an accurate and quick method of selecting the proper brines. It can be used most advantageously in any plant or field office in which several employees are running the brine tests simultaneously.

Brines of any desired strength may be quickly made up by combining some of the stock solution with tap water. They may be roughly made up by volume. For example, one half water and one half 26% salt solution will result in a solution of about 13% brine. Adjustments can be made by adding small amounts of water or stock solution, mixing thoroughly, and checking for accuracy with a properly calibrated salometer. Just prior to grading, solutions must be rechecked because of inaccuracies which are due to differences in temperature of the solution and the entrapment of air as a result of mixing. Difficulties in adjustment can be partially avoided by drawing a large container of tap water and allowing it to reach room temperature before making up solutions.

THIS INSTRUCTION DOES NOT ESTABLISH
A NEW OR REVISED SUBSTANTIVE RULE

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No change in text

IV INSPECTION OF THE PRODUCT (continuation)

L Tenderness and Maturity (continuation)

3 Preparing the Test Brines (continuation)

Make no temperature correction. Salometer readings are not corrected for temperature because we are concerned only with the buoyant effect of the solution. This buoyant effect is the same on the peas, or any other immersed object, as it is on the salometer at the same temperature. In other words, if an accurate salometer calibrated at 20°C. Reads 13% when immersed in a salt solution at 30°C. The solution will not actually contain 13% of salt. However, the buoyant effect of the solution is the same as that of a 13% solution at 20°C.. For the purpose of this test it may be considered a 13% salt solution. For the same reason we are not concerned whether all of the buoyant effect is caused by salt or by other materials in solution in the tap water. (Do not confuse this procedure with temperature corrections when using Brix spindles. Temperature corrections are necessary when determining per cent of solids in solution at any other temperature than that at which the instrument is calibrated.)

The important consideration is that the salt content of the test solution must be adjusted so that the salometer will read the desired per cent of salt when the test is made - regardless of the actual temperature.

THIS INSTRUCTION DOES NOT ESTABLISH
A NEW OR REVISED SUBSTANTIVE RULE

IV INSPECTION OF THE PRODUCT (continuation)

L Tenderness and Maturity (continuation)

4 General Rules to Assure Accuracy

- a Recheck solution just prior to grading, being certain that sufficient time has elapsed to dissipate entrapped air from the solutions.
- b Use tested salometers calibrated in percent salt with narrow range (0-18%) and graduated in tenths. If the salometer has not been checked for accuracy, compare it with an approved instrument or with accurately weight solutions at 20°C.
- c Read the salometer properly; with a dry stem; at the level of the liquid, not the top of the meniscus. Have your eye level with the top of the liquid.
- d Have the peas and the solutions at approximately the same temperature.
- e Change brines frequently as they become diluted.
- f If the brine is to be re-used, remove the peas immediately after the count has been made.
- g On borderline samples always use fresh tested brines; never use the same peas in successive brines.
- h Always test sufficient peas to definitely establish the grade. Follow the Multiple Sampling Plan – Inspection Aid 45, except when the single plan is used, which requires a minimum of 100 peas.

IV INSPECTION OF THE PRODUCT (continuation)

L Tenderness and Maturity (continuation)

5 The Multiple Sampling Plan for Brine Testing Peas

The multiple procedure is such that the results obtained by using it will be equivalent to those obtained after brine testing 100 peas in a single sampling procedure. Because the number of peas brine-tested on non-borderline peas will be less than 100 peas, the inspection workload will be reduced without loss of accuracy with respect to lot acceptance.

Inspection Aid 45 of this instruction has been devised to assist the inspector in determining how many peas to float.

This table consists of cumulative increments of 25 peas tested in sequence depending upon the results of each such grouping.

Also included is a scoring guide which will provide uniformity in rating the factor of tenderness and maturity under the multiple sampling plan.

The table provides:

nc - Sample size or no. of peas (cumulative) used in the brine test.

c - Acceptance no. or the maximum number of peas (cumulative) that may sink in the given brine and consider the sample unit acceptable for a specified grade.

r - Rejection no. or the minimum number of peas (cumulative) that may sink in the given brine before the sample unit is failed for a specified grade.

