



**United States
Department of
Agriculture**

Food Safety
and Quality
Service

Fruit and
Vegetable
Quality Division

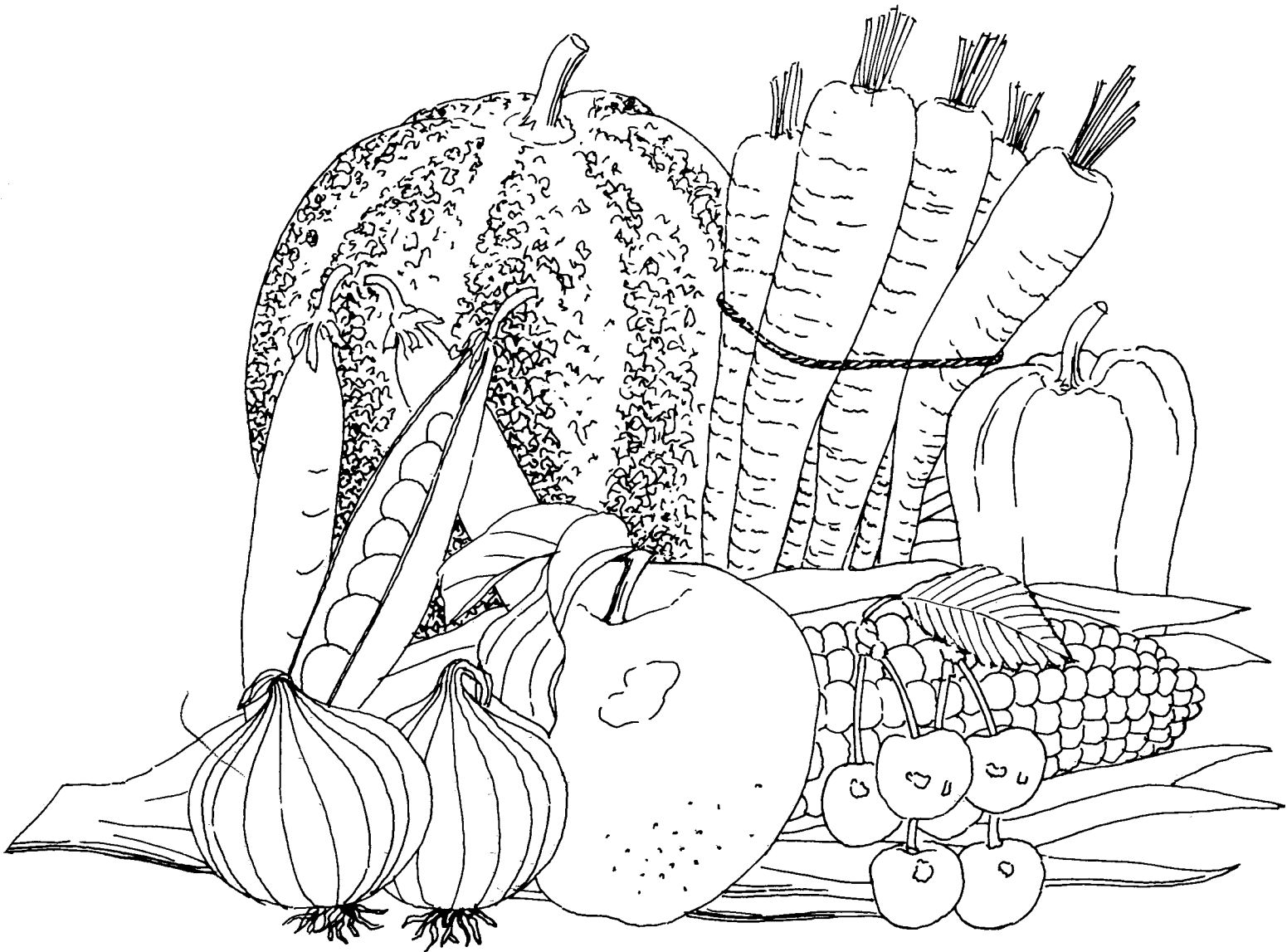
Fresh Products
Branch

Washington, DC

May, 1960

Broccoli for Processing

Inspection Instructions



C O N T E N T S

	<u>Paragraph</u>	<u>Page</u>
INTRODUCTION	1	1
INSPECTOR'S RESPONSIBILITY	2-5	1
EQUIPMENT NEEDED	6	2
SAMPLING	7-22	2-5
INSPECTION PROCEDURES	23-29	5-6
GRADE INTERPRETATIONS	30-36	6-7
Figure 1	8
Figure 2	9
Figure 3	10
GRADE INTERPRETATIONS (Continued)..	37-42	11
INSPECTION CERTIFICATES	43-54	12-14
APPEAL INSPECTIONS	55-61	14-15

