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Processed
Products
Branch

Grading Manual for Canned Whole Kernel (Whole Grain) Corn

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

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TABLE OF CONTENTS

	Page
SAMPLING PROCEDURES	1
SUGGESTED ORDER OF GRADING	3
A. Non-quality Factors	3
B. Prerequisite Quality Factors	5
C. Foreign Material	9
D. Smut	9
E. Grading of EVM and Specified Defects	9
F. Assigning the Grade for a Lot.	12
PROCEDURES FOR GRADING MIXED QUALITY LOTS	13
PROCEDURES FOR SINGLE SAMPLE UNITS (UNOFFICIAL SAMPLES)	13

TABLES

Table I, Minimum Sampling Rates	1
Table II, Sampling Rates for Small Containers	2
Table III, Drained Weights	4
Table IV, Acceptance Numbers for EVM	10
Table V, Acceptance Numbers for Other Defects	12
Time Sampling Tables	15
Attachment 1	17

SAMPLING PROCEDURES

Follow the general procedures and instructions as outlined in File Codes 109-A-1 and 120-A-1. **Follow** the procedures in File Code 128-A-20 (Vacuum); File Code 128-A-10 (Net Weight); File Code 130-A-67 (Small units of Alien Vegetables); and File Code 128-A-30 (Drained Weight). **Follow** the procedures in Condition of Container File Code series 125 when a formal condition of container is required. **Follow** File Code 172-A-1 (Foreign Material) to evaluate grit and soil found in canned whole kernel corn and for certifying "off-flavor" sample units.

Follow Table I and Table II Minimum Sampling Rates for Canned Whole Kernel Corn when sampling this product. When additional containers are required in Group 1, **draw and separately identify (mark)** all of the containers. For example, using Table II, if the sampling rate specifies six (6) containers, and the total number of containers needed is 12, **draw** two (2) adjacent containers per sample unit. **Identify** the containers as 1a, 1b; 2a, 2b; etc.

Table I
Minimum Sampling Rates for Canned Whole Kernel Corn

	Group 1 (up through 303) ^{1/}		Group 2 (No. 1 sq. through No.3 cylinder)		Group 3 (Exceeds 3 cylinder)	
	24 per case	48 per case	12 per case	24 per case	6 per case	12 per case
No. of Sample Units	Cases	Cases	Cases	Cases	Cases	Cases
3	125 or less	63 or less	125 or less	63 or less	125 or less	63 or less
6	126 to 500	64 to 250	126 to 500	64 to 250	126 to 500	64 to 250
13	501 to 1625	251 to 813	501 to 1625	251 to 813	501 to 1625	251 to 813
21	1626 to 3500	814 to 1750	1626 to 3500	814 to 1750	1626 to 3500	814 to 1750
29	3501 to 6042	1751 to 3021	3501 to 6042	1751 to 3021	3501 to 6042	1751 to 3021
	8z Tall	211 X 304	No. 2	307 X 409	No. 10	603 X 700
	No. 1 picnic	211 X 400	No. 2 1/2	401 X 411		
	No. 300	300 X 407	No. 3 cylinder	404 X 700		
	No. 1 Tall	301 X 411				
	No. 303	303 X 406				

1/ SEE TABLE II OF THIS MANUAL TO ENSURE THAT SUFFICIENT PRODUCT IS SAMPLED FOR GRADING PURPOSES.

SAMPLING PROCEDURES

NOTE: THE SAMPLING RATES IN THE FOLLOWING TABLE ARE DESIGNED TO ENSURE THAT SUFFICIENT PRODUCT IS DRAWN FOR GRADING PURPOSES.

Table II
Sampling Rates for Small Containers
of Canned Whole Kernel Corn (8 oz - No.303)

Container Size	Sampling Rate	Minimum Units of Product Needed	Total Number of Containers Needed	Action Draw and Separately Identify (Mark) <u>1/</u>
8 oz	3	3000	6	1 adjacent containers per sample unit.
8 oz	6	6000	12	1 adjacent containers per sample unit.
8 oz	13	13000	26	1 adjacent containers per sample unit.
8 oz	21	21000	42	1 adjacent containers per sample unit.
8 oz	29	21000	42	13 extra containers throughout the lot.
No. 300 & 303	3	3000	4	1 extra container throughout the lot.
No. 300 & 303	6	6000	7	1 extra container throughout the lot.
No. 300 & 303	13	13000	15	2 extra containers throughout the lot.
No. 300 & 303	21	21000	25	4 extra containers throughout the lot.
No. 300 & 303	29	21000	29	N/A

1/ Identify the containers as 1a, 1b, 1c, 1d; 2a, 2b, 2c, 2d; etc.

