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Vegetable
Division

Processed
Products
Branch

Grading Manual for Frozen Field Peas and Frozen Black-eye Peas

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PREFACE

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

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PRODUCT DESCRIPTION

There are no FDA "Standards of Identity" for frozen field peas and frozen black-eye peas. The U.S. standards provide for the use of field shelled (mechanically harvested) peas as the source of raw material for frozen field peas. "Seed-dry" peas, harvested at a very advanced stage of maturity, are not acceptable for frozen field peas.

One characteristic of the field pea plant is that pods don't mature uniformly. Thus, some seed-dry peas are expected to be harvested with seed of proper maturity. To be acceptable, seed-dry peas should not be noticeable when included with peas of proper maturity. Consider seed-dry peas that are noticeable under the prerequisite quality factor of character.

Totally seed-dry or dry-soaked peas fail the product description of the U.S. standards. Use the prerequisite quality factor of "character" as a "stopper" to downgrade any sample unit with hard cotyledons.

One industry practice is to blend field shelled peas with immature green peas that are shelled at the plant premises. This practice may be necessary to meet a required amount of "green" peas in buyers' specifications. While blending is not to be discouraged, it should not be used as a means of mixing "seed-dry" or "dry-soaked" peas with seed of proper maturity.

Snaps.

Succulent, unshelled pods of the field pea plant, regardless of varietal type, are permitted in "frozen peas with snaps." Snaps may be any length and may be prepared by snapping or cutting fresh or previously frozen pods. Green beans are not acceptable.

TYPES

Black-eye peas. Classify the following as "black-eye peas":

1. True black-eye peas;
2. Purple-hull peas; and
3. Arkansas 83's or other similar varietal types.

Field peas.

Classify any varietal type of field peas, including black-eye peas, purple hull peas, crowder peas, cream peas, White Acre peas, Arkansas 83's, and mixed varietal types as "field peas." Thus, black-eye peas may be classified as either "black-eye" or "field peas."

STYLES

Frozen peas with snaps.

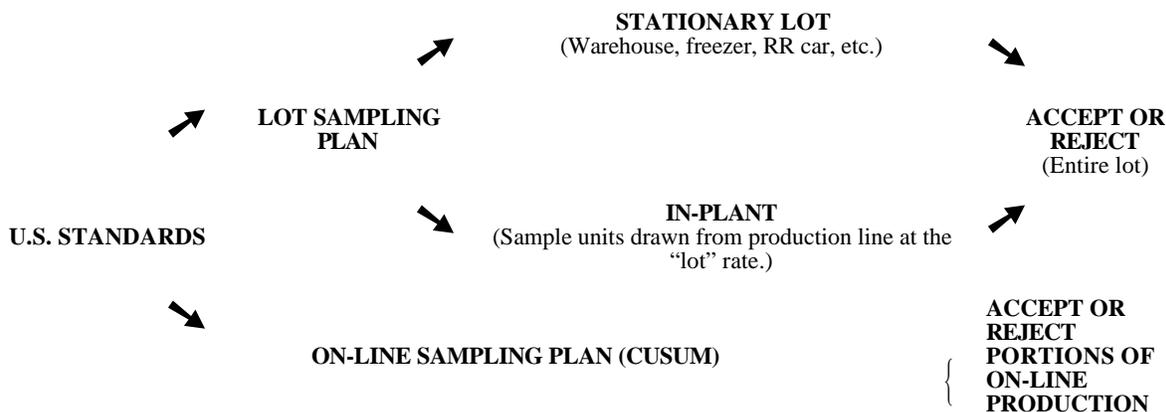
The U.S. standards establish minimum and maximum limits for snaps in each sample unit.

If packages of "frozen peas with snaps," occur in a lot of "frozen peas," and are indicated as a separate style, consider it as a "mixed lot." Do not count the snaps in the sample units of peas with snaps as HEVM. Count pieces of pod in the sample units of "frozen peas" as HEVM.

If packages of "frozen peas with snaps," occur in a lot of "frozen peas," and are not indicated as a separate style, consider the snaps as HEVM.

