GRADING MANUAL

FROZEN BROCCOLI

UNITED STATES DEPARTMENT OF AGRICULTURE
FOOD SAFETY AND QUALITY SERVICE
FRUIT AND VEGETABLE QUALITY DIVISION
PROCESSED PRODUCTS BRANCH

Frozen Broccoli
July 1980

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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This manual is for sale to the public. Address inquiries to:

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SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS

1. Select at random 50 spears from the processing line (either before freezing or after freezing). You may use 25 spears as an optional sample unit size. Unless the quality is borderline, 25 spears should be adequate. Also if you're grading several other products at the same time, 25 spears would save some grading time. In either case, 25 spears or 50 spears, you must keep the sample unit size constant during each basic grading period.

2. Reassemble any broken spear. Count each reassembled spear as a single unit.

3. Arrange all of the spears in the sample unit in a continuous row with the base end of each spear against the bottom rim of the grading tray. If you're using 50 spears, butt each spear against a straight edge on top of the grading table. As the spears are being arranged in a row, place them in order of size from the longest to the shortest, or vice versa.

   a. Disregard loose leaf material, pieces of leaves, EVM and detached fragments;

   b. Locate the point in the continuous row where the spears are longer than 15.5 cm, if any. Count the number of spears that are longer than 15.5 cm;

   c. Locate the point in the continuous row where the spears are shorter than 8.5 cm, if any. Count the number of spears that are shorter than 8.5 cm; and

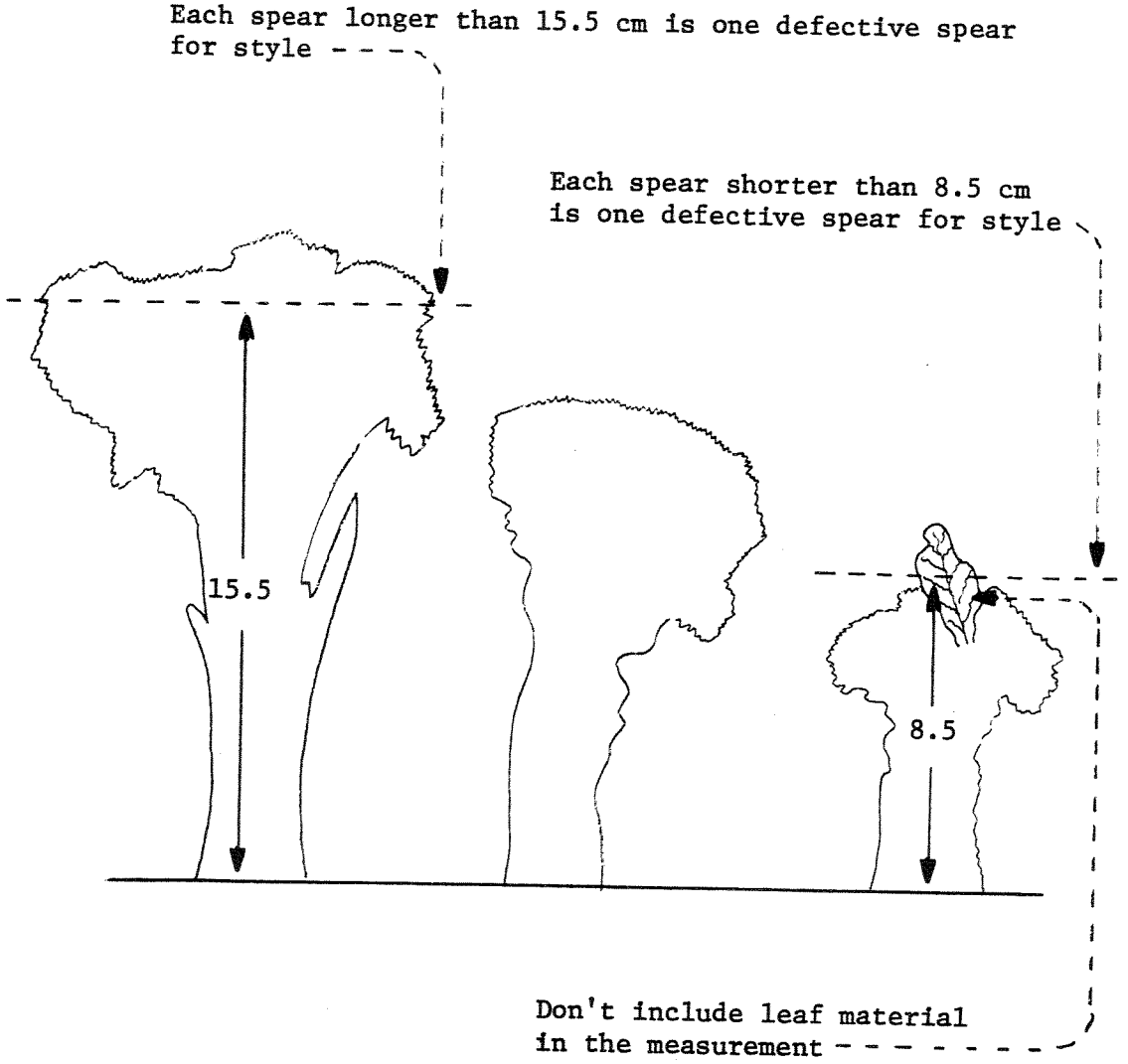
   d. Record the number of defective spears in b and c above in the "style" section of the defect tally. Spears that fail style requirements aren't "pieces." If a style failure occurs, certify the grade but show: "Fails style compliance for spears."

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

3. Style defectives (continuation).

Example 1:



SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

4. While the spears are arranged in a continuous row, check for uniformity of size. Uniformity of size is separate from the style defectives done in step 3, previously. Don't be overly critical. If it is apparent the spears are reasonably similar in length, accept them as meeting requirements. If some spears are obviously shorter or longer than others, do the following:

   a. Locate the point in the row where the spears vary more than 5 cm from the predominant length;

   b. Determine size variation so that only the least number of defects are tallied against size. This may be only the short spears, only the long spears, or both the long spears and the short spears; and

   c. Record the number of size defects on the defect tally as major defects.

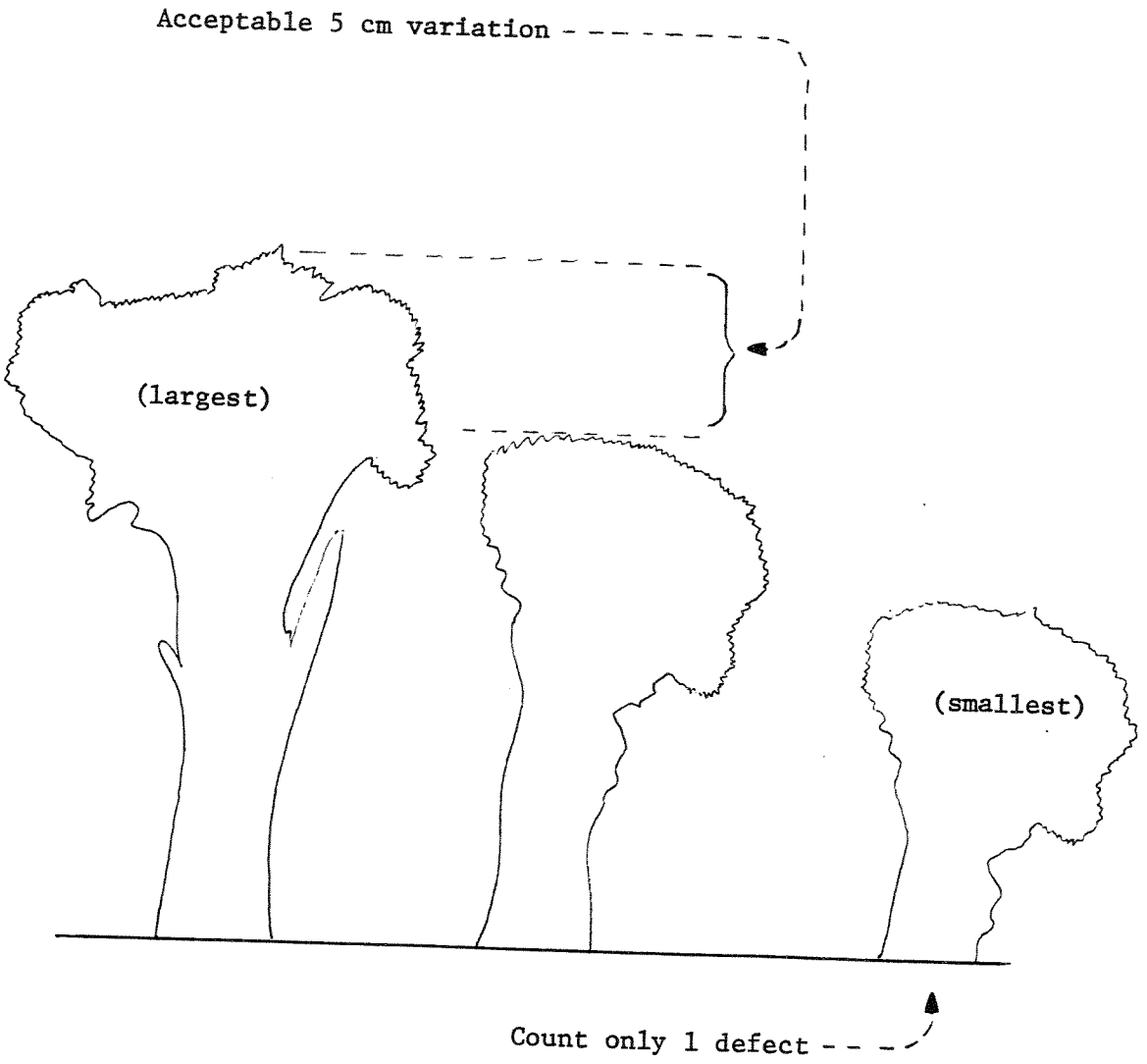
   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

4. Uniformity of length (continuation).

Example 2:

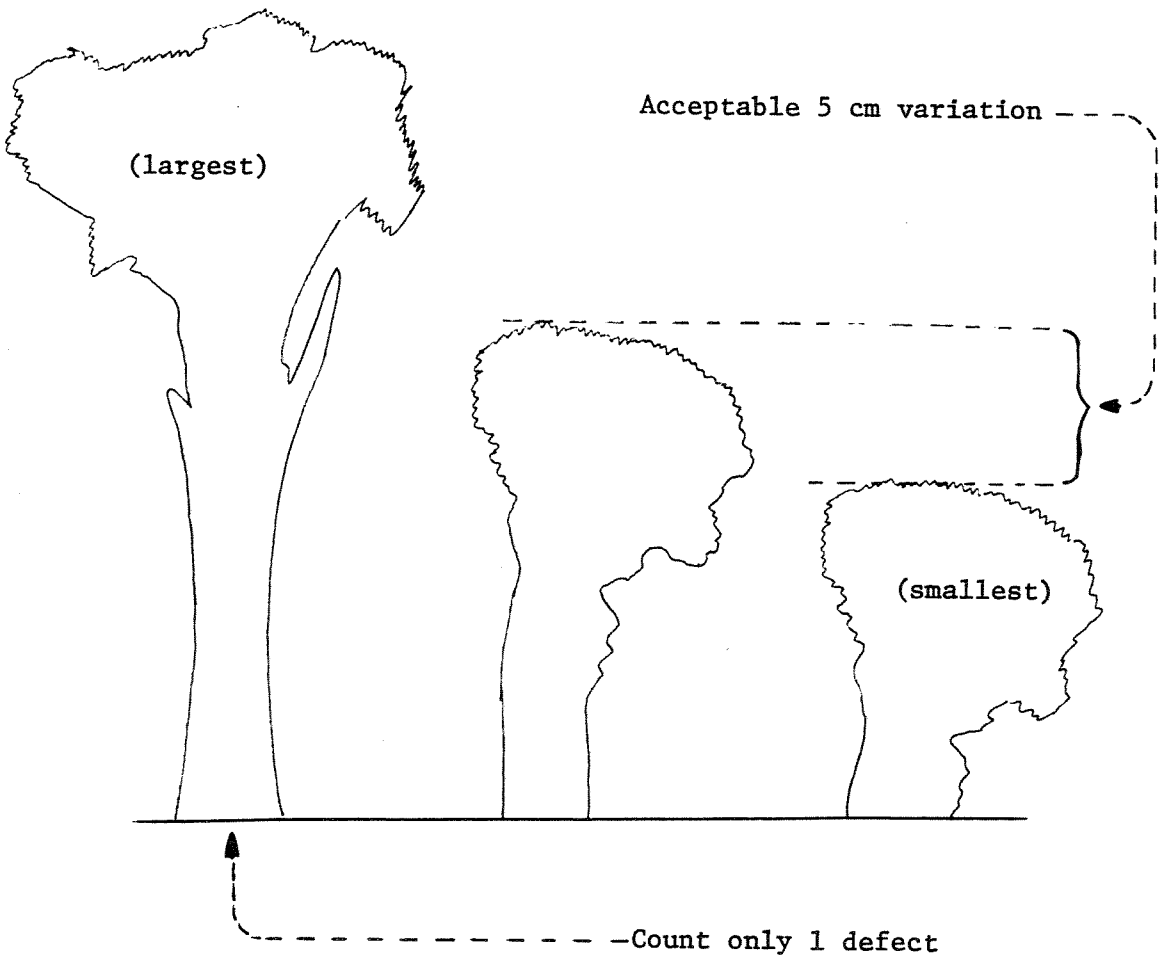


SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

4. Uniformity of length (continuation).

Example 3:

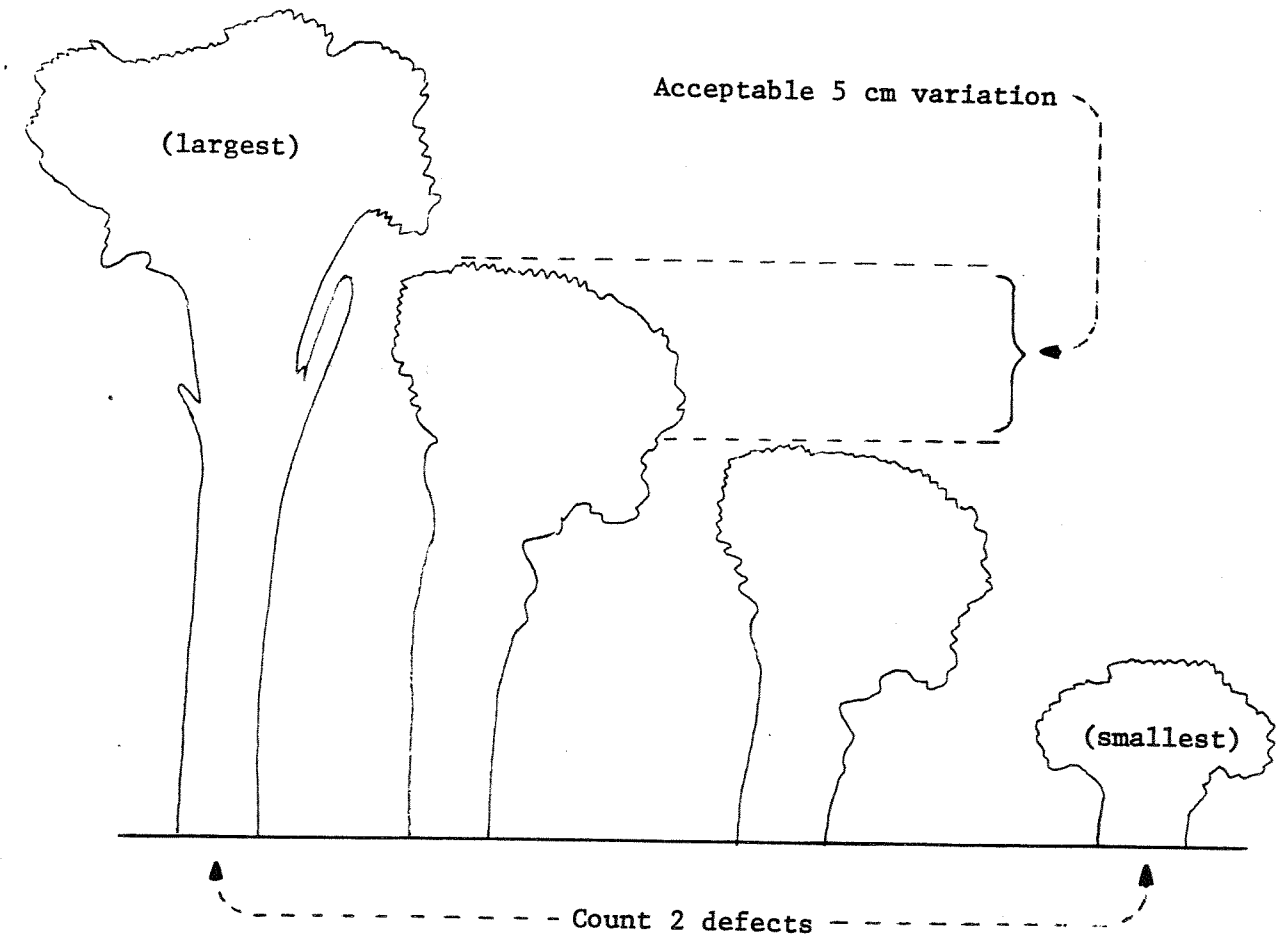


SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

4. Uniformity of length (continuation).

Example 4:



SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

5. While the spears are arranged in a continuous row, check for uniformity of diameter. Uniformity of diameter is separate from the style defectives done in step 3, and uniformity of length done in step 4, previously. Don't be overly critical. If it is apparent that the spears are reasonably similar in diameter, accept them as meeting requirements. If some spears are obviously larger or smaller than others, do the following:

   a. Locate the apparent spears that are outside an acceptable 2 cm range in diameter between the large diameters and the small diameters;

   b. Determine diameter variation so that only the least number of defects are tallied against size. This may be only the small diameter spears, only the large diameter spears, or both the small spears and the large spears; and

   c. Record the number of diameter defects on the defect tally as minor defects.