The minimum number of units of product used to evaluate seriously damaged kernels, damaged kernels, and pulled kernels is 1000 units. **For larger can sizes more product should be examined.** For example: If the lot size for No. 10 cans requires 13 sample units, the minimum sample size is 13 x 1000. You should examine more product by selecting more whole kernel corn based upon the next higher sample size which is 21 x 1000 or 21,000 units. By dividing 13 into 21000, you will be required to randomly draw 1615 whole kernels of corn from each of the 13 containers. Apply the acceptance numbers for the 21000 sample size to this lot.

NOTE: Limit sample size to no greater than 29 sample rate.

SUGGESTED ORDER OF GRADING

A. Non-quality Factors.

1. **Record** the following applicable information on the tally sheet.
 - a. Name and address of applicant.
 - b. Size and kind of container.
 - c. No. of cases in lot (page 1 only).
 - d. Contract (Cont. No.) or Purchase Order (P.O. No.).
 - e. Label -- or attach a copy -- (page 1 only).
2. **Select** the containers to be used for non-quality and prerequisite evaluation.
Note: For small containers (8 oz), select 1a, 2a, 3a, etc.
3. **Arrange** the containers on the grading table in chronological order by code.
4. **Record** the codes, on the tally sheet, including case codes if available.

NOTE: THE FINAL/AVG COLUMN (COLUMN 9) ON PAGE 1 OF THE TALLY SHEET SHALL BE USED FOR THE SUMMATION OF THE GRADING RESULTS OF THE LOT. COLUMN 9 MAY BE USED ON SUCCEEDING PAGES FOR RECORDING INDIVIDUAL CONTAINER DATA.

IF THERE IS INSUFFICIENT SPACE IN THE CODE SECTION OF THE TALLY SHEET FOR SINGLE LINE INK JET CODES, RECORD THEM AS DOUBLE LINE CODES. REFER TO THE BACK OF THE TALLY SHEET AND SHOW AN EXAMPLE OF THE ACTUAL CODE THERE.

5. **Determine and record** the net weight of each container using Branch procedures for determination of tares and reading of scales.
6. **Determine and record** the vacuum reading for each container.
NOTE: TO GET A PROPER VACUUM READING, SLIGHTLY ELEVATE ONE SIDE OF THE CAN AND TAKE THE VACUUM READING FROM THE HIGH SIDE.
7. **Open** each container, and for cans, **leave** the lid remaining on top of the product.

8. Using the lid to stem the flow of product, carefully **empty** the contents container by container into tared draining screens that have been placed on a 17 to 20 degree incline in individual grading trays. Determination of the drained weight of whole kernel corn is essential to properly determine the grade for extraneous vegetable material (EVM).

The minimum drained weight recommendations of Table I of this section are not incorporated in the grades of the finished product, since drained weight, as such, is not a factor of quality for the purpose of these grades. The drained weight of whole kernel (or whole grain) corn is determined by emptying the contents of the container upon a United States Standard No. 8 circular sieve of proper diameter so as to distribute the product evenly, inclining the sieve slightly to facilitate drainage and allowing the product to drain for two minutes. The drained weight is the weight of the sieve and the whole kernel (or whole grain) corn less the weight of the dry sieve. A sieve 8 inches in diameter is used for the No. 2-1/2 size can (401" x 411") and smaller sizes and a sieve 12 inches in diameter is used for containers larger than the No. 2-1/2 size can.

TABLE III
RECOMMENDED MINIMUM DRAINED WEIGHTS OF WHOLE KERNEL CORN
(EXCEPT VACUUM PACK)

Container size or designation	Grade A, tenderness and maturity		Grade B, C, and Substandard tenderness and maturity	
	Ounces	Grams	Ounces	Grams
8 ounce Tall	5.25	149	5.50	156
No. 1 (picnic)	6.75	191	7.00	198
No. 300	9.25	262	9.50	269
No. 303	10.50	298	10.75	305
No. 2	12.75	361	13.25	376
No. 10	70.00	1984	72.00	2041

9. **Drain (undisturbed)** for 2 minutes, using a U.S. Standard No. 8 circular sieve, **weigh** and **record** the drained weights on the tally sheet. A sieve, 8 inches (20.3 centimeters) in diameter, is used for 8 oz, No. 300, No. 303 containers, and No. 2-1/2 containers, and a sieve 12 inches (30.5 centimeters) in diameter, is used for larger containers such as No. 10's. The temperature of the packing medium at time of drained weight determination shall be 20 degrees Celsius (68N Fahrenheit). **See Attachment 1 instructions on drain weight determination for mixed maturity corn in a lot.**

NOTE: WHILE THE PRODUCT IS DRAINING EXAMINE THE INTERIOR CONDITION OF THE CONTAINER(S), MAKING NOTE OF ANY UNUSUAL CONDITIONS UNDER "REMARKS" OR ON BACK OF THE TALLY SHEET.