SAMPLING PLANS

Two sampling plans are available for assigning a grade to frozen field peas and frozen black-eye peas-- on-line (CuSum) sampling plan and lot sampling plan. The general file code contains instructions for using each of these plans. The purpose of the inspection determines which plan to use. Use the following steps to determine the appropriate sampling plan to use.



SAMPLE UNIT SIZES

The U.S. standards contain sample unit sizes for "White Acre" type (5 ounces - 141.75 grams) and "All other types" (10 ounces/283.5 grams) of field peas. These sample unit sizes are based on an average count of 1400 units for "White Acre" peas and 700 units for all other types of peas per 10 ounces.

Usually these average counts are quite close, however, on occasion a lot may consist of abnormally small or large peas. If this situation exists apply the following procedures:

1. Count 700 peas in several sample units.
2. Weigh each of the 700 peas.
3. Average all of the weights.
4. Use this average weight for the sample unit size until the size of the peas noticeably changes.

EXAMPLE:

A lot of blackeye peas contains peas that are abnormally small.

Sample No.	1	2	3	4	5
No. of Peas	700	700	700	700	700
Wt. of Peas					
(ounces)	7.3	7.6	7.2	7.4	7.0
(grams)	207	216	204	210	199

Average weight of 700 peas = (207 grams)

CONCLUSION: Use 7.3 ounces (207 grams) as the sample unit size until the pea size noticeably changes.

CAUTION: EVEN THOUGH THE SAMPLE UNIT SIZE WEIGHT IS ALTERED THE AQL'S MUST REMAIN THE SAME, AS THEY ARE BASED ON 700 PEAS PER SAMPLE UNIT.

CLASSIFICATION OF DEFECTS

Defects are classified as either "minor," "major," "severe," or "critical." Usually, two things determine the classification:

1. Visual severity (how bad does the defect appear to the eye); and
2. The chance of the defect occurring in the sample (how many of the defects are allowed).

"Total all classes" of defects, is "critical," plus "severe," plus "major," plus "minor."

There are related defects and unrelated defects. A good example of related defects is class 1 and class 2 HEVM. If a pea pod and an attached coarse, fibrous stem are present in the same sample unit, consider the defects related. Count only the defect which is most severe. In the previous example, the most severe defect is the coarse, fibrous stem (class 2, HEVM). The less severe defect (pod material--class 1, HEVM) is not counted.

A pea may be counted more than once if the defects are unrelated. For example, a pea may be:

1. A dissimilar varietal type	1 minor defect
2. Shriveled	1 minor defect
3. Blemished	1 major defect
	<hr/>
	3 total all classes of defects, all on one pea.

QUALITY FACTORS

Prerequisites.

Characteristics of frozen field peas and frozen black-eye peas that don't have specific acceptance numbers are provided for in the U.S. standards as prerequisite quality factors. Prerequisites are usually those factors that require a subjective (use of the senses of sight, taste, touch, or smell) evaluation. The evaluation of "broken peas" is an exception to the rule. "Broken peas" evaluations are a prerequisite because it's the fastest method of making the determination.

QUALITY FACTORS (continuation)

Prerequisite (continuation).

Handle prerequisites independently of the classified quality factors (on-line sampling plan and lot sampling plan). A sample unit fails a prerequisite quality factor for the intended grade but meets requirements of the classified quality factors, will fail because of the prerequisite. Also, the rules of the cumulative sum sampling plan (CuSum) do not apply to the prerequisites, such as 2 consecutive sample unit failures. The following is an example of the relationship of the prerequisites to the final grade.

Sample unit number	1	2	3	4	5	6
Prerequisites:						
Overall appearance	A	B	A	A	B	A
Character	A	A	A	A	A	B
Flavor and odor	A	A	A	A	A	A
Broken	A	A	A	A	B	A
Grit	A	A	A	A	A	A
Classified quality factors	A	A	B	A	A	A
Sample unit grade	A	B	B	A	B	B
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p><u>Do not</u> count as two consecutive sample unit failures under the on-line (CuSum) sampling plan.</p> </div>						
		∨			∨	

Classified quality factors.