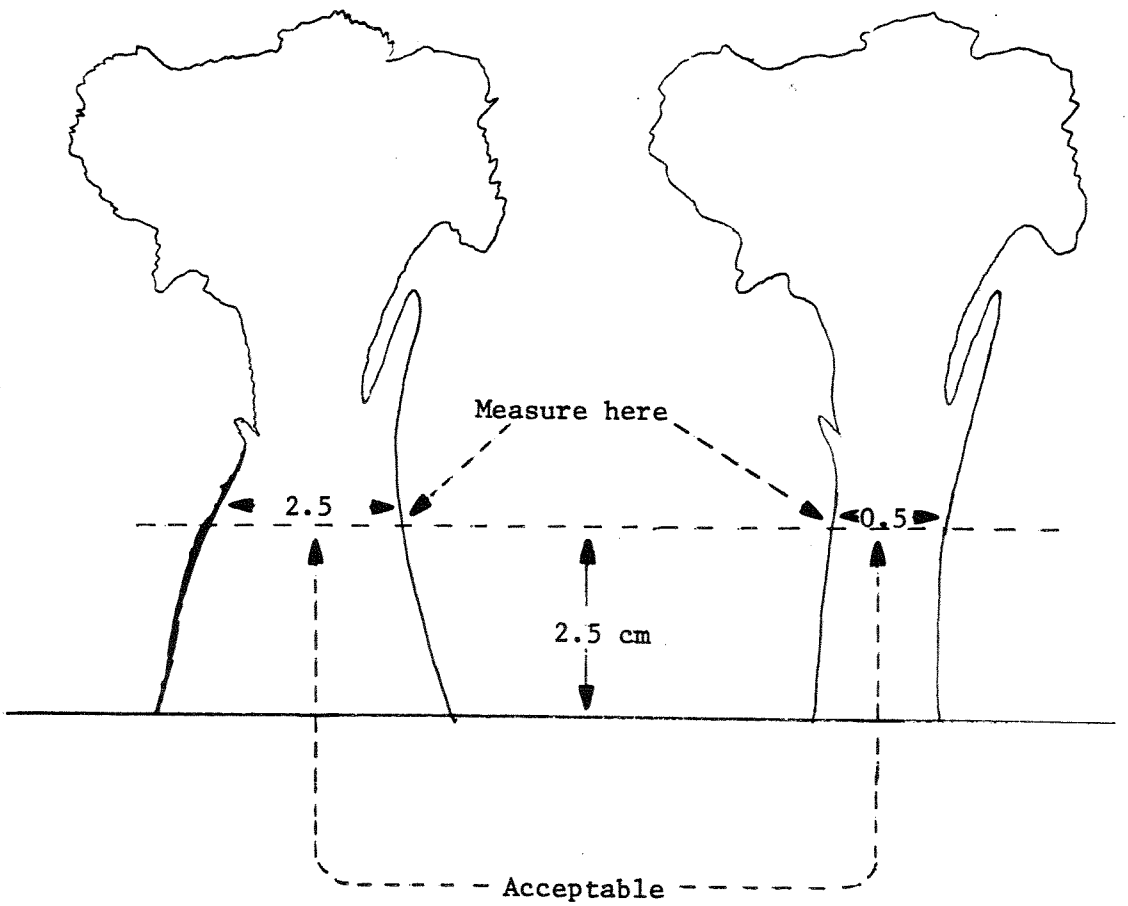
   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

5. Uniformity of diameter (continuation).

Example 5:



SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

6. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard.

7. At the same time that brightness is evaluated, record the letter grade (A or SSTD) in the "prerequisites" section of the defect tally for similar varietal characteristics.

8. Evaluate the color of the individual broccoli spears. The color classification of each broccoli spear is one of the following:

   a. Good color (grade A color) - not a defect in any grade;

   b. Reasonably good color (grade B color) - a defect only in grade A; or

   c. Poor color (Substandard color) - a defect in grade A and grade B.

   If a spear is blemished because of orange buds, olive-green leaf stem (petiole), etc., ignore the blemished areas for purposes of color evaluation. In other words, don't count a spear as "reasonably good" color or "poor" color because it is blemished. Record on the defect tally the number of spears that are either "reasonably good" or "poor" color. If the sample unit fails requirements for grade A, adjust the tally by dropping the number of "reasonably good" spears from the grade B defects. Reasonably good color (grade B color) is not a defect in a grade B sample unit. Count only "poor" color spears as defects in a grade B sample unit.

   If the frozen broccoli is designated as grade B by the processor, it would be necessary to count only the number of "poor" color spears. Remember, however, the tally could never be reevaluated for grade A.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

8. Color of individual spears (continuation).

Example 6: (Designated grade A production).

SEVERE	Color (Poor)						1
	Blemished (Seriously)						
	Fiber (Woody)						
	HEM (Class 1)						
	TOTAL SEVERE					0	1
	CUSUM	Grade A	0.5	0.5	1.5	0	0.5
		Grade B	1.5	1.5	3		
MAJOR	Color (Reas. Good) In grade A					1	2
	Size (Length)					1	2
	Detached Fragments						
	Blemished (Materially)					1	2
	Trim (Poor) In grade A						
	Development (Poor)						
	Fiber (Nonwoody)					1	2
	TOTAL MAJOR					4	6 8
	CUSUM	Grade A	1	4	3	1	3
		Grade B	1	6	4		B
TOTAL	TOTAL ALL CLASSES					11	12
	CUSUM	Grade A	2	12	5	1	1
		Grade B	2	14	7		
SAMPLE UNIT GRADE						A	B

Drop the defects that are counted only against grade A, before checking for compliance with grade B

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

8. Color of individual spears (continuation).

Example 7: (Designated grade B production).

SEVERE	Color (Poor)					1	
	Blemished (Seriously)					1	
	Fiber (Woody)						
	HEM (Class 1)						
	TOTAL SEVERE					2	
	CUSUM	Grade A	0.5	0.5	1.5		
		Grade B	1.5	1.5	3	2	
MAJOR	Color (Reas. Good) In grade A						
	Size (Length)					1	
	Detached Fragments					1	
	Blemished (Materially)					1	
	Trim (Poor) In grade A						
	Development (Poor)					2	
	Fiber (Nonwoody)						
	TOTAL MAJOR					5	
	CUSUM	Grade A	1	4	3		
		Grade B	1	6	4	0	
TOTAL	TOTAL ALL CLASSES					12	
	CUSUM	Grade A	2	12	5		
		Grade B	2	14	7	0	
	SAMPLE UNIT GRADE					B	

Don't count defects that are counted only against grade A

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

9. Weigh the detached fragments, if any, in the sample unit. Don't include loose leaves or pieces of leaves in the weight, these are minor defects. Ignore any chaff. Don't be overly critical but count each 28 g increment of detached fragments as 1 major defect. Record on the defect tally the number of detached fragments as follows:

0 - 28 g = 1 defect

29 - 56 g = 2 defects

57 - 84 g = 3 defects, etc.

Example 8:

MAJOR	Color (Reas. Good) In grade A						
	Size (Length)						
	Detached Fragments					2	
	Blemished (Materially)						
	Trim (Poor) In grade A						
	Development (Poor)						
	Fiber (Nonwoody)						
	TOTAL MAJOR						
	CUSUM Grade A	1	4	3			
	CUSUM Grade B	1	6	4			

Detached fragments = $\frac{35}{28}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

10. Weigh the loose leaves and pieces of leaves, if any, in the sample unit. Count each 14 g increment of loose leaf material as 1 minor defect. Record on the defect tally the number of loose leaf defects as follows:

0 - 14 g = 1 defect

15 - 28 g = 2 defects

29 - 42 g = 3 defects, etc.

Example 9:

MINOR	Size (Diameter)			
	Loose Leaves		4	
	Broken			
	Damaged			
	Blemished (Slightly)			
	Trim (Reas. Well) In grade A			
	Trim (Poor) In grade B			
	Development (Reas. Well) In A			
	TOTAL MINOR			

Loose leaves = $\frac{50}{14}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

11. Count the number of broken spears. These should be the same spears that were reassembled in step 2, if any. Record on the defect tally as minor defects the number of broken spears (each reassembled spear is counted as only 1 defect).

12. Count any mechanical damage to the head material of the spears as a defect. Don't be overly critical -- only materially damaged, or worse, are counted. Don't count broken spears (step 11) or trimmed spears (step 14) as damaged, or vice versa. Record on the defect tally as minor defects the number of damaged spears.

13. Count the number of spears that are blemished. Blemished broccoli is the most common defect. Usually, blemishes are:

    a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

    b. Yellow leaves;

    c. Orange buds (6 or more orange buds in a single area of the head is the cut-off point between blemished and nonblemished);

    d. Olive-green leaf stem (petiole); and

    e. Record on the defect tally the number of blemished spears as follows:

       i. Minor; or
       ii. Major; or
       iii. Severe.

       ← Use photoguides, if available.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

14. Count the number of spears that are adversely affected by trimming. Use the USDA photoguides, if available. The trim classification of each broccoli spear is one of the following:

    a. Well trimmed (grade A trim) - not a defect in any grade;

    b. Reasonably well trimmed (grade B trim) - a defect only in grade A; or

    c. Poorly trimmed (Substandard trim) - a major defect in grade A and a minor defect in grade B.

    Record on the defect tally the number of spears that are either "reasonably well trimmed" or "poorly trimmed." If the sample unit fails requirements for grade A, adjust the defect tally by: (1) dropping all "reasonably well trimmed" spears from the defects counted against grade B; and (2) striking out the number of "poorly trimmed" spears counted as major defects against grade A and moving them to minor defects to be counted against grade B. If the broccoli is designated as grade B by the processor, it would be necessary to count only the "poorly trimmed" spears in each sample unit. Place the number of "poorly trimmed" spears directly in the minor defect category. Remember, however, the tally could never be reevaluated for grade A.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

14. Trimming (continuation).

Example 10: (Designated grade A production)

MAJOR	Color (Reas. Good) In grade A						
	Size (Length)						1
	Detached Fragments					1	
	Blemished (Materially)					2	2
	Trim (Poor) In grade A					1	~~2~~
	Development (Poor)						
	Fiber (Nonwoody)						2
	TOTAL MAJOR					4	5 ~~7~~
	CUSUM	Grade A	1	4	3	1	3
		Grade B	1	6	4		B
MINOR	Size (Diameter)					1	
	Loose Leaves						1
	Broken					1	
	Damaged						
	Blemished (Slightly)					2	1
	Trim (Reas. Well) In grade A					1	1
	Trim (Poor) In grade B						
	Development (Reas. Well) In A						
	TOTAL MINOR					5	3
TOTAL	TOTAL ALL CLASSES					12	13
	CUSUM	Grade A	2	12	5	2	3
		Grade B	2	14	7		
SAMPLE UNIT GRADE						A	B

Drop the defects that are counted only against grade A, before checking for compliance with grade B - - - - - - - - - - - - - -

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

15. Count the number of spears that are adversely affected by development (head and bud cluster stages of maturity). Use the USDA photoguides, if available. The development classification of each broccoli spear is one of the following:

    a. Well developed (grade A development) - not a defect in any grade;

    b. Reasonably well developed (grade B development) - a defect only in grade A; or

    c. Poorly developed (Substandard development) - a defect in grade A and grade B.

    Record on the defect tally the number of spears that are either "reasonably well developed" or "poorly developed." If the sample unit fails requirements for grade A, adjust the tally by dropping all "reasonably well developed" spears from the number of defects counted against grade B. Reasonably well developed (grade B development) isn't a defect in a grade B sample unit. Count only "poorly developed" spears as defects in a grade B sample unit. If the frozen broccoli is designated as grade B by the processor, it would be necessary to count only the number of "poorly developed" spears. Remember, however, the tally could never be reevaluated for grade A.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

14. Trimming (continuation).

Example 11: (Designated grade B production).

MAJOR	Color (Reas. Good) In grade A					
	Size (Length)					
	Detached Fragments				1	
	Blemished (Materially)				2	
	Trim (Poor) In grade A					
	Development (Poor)					
	Fiber (Nonwoody)				1	
	TOTAL MAJOR				4	
	CUSUM Grade A	1	4	3		
	CUSUM Grade B	1	6	4	0	
MINOR	Size (Diameter)					
	Loose Leaves				1	
	Broken				1	
	Damaged					
	Blemished (Slightly)				2	
	Trim (Reas. Well) In grade A					
	Trim (Poor) In grade B				1	
	Development (Reas. Well) In A					
	TOTAL MINOR				5	
TOTAL	TOTAL ALL CLASSES				15	
	CUSUM Grade A	2	12	5		
	CUSUM Grade B	2	14	7	3	
	SAMPLE UNIT GRADE				B	

Don't tally defects that are counted only against grade A

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

13. Trimming (continuation).

Example 22: (Designated grade A production).

MAJOR	Color (Reas. Good) In grade A						
	Detached Fragments					1	1
	Blemished (Materially)					2	2
	Trim (Poor) In grade A					1	~~2~~
	Development (Poor)						
	Fiber (Nonwoody)						2
	TOTAL MAJOR					4	~~5~~ 7
	CUSUM	Grade A	1	4	3	1	3
		Grade B	1	6	4		8
MINOR	Size (More than 4X)					1	
	Loose Leaves						1
	Broken					1	
	Damaged						
	Blemished (Slightly)					2	1
	Trim (Reas. Well) In grade A					1	1
	Trim (Poor) In grade B						
	Development (Reas. Well) In A						
	TOTAL MINOR					5	3
TOTAL	TOTAL ALL CLASSES					12	13
	CUSUM	Grade A	2	12	5	2	3
		Grade B	2	14	7		
SAMPLE UNIT GRADE						A	B

Drop the defects that are counted only against grade A, before checking for compliance with grade B — — — — — — — — — — —

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

13. Count the number of short spears that are adversely affected by trimming. Use the USDA photoguides, if available. The trim classification of each broccoli short spear is one of the following:

    a. Well trimmed (grade A trim) - not a defect in any grade:

    b. Reasonably well trimmed (grade B trim) - a defect only in grade A; or

    c. Poorly trimmed (Substandard trim) - a major defect in grade A and a minor defect in grade B.