WHEN MULTIPLE SMALL CONTAINERS (8 OZ) ARE DRAWN TO PROVIDE SUFFICIENT PRODUCT TO GRADE, DETERMINE THE DRAINED WEIGHTS FOR EACH CONTAINER USED FOR GRADING.

10. **Empty** the product from each draining screen into the individual grading trays.
11. **Record** the **Varietal Type** (Conventional Sweet Corn, Sugar Enhanced, Supersweet, etc) and **Color Type** (Golden, White, Combination, etc.) based on the units in the container.

B. Prerequisite Quality Factors.

1. **Evaluate and grade** the prerequisite quality factors on a container-by-container basis. **Record** the letter grade, as applicable, in the appropriate place on the tally sheet.
 - a. **Varietal characteristics.** If applicable, apply File Code 130-A-67, Small Units of Alien Vegetables.
 - (1) **Grade A** should be assigned to those sample units containing whole kernel corn of similar varietal characteristics.
 - (2) **Sstd** should be assigned to those sample units containing whole kernel corn of dissimilar varietal characteristics.
 - b. **Appearance - use** the following guidelines in assigning a grade for appearance:
 - (1) **Good "Grade A"** means the whole kernel corn is bright in color and is practically uniform.
 - (2) **Reasonably good "Grade B"** means the whole kernel corn may lack brightness and is reasonably uniform in color.
 - (3) **Fairly good "Grade C"** means the sample unit may be dull and has a fairly uniform color. Any lots with samples possessing fairly good appearance shall not be graded above "Grade B."
 - (4) **Poor "Substandard" (Sstd)** means the sample unit fails the requirements for Grade C appearance.

- c. **Cut. Evaluate** "Cut" and assign the grade using the following :
- (1) **Grade A** - Well cut means the product is not more than slightly affected by the presence of ragged cut kernels, torn kernels, chaff, or irregular kernels.
 - (2) **Grade B** - Reasonably well cut means the product is not materially affected by the presence of ragged cut kernels, torn kernels and irregular cut kernels.
 - (3) **Grade C** - Fairly well cut means the product is not seriously affected by the presence of ragged cut kernels, torn kernels, chaff, or irregular cut kernels.
 - (4) **Sstd** - The sample unit fails the requirements for Grade C.
- d. **Tenderness and Maturity - Evaluate** the tenderness and maturity on a container by container basis. Tenderness and maturity means the degree of tenderness and stage of development typical for the varietal type of corn.

Record the level of quality within the grade and the letter grade on the tally sheet for "Tenderness and maturity."

Conventional Sweet Corn

- (1) Good tenderness and maturity -- is tender in texture with characteristics typical of the early stage of development of the kernels for the varietal type(s). Good tenderness and maturity in **conventional sweet corn** is tender corn with a creamy texture and pericarp that chews easily. The kernels are full and tender, typical of the milk or early cream stage of maturity. There are three levels of quality within "good tenderness and maturity:" very tender, tender, and moderately tender.

Conventional Sweet Corn - Tenderness and Maturity - Grade A

Top	Very tender (early milk)
Middle	Tender (milk, early cream)
Bottom	Moderately tender (cream stage)

- (2) Reasonably good tenderness and maturity --is reasonably tender in texture with characteristics typical of the intermediate stage of development of the kernels for the varietal type(s). Reasonably good tenderness and maturity in **conventional sweet corn** typifies the cream stage of maturity but lacks the attributes for "good tenderness and maturity." Some pericarp residue may be evident upon chewing. There are two levels of quality within "reasonably good tenderness and maturity:" cream stage and moderate cream stage.

Conventional Sweet Corn - Tenderness and Maturity - Grade B

Top	Cream stage
Bottom	Moderate cream stage

- (3) Fairly tough -- is fairly tough, but not hard, texture with characteristics typical of the late stage of development of the kernels for the varietal type(s). Fairly tough in conventional sweet corn is dry, chewy corn. Kernels are doughy, may be dented, but are not woody. Pericarp may be tough to very tough.

Conventional Sweet Corn - Tenderness and Maturity - Grade C

Range	Dough stage (starchy, doughy, chewy)
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Supersweet Corn

- (1) Good tenderness and maturity in **supersweet corn** is crisp, corn that may have slightly tough pericarp, compact internal flesh, that is associated with plump or full kernels. There are three levels of quality within "good tenderness and maturity:" very tender and crisp; tender and crisp, and; moderately tender and crisp.