Classified quality factors are listed in Table I of the U.S. standards. Use Table I to classify defects for all sampling plans (on-line and lot).

DEFINITIONS OF TERMS

Overall appearance.

Judge the prerequisite quality factor of overall appearance on the basis of brightness and dullness. Uniformity of color is not required.

Evaluate the color of "snaps," in the style of "frozen peas with snaps," under the prerequisite factor of overall appearance. Consider "off-color" snaps as to their effect on the overall appearance of the sample unit. "Snaps" should be green and succulent pods. Consider any "snaps" that possess colors that indicate advanced maturity of pods under the factor "overall appearance."

Blemished

Green units of field shelled peas (mechanically harvested) often oxidize and turn brown if held too long before processing. When the units are noticeably discolored, classify as "blemished."

Cowpea curculio damage to field peas may occur as visible holes eaten into the cotyledons or discoloration, commonly called "weevil sting." Damage is either insignificant or a defect that is counted. It depends on the extent to which the damage is noticeable. Generally, classify units affected by larva holes or dark-colored "stings" as "blemished." Slight discoloration is insignificant.

Sometimes Crowder peas develop an objectionable condition during periods of excessive rainfall at harvest. The peas take on an extreme rusty-brown color. Classify this objectionable discoloration as "blemished."

Broken

Mechanical harvesting increases loose skins and broken cotyledons. Some varietal types of field peas, especially cream peas, are more subject to mechanical damage than other varietal types.

Sprouted peas often occur in the sample unit. If the pea is damaged, noticeably, by sprouting, it and the sprout are classified as "broken." Include detached sprouts (loose sprouts) with other broken material in the sample unit and weigh.

Determine "broken" peas on a weight basis. After making several weighings of broken peas, use estimation to judge the amount of broken peas in the sample unit. If the sample unit is borderline, actual weight is advised.

DEFINITIONS OF TERMS (continuation)

Character.

General. Character is a prerequisite quality factor. Use it as a "stopper" if a sample unit meets all other quality factors, but is obviously processed from peas that are too mature for good quality. Character is not necessarily related to the number of "color attributes." Some "green" peas are hard after cooking 40 minutes. Other sample units with few "green" peas are tender.

Peas. Mechanically harvested field peas normally contain some "seed-dry" peas. Allow for occasional "seed-dry" peas to avoid being overly critical. In "good character" any seed-dry peas should blend well with the overall palatability of the cooked sample unit. When excessive seed-dry peas are present in the sample unit, character is grade B, or Substandard, depending on the quantity and tenderness of the firm and hard peas.

Snaps. Immature, succulent pods are required as the garnish for "frozen peas with snaps." Character is applicable to snaps. However, snaps do not have the same tenderness as pods of other legume plants, such as green beans. Make allowances for the natural characteristics of the field pea pods.

Cooking procedure. It is not intended that each sample unit need be cooked for determination of character. Individual judgement should determine the number of sample units to cook. However, cook enough sample units to get a good cross section of character.

Harmless extraneous vegetable material (HEVM).

General. Mechanically harvested peas contain large amounts of HEVM, principally pod and stem material. Shakers, air blast, and water flotation equipment are used to remove most of this material. Hand-picking on the sorting belt is used for final HEVM cleanup. Without hand-picking, or sorting, the product will rarely make grade.

Insignificant HEVM. Consider small, tender, units of the placental part of the pod (connects the pea to the pod) insignificant.

HEVM that is counted. Each individual piece is one defect. Do not reassemble pieces to approximate one piece of pod or pod material.

DEFINITIONS OF TERMS (continuation)

Harmless extraneous vegetable material (continuation).

Unstemmed snaps. In "frozen peas with snaps," count each piece of unstemmed snap material as one class 1 HEVM defect. In "frozen peas," count each unstemmed snap only once. The stem and pod are related defects and are not counted as two separate defects.