INSPECTION INSTRUCTIONS

BROCCOLI FOR PROCESSING 1/

INTRODUCTION

Most of the frozen broccoli is processed in California, but there is considerable broccoli being processed in Arizona, Maryland, Michigan, New York, Oregon, Pennsylvania, Texas and Washington. Frozen broccoli holds its fresh green color and maintains the fresh broccoli flavor remarkably well. From a volume standpoint frozen broccoli does not approach frozen peas or lima beans. It is, however, rapidly becoming one of the most popular frozen vegetables. (1)

INSPECTOR'S RESPONSIBILITY

Contracts may stipulate a certain price per ton for U. S. No. 1, a lower price for U. S. No. 2 and nothing for Cull material and Cull Broccoli. Therefore, it is very important to accurately determine the percentage of U. S. No. 1, U. S. No. 2, Cull Material and Culls in loads delivered to processing plants or loading stations, and to carefully report the percentages of each classification on the inspection certificate. These percentages furnish the basis for settlement for the loads. (2)

Some processors may contract on the basis of a flat rate for both U. S. No. 1's and U. S. No. 2's and require only that the percentage of cull material and culls be determined. It is satisfactory to make inspection on this basis when it furnishes the necessary information for applying the provisions of the contract between the processor and grower. (3)

Processors may reserve the right, by contract, to reject all loads which contain more than a specified percentage of Culls or Cull Material or less than a specified percentage of U. S. No. 1 Broccoli. The Inspection Service has no authority to reject loads that fail to meet contract specifications. You should report loads which fail to meet the contract specifications to the appropriate company personnel. It is then the processor's responsibility to reject or accept such loads. (4)

You are to be guided by the instructions in this handbook and by any additional instructions which may be given to you, either verbally or in writing, by your supervisor. If in the conduct of your work you encounter problems which are not fully covered by such instructions, you should contact your supervisor by telephone for further instructions. If it is necessary to take immediate action, you must use your best judgment, and immediately advise your supervisor of the action taken, in order that corrective measures can be taken in case the proper course was not followed. (5)

1/ This handbook supersedes "Shipping Point Inspection of Broccoli for Processing" issued June 1951 and reissued September 1956.

(6)

EQUIPMENT NEEDED

Inspection certificates.
Grading table or other suitable table.
Four suitable containers.
One direct reading scale. (Should be checked and adjusted whenever it does not show zero reading when container is empty).
One cutting box.
One large butcher knife.
Water bucket for washing hands.
Towels for drying hands.
Slide rule.
Sizing gauge.
Equipment essential to blanch specimens.

SAMPLING

(7)

Representative Sample. Too much emphasis cannot be placed on the importance of your obtaining representative samples from loads. You may be able to grade broccoli perfectly, but unless the sample is representative of the load, the inspection has not served its purpose. The percentage of each grade reported on the certificate determines the amount of money the grower will receive for the load. Therefore, if your sample is not representative, the settlement cannot be equitable.

(8)

Some processors may furnish helpers to obtain samples from the conveyance, empty the broccoli on the grading table, refill the containers after grading and place them back on the load. Such assistance from helpers is often necessary if the inspector is to keep up with the deliveries. Although these helpers are expected to do the manual labor, it is your responsibility to designate the representative samples to be drawn.

(9)

You should always remember that you, and not the helper, sign the inspection certificate. Regardless of how competent the helper may be, you must not allow him to draw a sample from a load without close supervision. Make sure the sample is drawn from representative containers scattered throughout the load.