Supersweet Corn - Tenderness and Maturity - Grade A

Top	Very tender and crisp
Middle	Tender and crisp
Bottom	Moderately tender and crisp

- (2) Reasonably good tenderness and maturity in supersweet corn lacks tenderness and may be moderately dry. Kernels may have a reasonably tough pericarp and occasionally are dented. There are two levels of quality within "reasonably good tenderness and maturity" not crisp, not moist; and not crisp, moderately dry, and may include occasional dented kernels.

Supersweet - Tenderness and Maturity - Grade B

Top	not crisp, not moist
Bottom	lacks tenderness, moderately dry, occasional dented kernels

- (3) Tough in **supersweet corn** is dry, chewy corn, with fairly tough pericarp.

Supersweet Corn - Tenderness and Maturity Grade C

Range	Dry, chewy, pulpy, dented kernels with tough but not very tough pericarp
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Reminder: The number of sample units in a lot that have "**reasonably good tenderness and maturity**", and "**fairly tough**" shall not exceed the applicable acceptance number specified in the sample plan contained in the "**Regulations Governing Inspection and Certification of Processed Fruits and Vegetables and Related Products.**"

- e. **Evaluate flavor and odor.** Flavor and odor refers to the palatability of the product. The natural flavor of the sweet corn for the varietal type and/or the effect of added natural sweeteners, salt, or other suitable optional ingredients (Food and Drug Standard of Identity 155.130) are considered in evaluating this factor.

- (1) Good flavor and odor means the product has a good characteristic flavor and odor for the varietal type of canned sweet corn and is free from objectionable flavors and odors. Good flavor and odor in **conventional sweet corn** is characteristic flavor and odor typical of tender or reasonably tender sweet corn with no unusual aftertaste. Good flavor and odor in **supersweet corn** is free from objectionable flavors and odors, typically crisp, moist, and sweeter flavor than conventional sweet corn. The number of sample units in a lot that have "fairly good flavor" shall not exceed the applicable acceptance number specified in the sample plan contained in the "Regulations Governing Inspection and Certification of Processed Fruits and Vegetables and Related Products."
- (2) Fairly good flavor and odor, in **conventional sweet corn**, means the product may be lacking in good flavor and odor,

- (2) Fairly good flavor and odor, in conventional sweet corn, means the product may be lacking in good flavor and odor, may have a flavor typical of very mature corn, may have an over cooked flavor or an atypical flavor caused by processing or post-harvest conditions, but is free from objectionable flavors and odors. Fairly good flavor and odor in supersweet corn means the corn may have a pronounced dry aftertaste, may have an over cooked flavor or an atypical flavor caused by processing or post-harvest conditions, but is free from objectionable flavors and odors.

Good - "Grade A"

Fairly good - "Grade C" should be assigned to sample units that have "fairly good" flavor and odor (no off flavor or odor).

Poor "SStd" should be assigned to those sample units containing product that has an off flavor or odor.

When canned whole kernel corn is packed in water but without salt, the salt and sugar balance may be affected. A sample unit that is typically expected to contain salt, but does not, may be down-graded if the flavor is neither typical nor off-flavor. For instruction for certifying off-flavor, see File Code 172-A-1.

C. Foreign Material

Occasionally silt, sand, or soil is found embedded in cracked whole kernel corn. Silt that is very fine and cannot be tasted is considered insignificant. When the silt is found and its presence affects the eating quality, follow File Code 172-A-1. Consider such silt as Class 1 foreign material. Consider sand or grit as Class 2 foreign material and consider soil, mud balls, or clods as Class 3 foreign material. Follow the allowances for these classes. Product that doesn't meet the allowances in the File Code is "Grade Not Certified" (GNC).

D. Smut

Smut is a fungus that causes a gall to develop on the corn plant. Portions are characterized by a grey to black color; and it is lighter in density and softer in texture than the corn kernel. If a piece (or pieces) is found in a sample unit that, in aggregate, measures $1/8 \times 3/16$ inch or more, classify it as "Substandard." If a lot contains one or more Substandard sample units account smut, the entire lot cannot be graded above Substandard.

E. Grading of Extraneous Vegetable Material (EVM) and Specified Defects

EVM and specified defects are evaluated based on one of the composite sample sizes provided in the grade standards. Determination of composite sample size to use for small containers is **based on the sample size for EVM in the grade**

nearest category to the composite sample size in the Time Sampling Table for EVM in the back of this manual. For No. 10 containers, use 30 ounces from each container. For example: 6 - No. 10 cans may have a combined drained weight of 428 oz. Taking 30 oz per sample unit for EVM would be 5100 g. Use the acceptance numbers in the 5100 column for cob, husk, silk, stalk, and shank.

Table IV
AQL's, TOLERANCES, AND ACCEPTANCE NUMBERS FOR EVM
BASED ON 850 GRAMS (30.0 oz.)