"Frozen peas with snaps." If the sample fails the criteria for style of "frozen peas with snaps," don't recount pieces of pod material as HEVM. Consider the sample as failing the requirements for style only.

Hard, woody, material. Count hard, woody material as harmful. Allow this material only as outlined in the instructions for "foreign material" (File Code 172). File Code 172 also provides for handling objectional weed material that is not HEVM, such as foxtail seed heads.

Large units of HEVM. If an otherwise class 1 piece of HEVM is extremely objectionable because of its large size, count the unit as class 2 HEVM.

Other succulent vegetable material. Count other succulent vegetable material that detracts from the overall appearance of the sample unit, such as squash, carrots, or corn, as class 1 HEVM. In the absence of other class 1 HEVM, more of the "alien" vegetables are permitted. In the presence of other class 1 HEVM, less of the "alien" vegetables are permitted.

Shriveled.

Field shelled peas lose moisture rapidly. The peas shrink in size. Once the peas are cleaned and placed in holding tanks, filled with water, they absorb moisture and swell to their original size. Don't count peas with slightly wrinkled skin as shriveled.

Snaps.

Consider two or more parts of a split pod as one snap in counting snaps for determination of style. Reassemble the pods to their approximate original shape, or the shape of the predominant sized snap in the sample unit. Don't use this procedure for HEVM.

CLASSIFICATION OF COLOR

General.

Grade "A" Requirements.

Frozen peas with snaps. The requirement for **color attributes** is applicable for grade A classification only. **Color attributes** does not apply to units of **snaps** in the style of **Frozen peas with snaps**.

Black-eye peas. Each unit of similar varieties, such as **Purple-hull peas**, with a color that is characteristic of very young peas that have a light colored skin, and a definite eye with contrasting color around the hilum. The "color attributes" are no longer applied to this type. Determine compliance based on this definition.

Crowder peas. Each unit of similar varieties with a color that is characteristic of very young peas that has , cream, light-tan, lavender, bluish-lavender, or bluish color. Any other color that is characteristic of very young peas is acceptable. Different varieties of crowder peas account of the widely varying colors of very young peas. The "color attributes" are applied to this type.

Cream peas. Peas of various groups, including **White Acre**, that have a solid cream-colored skin. The "color attributes" are no longer applied to this type. Determine compliance based on this definition.

Field peas and mixed types. Each unit with a color that is characteristic of very young peas. Black-eye peas and cream peas are not considered when applying "color attributes".

Substandard requirements.

Frozen Field Peas and Frozen Black-eye Peas that fail to meet the requirements for Grade "A" of this section shall not be graded above Substandard for color.

Acceptance numbers in the sampling plans (CuSum and Lot).

Acceptance numbers in the sampling plans for "color attributes" are minimum numbers. In other words, the number of color attributes must equal or exceed the values. Also, the AL value in the lot sampling plan is a minimum value. The individual sample unit is not permitted to go lower than the AL.