(10)

Helpers usually are employees of the processor. Growers may get the impression that these men are drawing biased samples favoring their employer unless you, by your actions, let it be known that you are supervising the drawing of the sample. You should not hesitate to tell helpers to draw additional samples from different containers or from more containers.

(11)

You should make every effort possible to draw samples from containers in all parts of the load, particularly if you have reason to believe that the load has been "stacked." In most cases it will be possible to draw

the samples during the process of unloading or after the truck is unloaded. You should always avoid taking samples from containers that are too easily accessible as they may have been placed there for that purpose. It is also good practice to continually vary the positions from which samples are to be taken from the loads or lots. It is absolutely essential that the sample be representative of the quality and condition of the entire load insofar as this can be assured by your best judgment and knowledge.

Method of Sampling and Minimum Number of Samples. You must necessarily be guided by the type of loading in setting up a method for sampling. (12)
Broccoli is normally put in bushel baskets or large wooden boxes for delivery to the processing plant. Draw a random sample of one to two handfuls each from representative containers uniformly scattered throughout the load. Part of these samples should be taken from the bottom and middle of the containers.

The minimum number of containers to be sampled will vary according to the size of the load. In loads of 50 containers or more, at least 10% should be sampled. In loads of less than 50 containers, five to ten containers should be sampled. However, when the quality or size is irregular, the number of containers to be sampled should be materially increased. (13)

Size of Sample to be Inspected and Mixing of Sample. The composite sample shall be approximately four times that of the amount to be graded, and shall be thoroughly mixed before weighing out the amount to be graded. A minimum of 10 pounds shall be graded and sorted on the basis of U. S. No. 1, U. S. No. 2, Culls and Cull Material. Larger samples should be graded when the size of the load exceeds four tons or the quality of the load is irregular. (14)

The above amounts are minimums, but it is sometimes desirable to increase the size of the sample when time will permit. In fact, your supervising inspector may set higher minimums when the conditions justify increasing the size of the sample. (15)

Grading Samples Selected by Other Parties. Growers may bring in loads late after you have gone for the day and one of the processor's employees may draw a sample to be graded the following day. Samples which are not selected by you or by the "sample snatcher" working under your direct supervision must be considered as submitted samples. The certificate should show under "Number of Containers" only the number of packages in the sample. Do not show the total number of packages the submitted sample is supposed to represent. Under "Remarks," the identity of the individual responsible for the information regarding the sample shall be shown, and the remarks so worded to show that such individual, and not the inspector, is responsible for all the information. Write or stamp on the face of the certificate in red letters - Submitted sample, and write "over" at the bottom of the certificate. On the back of the certificate show information such as the following under "Remarks": "Richard Roe, fieldman, Heinz & Co., states this sample is from truck license number ____; grower, John Doe; samples submitted by John Jones." (16)

- (17) In some instances it will not be feasible to separate copies of the certificate in order to write on the back. When it is not possible to do this, it will be permissible to show the information on a mimeographed form attached to the certificate and cross reference to identify with the sample.
- (18) This type of inspection is usually unsatisfactory to all parties concerned, and it should be avoided as much as possible. Growers should be urged to make all deliveries within the hours when the inspector is on the job. When inspections are made on samples drawn by processors' employees, the problem of identity of the sample and settlement with the grower is left completely to the processor.
- (19) Irregularity in Loads. At some broccoli receiving stations, loads are sampled and graded at a point some distance from the unloading platform. Under these circumstances, it is impossible to obtain portions of the sample from all sections of a large load and it will be necessary to issue a restricted certificate. The subsequent unloading of large loads may reveal a different quality in the bottom layers than that found in accessible portions of the load.
- (20) Some processors may request the Inspection Service to place an inspector at the unloading point to send back for further sampling any lots which appear to be of different quality in the lower layers than in the portions accessible to sampling at the inspection platform. It is not considered proper for the Inspection Service to undertake this kind of additional service for the processor. The casual examination of the stock as it is being dumped rapidly from the containers cannot give an accurate idea of how the quality is running, and the Inspection Service should not assume the responsibility for ordering loads back to the inspection platform on the basis of general impressions of quality obtained by this type of examination. While it is recognized that large truckloads may be "stacked", our inspection regulations require the applicant to make the lots on which the inspection is requested available for thorough examination. If facilities provided do not permit adequate sampling of all layers, the processor must expect variations in quality in different parts of a load, and the responsibility of sending loads back for further examination should rest with him.
- (21) Resampling Partly Unloaded Trucks. The Inspection Service should have a definite understanding with the processor to the effect that he may send back a load for regrading if in the process of unloading it appears there is a material difference between the upper and lower portions of the load. Some processors may stipulate in their contracts with the growers that loads showing a material difference in quality of the broccoli in the lower portion of the load from that in the upper portion may be reweighed and sent back to the grading platform for a grading of the lower portion. The same privilege should also be extended to a grower if he feels that he has better broccoli in the bottom portion of his load.