    Record on the defect tally the number of short spears that are either "reasonably well trimmed" or "poorly trimmed." If the sample unit fails requirements for grade A, adjust the defect tally by: (1) dropping all "reasonably well trimmed" short spears from the defects counted against grade B; and (2) striking out the number of "poorly trimmed" short spears counted as major defects against grade A and moving them to minor defects to be counted against grade B. If the broccoli is designated as grade B by the processor, it would be necessary to count only the "poorly trimmed" short spears in each sample unit. Place the number of "poorly trimmed" short spears directly in the minor defect category. Remember, however, the tally could never be reevaluated for grade A.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

10. Count the number of broken short spears. These should be the same short spears that were reassembled in step 2, if any. Record on the defect tally as minor defects the number of broken spears (each reassembled short spear is counted as only 1 defect).

11. Count any mechanical damage to the head material of the short spear as a defect. Don't be overly critical -- only materially damaged, or worse, is counted. Don't count broken short spears (step 10) or trimmed short spears (step 13) as damaged, or vice versa. Record on the defect tally as minor defects the number of damaged short spears.

12. Count the number of short spears that are blemished. Blemished broccoli is the most common defect. Usually, blemishes are:

    a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

    b. Yellow leaves;

    c. Orange buds (6 or more orange buds in a single area of the head is the cut-off point between blemished and nonblemished);

    d. Olive-green leaf stem (petiole); and

    e. Record on the defect tally the number of blemished short spears as follows:

        i. Minor; or
        ii. Major; or
        iii. Severe.

        ← Use photoguides, if available.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

9. Weigh the loose leaves and pieces of leaves, if any, in the sample unit. Count each 14 g increment of loose leaf material as 1 minor defect. Record on the defect tally the number of loose leaf defects as follows:

0 - 14 g = 1 defect

15 - 28 g = 2 defects

29 - 42 g = 3 defects, etc.

Example 21:

MINOR	Size (More than 4X)			
	Loose Leaves		2	
	Broken			
	Damaged			
	Blemished (Slightly)			
	Trim (Reas. Well) In grade A			
	Trim (Poor) In grade B			
	Development			
	TOTAL MINOR			

Loose leaves = $\frac{20}{14}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

8. Weigh the detached fragments, if any, in the sample unit. Don't include loose leaves or pieces of leaves in the weight, these are minor defects. Ignore any chaff. Don't be overly critical but count each 28g increment of detached fragments as 1 major defect. Record on the defect tally the number of detached fragment defects as follows:

0 - 28 g = 1 defect

29 - 56 g = 2 defects

57 - 84 g = 3 defects, etc.

Example 20:

MAJOR	Color (Reas. Good) In grade A						
	Detached Fragments					3	
	Blemished (Materially)						
	Trim (Poor) In grade A						
	Development (Poor)						
	Fiber (Nonwoody)						
	TOTAL MAJOR						
	CUSUM	Grade A	1	4	3		
		Grade B	1	6	4		

Detached fragments = $\frac{60}{28}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

7. Color of individual short spears (continuation).

Example 19: (Designated grade B production).

SEVERE	Color (Poor)					1
	Blemished (Seriously)					1
	Fiber (Woody)					
	HEM (Class 1)					
	TOTAL SEVERE					2
	CUSUM	Grade A	0.5	0.5	1.5	
		Grade B	1.5	1.5	3	2
MAJOR	Color (Reas. Good) In grade A					
	Detached Fragments					1
	Blemished (Materially)					1
	Trim (Poor) In grade A					
	Development (Poor)					2
	Fiber (Nonwoody)					1
	TOTAL MAJOR					5
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	0
TOTAL	TOTAL ALL CLASSES					12
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	0
SAMPLE UNIT GRADE						B

Don't count defects that are counted only against grade A

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

7. Color of individual short spears (continuation).

Example 18: (Designated grade A production).

SEVERE	Color (Poor)						1
	Blemished (Seriously)						
	Fiber (Woody)						
	HEM (Class 1)						
	TOTAL SEVERE					0	1
	CUSUM	Grade A	0.5	0.5	1.5	0	0.5
		Grade B	1.5	1.5	3		
MAJOR	Color (Reas. Good) In grade A					1	~~2~~
	Detached Fragments					1	2
	Blemished (Materially)					1	2
	Trim (Poor) In grade A						
	Development (Poor)						
	Fiber (Nonwoody)					1	2
	TOTAL MAJOR					4	6 ~~8~~
	CUSUM	Grade A	1	4	3	1	3
		Grade B	1	6	4		B
TOTAL	TOTAL ALL CLASSES					11	12
	CUSUM	Grade A	2	12	5	1	1
		Grade B	2	14	7		
SAMPLE UNIT GRADE						A	B

Drop the defects that are counted only against grade A, before checking for compliance with grade B

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

5. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard.

6. At the same time that brightness is evaluated, record the letter grade (A or SSTD) in the "prerequisites" section of the defect tally for similar varietal characteristics.

7. Evaluate the color of the individual broccoli short spears. The color classification of each short spear is one of the following:

   a. Good color (grade A color) - not a defect in any grade;

   b. Reasonably good color (grade B color) - a defect only in grade A; or

   c. Poor color (Substandard color) - a defect in grade A and grade B.

   If a short spear is blemished because of orange buds, olive-green leaf stem (petiole), etc., ignore the blemished areas for purposes of color evaluation. In other words, don't count a short spear as "reasonably good" color or "poor" color because it is blemished. Record on the defect tally the number of short spears that are either "reasonably good" or "poor" color. If the sample unit fails requirements for grade A, adjust the tally by dropping the number of "reasonably good" short spears from the grade B defects. Reasonably good color (grade B color) is not a defect in a grade B sample unit. Count only "poor" color short spears as defects in a grade B sample unit.

   If the frozen broccoli is designated as grade B by the processor, it would be necessary to count only the number of "poor" color short spears. Remember, however, the tally could never be reevaluated for grade A.

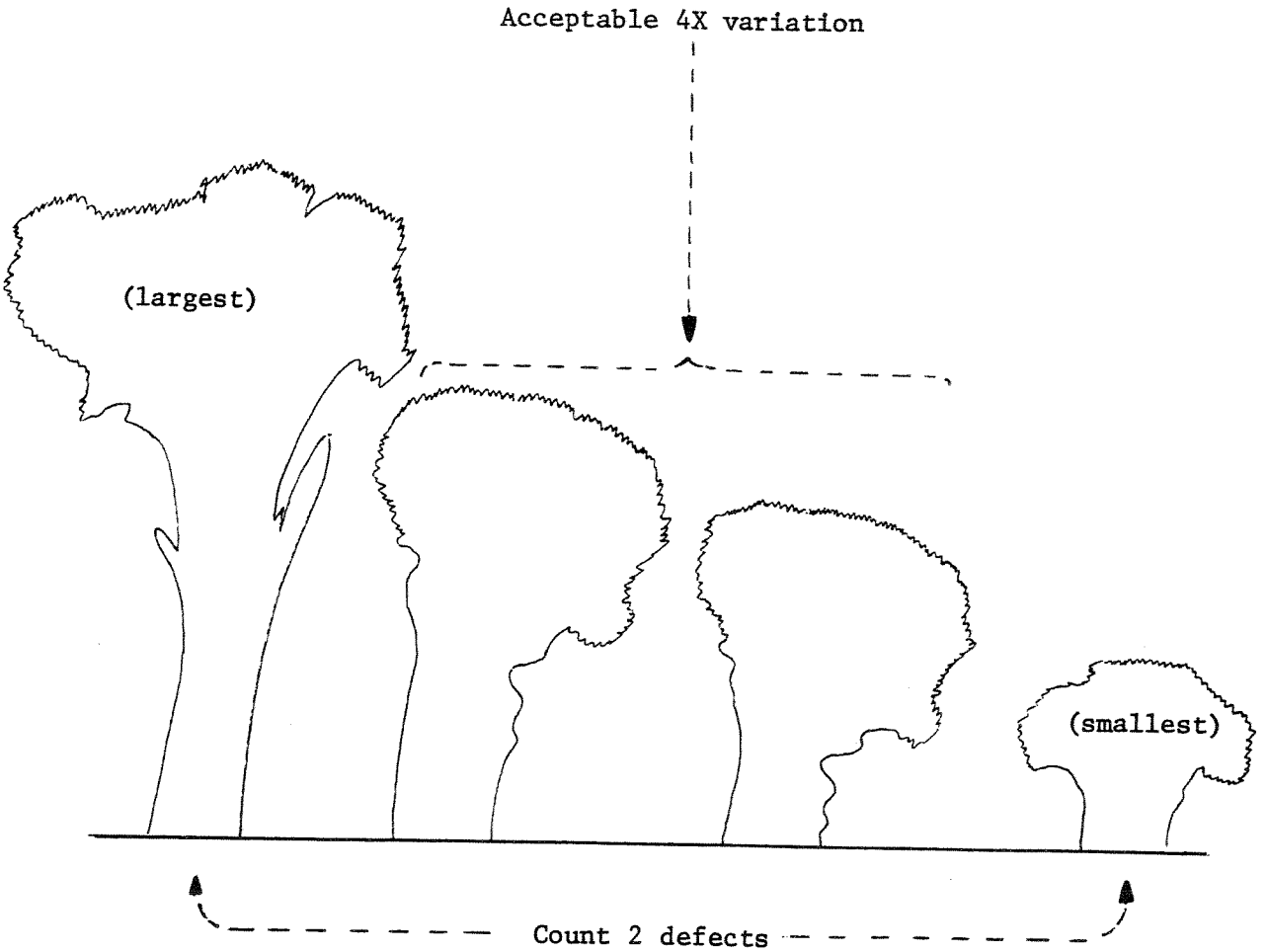
See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

4. Uniformity of size (continuation).

Example 17:

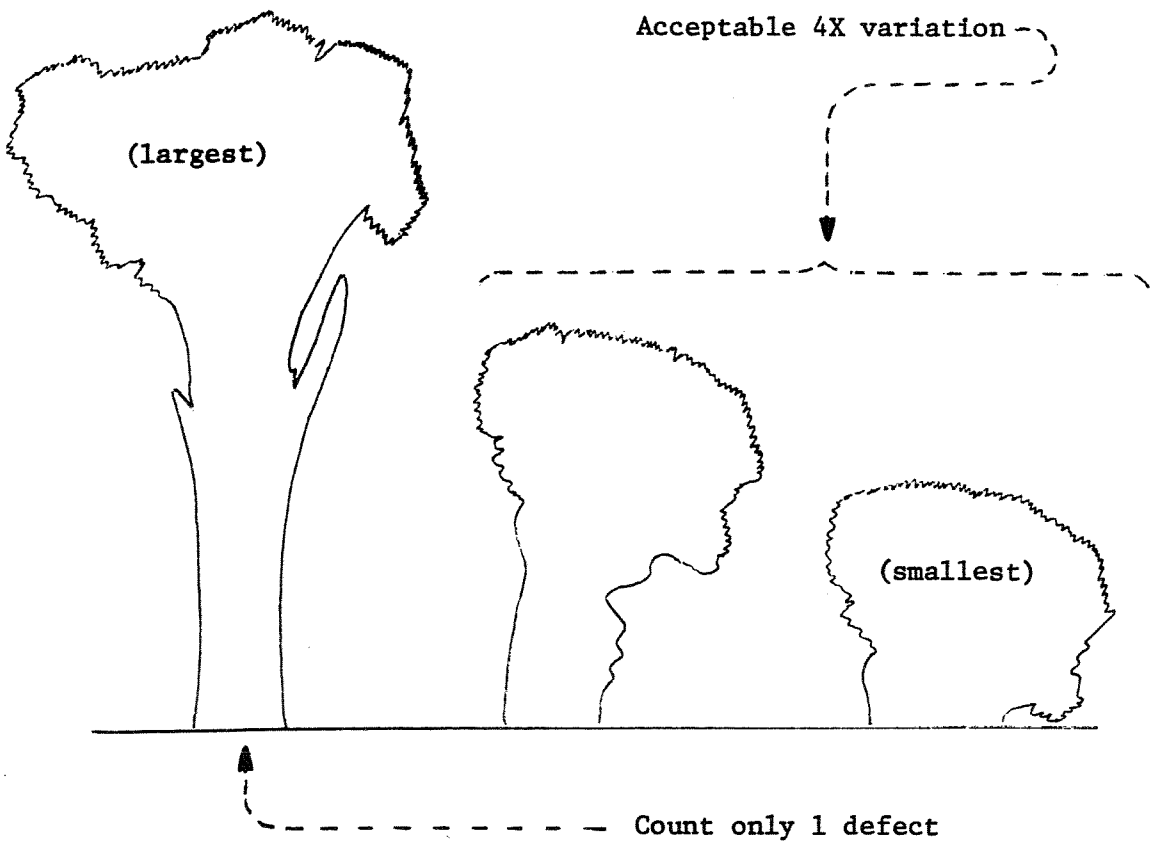


SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

4. Uniformity of size (continuation).

Example 16:

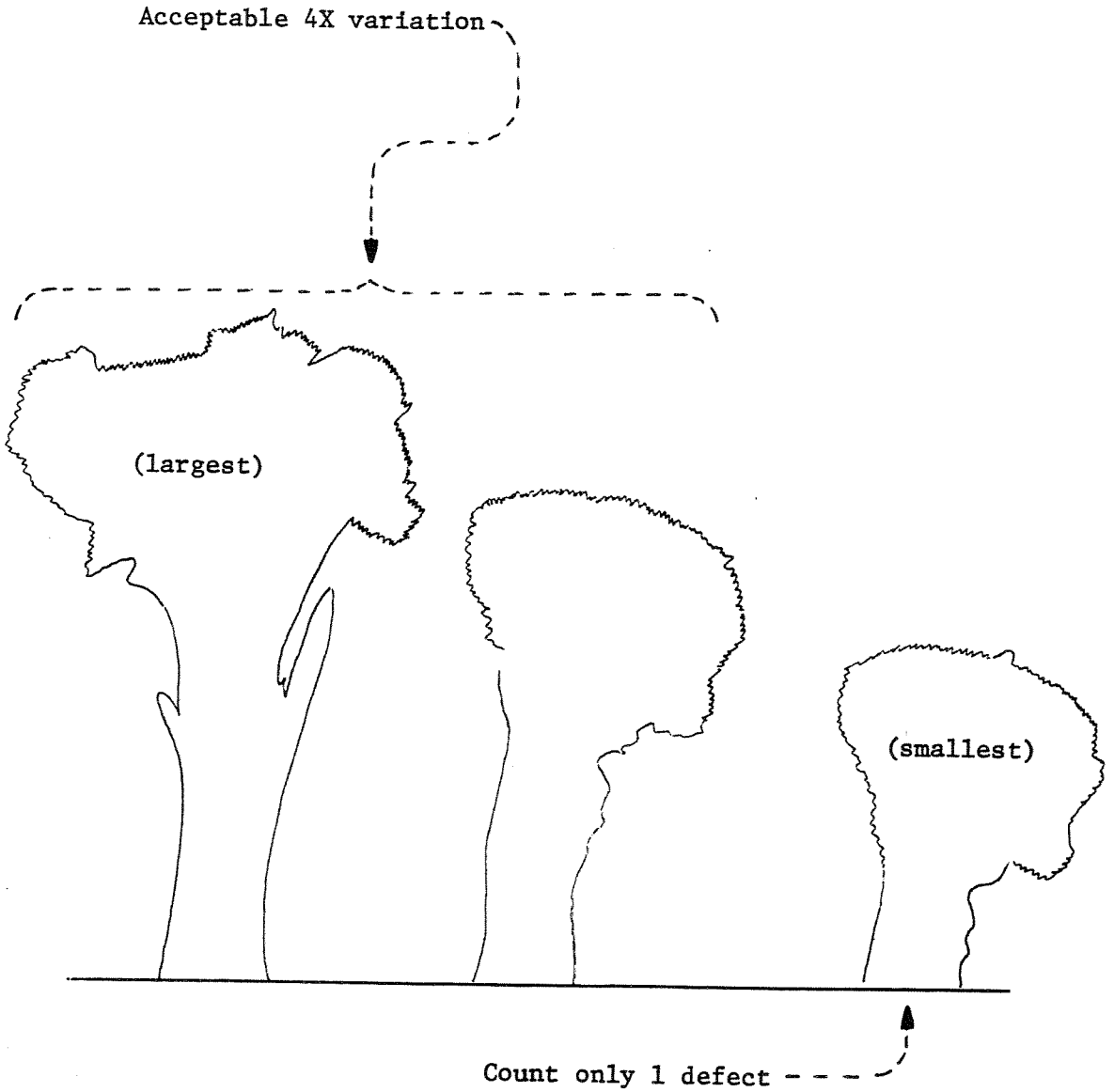


SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

4. Uniformity of size (continuation).

Example 15:



SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

4. While the short spears are arranged in a continuous row, check for uniformity of size. Uniformity of size is separate from the style defectives done in step 3, previously. Don't be overly critical. If it is apparent that short spears are reasonably similar in weight, accept them as meeting requirements. If some short spears vary greatly in weight from others, do the following:

   a. Locate the point in the continuous row where the short spears vary in weight more than 4 times (4X) from the other units;

   b. Determine size variation so that only the least number of defects are tallied against size. This may be only the small unit, only the large units, or both the large units and the small units; and

   c. Record the number of size defects on the defect tally as minor defects.