Sample Units x Sample Unit Size			1x 850	3x 850	6x 850	13x 850	21x 850	29x 850
Units of Product in Grams			850	2550	5100	11050	17850	24650
Extraneous Vegetable Material (EVM)	TOL <u>1</u> /	AQL	Acceptance Numbers					
GRADE A								
Cob each cc (0.061 cu in) <u>2</u> /	1.41	1.25	0.80	2.05	3.85	7.85	12.35	16.85
Husk each cm ² (0.155 sq. in) <u>2</u> /	0.57	0.47	7	17	32	64	99	133
Silk, each 2.54 cm, recorded in inches	3.5	3.2	36	96	184	384	611	835
GRADE B								
Cob each cc (0.061 cu in) <u>2</u> /	3.5	3.2	1.8	4.8	9.2	19.2	30.6	41.8
Husk each cm ² (0.155 sq. in) <u>2</u> /	1.14	0.99	13	33	62	126	198	270
Silk, each 2.54 cm, recorded in inches	7.0	6.6	68	189	367	774	1235	1693
GRADE C								
Cob each cc (0.061 cu in) <u>2</u> /	4.94	4.6	2.45	6.75	13.0	27.3	43.4	59.5
Husk each cm ² (0.155 sq. in) <u>2</u> /	1.71	1.5	18	48	91	187	244	402
Silk, each 2.54 cm, recorded in inches	24.5	23.8	222	642	1264	2703	4342	5976

^{1/} Based on 13 x 850 (11,050 g)

^{1/} Tolerance for cob is based on each 0.05 cc; for husk--each cm²; and for silk--each 9 cm. at 11050 grams. (This is the basis for the calculation of the tolerances only.)

^{2/} Corn stalk and shank: If hard and tough, count as cob. If less severe, count as husk.

The allowance for cob is determined by displacement of water. Use a 10 ml graduated cylinder reading to 0.1 ml. Fill graduated cylinder with water to 8.0 ml. Drop in cob. The increase in volume from the starting point of 8.0 ml is the amount of cob. Enter the measured amount of cob (cc), husk (cm²), and silk (in) for each sample unit. They will be tallied after all sample units have been evaluated.

SPECIFIED DEFECTS

The procedure to determine the weight equivalent for each sample unit of 1000 kernels is to weigh one ounce of kernels and count the units. Then divide the kernel count in one ounce into 1000 to determine the numbers of ounces needed to represent 1000 kernels.

- Determine** the average count of 3 random one ounce (1 oz) sub-samples selected from different grading trays.

Example: 102, 118, and 122 whole kernel corn units total 342 whole kernel corn units. The average is 114 whole kernel corn units per oz.

Weigh one ounce (1 oz) of randomly selected kernels of corn.

2. **Use** the following formula to determine the number of units available on a weight basis.

The average number of whole kernel units of corn per one ounce divided into 1000 equals the number ounces of product that represent 1000 whole kernels of corn. For example, the average number of whole kernels of corn from three one-ounce sub-samples equals 120.

$1000 \div (\text{number of whole kernels of corn in one ounce}) = \text{number of ounces.}$

$(1000 \div 120 = 8.33)$ means 1000 whole kernels are represented by each 8.33 oz of drained product.

3000 whole kernels are represented by: $3000 \div 120 = 25.0$ oz, 6000 whole kernels are represented by $6000 \div 120 = 50.0$ oz, etc.

3. **Refer** to the applicable acceptance numbers table in the standards or this manual, and **select** the Units of Product (sample size) that will use the maximum amount of product available.

Note: For smaller than No. 300 container sizes, refer to the tables in this manual. For other container sizes and sampling rates, refer to the tables in the standards.

4. **Count or weigh out** a uniform amount of product from each grading tray to arrive at the sample size selected for the lot as a whole.

WHEN THERE IS INSUFFICIENT PRODUCT FOR EVALUATING SPECIFIED DEFECTS FROM ONE CONTAINER, ADD THE PRODUCT FROM SAMPLE 1b, THEN 2b, ETC. UNTIL SUFFICIENT PRODUCT IS OBTAINED.

FOR THESE EXTRA CONTAINERS, YOU NEED NOT EVALUATE THE NON-QUALITY OR PREREQUISITE QUALITY FACTORS. HOWEVER, IF IT IS OBVIOUS THAT SOME OF THESE ADDITIONAL CONTAINERS DEVIATE EXCESSIVELY FROM THE SAMPLE AS A WHOLE, YOU SHOULD: RECONSIDER THE EXAMINATION (E.G., ONE OF THE CONTAINERS NOT IN THE PREDETERMINED NUMBER TO CHECK FOR NON-QUALITY FACTORS IS OBVIOUSLY "SLACK FILLED"). FOLLOW BRANCH GUIDELINES AND OTHER INSTRUCTIONS THAT COVER THE DEVIATION IN QUESTION IF YOU RECONSIDER THE EXAMINATION. .