IV INSPECTION OF THE PRODUCT (continuation)

L Tenderness and Maturity (continuation)

6 Making the Brine Flotation Test

- a Have available two 250 ml. beakers for each brine you expect to use.

If the brines have not been colored as previously explained, mark the beakers to show the percent brines to be used in each.

- b Start with the weakest brine - 13% NaCl.

As inspectors gain experience, organoleptic judgement may permit eliminating the weaker brine (s) when it is obvious by taste that the peas may be of more advanced maturities. Even then, organoleptic judgments must be frequently checked against the brine flotation test.

- c Select a representative sample of peas to test in each brine.

The peas should be thoroughly mixed, making a pile in one part of the tray. A representative sub-sample may be taken from the mixed peas by inserting the hands from opposite sides of the pile and bringing them up through the top, retaining approximately 100 peas. This sub-sample is then placed on a cleared portion of the tray.

Separate the peas in increments of 25 for brine testing. Discard only broken or mashed peas. When obtaining a sub-sample for brine testing, do not select by size or appearance.

- d Carefully remove the skins from the peas. If cotyledons divide use both cotyledons in the test.

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IV INSPECTION OF THE PRODUCT (continuation)

L Tenderness and Maturity (continuation)

6 Making the Brine Flotation Test (continuation)

- e Place nc (25) peas at a time in a beaker containing about 2 inches of the brine solution; count the peas that sink to the bottom in ten seconds; and remove promptly by pouring the brine into the second beaker to be used for that brine, catching the peas in a tea or other suitable strainer.
- f Accept, reject, or test more peas –
 - i If the number of sinkers are not more than the acceptance number for the sample size and brine, accept the sample unit as meeting the brine requirement for the applicable grade; or
 - ii If the number of sinkers are equal to or more than the rejection number for the sample size and brine, reject the sample unit as failing the brine requirement; or
 - iii If the number of sinkers is more than the acceptance number but less than the rejection number, test more peas in increments of 25 until either the acceptance or rejection criteria for the applicable brine is met.
- g When the rejection criteria for Grade A or Grade B applies, go on to the brine for the next lower grade and test the number of peas (nc) until the acceptance or rejection criteria is met for that brine to establish the score point for the applicable grade.

IV INSPECTION OF THE PRODUCT (continuation)

L Tenderness and Maturity (continuation)

7 Applying the Scoring Guide

Inspection Aid 45 provides score points that apply to specific acceptance numbers of sinkers, (c), for a given sample size (nc). The accuracy of the multiple sampling plan for assigning the grade to a sample unit for maturity is equal to a single sampling plan based on 100 peas.

It should be noted that two separate score points are provided for the first multiple of $nc = 25$, $c = 0$ in each of the grade classifications. A top score of 40, 35, or 31 points for the respective grade classifications is assigned on the basis of 100 peas - 25 peas from each of 4 consecutive sample units, except when there are less than 4 sample units in the sample. (In the case of lot inspection when only three sample units are required, 40 points may be assigned on the basis of 0 sinkers in 75 peas - 25 from each sample unit.

The scoring procedure for the multiple plan is applied as follows:

- a In the case of in-plant inspection, sample units are considered consecutive in the order of production.
- b In the case of lot inspection, sample units are considered consecutive in order of code mark groupings.
- c When at least four consecutive sample units (three in the case of minimum sample size in lot inspection) show $c=0$, $nc =25$, assign the top score for the grade classification to these sample units. Each subsequent consecutive sample unit that shows $c = 0$, $nc = 25$ also is assigned the top score as applicable.

Example 1

<u>Sample Unit No.</u>		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
13% Brine	Nc = 25	0	0	0	0	0	0
	Score Points	40	40	40	40	40	40

IV INSPECTION OF THE PRODUCT (continuation)

L Tenderness and Maturity (continuation)

7 Applying the Scoring Guide (continuation)

- d If, after four or more consecutive sample units which are assigned the top score, a sample unit is encountered that shows sinkers proceed with the brine test for this sample unit in accordance with the multiple sample plan. Assign the score points to this sample unit applicable to the number of sinkers and brine. Begin the sequence of consecutive sample units for $c = 0$, $N_c = 25$ with the next sample unit.