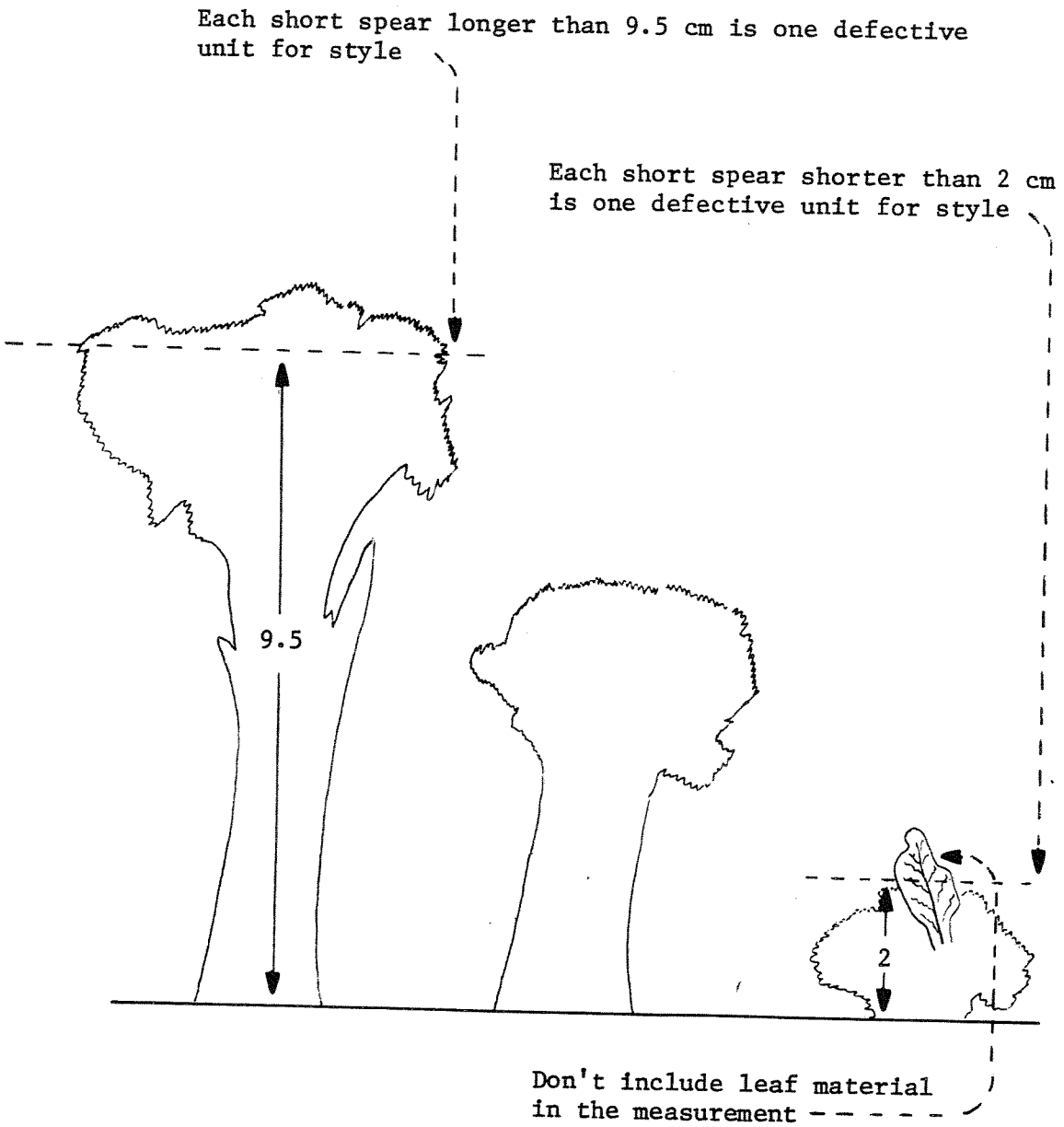
   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

3. Style defectives (continuation).

Example 14:



SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS

1. Select at random 50 short spears from the processing line (either before freezing or after freezing). You may use 25 short spears as an optional sample unit size. Unless the quality is borderline, 25 short spears should be adequate. Also if you're grading several other products at the same time, 25 short spears would save time in grading. In either case, 25 short spears or 50 short spears, you must keep the sample unit size constant during each basic grading period.

2. Reassemble any broken short spear. Count each reassembled short spear as a single unit.

3. Arrange all of the short spears in the sample unit in a continuous row with the base end of each short spear against the bottom rim of the grading tray. If you're using 50 short spears, butt each unit against a straight edge on top of the grading table. As the short spears are being arranged in a row, place them in order of size from the longest to the shortest, or vice versa.

   a. Disregard loose leaf material, pieces of leaves, EVM and detached fragments;

   b. Locate the point in the continuous row where the short spears are longer than 9.5 cm, if any. Count the number of short spears that are longer than 9.5 cm;

   c. Locate the point in the continuous row where the spears are shorter than 2 cm, if any. Count the number of short spears that are shorter than 2 cm;

   d. The standards require that each short spear weigh more than 6 g but don't provide acceptance criteria for these small units. Do this: If any floret weighs 6 g or less and is not counted in the less than 2 cm defectives, count it as a "minor" style defective, regardless of the length; and

   e. Record the number of defective spears in b, c and d above in the style section of the defect tally. Short spears that fail style requirements aren't "pieces." If a style failure occurs, certify the grade but show: "Fails style compliance for short spears."

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

19. Evaluate the cooked broccoli for grit or silt. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites."

20. Evaluate the cooked broccoli for fiber. Be alert for fiber located at the base end of the spear. Any detectable fiber should be classified as follows:

    a. Major (nonwoody - noticeable fiber but can be eaten without difficulty); or

    b. Severe (woody).

21. Total the classes of defects on the defect tally and compute the CUSUM values outlined in File Code 120-A-6.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

16. Count the number of pieces of harmless extraneous material (HEM). The expected frequency of occurrence for HEM should be low. Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Record on the defect tally the number of pieces of HEM as follows:

    a. Severe; or

    b. Critical.

    If 25 broccoli spears are being used for inspection, rather than 50 spears, 0.4 AQL is the smallest AQL in the 25 plan. This doesn't cover grade A critical defects (class 2 HEM) which has an AQL of 0.25; thus, you're left without S, T and L values for critical defects in grade A if you're using the 25 plan. This shouldn't cause a problem given the small chance of class 2 HEM occurring in the sample unit. However, if you do find class 2 HEM in a sample unit of 25 spears, it fails grade A (S=0; T=0; L=0).

17. Cook a representative portion of the spears as outlined in File Code 130-A-38. You may wish to select only "suspect" spears for the cooking test. Also, it isn't necessary to cook each sample unit unless a problem develops, such as fibrous spears.

18. Evaluate the cooked broccoli for flavor and odor. Assign the letter grade (A, B or SSTD) for flavor and odor in the section for "prerequisites." Consider any objectionable "off-flavor" ("hay-like," "straw-like," "smoke," "chemical," or "sour"), but edible sample unit, as Substandard. Permit a slight "hay-like" or "straw-like" odor in grade B.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

15. Development (continuation).

Example 13: (Designated grade B production)

MAJOR	Color (Reas. Good) In grade A						
	Size (Length)						
	Detached Fragments					1	
	Blemished (Materially)					1	
	Trim (Poor) In grade A						
	Development (Poor)					1	
	Fiber (Nonwoody)						
	TOTAL MAJOR					3	
	CUSUM Grade A	1	4	3			
	CUSUM Grade B	1	6	4		0	
MINOR	Size (Diameter)						
	Loose Leaves					1	
	Broken					1	
	Damaged						
	Blemished (Slightly)					1	
	Trim (Reas. Well) In grade A						
	Trim (Poor) In grade B						
	Development (Reas. Well) In A						
	TOTAL MINOR					3	
TOTAL	TOTAL ALL CLASSES					10	
	CUSUM Grade A	2	12	5			
	CUSUM Grade B	2	14	7		0	
	SAMPLE UNIT GRADE					B	

Don't tally defects that are counted only against grade A

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SPEARS (continuation).

15. Development (continuation).

Example 12: (Designated grade A production).

MAJOR	Color (Reas. Good) In grade A						
	Size (Length)					2	
	Detached Fragments					1	
	Blemished (Materially)					1	2
	Trim (Poor) In grade A						
	Development (Poor)					1	1
	Fiber (Nonwoody)						
	TOTAL MAJOR					5	3
	CUSUM	Grade A	1	4	3	2	1
		Grade B	1	6	4		
MINOR	Size (Diameter)						
	Loose Leaves					1	1
	Broken						1
	Damaged					1	
	Blemished (Slightly)					1	2
	Trim (Reas. Well) In grade A						
	Trim (Poor) In grade B						
	Development (Reas. Well) In A					1	~~2~~
	TOTAL MINOR					4	~~4~~ 6
TOTAL	TOTAL ALL CLASSES					14	12 ~~14~~
	CUSUM	Grade A	2	12	5	4	5
		Grade B	2	14	7		B
SAMPLE UNIT GRADE						A	B

Drop the defects that are counted only against grade A, before checking for compliance with grade B - - - - - - - - - - - - - - -

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

13. Trimming (continuation).

Example 23: (Designated grade B production).

MAJOR	Color (Reas. Good) In grade A					
	Detached Fragments				1	
	Blemished (Materially)				2	
	Trim (Poor) In grade A					
	Development (Poor)					
	Fiber (Nonwoody)				1	
	TOTAL MAJOR				4	
	CUSUM Grade A	1	4	3		
	CUSUM Grade B	1	6	4		
MINOR	Size (More than 4X)					
	Loose Leaves				1	
	Broken				1	
	Damaged					
	Blemished (Slightly)				2	
	Trim (Reas. Well) In grade A					
	Trim (Poor) In grade B				1	
	Development (Reas. Well) In A					
	TOTAL MINOR				5	
TOTAL	TOTAL ALL CLASSES				15	
	CUSUM Grade A	2	12	5		
	CUSUM Grade B	2	14	7	3	
	SAMPLE UNIT GRADE				B	

Don't tally defects that are counted only against grade A

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

14. Count the number of short spears that are adversely affected by development (head and bud cluster stages of maturity). Use the USDA photoguides, if available. The development classification of each short spear is one of the following:

    a. Well developed (grade A development) - not a defect in any grade;

    b. Reasonably well developed (grade B development) - a defect only in grade A; or

    c. Poorly developed (Substandard development) - a defect in grade A and grade B.

    Record on the defect tally the number of short spears that are either "reasonably well developed" or "poorly developed." If the sample unit fails requirements for grade A, adjust the tally by dropping all "reasonably well developed" spears from the number of defects counted against grade B. Reasonably well developed (grade B development) isn't a defect in a grade B sample unit. Count only "poorly developed" short spears as defects in a grade B sample unit. If the frozen broccoli is designated as grade B by the processor, it would be necessary to count only the number of "poorly developed" short spears. Remember, however, the tally could never be reevaluated for grade A.

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

14. Development (continuation).

Example 24: (Designated grade A production).

MAJOR	Color (Reas. Good) In grade A						
	Detached Fragments					2	
	Blemished (Materially)					2	2
	Trim (Poor) In grade A						
	Development (Poor)					1	1
	Fiber (Nonwoody)						
	TOTAL MAJOR					5	3
	CUSUM	Grade A	1	4	3	2	1
		Grade B	1	6	4		
MINOR	Size (More than 4X)						
	Loose Leaves					1	1
	Broken						1
	Damaged					1	
	Blemished (Slightly)					1	2
	Trim (Reas. Well) In grade A						
	Trim (Poor) In grade B						
	Development (Reas. Well) In A					1	~~2~~
	TOTAL MINOR					4	~~4~~ 6
TOTAL	TOTAL ALL CLASSES					14	12 ~~14~~
	CUSUM	Grade A	2	12	5	4	5
		Grade B	2	14	7		B
SAMPLE UNIT GRADE						A	B

Drop the defects that are counted only against grade A, before checking for compliance with grade B

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

14. Development (continuation).

Example 25: (Designated grade B production).

MAJOR	Color (Reas. Good) In grade A					
	Detached Fragments				1	
	Blemished (Materially)				1	
	Trim (Poor) In grade A					
	Development (Poor)				1	
	Fiber (Nonwoody)					
	TOTAL MAJOR				3	
	CUSUM Grade A	1	4	3		
	CUSUM Grade B	1	6	4	0	
MINOR	Size (More than 4X)					
	Loose Leaves				1	
	Broken				1	
	Damaged					
	Blemished (Slightly)				1	
	Trim (Reas. Well) In grade A					
	Trim (Poor) In grade B					
	Development (Reas. Well) In A					
	TOTAL MINOR				3	
TOTAL	TOTAL ALL CLASSES				10	
	CUSUM Grade A	2	12	5		
	CUSUM Grade B	2	14	7	0	
	SAMPLE UNIT GRADE				B	

Don't tally defects that are counted only against grade A

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

15. Count the number of pieces of harmless extraneous material (HEM). The expected frequency of occurrence for HEM should be low. Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Record on the defect tally the number of pieces of HEM as follows:

    a. Severe; or

    b. Critical.

    If 25 short spears are being used for inspection, rather than 50 short spears, 0.4 AQL is the smallest AQL in the 25 plan. This doesn't cover grade A critical defects (class 2 HEM) which has an AQL of 0.25; thus, you're left without S, T and L values for critical defects in grade A if you're using the 25 plan. This shouldn't cause a problem given the small chance of class 2 HEM occurring in the sample unit. However, if you do find class 2 HEM in a sample unit of 25 spears, it fails grade A (S=0; T=0; L=0).

16. Cook a representative portion of the short spears as outlined in File Code 130-A-38. You may wish to select only "suspect" short spears for the cooking test. Also, it isn't necessary to cook each sample unit unless a problem develops, such as fibrous short spears.

17. Evaluate the cooked broccoli for flavor and odor. Assign the letter grade (A, B or SSTD) for flavor and odor in the section for "prerequisites." Consider any objectionable "off-flavor" ("hay-like," "straw-like," "smoke," "chemical," or "sour"), but edible sample unit, as Substandard. Permit a slight "hay-like" or "straw-like" odor in grade B.