If the partly unloaded truck is sent back to the inspection platform for resampling and grading without reweighing of the remaining load, the weighted average of the two inspections should be given for the load as a whole, and the first memorandum should be voided. However, if the portion of the load returned for resampling is to be weighed, do not average the results of the two inspections, but issue a new certificate on this portion of the load, and treat it as a new inspection without any reference to the first inspection. The number of containers shown on the first memorandum should be reduced to agree with the number unloaded before the second weighing and second inspection. (22)

INSPECTION PROCEDURES

Importance of Rapid Inspection. It is necessary that you work rapidly at times, in order that factory operations or growers may not be unnecessarily delayed. You should be on hand to make inspections whenever deliveries are made within reasonable limits. When practical, definite hours should be established for receiving broccoli for inspection. This time may have to be varied as the season advances. (23)

Adherence to Contract Specifications. Your supervisor will obtain or arrange for you to be provided with a copy of the processor's contract with the growers. This will indicate the basis for inspection with which you must be familiar before inspection is begun. (24)

Occasionally a processor may deviate from his contract specifications as to size or some other factor. He may even request you to notify the growers of the deviation from the contract specifications. In no case, should you or the Inspection Service assume the processor's responsibility of notifying the growers of the variation from or return to the contract specifications. However, you or your supervisor should always insist that the processor notify the Central Inspection Office within the State in writing of any change from the contract, or return to the contract specifications, once it has been changed. Notice of such changes in specifications should also be posted at the inspection platform. Your supervisor should instruct you in the methods of handling such changes and inform you regarding the proper notation to be placed on the certificate to cover any deviations from the grades. (25)

Inspection Under Artificial Light. To handle the volume at some processing plants, it may be necessary to inspect broccoli under artificial lights. While the Department does not favor inspection of broccoli under artificial light, it must be recognized that frequently it cannot be avoided. In these cases, the Inspection Service should insist on proper lighting facilities for both the grading table and the place where the loads are to be sampled. (26)

- (27) Sorting Into Containers on Grading Table. Practices may vary among inspectors as to the location of the containers in which stalks of broccoli of the various grades are placed when grading. It would be preferable if all inspectors used the same location for containers for the same grade. However, some inspectors find it easier to place the U. S. No. 1 broccoli in the right hand container, U. S. No. 2 broccoli in the next container, Culls in the third container and Cull Material in the left-hand container. Other inspectors prefer to reverse the order from left to right for the four classifications. Since no specific order of container arrangement appears to result in maximum efficiency for all inspectors, no set rules are established. However, to assure that growers can readily see which containers are being used for the various classifications you should mark each container to indicate the grade of material being placed therein.
- (28) After the composite sample has been drawn and thoroughly mixed, a definite portion is weighed to be segregated into the four classifications, U. S. No. 1, U. S. No. 2, Culls and Cull Material. The stems of the stalks are trimmed to exactly 6 inches in length with the aid of the cutting box. The excess length cut from the stems, foreign material, stalks under 3 inches in length, coarse, damaged and discolored leaves, and leaves extending more than 1-1/2 inches above the top of the head are placed in the Cull Material container. The remainder of the sample is then checked for minimum diameter and all stalks with stems under 1/4 inch in diameter are placed in the Cull container. The sample is then segregated on the basis of grade factors into U. S. No. 1, U. S. No. 2 and Culls. Each broccoli stalk shall be halved or quartered lengthwise to remove defective portions; except that stalks with heads smaller than 1-1/2 inches in diameter shall not be cut to remove defective portions, but shall be treated as a whole stalk. Stalks shall be cut so that a proportionate ratio of head material to stem material is maintained. See fig. 1.
- (29) Experience has demonstrated that it is good practice to first pick out those stalks of broccoli that are distinctly U. S. No. 1, U. S. No. 2 or Culls, and place them in the proper container, leaving all borderline specimens until the last. After most of the broccoli stalks have been segregated in this way, it will be less difficult to place the borderline specimens properly. By following this method, you can usually segregate most of the samples very rapidly with no likelihood of criticism from the grower. This procedure usually gives the grower more confidence in you and eliminates many arguments.