Record both the total Units of Product that comprise the sample size as well as the number of units used from each container on the tally sheet. Acceptance numbers in the Tables are based on **count**. If using a weight/count conversion, indicate it on the tally sheet. For example:

6000 or 6000/50.0 oz; 1000 or 1000/8.33 oz.

5. **Count** the number of seriously damaged kernels, damaged kernels, and pulled kernels found in the sample unit **and record** on the tally sheet.

Table V
AQL's, TOLERANCES, AND ACCEPTANCE NUMBERS FOR OTHER DEFECTS ^{1/}

Sample Units x Sample Unit Size			1x 1000	3x 1000	6x 1000	13x 1000	21x 1000	29x 1000
Units of Product by Count			1000	3000	6000	13000	21000	29000
Defects Other than EVM	TOL. 1/	AQL	Acceptance Numbers					
GRADE A								
Seriously damaged kernels	0.08	.047	1	3	5	10	15	20
Damaged kernels	0.25	.192	4	10	17	33	51	68
Pulled kernels	0.25	.192	4	10	17	33	51	68
GRADE B								
Seriously damaged kernels	0.25	.192	4	10	17	33	51	68
Damaged kernels	0.50	.409	7	18	33	65	101	136
Pulled kernels	0.42	0.34	6	15	28	55	85	115
GRADE C								
Seriously damaged kernels	0.42	0.34	6	15	28	55	85	115
Damaged kernels	1.00	.867	13	34	64	130	204	277
Pulled kernels	0.67	.562	9	23	43	87	136	184

^{1/} Based on 1000 x 13 (13,000) kernels.

F. Assigning the Grade for a Lot

1. **Determine** the total amount of defects found in each category of specified defects and enter these figures in the "Final/Average" column on page 1 of the tally sheet.
2. **Compare** the number of specified defects found with the acceptance numbers from the applicable tables in the standards or this grading manual.

Note: See "Procedures for Mixed Quality Lots" -- this manual -- on lots that meet the acceptance numbers but yet have pockets of obviously lower quality.

3. **Enter** the "Lot Grade" on the tally sheet based on the lowest grade assigned to any prerequisite or specified quality factor. A sample unit assigned Grade C "Appearance" due to fairly uniform color shall limit the "Lot Grade" to Grade B,

if it is the lowest grade assigned of all quality factors. **Compare** the number found with the corresponding acceptance number for each grade, and **enter** the applicable letter grade on the tally sheet.

PROCEDURES FOR GRADING MIXED QUALITY LOTS

If an inspection lot is encountered with individual (suspect) sample units in the sample which seem to be of lower quality than the sample as a whole, take the following action:

1. **Assemble** 1000 units of product from the "suspect" container(s) regardless of code.
2. **Compare** the number or weight of defects found, as applicable to the style, with the acceptance numbers from the applicable table in this manual and determine the grade of the suspect sample units.
3. **Compare** the grade of the suspect sample units to the grade of the sample as a whole. If the grade of the suspect sample is **more than one grade below** the grade of the sample as a whole, **certify** to the lowest grade. Otherwise **certify** to the grade of the original inspection results.

PROCEDURES FOR SINGLE SAMPLE UNITS (UNOFFICIAL SAMPLES)

Branch regulations provide for grading of samples submitted by an applicant. These samples are "unofficial samples" and do not represent a lot. When requested to perform grading on unofficial samples, use the following guidelines:

1. Each unofficial sample must stand on its own;
2. Each unofficial sample must contain 30 oz of drained product to determine EVM (**additional containers may be needed to meet this requirement**); 1000 kernels of corn for other specified defects.
3. **Grade** the sample as outlined in this manual.
4. **Apply** the applicable acceptance numbers found in the U.S. grade standards.

SEGREGATION PROCEDURES

If at any time during production, a portion of production falls into **the next lower grade**, the entire production fails at that point unless the offending portion can be segregated by codes. Plant management has two options--(1) to request segregation of the offending portion or, (2) to continue production without segregation anticipating better quality product

will offset the offending portion. If plant management requests that a portion of failing production be segregated, all defects found that are associated with the failing portion shall be excluded from the tally of the remaining portion. The failing portion may be re-inspected as a new lot only under appeal inspection or after the product has been reworked in an effort to eliminate or reduce the defects from the failing portion.

OTHER REQUIREMENTS

Inspectors cannot switch back and forth between on-line single sampling rates and time sampling **unless an occurrence of mixed quality sample units are encountered within a production period. When this happens inspectors can switch from time sampling to on-line single sampling due to the processing operation's inability to pack product at a consistent quality level. Inspectors should notify their supervisors when this occurs.**

The inspector must indicate that "time sampling" is being used on each tally sheet.