Frozen Broccoli
July 1980

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

SHORT SPEARS OR FLORETS (continuation).

18. Evaluate the cooked broccoli for grit or silt. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites."

19. Evaluate the cooked broccoli for fiber. Be alert for fiber located at the base end of the short spear. Any detectable fiber should be classified as follows:

    a. Major (nonwoody - noticeable fiber but can be eaten without difficulty); or

    b. Severe (woody).

20. Total the classes of defects on the defect tally and compute CUSUM values as outlined in File Code 120-A-6.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CUT BROCCOLI

1. Select at random a 250 g sample unit from the processing line (either before freezing or after freezing). You may also use the following optional sample unit sizes:

   a. 500 g (100 - 5 g increments - use the 100 plan §2852.38b); or

   b. 1000 g (200 - 5 g increments - use the 200 plan §2852.38b).

   You should remember that larger sample unit sizes require more time to grade. Regardless of the sample unit size that you chose, keep it constant for each basic grading period. You may vary the sample unit size between style compliance and quality compliance.

   Example 26:

Sample Unit Size	Use for Style	Use for Quality
500 g	250 g	500 g
1000 g	250 g	1000 g
1000 g	500 g	1000 g

2. Arrange the sample unit of cut broccoli on a grading tray to make each unit visible to you.

3. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard.

4. At the same time that brightness is evaluated, record the letter grade (A or SSTD) in the "prerequisites" section of the defect tally for similar varietal characteristics.

5. Evaluate the cut broccoli for development (head and bud cluster stages of maturity). Even though the USDA photoguides which show various stages of development, cover only spears, you may use these photoguides as an indication of the cut-off point between "reasonably well developed" and "poorly developed."

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CUT BROCCOLI (continuation).

5. Development (continuation).

   The development classifications of cut broccoli are as follows:

   a. Grade A - the broccoli may be only "reasonably well developed" (grade B); or

   b. Grade B - the broccoli may be only "poorly developed" (SSTD) if the appearance is not materially affected. Poorly developed means the individual buds are in the flowering stage.

   Record the letter grade (A, B or SSTD) for development in the "prerequisites" section of the defect tally.

6. Separate all of the blemished units into 3 categories:

   a. Slightly; or

   b. Materially; or

   c. Seriously.

   Place each category on a suitable scale. Record the weight. Each 5 g increment of this weight is 1 defect.

   Blemished broccoli is the most common defect. Usually blemishes are:

   a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

   b. Yellow leaves;

   c. Orange buds (3 or more orange buds in a single area is the cut-off point between blemished and nonblemished);

   d. Olive-green leaf stem (petiole); and

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CUT BROCCOLI (continuation).

6. Blemished (continuation).

e. Record on the defect tally the number of blemished defects (each 5 g increment is 1 defect) as follows:

i. Minor; or
ii. Major; or
iii. Severe.

} ← —Use photoguides for spears, if available.

Example 27:

SEVERE	Blemished (Seriously)					1	
	Fiber (Woody)						
	HEM (Class 1)						
	TOTAL SEVERE						
	CUSUM	Grade A	0.4	0.8	1.6		
		Grade B	1	1	2		
MAJOR	Blemished (Materially)					2	
	Fiber (Nonwoody)						
	TOTAL MAJOR						
	CUSUM	Grade A	1.5	1.5	3		
		Grade B	1	3	3		
MIN	Blemished (Slightly)					4	
	TOTAL MINOR						
TOTAL	TOTAL ALL CLASSES						
	CUSUM	Grade A	1	4	3		
		Grade B	1	9	4		
SAMPLE UNIT GRADE							

Slightly = $\frac{20}{5}$ g

Materially = $\frac{10}{5}$ g

Seriously = $\frac{3}{5}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CUT BROCCOLI (continuation).

7. Separate all of the pieces of harmless extraneous material (HEM) into 2 categories as follows:

   a. Severe (Class 1); or

   b. Critical (Class 2).

   Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Place each piece of HEM, by class, end-to-end (use the longest dimension) in a continuous row. Measure each class separately. Record on the defect tally the number of HEM defects (each 2.5 cm increment is 1 defect).

   Example 28:

CRITICAL	HEM (Class 2)					1	
	TOTAL CRITICAL						
	CUSUM	Grade A	0	0.5	0.5		
		Grade B	0.4	0.8	1.6		
SEVERE	Blemished (Seriously)						
	Fiber (Woody)						
	HEM (Class 1)					2	
	TOTAL SEVERE						
	CUSUM	Grade A	0.4	0.8	1.6		
		Grade B	1	1	2		

Class 1 = $\frac{3}{2.5}$ cm

Class 2 = $\frac{1}{2.5}$ cm

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CUT BROCCOLI (continuation).

8. At a sampling frequency outlined in File Code 120-A-5, check the sample unit for style compliance. (NOTE: It isn't necessary to check the style of each sample unit drawn for quality).

   a. Disregard leaf material, pieces of leaves and EVM;

   b. Consider the product for the style that it is offered for even though you may disagree with the declaration of style;

   c. Separate all cuts in the sample unit that are longer than 5 cm and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 major style defective;

   d. Separate all cuts in the sample unit that are shorter than
   * 1.5 cm (exclusive of chaff) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 minor style defective;

   e. Record the number of minor and major style defectives in the style section of the defect tally. If a style failure occurs, certify the style as "pieces";

   Example 29:

S	Major (Longer than 5 cm)					3	
T	CUSUM	250 g	1	4	3		
Y	Minor (Shorter than 1.5 cm)					8	
L	CUSUM	250 g	1	6	4		
E	Head Material						
	Leaf Material						

Longer than 5 cm = $\frac{14\ g}{5\ g}$

Shorter than 1.5 cm = $\frac{38\ g}{5\ g}$

See also next page.

* Change

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CUT BROCCOLI (continuation).

9. After the sample unit has been evaluated for style, or if the sample unit is skipped for style evaluation, cook a representative portion of the cut broccoli as outlined in File Code 130-A-38. You may wish to select only "suspect" units for the cooking test. Also, it isn't necessary to cook each sample unit unless a problem develops, such as fibrous units or grit.

10. Evaluate the cooked broccoli for flavor and odor. Assign the letter grade (A, B or SSTD) for flavor and odor in the section for "prerequisites." It isn't necessary to cook each sample unit unless a problem develops. Consider any objectionable "off-flavor" ("hay-like," "straw-like," "smoke," "chemical," or "sour"), but edible sample unit, as Substandard. Permit a slight "hay-like" or "straw-like" odor in grade B.

11. Evaluate the cooked broccoli for grit or silt. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites." It isn't necessary to cook each sample unit for the grit evaluation unless a problem develops.

12. Evaluate the cooked broccoli for fiber. Be alert for fiber located in the pieces (cuts) that are made from the base end of the stalk. Fiber is a "fooler." It's usually more tender after cooking than would be expected. It isn't necessary to cook each sample unit unless a problem develops. However, cook enough of the "suspect" cuts to set your sights.

    If any detectable fiber is to be counted against the sample unit, cook the entire sample unit. Follow this procedure:

    a. Separate all of the units with major fiber (nonwoody-noticeable fiber but can be eaten without difficulty) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 major defect;

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CUT BROCCOLI (continuation).

12. Fiber (continuation).

b. Separate all of the units with severe fiber (woody) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 severe defect;

c. Record on the defect tally the number of minor and major fiber defects.

Example 31:

SEVERE	Blemished (Seriously)						
	Fiber (Woody)					1	
	HEM (Class 1)						
	TOTAL SEVERE						
	CUSUM	Grade A	0.4	0.8	1.6		
		Grade B	1	1	2		
MAJOR	Blemished (Materially)						
	Fiber (Nonwoody)					2	
	TOTAL MAJOR						
	CUSUM	Grade A	1.5	1.5	3		
		Grade B	1	3	3		

Woody fiber = $\frac{5}{5}$ g

Nonwoody fiber = $\frac{10}{5}$ g

13. Total the classes of defects on the defect tally and compute the CUSUM values as outlined in File Code 120-A-6.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CHOPPED BROCCOLI

1. Select at random a 250 g sample unit from the processing line (either before freezing or after freezing). You may also use the following optional sample unit size:

   500 g (200-2.5 g increments - use the 200 plan in §2852.38b).

   You should remember that larger sample units require more time to grade. Regardless of the sample unit size that you chose, keep it constant for each basic grading period. You may vary the sample unit size between style compliance and quality compliance.

   Example 32:

Sample Unit Size	Head/Leaf Material	Other Style	Quality
250 g	50 g	250 g	250 g
250 g	100 g	250 g	250 g
500 g	50 g	250 g	500 g
500 g	100 g	250 g	500 g
500 g	250 g	500 g	500 g

2. Arrange the sample unit of chopped broccoli on a grading tray to make each unit visible to you.

3. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard.

4. At the same time that brightness is evaluated, record the letter grade (A or SSTD) in the "prerequisites" section of the defect tally for similar varietal characteristics.

5. Evaluate the chopped broccoli for development (head and bud cluster stages of maturity). Even though the USDA photoguides which show various stages of development, cover only spears, you may use these photoguides as an indication of the cut-off point between "reasonably well developed" and "poorly developed."

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CHOPPED BROCCOLI (continuation).

5. Development (continuation).

   The development classifications of chopped broccoli are as follows:

   a. Grade A - the broccoli may be only "reasonably well developed" (grade B); or

   b. Grade B - the broccoli may be only "poorly developed" (SSTD) if the appearance is not materially affected. Poorly developed means the individual buds are in the flowering stage.

   Record the letter grade (A, B or SSTD) for development in the "prerequisites" section of the defect tally.

6. Separate all of the blemished units into 3 categories:

   a. Slightly; or

   b. Materially; or

   c. Seriously.

   Place each category on a suitable scale. Record the weight. Each 2.5 g increment of this weight is 1 defect.

   Blemished broccoli is the most common defect. Usually blemishes are:

   a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

   b. Yellow leaves;

   c. Orange buds (3 or more orange buds in a single area is the cut-off point between blemished and nonblemished);

   d. Olive-green leaf stem (petiole);

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CHOPPED BROCCOLI (continuation).

6. Blemished (continuation).

e. Record on the defect tally the number of blemished defects (each 2.5 g increment is 1 defect) as follows:

i. Minor; or
ii. Major; or
iii. Severe.

← Use photoguides for spears, if available.

Example 33:

SEVERE	Blemished (Seriously)					2	
	Fiber (Woody)						
	HEM (Class						
	TOTAL SEVERE						
	CUSUM	Grade A	0.5	1.5	2		
		Grade B	1	2	2		
MAJOR	Blemished (Materially)					5	
	Fiber (Nonwoody)						
	TOTAL MAJOR						
	CUSUM	Grade A	1	3	3		
		Grade B	1	6	4		
MIN	Blemished (Slightly)					10	
	TOTAL MINOR						
TOTAL	TOTAL ALL CLASSES						
	CUSUM	Grade A	1	8	4		
		Grade B	2	17	7		
SAMPLE UNIT GRADE							

Slightly = $\frac{25}{2.5}$ g

Materially = $\frac{12}{2.5}$ g

Seriously = $\frac{5}{2.5}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CHOPPED BROCCOLI (continuation).

7. Separate all of the pieces of harmless extraneous material (HEM) into 2 categories as follows:

   a. Severe (Class 1); or

   b. Critical (Class 2).

   Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Place each piece of HEM, by class, end-to-end (use the longest dimension) in a continuous row. Measure each class separately. Record on the defect tally the number of HEM defects (each 2.5 cm increment is 1 defect).

   Example 34:

CRITICAL	HEM (Class 2)					1	
	TOTAL CRITICAL						
	CUSUM	Grade A	0	0.5	0.5		
		Grade B	0	1	1		
SEVERE	Blemished (Seriously)						
	Fiber (Woody)						
	HEM (Class 1)					2	
	TOTAL SEVERE						
	CUSUM	Grade A	0.5	1.5	2		
		Grade B	1	2	2		

Class 1 = $\frac{3}{2.5}$ cm

Class 2 = $\frac{1}{2.5}$ cm

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CHOPPED BROCCOLI (continuation).

8. At a sampling frequency outlined in File Code 120-A-5, check the sample unit for style compliance. (NOTE: It isn't necessary to check the style of each sample unit drawn for quality).

   a. Disregard leaf material, pieces of leaves and EVM;

   b. Consider the product for the style that it is offered for even though you may disagree with the declaration of style;

   c. Separate all cuts in the sample unit that are longer than 2 cm and place them on a suitable scale. Record the composite weight. Count each 2.5 g increment of this weight as 1 minor style defective;

   d. Record the number of minor style defectives in the style section of the defect tally. If a style failure occurs, certify the style as "pieces";

   Example 35:

S	Minor (Longer than 2 cm)					5	
T	CUSUM	250 g	2	10	5		
Y	Head Material						
L	Leaf Material						
E							

Longer than 2 cm = $\frac{12}{2.5}$ g

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CHOPPED BROCCOLI (continuation).

8. Style (continuation).

   e. Separate the stalk material and ignore it;

   f. Separate the head material and weigh ("Bald" units completely stripped of flower buds should not be considered as head material);

   g. Separate the leaf material and weigh;

   h. Allow, regardless of sample unit size, the following:

      Average: Head material not less than 25% (12.5 g/50 g)

      Leaf material not more than 25% (12.5 g/50 g)

      Individual sample unit:

      Head material not less than 15% (7.5 g/50 g)

      Leaf material not more than 35% (17.5 g/50 g)

      Example 36:

S	Minor (Longer than 2 cm)					
T	CUSUM	2	10	5		
Y	Head Material	50 g			80% 15g	
L	Leaf Material	"			20% 10g	
E						

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CHOPPED BROCCOLI (continuation).

9. After the sample unit has been evaluated for style, or if the sample unit is skipped for style evaluation, cook a representative portion of the chopped broccoli as outlined in File Code 130-A-38. You may wish to select only "suspect" units for the cooking test. Also, it isn't necessary to cook each sample unit unless a problem develops, such as fibrous units or grit.

10. Evaluate the cooked broccoli for flavor and odor. Assign the letter grade (A, B or SSTD) for flavor and odor in the section for "prerequisites." It isn't necessary to cook each sample unit unless a problem develops. Consider any objectionable "off-flavor" ("hay-like," "straw-like," "smoke," "chemical," or "sour"), but edible sample unit, as Substandard. Permit a slight "hay-like" or "straw-like" odor in grade B.

11. Evaluate the cooked broccoli for grit or silt. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites." It isn't necessary to cook each sample unit for the grit evaluation unless a problem develops.

12. Evaluate the cooked broccoli for fiber. Be alert for fiber located in the pieces (chops) that are made from the base end of the stalk. Fiber is a "fooler." It's usually more tender after cooking than would be expected. It isn't necessary to cook each sample unit unless a problem develops. However, cook enough of the "suspect" units to set your sights.

    If any detectable fiber is to be counted against the sample unit, cook the entire sample unit. Follow this procedure:

    a. Separate all of the units with major fiber (nonwoody-noticeable fiber but can be eaten without difficulty) and place them on a suitable scale. Record the composite weight. Count each 2.5 g increment of this weight as 1 major defect;

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

CHOPPED BROCCOLI (continuation).

12. Fiber (continuation).

b. Separate all of the units with severe fiber (woody) and place them on a suitable scale. Record the composite weight. Count each 2.5 g increment of this weight as 1 severe defect;

c. Record on the defect tally the number of major and severe fiber defects.

Example 37:

SEVERE	Blemished (Seriously)						
	Fiber (Woody)					2	
	HEM (Class 1)						
	TOTAL SEVERE						
	CUSUM	Grade A	0.5	1.5	2		
		Grade B	1	2	2		
MAJOR	Blemished (Materially)						
	Fiber (Nonwoody)					4	
	TOTAL MAJOR						
	CUSUM	Grade A	1	3	3		
		Grade B	1	6	4		

Woody fiber = $\frac{5}{2.5}$ g

Nonwoody fiber = $\frac{8}{2.5}$ g

13. Total the classes of defects on the defect tally and compute the CUSUM values as outlined in File Code 120-A-6.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

BROCCOLI PIECES

1. Select at random a 250 g sample unit from the processing line (either before freezing or after freezing). You may also use the following optional sample unit sizes:

   a. 500 g (100 - 5 g increments - use the 100 plan §2852.38b); or

   b. 1000 g (200 - 5 g increments - use the 200 plan §2852.38b).