Example 2

<u>Sample Unit No.</u>		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
13% Brine	$N_c = 25$	0	0	0	0	0	1
	$N_c = 50$						0
	Score Points	40	40	40	40	40	39

- e When less than four consecutive sample units which test 0 sinkers in 25 peas (sample units 4, 5, and 6 example 3) follow a sample unit with sinkers (sample unit 3, example 3) these sample units are assigned 39 points.

Example 3

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
<u>Sample Unit No.</u>		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
13% Brine	$N_c = 25$	0	0	1	0	0	0
	$N_c = 50$			1			
	Score Points	39	39	38	39	39	39

Inspector Aid 45
 Revised, November 1964

FROZEN PEAS
 DETERMINATION OF TENDERNESS AND MATURITY
 Multiple Sampling Plans and Scoring Guide

Multiple Sampling Plan	GRADE A 15% Defect		GRADE B 15% Defect		GRADE C 16% Defect				
	Scoring Guide	Score Points	Multiple Sampling Plan	Scoring Guide	Multiple Sampling Plan	Scoring Guide			
0	0	40 1/2	0	0	35 1/2	1	7	0	31 1/2
5	0	39	6	0	34	1	7	0-1	30
2	1	39	9	1-2	34	5	12	2-3	30
0	2	38	3	3	33	5	12	4-5	29
5	3	38	13	4-6	33	9	16	6-8	29
21	4-5	37	7	7	32	11	18	9	28
8	6-7	37	10	8	33	13	19	10-11	29
13	8	36	16	9-10	32	19	28	12-13	28
13	9-13	36	15	11-15	32	20	21	14-20	28

A top score for the applicable grade classification is assigned only under the conditions prescribed in these instructions. Do not use the single plan when testing has begun on the multiple plan and vice versa.

Replaces page 45, dated November, 1964.
No Change in Text.

Frozen Peas
March, 1974

IV INSPECTION OF THE PRODUCT (continuation)

M Foreign Material

1 Insect Infestation

Frozen peas may become infested by various types of insects, their eggs or larvae; such infestation may be found in the finished product.

Weevil infestation, by far the most common encountered in peas, occurs in the fields prior to harvesting. Adult weevil lay their eggs on the tiny pods and after hatching, the larvae perforate the skins and enter the peas. Infestation is evidenced by the presence on the peas of small round holes. These holes are usually accompanied by discolorations around the openings.

Weevil infestation may go undetected unless the peas are carefully scrutinized for evidence of infestation.

Since many small holes on the peas are caused by weeds, seeds, or similar substances, it is necessary to make a search for the larvae, both for identification and to determine the extent of the infestation.

Examine all suspected peas in the sample, using a hand glass or a wide-field scope and a teasing needle. If the holes are caused by weevil, the larvae may be found under the skin embedded in the cotyledon.

If peas are damaged by insects, handle as described under "blemished" or "seriously blemished" peas taking into consideration any infestation that may be recovered.

IV INSPECTION OF THE PRODUCT (continuation)

M Foreign Material (continuation)

2 Other Foreign Material

Other substances or materials not common to the pea plant or that may be deleterious to health that are classified as foreign material include but are not limited to the following:

Peat
Puncture Vine
Green, immature burr clover buds
Hard, mature burr clover buds or other burrs
Immature barley barbs
Mature barley barbs
Wood splinters
Stones

* Consult File Code 172-A-1 for guidelines for presence of foreign material in the product.

N Special Inspection Procedures and Tests

When the product is packed under continuous or other in-plant inspection, or when adequacy of blanch is required in a purchase specification or contract, the adequacy of blanch should be determined in accordance with special inspectors instructions.

Other special tests may be required on frozen peas. If the peas are intended for dietetic purposes, certain determinations, such as salt content, may be required. The supervisor should be contacted relative to handling any tests with which the inspector is unfamiliar.

File Code 165-A-13 – “Tote-Bin Inspection and Certification” provides information with respect to special sampling techniques and sample sizes of frozen peas packed in tote-bins.

* Change.

IV INSPECTION OF THE PRODUCT (continuation)

O Summary of Score Sheet

Before preparing the certificate, the score sheet should be carefully analyzed to see that the ratings and notations are in good order. Assign a grade for the lot and if appropriate indicate whether lot meets or fails buyers' or other applicable specification. Sign and date the score sheet.