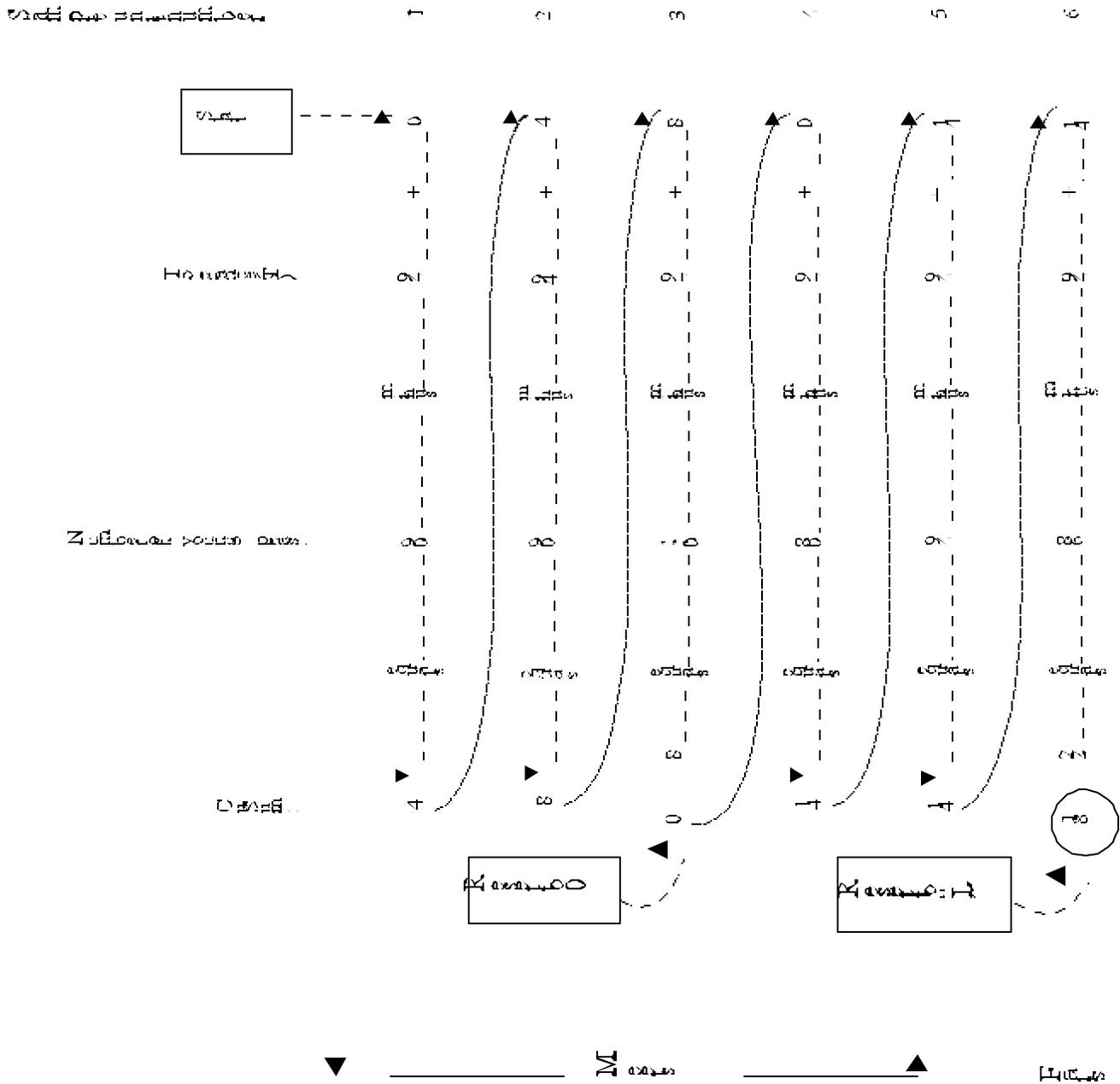
CLASSIFICATION OF COLOR (continuation)

CuSum (on-line) sampling plan. For "color attributes" only, under the CuSum sampling plan, it is necessary to use a different computation than the one given in the general instructions for CuSum. Use the following formula:

$$\begin{array}{r} \text{CUSUM FROM THE PREVIOUS SAMPLE UNIT} \\ \text{PLUS} \quad \rightarrow \\ \text{TOLERANCE ("T") VALUE} \\ \text{MINUS} \\ \text{NUMBER OF COLOR ATTRIBUTES IN THE SAMPLE UNIT} \\ \text{EQUALS} \\ \text{NEW CUSUM} \quad \rightarrow \end{array}$$

CLASSIFICATION OF COLOR (continuation)
 Example of "color attributes" using the CuSum plan:

T=94
 L=18

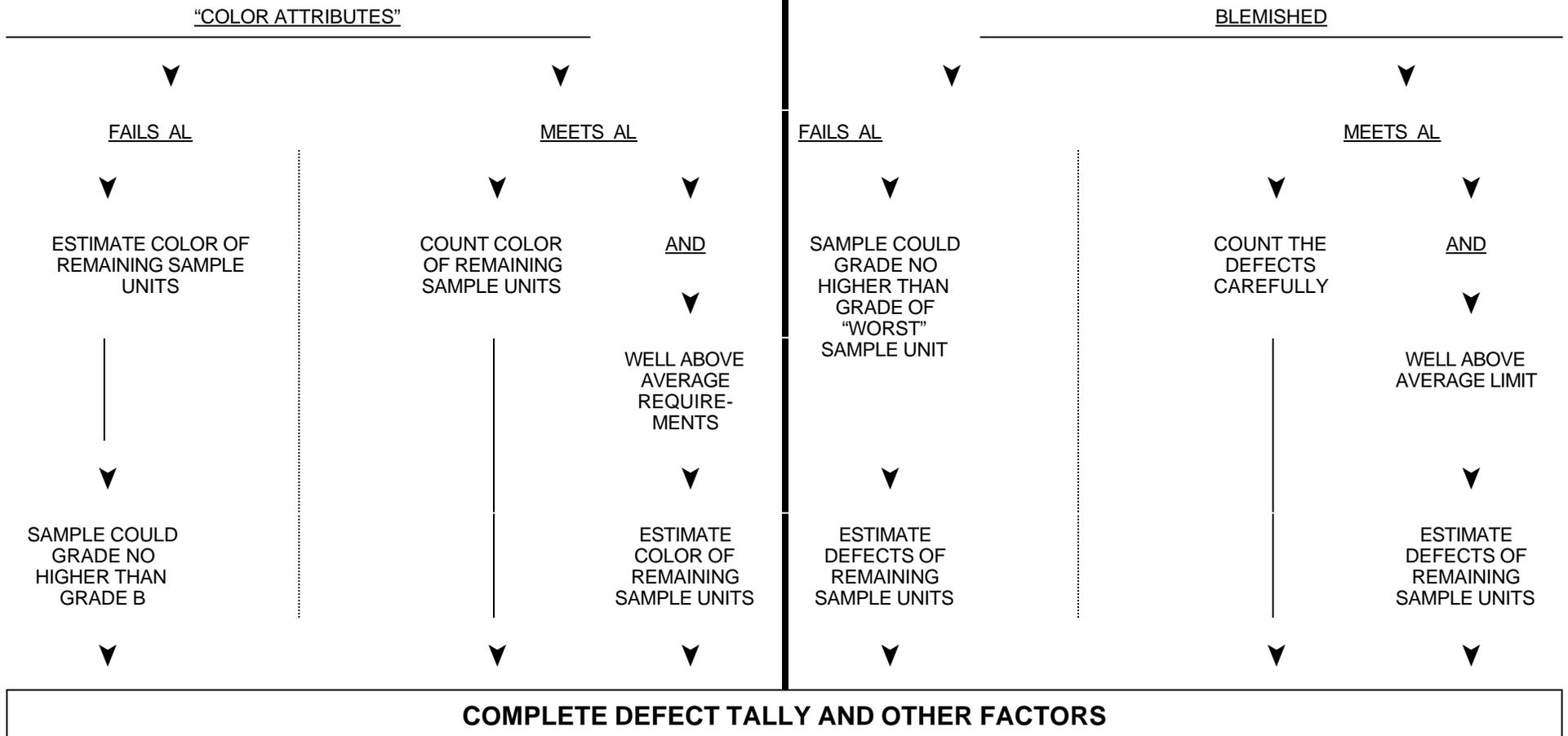


SUMMARY OF THE QUICK PROCEDURE FOR USING THE LOT SAMPLING PLAN

DISPLAY ALL SAMPLE UNITS

RECORD THE OVERALL APPEARANCE OF EACH SAMPLE UNIT ON THE TALLY SHEET

BASED ON EYE-APPEAL, SELECT THE "WORST" SAMPLE UNIT FOR THE FOLLOWING FACTORS:



LOT SAMPLING PLAN

Sample Unit Size:

White Acre = 5 Ounces (142 g);

*All Other Varieties (except black-eye peas and cream peas) = 10 Ounces (284 g)