**Time Sampling Acceptance Numbers for Canned Corn -- 1000 Plan
For Other Defects**

U N I T S O F P R O D	S E R D A M A G E D	D A M A G E D	P U L L E D K E R N E L S	S E R D A M A G E D	D A M A G E D	P U L L E D K E R N E L S	S E R D A M A G E D	D A M A G E D	P U L L E D K E R N E L S
	GRADE A			GRADE B			GRADE C		
(AQL)	0.47	0.192	0.192	0.192	0.409	0.34	0.34	0.867	0.562
1000	1	4	4	4	7	6	6	13	9
2000	2	7	7	7	13	11	11	24	17
3000	3	10	10	10	18	15	15	34	23
4000	4	12	12	12	23	19	19	44	30
5000	5	15	15	15	28	24	24	54	37
6000	5	17	17	17	33	28	28	64	43
7000	6	19	19	19	37	32	32	73	49
8000	7	22	22	22	42	36	36	83	56
9000	7	24	24	24	47	40	40	92	62
10000	8	26	26	26	51	44	44	102	68
11000	9	29	29	29	56	47	47	111	75
12000	9	31	31	31	60	51	51	121	81
13000	10	33	33	33	65	55	55	130	87
14000	11	35	35	35	70	59	59	139	93
15000	11	38	38	38	74	63	63	149	99
16000	12	40	40	40	79	66	66	158	105
17000	12	42	42	42	83	70	70	167	111
18000	13	44	44	44	88	74	74	176	117
19000	14	46	46	46	92	78	78	186	124
20000	14	48	48	48	96	81	81	195	130
21000	15	51	51	51	101	85	85	204	136
22000	15	53	53	53	105	89	89	213	142
23000	16	55	55	55	110	93	93	222	148
24000	17	57	57	57	114	96	96	232	154
25000	17	59	59	59	119	100	100	241	160
26000	18	61	61	61	123	104	104	250	166
27000	18	63	63	63	128	107	107	259	172
28000	19	66	66	66	132	111	111	268	178
29000	20	68	68	68	136	115	115	277	184

**Time Sampling Acceptance Numbers for Canned Corn -- 850 Plan
For Extraneous Vegetable Material (EVM)**

GRAMS OF PROD	COB C EACH	HUSK EACH	SILK EACH	COB C EACH	HUSK EACH	SILK EACH	COB C EACH	HUSK EACH	SILK EACH
	GRADE A			GRADE B			GRADE C		
(AQL)	1.25	0.47	3.2	3.2	0.99	6.6	4.6	1.5	23.8
850 (30 oz)	0.8	7	36	1.8	13	68	2.45	18	222
1700 (60 oz)	1.45	12	66	3.3	23	129	4.65	34	434
2550 (90 oz)	2.05	17	96	4.8	33	189	6.75	48	642
3400 (120 oz)	2.65	22	126	6.3	43	249	8.85	63	850
4250 (150 oz)	3.25	27	155	7.75	53	308	10.9	77	1057
5100 (180 oz)	3.85	32	184	9.2	62	367	13.0	91	1264
5950 (210 oz)	4.4	37	213	10.65	71	425	15.05	105	1470
6800 (240 oz)	5.0	41	242	12.1	81	484	17.1	118	1676
7650 (270 oz)	5.6	46	270	13.5	90	542	19.15	132	1882
8500 (300 oz)	6.15	50	299	14.95	99	600	21.2	146	2087
9350 (330 oz)	6.7	55	327	16.35	108	658	23.2	160	2293
10200 (360 oz)	7.3	59	356	17.8	117	716	25.25	173	2498
11050 (390 oz)	7.85	64	384	19.2	126	774	27.3	187	2703
11900 (420 oz)	8.45	68	413	20.65	135	832	29.3	200	2908
12750 (450 oz)	9.0	72	441	22.05	144	889	31.35	214	3113
13600 (480 oz)	9.55	77	470	23.5	154	947	33.35	227	3318
14450 (510 oz)	10.15	81	498	24.9	163	1005	35.35	241	3523
15300 (540 oz)	10.7	86	526	26.3	172	1062	37.4	254	3728
16150 (570 oz)	11.25	90	554	27.7	180	1120	39.4	268	3932
17000 (600 oz)	11.8	94	583	29.15	189	1177	41.4	281	4137
17850 (630 oz)	12.35	99	611	30.55	198	1235	43.4	294	4342
18700 (660 oz)	12.95	103	639	31.95	207	1292	45.45	308	4546
19550 (690 oz)	13.5	107	667	33.35	216	1349	47.45	322	4750
20400 (720 oz)	14.05	112	695	34.75	225	1407	49.45	335	4955
21250 (750 oz)	14.6	116	723	36.15	234	1464	51.45	348	5159
22100 (780 oz)	15.15	120	751	37.55	243	1521	53.45	362	5364
22950 (810 oz)	15.75	125	779	38.95	252	1579	55.45	375	5568
23800 (840 oz)	16.3	129	807	40.35	261	1636	57.45	388	5772
24650 (870 oz)	16.85	133	835	41.75	270	1693	59.45	402	5976