   You should remember that larger sample unit sizes require more time to grade. Regardless of the sample unit size that you chose, keep it constant for each basic grading period.

2. Arrange the sample unit of broccoli on a grading tray to make each unit visible to you.

3. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard.

4. At the same time that brightness is evaluated, record the letter grade (A or SSTD) in the "prerequisites" section of the defect tally for similar varietal characteristics.

5. Evaluate the broccoli for development (head and bud cluster stages of maturity). Even though the USDA photoguides which show various stages of development, cover only spears, you may use these photoguides as an indication of the cut-off point between "reasonably well developed" and "poorly developed."

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

BROCCOLI PIECES (continuation).

5. Development (continuation).

   The development classifications of broccoli pieces are as follows:

   a. Grade A - the broccoli may be only "reasonably well developed" (grade B); or

   b. Grade B - the broccoli may be only "poorly developed" (SSTD) if the appearance is not materially affected. Poorly developed means the individual buds are in the flowering stage.

   Record the letter grade (A, B or SSTD) for development in the "prerequisites" section of the defect tally.

6. Separate all of the blemished units into 3 categories:

   a. Slightly; or

   b. Materially; or

   c. Seriously.

   Place each category on a suitable scale. Record the weight. Each 5 g increment of this weight is 1 defect.

   Blemished broccoli is the most common defect. Usually blemishes are:

   a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

   b. Yellow leaves;

   c. Orange buds (3 or more orange buds in a single area is the cut-off point between blemished and nonblemished);

   d. Olive-green leaf stem (petiole);

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

BROCCOLI PIECES (continuation).

6. Blemished (continuation).

e. Record on the defect tally the number of blemished defects (each 5 g increment is 1 defect) as follows:

i. Minor; or
ii. Major; or
iii. Severe.

← Use photoguides for spears, if available.

Example 38:

SEVERE	Blemished (Seriously)					1	
	Fiber (Woody)						
	HEM (Class 1)						
	TOTAL SEVERE						
	CUSUM	Grade A	0.4	0.8	1.6		
		Grade B	1	1	2		
MAJOR	Blemished (Materially)					2	
	Fiber (Nonwoody)						
	TOTAL MAJOR						
	CUSUM	Grade A	1.5	1.5	3		
		Grade B	1	3	3		
MIN	Blemished (Slightly)					4	
	TOTAL MINOR						
TOTAL	TOTAL ALL CLASSES						
	CUSUM	Grade A	1	4	3		
		Grade B	1	9	4		
SAMPLE UNIT GRADE							

Slightly = $\frac{20}{5}$ g

Materially = $\frac{10}{5}$ g

Seriously = $\frac{3}{5}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

BROCCOLI PIECES (continuation).

7. Separate all of the pieces of harmless extraneous material (HEM) into 2 categories as follows:

   a. Severe (Class 1); or

   b. Critical (Class 2).

   Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Place each piece of HEM, by class, end-to-end (use the longest dimension) in a continuous row. Measure each class separately. Record on the defect tally the number of HEM defects (each 2.5 cm increment is 1 defect).

   Example 39:

CRITICAL	HEM (Class 2)					1	
	TOTAL CRITICAL						
	CUSUM	Grade A	0	0.5	0.5		
		Grade B	0.4	0.8	1.6		
SEVERE	Blemished (Seriously)						
	Fiber (Woody)						
	HEM (Class 1)					2	
	TOTAL SEVERE						
	CUSUM	Grade A	0.4	0.8	1.6		
		Grade B	1	1	2		

Class 1 = $\frac{3}{2.5}$ cm

Class 2 = $\frac{1}{2.5}$ cm

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

BROCCOLI PIECES (continuation).

8. Cook a representative portion of the broccoli as outlined in File Code 130-A-38. You may wish to select only "suspect" units for the cooking test. Also, it isn't necessary to cook each sample unit unless a problem develops, such as fibrous units or grit.

9. Evaluate the cooked broccoli for flavor and odor. Assign the letter grade (A, B or SSTD) for flavor and odor in the section for "prerequisites." It isn't necessary to cook each sample unit unless a problem develops. Consider any objectionable "off-flavor" ("hay-like," "straw-like," "smoke," "chemical," or "sour"), but edible sample unit, as Substandard. Permit a slight "hay-like" or "straw-like" odor in grade B.

10. Evaluate the cooked broccoli for grit or silt. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites." It isn't necessary to cook each sample unit for the grit evaluation unless a problem develops.

11. Evaluate the cooked broccoli for fiber. Be alert for fiber located in the pieces that are cut from the base end of the stalk. Fiber is a "fooler." It's usually more tender after cooking than would be expected. It isn't necessary to cook each sample unit unless a problem develops. However, cook enough of the "suspect units to set your sights. The expected incidence of fiber may be higher in broccoli "pieces" than in any other style because of the absence of any head material requirement; thus, "pieces" may be composed of all stalk material.

    If any detectable fiber is to be counted against the sample unit, cook the entire sample unit. Follow this procedure.

    a. Separate all of the units with major fiber (nonwoody-noticeable fiber but can be eaten without difficulty) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 major defect;

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

BROCCOLI PIECES (continuation).

11. Fiber (continuation).

b. Separate all of the units with severe fiber (woody) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 severe defect;

c. Record the number of major and severe fiber defects on the defect tally.

Example 40:

SEVERE	Blemished (Seriously)						
	Fiber (Woody)					1	
	HEM (Class 1)						
	TOTAL SEVERE						
	CUSUM	Grade A	0.4	0.8	1.6		
		Grade B	1	1	2		
MAJOR	Blemished (Materially)						
	Fiber (Nonwoody)					2	
	TOTAL MAJOR						
	CUSUM	Grade A	1.5	1.5	3		
		Grade B	1	3	3		

Woody fiber = $\frac{5}{5}$ g

Nonwoody fiber = $\frac{10}{5}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNIT UNDER ON-LINE INSPECTION

BROCCOLI PIECES (continuation).

12. Total the classes of defects on the defect tally and compute the CUSUM values as outlined in File Code 120-A-6.

13. The style of "pieces" is a catch all from "cut" and "chopped" broccoli. It doesn't have a requirement for head material; thus, the entire sample unit could be stalk and leaf material. Any sample unit that fails requirements for "cut" or "chopped" is to be classified as "pieces." However, this is not true for "spears" or "short spears."

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS

1. Follow the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan [Attributes]).

2. Use the same defect tally sheet for lot inspection as you would use for on-line inspection. Ignore the section of the tally devoted to CUSUM values.

3. Open each individual container that you have drawn for the sample. Keep the product in its container. On a container-by-container basis, without sorting through the product, tentatively evaluate the following prerequisites:

   a. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard.

   b. At the same time that brightness is evaluated, record in the "prerequisites" section of the defect tally the letter grade (A or SSTD) for similar varietal characteristics.

   c. Evaluate the broccoli for odor. Assign the letter grade (A, B or SSTD) for odor in the section for "prerequisites." Consider any objectionable "off-odor" ("hay-like," "straw-like," "smoke," "chemical" or "sour") as Substandard. But the sample must be edible in step 19. Permit a slight "hay-like" or "straw-like" odor in Grade B.

   d. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites."

   e. If any container is "suspect" because of "brightness," "odor," or "grit," identify the container and its product for further examination.

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

Example 41: (Prerequisites on a container-by-container basis)

	Carton No. 1	Carton No. 2	Carton No. 3, etc.
Similar Varietal Char.	A	A	A
Brightness	A	A	A
Flavor and Odor	A	A	A
Grit and Silt	A	A	A

The grade for a lot of broccoli spears may not be higher than the grade of any "prerequisite" grade for any individual sample unit in the sample. If the sample should fail the anticipated grade because of a prerequisite factor, don't skip the other factors. Continue grading the sample but don't spend a lot of time with problem areas, such as uniformity of size, borderline trim, borderline development, etc.

4. Assemble (physically or mentally) all of the spears from all of the containers into one sample. Adjust the total number of spears in the sample to meet the lot single sampling plan that you're using. If any of the cartons are "suspect" in step 3, you may wish to assemble the spears mentally into one sample. This procedure would enable you to retain the identity of the "suspect" cartons.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

4. Assembling the sample (continuation).

Example 42:

		NUMBER OF CARTONS			
		6	13	21	29
		(Number of Spears)			
SPEARS PER CARTON	6	36	78	126	174
	13	78	169	273	377
	25	150	325	525	725
	50	300	650	1050	1450
	100	600	1300	2100	2900

5. Reassemble any broken spear. Count each reassembled spear as a single unit.

6. Evaluate the color of the individual broccoli spears. The color classification of each broccoli spear is one of the following:

   a. Good color (grade A color) - not a defect in any grade;

   b. Reasonably good color (grade B color) - a defect in grade A only; or

   c. Poor color (Substandard color) - A defect in grade A and grade B.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

6. Color of the individual spears (continuation).

If a spear is blemished because of orange buds, olive-green leaf stem (petiole), etc., ignore the blemished areas for the purpose of color evaluation. Don't count a spear as "reasonably good" color or "poor" color because it is blemished. Record on the defect tally the total number of spears in the sample that are either "reasonably good" or "poor" color (not each container). If the sample fails requirements for grade A, adjust the tally by dropping the number of "reasonably good" spears from the grade B defects. Reasonably good color (grade B color) is not a defect in a grade B sample. Count only "poor" color against a grade B sample.

Example 43:

50 X 13 = 650 Spears

MAJOR	Color (Reas. Good) In grade A					~~30~~
	Size (Length)					10
	Detached Fragments					5
	Blemished (Materially)					10
	Trim (Poor) In grade A					
	Development (Poor)					
	Fiber (Nonwoody)					5
	TOTAL MAJOR					30 ~~60~~
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	
TOTAL	TOTAL ALL CLASSES					110 ~~140~~
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	
SAMPLE UNIT GRADE						
FINAL GRADE						B

Failed grade A

Drop the defects that are counted only against grade A, before checking for compliance with grade B

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

7. Weigh all of the detached fragments, if any, in the sample (not each container). Don't include loose leaves or pieces of leaves in the weight, these are minor defects. Ignore any chaff. Don't be overly critical but count each 28 g increment of the composite weight (all of the detached fragments in the sample) as 1 major defect. Record on the defect tally the total number of detached fragment defects as follows:

0 - 28 g = 1 defect

29 - 56 g = 2 defects

57 - 84 g = 3 defects, etc.

Example 44:

50 X 13 = 650 Spears

MAJOR	Color (Reas. Good) In grade A					
	Size (Length)					
	Detached Fragments					11
	Blemished (Materially)					
	Trim (Poor) In grade A					
	Development (Poor)					
	Fiber (Nonwoody)					
	TOTAL MAJOR					
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	
TOTAL	TOTAL ALL CLASSES					
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	
SAMPLE UNIT GRADE						
FINAL						

Detached Fragments = $\frac{300}{28}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

8. Weigh the loose leaves and pieces of leaves, if any, in the total sample (not each container). Count each 14 g increment of the composite weight (all of the loose leaf material in the sample) as 1 minor defect. Record on the defect tally the total number of loose leaf defects as follows:

0 - 14 g = 1 defect

15 - 28 g = 2 defects

29 - 42 g = 3 defects, etc.

Example 45:

50X13 = 650 Spears

MINOR	Size (Diameter)		
	Loose Leaves		18
	Broken		
	Damaged		
	Blemished (Slightly)		
	Trim (Reas. Well) In grade A		
	Trim (Poor) In grade B		
	Development (Reas. Well) In A		
	TOTAL MINOR		

Loose leaves = $\frac{250}{14}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

9. Count the number of broken spears. These should be the same spears that were reassembled in step 5, if any. Record on the defect tally the total number of broken spears in the sample (not each container).

10. Count the number of spears with mechanical damage to the head of the spear. Don't be overly critical. Don't count broken spears (step 9) or trimmed spears (step 12) as damaged, or vice versa. Record on the defect tally the total number of damaged spears in the sample (not each container).

11. Count the number of spears in the sample that are blemished (not each container). Blemished broccoli is the most common defect. Usually, blemishes are:

    a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

    b. Yellow leaves;

    c. Orange buds (6 or more orange buds in a single area of the head is the cut-off point between blemished and nonblemished);

    d. Olive-green leaf stem (petiole); and

    e. Record on the defect tally the total number of blemished spears as follows:

       i. Minor;
       ii. Major; or
       iii. Severe.

       ◄ — Use photoguides, if available.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

12. Count the number of spears in the sample that are adversely affected by trimming (not each container). Use the USDA photoguides, if available. The trim classification of each broccoli spear is one of the following:

    a. Well trimmed (grade A trim) - not a defect in any grade;

    b. Reasonably well trimmed (grade B trim) - a defect only in grade A; or

    c. Poorly trimmed (Substandard trim) - a major defect in grade A and a minor defect in grade B. Record on the defect tally the total number of spears in the sample that are either "reasonably well trimmed" or "poorly trimmed" (not each container).

    If the sample fails requirements for grade A, adjust the defect tally by: (1) dropping all "reasonably well trimmed" spears from the defects counted against grade B; and (2) striking out the major defects against grade A and moving them to minor defects to be counted against grade B.

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

12. Trim (continuation).

Example 46: (Failed grade A, check against grade B)

50x13 = 650 Spears

MAJOR	Color (Reas. Good) In grade A					
	Size (Length)					5
	Detached Fragments					
	Blemished (Materially)					20
	Trim (Poor) In grade A					~~40~~
	Development (Poor)					
	Fiber (Nonwoody)					
	TOTAL MAJOR					25 ~~65~~
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	
MINOR	Size (Diameter)					
	Loose Leaves					
	Broken					
	Damaged					
	Blemished (Slightly)					
	Trim (Reas. Well) In grade A					~~75~~
	Trim (Poor) In grade B					40
	Development (Reas. Well) In A					
	TOTAL MINOR					40 ~~75~~
TOTAL	TOTAL ALL CLASSES					85 ~~160~~
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	
SAMPLE UNIT GRADE						
FINAL GRADE						B

Drop the defects that are counted only against grade A, before checking for compliance with grade B

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

13. Count the total number of spears in the sample that are adversely affected by development (head and bud cluster stages of maturity). Use the USDA photoguides, if available. The development classification of each broccoli spear is one of the following:

    a. Well developed (grade A development) - not a defect in any grade;

    b. Reasonably well developed (grade B development) - a defect only in grade A; or

    c. Poorly developed (Substandard development) - a defect in grade A and grade B.

    Record on the defect tally the total number of spears that are either "reasonably well developed" or "poorly developed." If the sample fails requirements for grade A, adjust the tally by dropping all "reasonably well developed" spears from the number of defects that are to be counted against grade B. Reasonably well developed (grade B development) isn't a defect in a grade B sample. Count only "poorly" developed spears as defects in a grade B sample.

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

13. Development (continuation).

Example 47: (Failed grade A, check against grade B).

MAJOR	Color (Reas. Good) In grade A					
	Size (Length)					
	Detached Fragments					
	Blemished (Materially)					
	Trim (Poor) In grade A					
	Development (Poor)					25
	Fiber (Nonwoody)					
	TOTAL MAJOR					25
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	
MINOR	Size (Diameter)					5
	Loose Leaves					5
	Broken					
	Damaged					
	Blemished (Slightly)					50
	Trim (Reas. Well) In grade A					
	Trim (Poor) In grade B					
	Development (Reas. Well) In A					~~100~~
	TOTAL MINOR					60 ~~160~~
TOTAL	TOTAL ALL CLASSES					100 ~~200~~
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	
	SAMPLE UNIT GRADE					
	FINAL GRADE					B

Drop the defects that are counted only against grade A, before checking for compliance with grade B - - - - - - - - - - - - -

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

14. Count the total number of pieces of harmless extraneous material (HEM) in the sample (not each container). Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Record on the defect tally the total number of pieces of HEM as follows:

    a. Severe; or

    b. Critical.