GRADE INTERPRETATIONS

- (30) Color. Color is an important factor in determining the quality of broccoli for processing, but it is not difficult to determine whether the stalk meets the grade requirements for color. U. S. No. 1 and U. S. No. 2 grades both require good characteristic color, which means that the stem

and external portion of the head has a light green or darker shade of green color, except that purplish color shall also be allowed on the external portion of the head. The white or creamy-white color in the center of the head, characteristic of young compact heads, has no bearing on the grade. In blanching, the purplish color on the external portion of the heads bleaches out leaving a light green color.

Compactness of heads. The U. S. No. 1 grade requires that the head be compact, which means that the individual head is closely formed, not open or spread to the extent that it has a loose appearance, and that the individual florets are fairly tightly formed and not more than moderately elongated. (31)

U. S. No. 2 grade requires that the head be fairly compact, which means that the individual head is fairly closely formed and not excessively spread and that the florets are not on the verge of opening and will not open in the ordinary process of blanching. The florets may be elongated, provided that they are not on the verge of opening. You can easily determine the stage at which the florets will open by blanching a few heads of questionable stock. (32)

Discoloration. Freedom from discoloration is very important in broccoli for processing. Discoloration which is more than very slight, or which will not change to a light green or darker shade of green color in the process of blanching three minutes in boiling water should be considered as damage. Discoloration which materially affects the appearance of the individual unit or head should be considered as serious damage and scored against the U. S. No. 2 grade. (33)

Hollow Stems or Pithiness. The U. S. No. 1 grade requires that the broccoli be free from damage by hollow stems or pithiness. Hollow stems and pithiness should only be considered on that portion of the stalks within six inches from the top of the head. Slight hollow stems or pithiness which are not discolored should not be considered as damage, provided they do not more than slightly detract from the appearance of the individual unit. See fig. 2. (34)

U. S. No. 2 grade requires the broccoli to be free from serious damage by hollow stems or pithiness. Hollow stem or pithiness that is free from discoloration which does not materially detract from the appearance of the individual unit or which does not show a ragged appearance or deep holes shall not be considered as serious damage. See fig. 3. Units which show deep holes which have the appearance of worm holes or show discoloration shall be considered as serious damage. (35)

Insects. The U. S. No. 1 and U. S. No. 2 grades have the same requirements for insect damage. Both grades require that the broccoli be free from damage caused by insects. Broccoli should be considered as damaged when (36)



FIGURE 1

The above photographs illustrate examples of stalks of broccoli which have been trimmed and still maintain a proportionate ratio of head material to stem material.



FIGURE 2

These photographs illustrate examples of slight "hollow stem" or "pithiness" permitted in U. S, No. 1 grade, providing it is not discolored.



FIGURE 3

These photographs illustrate stalks of broccoli which are damaged by "hollow stem" or "pithiness" and are not permitted in the U. S. No. 1 grade.

there are worms or worm frass present which cannot be easily removed in the normal washing process. Slight infestation by aphids shall not be considered as damage. With the use of a good detergent, the washing process will remove 75 to 85% of the aphids. Therefore, individual stalks of broccoli which average 25 or less aphids per ounce shall be considered slightly infested.