ATTACHMENT 1

Drain Weight: Mixed Maturity Corn

The recommended minimum drained weight for whole kernel corn is different for grade A maturity than for other maturities. Grade A maturity corn may have slightly lower drained weight. This situation presents a problem if corn of mixed maturities (e.g., 3 cans grade A maturity and 3 cans grade B maturity) is being certified. Use the following system.

1. Acronyms and definitions for equation to determine mixed maturities:

"Adw" means recommended minimum drained weight for grade A maturity for a given can size.

"Bdw" means recommended minimum drained weight for grade B or lower maturity for a given can size.

"Na" means number of grade A maturity sample units.

"Nb" means the number of grade B or lower maturity sample units.

"N" means the number of sample units in the sample.

"Rdw" means the recommended average minimum drained weight that the sample should meet.

2. Equation:

$$(Na \times Adw) + (Nb \times Bdw) / N = Rdw$$

Example:

No. 300 cans: 3 cans A maturity; 5 cans B maturity; 4 cans C maturity; 1 can SSD maturity.

$$Adw = 9.25; Bdw = 9.50; Na = 3; Nb = 10; N = 13$$

$$(3 \times 9.25) + (10 \times 9.50) / 13 = Rdw = 9.44$$

ATTACHMENT 1

RECOMMENDED AVERAGE MINIMUM DRAIN WEIGHT FOR NO. 10 CANS

N=21				N=13		
No. Adw	No. Bdw	Rdw		No. Adw	No. Bdw	Rdw
21	0	70.00		13	0	70.00
20	1	70.01		12	1	70.15
19	2	70.19		11	2	70.31
18	3	70.29		10	3	70.46
17	4	70.38		9	4	70.62
16	5	70.48		8	5	70.77
15	6	70.57		7	6	70.92
14	7	70.67		6	7	71.08
13	8	70.76		5	8	71.23
12	9	70.86		4	9	71.38
11	10	70.95		3	10	71.54
10	11	71.95		2	11	71.69
9	12	71.05		1	12	71.85
8	13	71.14		0	13	72.00
7	14	71.33				
6	15	71.43		N =6		
5	16	71.52		No. Adw	No. Bdw	Rdw
4	17	71.62		6	0	70.00
3	18	71.74		5	1	70.33
2	19	71.81		4	2	70.66
1	20	71.90		3	3	71.00
0	21	72.00		2	4	71.33
			1	5	71.66	
			0	6	72.00	

ATTACHMENT 1

RECOMMENDED AVERAGE MINIMUM DRAIN WEIGHT FOR NO. 10 CANS

N = 3		
No. Adw	No. Bdw	Rdw
3	0	70.00
2	1	70.67
1	2	71.33
0	3	72.00

ATTACHMENT 1

RECOMMENDED AVERAGE MINIMUM DRAIN WEIGHT FOR NO. 300 CANS

N = 3		
No. Adw	No. Bdw	Rdw
3	0	9.25
2	1	9.33
1	2	9.42
0	3	9.50

ATTACHMENT 1

RECOMMENDED AVERAGE MINIMUM DRAIN WEIGHT FOR NO. 300 CANS

N=21				N=13		
No. Adw	No. Bdw	Rdw		No. Adw	No. Bdw	Rdw
21	0	9.25		13	0	9.25
20	1	9.26		12	1	9.27
19	2	9.27		11	2	9.29
18	3	9.29		10	3	9.31
17	4	9.30		9	4	9.33
16	5	9.31		8	5	9.35
15	6	9.32		7	6	9.37
14	7	9.33		6	7	9.38
13	8	9.35		5	8	9.42
12	9	9.36		4	9	9.44
11	10	9.37		3	10	9.46
10	11	9.38		2	11	9.48
9	12	9.39		1	12	9.48
8	13	9.40		0	13	9.50
7	14	9.42				
6	15	9.43		N =6		
5	16	9.44		No. Adw	No. Bdw	Rdw
4	17	9.45		6	0	9.25
3	18	9.46		5	1	9.29
2	19	9.48	4	2	9.33	
1	20	9.49	3	3	9.38	
0	21	9.50	2	4	9.42	
			1	5	9.46	
			0	6	9.50	