15. Establish by observation the predominant length of the broccoli spears in the sample. Don't be overly critical. If it is apparent the spears vary less than 5 cm from the predominant length, accept them as meeting length requirements. If some spears obviously vary more than 5 cm from the predominant length, do the following:

    a. Determine size variation so that the least number of defects are tallied against length; and

    b. Record on the defect tally the number of length defects in the total sample (not each container).

    See also example 2, page 6; example 3, page 7; and example 4, page 8.

16. Establish by observation the predominant diameter of the broccoli spears in the sample. Don't be overly critical. If it is apparent the spears vary less than 2 cm from the predominant diameter, accept them as meeting requirements. If some spears obviously vary more than 2 cm from the predominant diameter, do the following:

    a. Determine diameter variation so that the least number of defects are tallied against diameter; and

    b. Record on the defect tally the number of diameter defects in the sample (not each container).

    See also example 5, page 10.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

17. Evaluate the sample for compliance with style requirements.

    a. Disregard loose leaf material, pieces of leaves, EVM and detached fragments;

    b. Determine the total number of spears in the sample (not each container) that are longer than 15.5 cm;

    c. Determine the total number of spears in the sample (not each container) that are shorter than 8.5 cm;

    d. Record the number of defective spears in b and c above in the style section of the defect tally. Spears that fail style requirements aren't "pieces." If a style failure occurs, certify the grade but show: "Fails style compliance for spears."

    See also example 1, page 4.

18. Cook a representative portion of the spears as outlined in File Code 130-A-38. You may wish to select only "suspect" (step 3) spears for the cooking test. Also, it isn't necessary to cook all of the spears.

19. Evaluate the cooked broccoli for flavor to verify the tentative grade given for odor in step 3.

20. Evaluate the cooked broccoli by chewing. This should verify the tentative grade given for grit in step 3.

21. Evaluate the cooked broccoli for fiber. Only fiber which is detectable in the cooked broccoli should be counted. It is not necessary to cook all of the spears that are suspected of having tough fiber if enough of the spears are cooked to accurately set your sights.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SPEARS (continuation).

22. Compare the total number of defects that you've found in the sample with the acceptance number for the applicable AQL and sample size in the "Regulations" (File Code 109-A-1, Tables XV-XIX).

23. Assign a grade to the sample based on the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan).

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS

1. Follow the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan [Attributes]).

2. Use the same defect tally sheet for lot inspection as you would use for on-line inspection. Ignore the section of the tally devoted to CUSUM values.

3. Open each individual container that you have drawn for the sample. Keep the product in its container. On a container-by-container basis, without sorting through the product, tentatively evaluate the following prerequisites:

   a. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard.

   b. At the same time that brightness is evaluated, record in the "prerequisites" section of the defect tally the letter grade (A or SSTD) for similar varietal characteristics.

   c. Evaluate the broccoli for odor. Assign the letter grade (A, B or SSTD) for odor in the section for "prerequisites." Consider any objectionable "off-odor" ("hay-like," "straw-like," "smoke," "chemical" or "sour") as Substandard. But the sample must be edible in step 18. Permit a slight "hay-like" or "straw-like" odor in grade B.

   d. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites."

   e. If any container is "suspect" because of "brightness," "odor," or "grit," identify the container and its product for further examination.

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

Example 48: (Prerequisites on a container-by-container basis)

	Carton No. 1	Carton No. 2	Carton No. 3, etc.
Similar Varietal Char.	A	A	A
Brightness	A	A	A
Flavor and Odor	A	A	A
Grit and Silt	A	A	A

The grade for a lot of broccoli short spears may not be higher than the grade of any "prerequisite" grade for any individual sample unit in the sample. If the sample should fail the anticipated grade because of a prerequisite factor, don't skip the other factors. Continue grading the sample but don't spend a lot of time with problem areas, such as uniformity of size, borderline trim, borderline development, etc.

4. Assemble (physically or mentally) all of the short spears from all of the containers into one sample. Adjust the total number of short spears in the sample to meet the lot single sampling plan that you're using. If any of the cartons are "suspect" in step 3, you may wish to assemble the short spears mentally into one sample. This procedure would enable you to retain the identity of the "suspect" cartons.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

4. Assembling the sample (continuation).

Example 49:

		NUMBER OF CARTONS			
		6	13	21	29
		(Number of Short Spears)			
SPEARS PER CARTON	6	36	78	126	174
	13	78	169	273	377
	25	150	325	525	725
	50	300	650	1050	1450
	100	600	1300	2100	2900

5. Reassemble any broken short spear. Count each reassembled short spear as a single unit.

6. Evaluate the color of the individual short spears. The color classification of each short spear is one of the following:

   a. Good color (grade A color) - not a defect in any grade;

   b. Reasonably good color (grade B color) - a defect in grade A only; or

   c. Poor color (Substandard color) - a defect in grade A and grade B.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

6. Color of the individual short spears (continuation).

If a short spear is blemished because of orange buds, olive-green leaf stem (petiole), etc., ignore the blemished areas for the purpose of color evaluation. Don't count a short spear as "reasonably good" color or "poor" color because it is blemished. Record on the defect tally the total number of short spears in the sample that are either "reasonably good" or "poor" color (not each container). If the sample fails requirements for grade A, adjust the tally by dropping the number of "reasonably good" short spears from the grade B defects. Reasonably good color (grade B color) is not a defect in a grade B sample. Count only "poor" color against a grade B sample.

Example 50:

50X13=650 Short Spears

MAJOR	Color (Reas. Good) In grade A					~~30~~
	Detached Fragments					15
	Blemished (Materially)					10
	Trim (Poor) In grade A					
	Development (Poor)					
	Fiber (Nonwoody)					5
	TOTAL MAJOR					30 ~~60~~
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	
TOTAL	TOTAL ALL CLASSES					110 ~~140~~
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	
SAMPLE UNIT GRADE						
FINAL GRADE						B

Failed grade A

Drop the defects that are counted only against grade A, before checking for compliance with grade B

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

7. Weigh all of the detached fragments, if any, in the sample (not each container). Don't include loose leaves or pieces of leaves in the weight, these are minor defects. Ignore any chaff. Don't be overly critical but count each 28 g increment of the composite weight (all of the detached fragments in the sample) as 1 major defect. Record on the defect tally the total number of detached fragments as follows:

0 - 28 g = 1 defect

29 - 56 g = 2 defects

57 - 84 g = 3 defects, etc.

Example 51:

50×13 = 650 Short Spears

MAJOR	Color (Reas. Good) In grade A					
	Detached Fragments					11
	Blemished (Materially)					
	Trim (Poor) In grade A					
	Development (Poor)					
	Fiber (Nonwoody)					
	TOTAL MAJOR					
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	
TOTAL	TOTAL ALL CLASSES					
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	
SAMPLE UNIT GRADE						
FINAL GRADE						

Detached Fragments = $\frac{300}{28}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

8. Weigh the loose leaves and pieces of leaves, if any, in the total sample (not each container). Count each 14 g increment of the composite weight (all of the loose leaf material in the sample) as 1 minor defect. Record on the defect tally the total number of loose leaf defects as follows:

0 - 14 g = 1 defect

15 - 28 g = 2 defects

29 - 42 g = 3 defects, etc.

Example 52:

50X13=650 Short Spears

MINOR	Size (More Than 4X)		
	Loose Leaves		18
	Broken		
	Damaged		
	Blemished (Slightly)		
	Trim (Reas. Well) In grade A		
	Trim (Poor) In grade B		
	Development (Reas. Well) In A		
	TOTAL MINOR		

Loose leaves = $\frac{250}{14}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

9. Count the number of broken short spears. These should be the same short spears that were reassembled in step 5, if any. Record on the defect tally the total number of broken short spears in the sample (not each container).

10. Count the number of short spears with mechanical damage to the head of the unit. Don't be overly critical. Don't count broken short spears (step 9) or trimmed short spears (step 12) as damaged, or vice versa. Record on the defect tally the total number of damaged short spears in the sample (not each container).

11. Count the number of short spears in the sample that are blemished (not each container). Blemished broccoli is the most common defect. Usually, blemishes are:

    a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

    b. Yellow leaves;

    c. Orange buds (6 or more orange buds in a single area of the head is the cut-off point between blemished and nonblemished);

    d. Olive-green leaf stem (petiole); and

    e. Record on the defect tally the total number of blemished short spears as follows:

        i. Minor;
        ii. Major;
        iii. Severe.

        ◄ -- Use photoguides for spears, if available.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

12. Trim (continuation).

Example 53: (Failed grade A, check against grade B)

50X13 = 650 Short Spears

MAJOR	Color (Reas. Good) In grade A					
	Detached Fragments					5
	Blemished (Materially)					20
	Trim (Poor) In grade A					40
	Development (Poor)					
	Fiber (Nonwoody)					
	TOTAL MAJOR					25 ~~65~~
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	
MINOR	Size (More Than 4X)					
	Loose Leaves					
	Broken					
	Damaged					
	Blemished (Slightly)					
	Trim (Reas. Well) In grade A					~~75~~
	Trim (Poor) In grade B					40
	Development (Reas. Well) In A					
	TOTAL MINOR					40 ~~75~~
TOTAL	TOTAL ALL CLASSES					85 ~~160~~
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	
SAMPLE UNIT GRADE						
FINAL GRADE						B

Drop the defects that are counted only against grade A, before checking for compliance with grade B

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

12. Count the number of short spears in the sample that are adversely affected by trimming (not each container). Use the USDA photoguides, if available. The trim classification of each short spear is one of the following:

    a. Well trimmed (grade A trim) - not a defect in any grade;

    b. Reasonably well trimmed (grade B trim) - a defect only in grade A; or

    c. Poorly trimmed (Substandard trim) - a major defect in grade A and a minor defect in grade B. Record on the defect tally the total number of short spears in the sample that are either "reasonably well trimmed" or "poorly trimmed" (not each container).

    If the sample fails requirements for grade A, adjust the defect tally by: (1) dropping all "reasonably well trimmed" short spears from the defects counted against grade B; and (2) striking out the major defects counted against grade A and moving them to minor defects to be counted against grade B.

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

13. Count the total number of short spears in the sample that are adversely affected by development (head and bud cluster stages of maturity). Use the USDA photoguides, if available. The development classification of each broccoli short spear is one of the following:

    a. Well developed (grade A development) - not a defect in any grade;

    b. Reasonably well developed (grade B development) - a defect only in grade A; or

    c. Poorly developed (Substandard development) - a defect in grade A and grade B.

    Record on the defect tally the total number of short spears that are either "reasonably well developed" or "poorly developed." If the sample fails requirements for grade A, adjust the tally by dropping all "reasonably well developed" short spears from the number of defects that are to be counted against grade B. Reasonably well developed (grade B development) isn't a defect in a grade B sample. Count only "poorly" developed short spears as defects in a grade B sample.

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

13. Development (continuation).

Example 54: (Failed grade A, check against grade B).

50X13 = 650 Short Spears

MAJOR	Color (Reas. Good) In grade A					
	Detached Fragments					
	Blemished (Materially)					
	Trim (Poor) In grade A					
	Development (Poor)					25
	Fiber (Nonwoody)					
	TOTAL MAJOR					25
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	
MINOR	Size (More Than 4X)					5
	Loose Leaves					5
	Broken					
	Damaged					
	Blemished (Slightly)					50
	Trim (Reas. Well) In grade A					
	Trim (Poor) In grade B					
	Development (Reas. Well) In A					~~100~~
	TOTAL MINOR					60 ~~160~~
TOTAL	TOTAL ALL CLASSES					100 ~~200~~
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	
	SAMPLE UNIT GRADE					
	FINAL GRADE					B

Drop the defects that are counted only against grade A, before checking for compliance with grade B

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

14. Count the total number of pieces of harmless extraneous material (HEM) in the sample (not each container). Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Record on the defect tally the total number of pieces of HEM as follows:

    a. Severe; or

    b. Critical.

15. Establish by observation the predominant weight of the short spears in the sample. Don't be overly critical. If it is apparent the short spears vary less than 4 times (4X) from the predominant weight, accept them as meeting requirements. If some short spears obviously vary more than 4X from the predominant weight, do the following:

    a. Determine size variation so that the least number of defects are tallied against size; and

    b. Record on the defect tally the number of size defects in the sample (not each container).

    See also example 15, page 28; example 16, page 29; and example 17, page 30.

16. Evaluate the sample for compliance with style:

    a. Disregard loose leaf material, pieces of leaves, EVM and detached fragments;

    b. Determine the total number of short spears in the sample (not each container) that are longer than 9.5 cm;

    c. Determine the total number of short spears in the sample (not each container) that are shorter than 2 cm; and

    d. Record the number of defective short spears in b and c above in the style section of the defect tally. If a style failure occurs, certify the grade but show: "Fails style compliance for short spears." See also example 14, page 26.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

SHORT SPEARS OR FLORETS (continuation).

17. Cook a representative portion of the short spears as outlined in File Code 130-A-38. You may wish to select only "suspect" (step 3) short spears for the cooking test. Also, it isn't necessary to cook all of the short spears.

18. Evaluate the cooked broccoli for flavor to verify the tentative grade given for odor in step 3.

19. Evaluate the cooked broccoli by chewing. This should verify the tentative grade given for grit in step 3.

20. Evaluate the cooked broccoli for fiber. Only fiber which is detectable in the cooked broccoli should be counted. It is not necessary to cook all of the short spears that are suspected of having tough fiber if enough of the short spears are cooked to accurately set your sights.

21. Compare the total number of defects that you've found in the sample with the acceptance number for the applicable AQL and sample size in the "Regulations" (File Code 109-A-1, Tables XV-XIX).

22. Assign a grade to the sample based on the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan).

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI

1. Follow the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan [Attributes]).

2. Use the same defect tally sheet for lot inspection as you would use for on-line inspection. Ignore the section of the tally devoted to CUSUM values.

3. Open each individual container that you have drawn for the sample. Keep the product in its container. On a container-by-container basis, without sorting through the product, tentatively evaluate the following prerequisites:

   a. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard.

   b. At the same time that brightness is evaluated, record in the "prerequisites" section of the defect tally the letter grade (A or SSTD) for similar varietal characteristics.

   c. Evaluate the broccoli for odor. Assign the letter grade (A, B or SSTD) for odor in the section for "prerequisites." Consider any objectionable "off-odor" ("hay-like," "straw-like," "smoke," "chemical" or "sour") as Substandard. But the sample must be edible in step 10. Permit a slight "hay-like" or "straw-like" odor in grade B.

   d. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites."

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

3. Prerequisites, container by container (continuation).

e. Evaluate the cut broccoli for development(head and bud cluster stages of maturity). Even though the USDA photoguides which show various stages of development, cover only spears, you may use these photoguides as an indication of the cut-off point between "reasonably well developed" and "poorly developed."

The development classifications of cut broccoli are as follows:

a. Grade A - the broccoli may be only "reasonably well developed" (grade B); or

b. Grade B - the broccoli may be only "poorly developed" (SSTD) if the appearance is not materially affected. Poorly developed means the individual buds are in the flowering stage.

Assign the letter grade (A, B or SSTD) for development in the "prerequisites" section of the defect tally.

f. If any container is "suspect" because of "brightness," "odor," "grit" or "development," identify the container and its product for further examination.