You can become fairly accurate in estimating whether individual stalks exceed 25 aphids per ounce by conducting a few simple experiments. First, hit the head three or four times on a table which has a dark or white surface and record the number of aphids which are dislodged. Weigh and record the weight of the individual stalk. Place a white towel between two screens, such as are used by Processed Products Inspection Division for draining canned tomatoes. Hold head over screen and cut into pieces of approximately 1/2 inch thickness at right angles to a line from stem to apex. Then use nozzle spray with ordinary water pressure to wash the aphids through the top screen onto the towel. After a thorough washing, remove the towel and count the aphids. Divide the number of ounces into the total number of aphids on the table and screen to determine the average per ounce. (37)

Scars. Scars are generally caused by some injury during the growing period and usually are not an important factor in broccoli for processing. Scars that are discolored, or which are more than slight or superficial should be counted against the U. S. No. 1 and U. S. No. 2 grades. Like all other grade factors, scars should only be considered on that portion of the stalk within six inches from the top of the head. (38)

Mechanical Injury. Naturally an occasional stalk of broccoli is injured during handling and hauling. Mechanical injury which more than slightly detracts from the appearance, or the processing or edible quality within six inches from the top of the head should be scored against the U. S. No. 1 grade. Slight bruises which are not discolored should not be considered as damage. (39)

Mechanical injury which materially detracts from the appearance, or the processing or edible quality within six inches from the top of the head should be considered as serious damage and scored against U. S. No. 2 grade. (40)

Decay. Decay is seldom a factor in freshly cut broccoli. The U. S. No. 1 and U. S. No. 2 grades require the broccoli to be free from decay. All decayed portions which are removed in the process of quartering or halving the broccoli heads shall be classified as Culls. (41)

Other Defects. Other defects should be handled under the general definition of damage and serious damage. (42)

INSPECTION CERTIFICATES

- (43) Care of Certificate. You should take necessary precautions to prevent blank certificates from falling into hands of persons who have no authorization to use them. You will be held responsible for the return of all unused certificates to your supervising inspector or inspection office when inspection is discontinued.
- (44) You will receive specific instructions from your supervising inspector with reference to mailing the copies of the certificates to the inspection office. Some States desire these mailed daily, while others follow different procedures.
- (45) Care in Recording. The certificate must be easily legible. All data recording during the process of inspection should be complete, neat in appearance, and clear. All computations should be checked carefully for errors. You will be held responsible for figures being correct and legible on all copies of the certificate. The original certificate is sometimes lost, and it then becomes necessary to use the carbon copies.
- (46) Correct Numbers and Name. Most processors furnish the growers with a book of forms which are to be filled in by the growers on each load delivered. These forms give the name of grower, date and number of packages or weight on the individual load. You will copy this information from this form to the certificate. There is no excuse for failure to record this information correctly on the certificate.
- (47) Name of Place, Processor, Grower and Date. The name of the place where the inspection is made, name of processor and grower, time of inspection and date should be filled in on the certificate just before starting the inspection, or immediately after the inspection is made. Where the processor has obtained authority from Washington to print a supply of inspection certificates to be used in their inspections, it will not be necessary to write in the name of the processor, since it appears on the face of each certificate.
- (48) Recording Weights and Percentages. The weight of the sample to be graded must be recorded since it is impossible to calculate the percentages of U.S. No. 1 Broccoli and the other percentages without it. The form outlined below illustrates the part of the certificate on which you record weights and percentages. After the broccoli in each container has been weighed, the results should be recorded on the certificate as shown below:

	<u>WEIGHT LBS.</u>	<u>PERCENT</u>
U. S. No. 1	6.5	65
U. S. No. 2	2.0	20
CULL MATERIAL	1.0	10
CULLS	.5	5
TOTALS	10	100

The recording of the weight on the certificate should be to the nearest half pound. The nearest half pound should be used, except that when the amount of Cull Material or Culls is 1/4 pound, it should be reported as 1/2 pound. When the amount of Cull Material or Culls is less than 1/4 pound, it should be ignored and zero should be recorded on the certificate under that column. (49)

When computing percentages from the percentage chart or slide rule, it may be necessary to add or subtract one or a fraction of one percent to make the percentages total exactly 100. Such changes should always be made in the percentage of U. S. No. 2. If the total of percentages is too far from 100% the weights and calculations should be rechecked. (50)