Sample Size	Grade Compliance								Color Compliance ^{1/}	
	"GRADE A"				"GRADE B"				Crowder Peas	*Other Varieties
	Absolute Limit				Absolute Limit				Absolute Limit	
	67 Total	32 Major	5 Severe	2 Critical	100 Total	49 Major	9 Severe	4 Critical	119	73
									Minimum #	
3	167	69	8	2	256	113	15	5	421	268
6	322	131	13	3	497	216	26	8	859	551
13	679	272	25	6	1053	452	51	14	1892	1220
21	1082	430	38	8	1683	719	79	21	3079	1989
29	1483	587	51	10	2311	984	107	28	4306	2760
38	1933	762	65	13	3015	1282	138	35	5609	3631
48	2432	957	81	15	3796	1611	171	43	7100	4599
60	3020	1189	99	19	4732	2004	212	53	8891	5763
AQL	7.0	2.7	0.2	0.03	11.0	4.6	0.45	0.10	21.5	14.0

^{1/} Minimum numbers are required for color compliance.

LOT SAMPLING PLAN

Sample Unit Size:

White Acre = 2.5 Ounces (71 g);

*All Other Varieties (except black-eye peas and cream peas) = 5 Ounces (142 g)

Sample Size	Grade Compliance								Color Compliance ^{1/}	
	"GRADE A"				"GRADE B"				Crowder Peas	*Other Varieties
	Absolute Limit				Absolute Limit				Absolute Limit	
	38 Total	19 Major	4 Severe	2 Critical	55 Total	29 Major	6 Severe	4 Critical	53 Minimum #	31 Minimum #
3	87	37	5	1	133	60	8	3	204	128
6	167	69	8	2	256	113	15	5	421	268
13	348	141	14	3	537	233	28	8	933	598
21	552	222	21	5	855	368	43	12	1522	980
AQL	7.0	2.7	0.2	0.03	11.0	4.6	0.45	0.10	21.5	14.0

^{1/} Minimum numbers are required for color compliance.

ON-LINE SAMPLING PLAN

Sample Unit Size:

White Acre = 5 Ounces (142 g);

*All Other Varieties (except black-eye peas and cream peas) = 10 Ounces (284 g)

	Grade Compliance												Color Compliance ^{1/}							
	"GRADE A"								"GRADE B"				Crowder Peas		*Other Varieties					
	Total		Major		Severe		Critical		Total		Major		Severe		Critical		Minimum #			
	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	L
	52	14	21	9	2	2	½	½	81	17	35	11	4	3	2	2	146	23	94	18
AQL	7.0		2.7		0.2		0.03		11.0		4.6		0.45		0.10		21.5		14.0	

^{1/} Minimum numbers are required for color compliance.

ON-LINE SAMPLING PLAN

Sample Unit Size:

White Acre = 2.5 Ounces (71 g);

*All Other Varieties (except black-eye peas and cream peas) = 5 Ounces (142 g)

	Grade Compliance										Color Compliance <u>1/</u>									
	"GRADE A"								"GRADE B"				Crowder Peas		*Other Varieties					
	Total		Major		Severe		Critical		Total		Major		Severe		Critical		Minimum #			
	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	L	T	L
	27	10	11	6	1	1	c	f	41	13	18	8	2	2	1	1	72	16	46	13
AQL	7.0		2.7		0.2		0.03		11.0		4.6		0.45		0.10		21.5		14.0	

1/ Minimum numbers are required for color compliance.

ON-LINE SAMPLING PLAN

Sample Unit Size:

White Acre = 5 Ounces (142 g);

*All Other Varieties (except black-eye peas and cream peas) = 10 Ounces (284 g)

	Grade Compliance								Color Compliance ^{1/}	
	"GRADE A"				"GRADE B"				Crowder Peas	*Other Varieties
	Total	Major	Severe	Critical	Total	Major	Severe	Critical	Minimum #	
One Sample Unit	52	21	2	0	81	35	4	2	146	94

^{1/} Minimum numbers are required for color compliance.