Signing Inspection Certificate. You will sign the certificate with your full name, or the initials of your given name, and your last name in full. This warning is given because some new inspectors may be tempted to either initial the certificate or simply sign the last name only. Legally either of such signatures would be worthless. (51)

Issuing Restricted Certificates on Large Loads. Certificates restricting the inspection to certain portions of loads will likely be issued only at receiving stations located at considerable distances from the processing plant where the processor is unwilling to make the load accessible. When inspections are made at outlying receiving stations, it is usually not practicable to break down large loads for sampling. In such instances you may issue certificates restricting the inspection to the accessible portion of the load, which will probably consist of containers in the top layer and in some instances the outside rows. When you are inspecting at processing plants, you will ordinarily be able to issue unrestricted certificates. It should always be possible to obtain representative samples, even though some must be taken during the process of unloading. (52)

- (53) Correcting Inspection Certificates. If the corrections are not too conspicuous, minor mistakes which will not affect the validity of the certificate, if presented in court, may be changed by crossing out the part in error, and inserting the correct information. No corrections should be made on any certificate unless you have all copies so that all may be corrected at the same time. No attempt should be made to erase errors on certificates. All corrections should be initialed to show the authority for the correction. When an error has been discovered, and you do not have all copies of the certificate, a new certificate should be issued upon which the following statement should be made:

"This certificate supersedes Certificate _____."

- (54) Distribution of Certificate Copies. The distribution of the original certificate and one copy will depend on the arrangements made by the party requesting the inspection. In most cases, this party will be the processor. In all probability, he will request that you give the original and one copy to the grower, who will present these documents to the processor when delivering the load. The processor usually keeps the original and gives the copy to the grower for his files. The second carbon copy is retained by the inspection office.

APPEAL INSPECTIONS

- (55) Either the grower or the processor may appeal your findings. The appeal may be based on either (1) the sampling, or (2) the grading of the sample.
- (56) (1) Appeal on Sampling. The grower or processor may question the accuracy of the inspection owing to the irregularity of quality in the various containers. In such cases it is the sample obtained rather than the grade interpretation that is in question. Regardless of how careful you are in sampling loads, there may be an occasional load in which the samples will not accurately represent its average quality. For this reason, it is necessary to admit the possibility of error in sampling loads of irregular quality.
- (57) When the grower or processor questions the accuracy of the sampling but does not question the grade interpretation of the inspector, it will be permissible for you to draw another sample for analysis. This sample should be inspected, and the results of the two inspections combined into a weighted average on a new certificate. The first certificate should be voided, if all copies are on hand.
- (58) (2) Appeal on Grading. If either the processor or grower questions the accuracy of your report because of grade interpretations, he may request an appeal inspection. Such a request usually cannot be granted immediately at outlying plants or receiving stations, unless a Keyman or your Supervising Inspector happens to be in the immediate vicinity. If

neither is available, you should endeavor to adjust the difficulty, perhaps by taking additional samples and giving a detailed explanation of the reasons for your scoring. If a processor or grower still insists on having an appeal inspection, you should try to arrange by telephone for your Keyman or Supervisor to come as soon as possible to make the inspection. Meanwhile, the lot of broccoli will have to be held aside until the appeal inspection can be made. If you are in doubt as to whether some of your grade interpretations are correct, you should so notify your Supervisor and request an early check-up.

The certificate issued on an appeal inspection by the Keyman or Supervisor upon request of either a grower or processor, should include only the results of the appeal examination. In other words, results of the appeal inspection should never be averaged with those obtained from the first inspection, as reported on the first certificate. (59)

When Second Inspection Not an Appeal. If a considerable period of time has elapsed since the first inspection was made, or the load has been out of the inspection yard, a second inspection should be treated as a new inspection and no reference should be made to the first certificate. This policy is necessary in the inspection of broccoli for processing, as it wilts very rapidly after harvesting, particularly during periods of hot weather. (60)

Number of Containers Sampled. The number of containers to be sampled in case of an appeal or second inspection will depend upon the uniformity of the lot in question and the character of the defects. If the load shows considerable irregularity, double the usual number should be sampled. If the quality is relatively uniform in the different containers, and it is only a question of proper interpretation of certain quality factors, it may not be necessary to increase the size of the sample drawn. (61)