Example 55: (Prerequisites on a container-by-container basis)

	Carton No. 1	Carton No. 2	Carton No. 3, etc.
Similar Varietal Char.	A	A	A
Brightness	A	A	A
Flavor and Odor	A	A	A
Grit and Silt	A	A	A
Development	A	A	A

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

3. Prerequisites, container-by-container (continuation).

   The grade for a lot of cut broccoli may not be higher than the grade of any "prerequisite" grade for any individual sample unit in the sample. If the sample should fail the anticipated grade because of a prerequisite factor, don't skip the other factors. Continue grading the sample but don't spend a lot of time with style or problem areas, such as blemishes or fiber.

4. While the cut broccoli is identified by individual containers, determine compliance with head material and leaf material. It isn't necessary to check each individual carton but enough cartons should be checked to satisfy yourself the requirements are either met or failed. In the cartons that are selected for the check, do the following:

   a. Separate the head material and weigh ("Bald" units completely stripped of flower buds should not be counted as head material);

   b. Separate the leaf material and weigh;

   c. Allow the following:

      Average: Head material not less than 25%.

      Leaf material not more than 25%.

      Individual sample cartons:

      Head material not less than 15%.

      Leaf material not more than 35%.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

5. Assemble (physically or mentally) all of the cut broccoli from all of the cartons that were drawn into one sample. Adjust the entire sample (either by randomly removing cuts or adding cuts) to meet the closest weight possible in the lot single sampling plan. If any of the cartons are "suspect" in step 3, you may wish to assemble the broccoli mentally into one sample. This procedure would enable you to retain the identity of the "suspect" cartons.

Example 56:

		NUMBER OF CARTONS			
		6	13	21	29
		Total Weight of Broccoli 1/ (grams)			
5 g INCREMENTS	6	180	390	630	870
	13	390	845	1365	1885
	25	750	1625	2625	3625
	50	1500	3250	5250	7250
	100	3000	6500	10500	14500

1/ Sample size x 5 g increments = weight of cut broccoli equivalent to the number of sample units times the standard sample unit size.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

6. Separate all of the blemished units into 3 categories:

   a. Slightly; or

   b. Materially; or

   c. Seriously.

   Place each category, separately, on to a suitable scale. Record the weight. Each 5 g increment of this weight is 1 defect.

   Blemished broccoli is the most common defect. Usually blemishes are:

   a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

   b. Yellow leaves;

   c. Orange buds (3 or more orange buds in a single area is the cut-off point between blemished and nonblemished);

   d. Olive-green leaf stem (petiole);

   e. Record on the defect tally the number of blemished defects (each 5 g increment is 1 defect) as follows:

      i. Minor; or
      ii. Major; or
      iii. Severe.

      ← Use photoguides for spears, if available.

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

6. Blemished (continuation).

Example 57:

SEVERE	Blemished (Seriously)					4
	Fiber (Woody)					
	HEM (Class 1)					
	TOTAL SEVERE					
	CUSUM	Grade A	0.4	0.8	1.6	
		Grade B	1	1	2	
MAJOR	Blemished (Materially)					10
	Fiber (Nonwoody)					
	TOTAL MAJOR					
	CUSUM	Grade A	1.5	1.5	3	
		Grade B	1	3	3	
MIN	Blemished (Slightly)					20
	TOTAL MINOR					
TOTAL	TOTAL ALL CLASSES					
	CUSUM	Grade A	1	4	3	
		Grade B	1	9	4	
SAMPLE UNIT GRADE						
FINAL GRADE						

Slightly = $\frac{100}{5}$ g

Materially = $\frac{50}{5}$ g

Seriously = $\frac{20}{5}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

7. Separate all of the pieces of harmless extraneous material (HEM) into 2 categories as follows:

   a. Severe (Class 1); or

   b. Critical (Class 2).

   Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Place each piece of HEM, by class, end-to-end (use the longest dimension) in a continuous row. Measure each class separately. Record on the defect tally the number of HEM defects (each 2.5 cm increment is 1 defect).

   Example 58:

CRITICAL	HEM (Class 2)					2
	TOTAL CRITICAL					
	CUSUM	Grade A	0	0.5	0.5	
		Grade B	0.4	0.8	1.6	
SEVERE	Blemished (Seriously)					
	Fiber (Woody)					
	HEM (Class 1)					4
	TOTAL SEVERE					
	CUSUM	Grade A	0.4	0.8	1.6	
		Grade B	1	1	2	

Class 1 = $\frac{10}{2.5}$ cm

Class 2 = $\frac{4}{2.5}$ cm

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

8. Check the sample for style compliance. It isn't necessary to use the same sample size that you're using for the other factors. You may use a smaller sample size for style. The smaller sample size makes grading faster. This procedure would be the equivalent of drawing a subsample. For example, if you're using 14500 g (29 x 100-5 g increments) for the other factors, you could use 10500 g (21 x 100-5 g increments); or 6500 g (13 x 100-5 g increments); or 3000 g (6 x 100-5 g increments) for style. If you do chose a smaller sample size for style, be sure and note on the tally the size that you've used for style. Otherwise, it's difficult to reevaluate the tally.

   To check for style, do the following:

   a. Disregard leaf material, pieces of leaves and EVM;

   b. Consider the product for the style that it is offered for even though you may disagree with the declaration of style;

   c. Separate all cuts in the sample that are longer than 5 cm and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 major style defective;

   d. Separate all cuts in the sample that are shorter than
   * 1.5 cm (exclusive of chaff) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 minor style defective;

   e. Record the number of minor and major style defectives in the style section of the defect tally. If a style failure occurs, certify the style as "pieces";

See also the next page.

* Change

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

8. Style (continuation).

Example 59:

STYLE	Major (Longer than 5 cm)				32
	CUSUM 6500 g	1	4	3	
	Minor (Shorter than 1.5 cm)				61
	CUSUM 6500 g	1	6	4	
	Head Material				
	Leaf Material				

Longer than 5 cm = $\frac{158}{5}$ g

Shorter than 1.5 cm = $\frac{302}{5}$ g

9. After the sample has been evaluated for style, cook a representative portion of the cut broccoli as outlined in File Code 130-A-38. You may wish to select only "suspect" units (step 3) for the cooking test. Also, it isn't necessary to cook the entire sample.

10. Evaluate the cooked broccoli to verify the tentative grade given for odor in step 3.

11. Evaluate the cooked broccoli by chewing representative portions. This should verify the tentative grade given for grit and silt in step 3.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

12. Evaluate the cooked broccoli for fiber. Be alert for fiber located in the pieces (cuts) that are made from the base end of the stalk. Fiber is a "fooler." It's usually more tender after cooking than would be expected. Cook enough of the "suspect" cuts to set your sights.

    If any detectable fiber is to be counted against the sample, cook all of the "suspect" units. Follow this procedure:

    a. Separate all of the cuts with major fiber (nonwoody-noticeable fiber but can be eaten without difficulty) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 major defect;

    b. Separate all of the cuts with severe fiber (woody) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 severe defect;

    c. Record the number of major and severe fiber defects on the defect tally.

    Example 60:

SEVERE	Blemished (Seriously)					
	Fiber (Woody)					13
	HEM (Class 1)					
	TOTAL SEVERE					
	CUSUM	Grade A	0.4	0.8	1.6	
		Grade B	1	1	2	
MAJOR	Blemished (Materially)					
	Fiber (Nonwoody)					26
	TOTAL MAJOR					
	CUSUM	Grade A	1.5	1.5	3	
		Grade B	1	3	3	

Woody fiber = $\frac{62}{5}$ g

Nonwoody fiber = $\frac{128}{5}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CUT BROCCOLI (continuation).

13. Compare the total number of defects that you've found in the sample with the acceptance number for the applicable AQL and sample size in the "Regulations" (File Code 109-A-1, Tables XV-XIX).

14. Assign a grade to the sample based on the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan).

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI

1. Follow the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan [Attributes]).

2. Use the same defect tally sheet for lot inspection as you would use for on-line inspection. Ignore the section of the tally devoted to CUSUM values.

3. Open each individual container that you have drawn for the sample. Keep the product in its container. On a container-by-container basis, without sorting through the product, tentatively evaluate the following prerequisites:

   a. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard).

   b. At the same time that brightness is evaluated, record in the "prerequisites" section of the defect tally the letter grade (A or SSTD) for similar varietal characteristics.

   c. Evaluate the broccoli for odor. Assign the letter grade (A, B or SSTD) for odor in the section for "prerequisites." Consider any objectionable "off-odor" ("hay-like," "straw-like," "smoke," "chemical" or "sour") as Substandard. But the sample must be edible in step 10. Permit a slight "hay-like" or "straw-like" odor in grade B.

   d. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites."

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI (continuation).

3. Prerequisites, container-by-container (continuation).

e. Evaluate the chopped broccoli for development (head and bud cluster stages of maturity). Even though the USDA photoguides which show various stages of development, cover only spears, you may use these photoguides as an indication of the cut-off point between "reasonably well developed" and "poorly developed."

The development classifications of chopped broccoli are as follows:

a. Grade A - the broccoli may be only "reasonably well developed" (grade B); or

b. Grade B - the broccoli may be only "poorly developed" (SSTD) if the appearance is not materially affected. Poorly developed means the individual buds are in the flowering stage.

Assign the letter grade (A, B or SSTD) for development in the "prerequisites" section of the defect tally.

f. If any container is "suspect" because of "brightness," "odor," "grit" or "development," identify the container and its product for further examination.

Example 61: (Prerequisites on a container-by-container basis)

	Carton No. 1	Carton No. 2	Carton No. 3, etc.
Similar Varietal Char.	A	A	A
Brightness	A	A	A
Flavor and Odor	A	A	A
Grit and Silt	A	A	A
Development	A	A	A

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI (continuation).

3. Prerequisites, container-by-container (continuation).

   The grade for a lot of chopped broccoli may not be higher than the grade of any "prerequisite" grade for any individual sample unit in the sample. If the sample should fail the anticipated grade because of a prerequisite factor, don't skip the other factors. Continue grading the sample but don't spend a lot of time with style or problem areas, such as blemishes or fiber.

4. While the chopped broccoli is identified by individual containers, determine compliance with head material and leaf material. It isn't necessary to check each individual carton but enough cartons should be checked to satisfy yourself the requirement is met or failed. In the cartons that are selected for the check, do the following:

   a. Separate the head material and weigh ("Bald" units completely stripped of flower buds should not be counted as head material);

   b. Separate the leaf material and weigh;

   c. Allow the following:

      Average: Head material not less than 25%.

      Leaf material not more than 25%.

      Individual sample cartons:

      Head material not less than 15%.

      Leaf material not more than 35%.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI (continuation).

5. Assemble (physically or mentally) into one sample all of the chopped broccoli from all of the cartons that were drawn. Adjust the entire sample (either by randomly removing units or adding units) to meet the closest weight possible in the lot single sampling plan. If any of the cartons are "suspect" in step 3, you may wish to assemble the broccoli mentally into one sample. This procedure would enable you to retain the identity of the "suspect" cartons.

Example 62:

		6	13	21	29
		Total Weight of Broccoli 1/ (grams)			
2.5 g INCREMENTS	6	90	195	315	435
	13	195	423	683	943
	25	375	813	1313	1813
	50	750	1625	2625	3625
	100	1500	3250	5250	7250

1/ Sample size x 2.5 g increments = weight of chopped broccoli equivalent to the number of sample units times the standard sample unit size.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI (continuation)

6. Separate all of the blemished units into 3 categories:

   a. Slightly; or

   b. Materially; or

   c. Seriously.

   Place each category, separately, on to a suitable scale. Record the weight. Each 2.5 g increment of this weight is 1 defect.

   Blemished broccoli is the most common defect. Usually blemishes are:

   a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

   b. Yellow leaves;

   c. Orange buds (3 or more orange buds in a single area is the cut-off point between blemished and nonblemished);

   d. Olive-green leaf stem (petiole);

   e. Record on the defect tally the number of blemished defects (each 2.5 g increment is 1 defect) as follows:

      i. Minor; or
      ii. Major; or
      iii. Severe.

      ← Use photoguides for spears, if available.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI (continuation).

6. Blemished (continuation).

Example 63:

SEVERE	Blemished (Seriously)					5
	Fiber (Woody)					
	HEM (Class 1)					
	TOTAL SEVERE					
	CUSUM	Grade A	0.5	1.5	2	
		Grade B	1	2	2	
MAJOR	Blemished (Materially)					15
	Fiber (Nonwoody)					
	TOTAL MAJOR					
	CUSUM	Grade A	1	3	3	
		Grade B	1	6	4	
MIN	Blemished (Slightly)					22
	TOTAL MINOR					
TOTAL	TOTAL ALL CLASSES					
	CUSUM	Grade A	1	8	4	
		Grade B	2	17	7	
	SAMPLE UNIT GRADE					
	FINAL GRADE					

Slightly = $\frac{53}{2.5}$ g

Materially = $\frac{37}{2.5}$ g

Seriously = $\frac{12}{2.5}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI (continuation).

7. Separate all of the pieces of harmless extraneous material (HEM) into 2 categories as follows:

   a. Severe (Class 1); or

   b. Critical (Class 2).

   Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Place each piece of HEM, by class, end-to-end (use the longest dimension) in a continuous row. Measure each class separately. Record on the defect tally the number of HEM defects (each 2.5 cm increment is 1 defect).

   Example 64:

CRITICAL	HEM (Class 2)					3
	TOTAL CRITICAL					
	CUSUM	Grade A	0	0.5	0.5	
		Grade B	0	1	1	
SEVERE	Blemished (Seriously)					
	Fiber (Woody)					
	HEM (Class 1)					5
	TOTAL SEVERE					
	CUSUM	Grade A	0.5	1.5	2	
		Grade B	1	2	2	

Class 1 = $\frac{12}{2.5}$ cm

Class 2 = $\frac{6}{2.5}$ cm

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI (continuation).

8. Check the sample unit for style compliance. It isn't necessary to use the same sample size that you're using for the other factors. You may use a smaller sample size for style. The smaller sample size makes grading faster. This procedure would be the same as drawing a subsample. For example, if you're using 7250 g (29 x 100-2.5 g increments) for the other factors, you could use 5250 g (21 x 100-2.5 g increments); or 3250 g (13 x 100-2.5 g increments); or 1500 g (6 x 100-2.5 g increments) for style. If you do chose a smaller sample size for style, be sure and note on the tally the size that you've used for style. Otherwise, it's difficult to reevaluate the tally.

   To check for style, do the following:

   a. Disregard leaf material, pieces of leaves and HEM;

   b. Consider the product for the style that it is offered for even though you may disagree with the declaration of style;

   c. Separate all cuts in the sample unit that are longer than 2 cm and place them on a suitable scale. Record the composite weight. Count each 2.5 g increment of this weight as 1 minor style defective;

   d. Record the number of minor style defectives in the style section of the defect tally. If a style failure occurs, certify the style as "pieces."

   Example 65:

S	Minor (Longer than 2 cm)	90 grams			5
T	CUSUM	2	10	5	
Y					
L	Head Material				
E	Leaf Material				

Longer than 2 cm = $\frac{12}{2.5}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI (continuation).

9. After the sample has been evaluated for style, cook a representative portion of the chopped broccoli as outlined in File Code 130-A-38. You may wish to select only "suspect" units (step 3) for the cooking test. Also, it isn't necessary to cook the entire sample.

10. Evaluate the cooked broccoli to verify the tentative grade given for odor in step 3.

11. Evaluate the cooked broccoli by chewing representative portions. This should verify the tentative grade given for grit and silt in step 3.

12. Evaluate the cooked broccoli for fiber. Be alert for fiber located in the units that are made from the base end of the stalk. Fiber is a "fooler." It's usually more tender after cooking than would be expected. Cook enough of the "suspect" units to set your sights.

    If any detectable fiber is to be counted against the sample, cook all of the "suspect" units. Follow this procedure:

    a. Separate all of the units with major fiber (nonwoody-noticeable fiber but can be eaten without difficulty) and place them on a suitable scale. Record the composite weight. Count each 2.5 g increment of this weight as 1 major defect;

    b. Separate all of the units with severe fiber (woody) and place them on a suitable scale. Record the composite weight. Count each 2.5 g increment of this weight as 1 severe defect;

    c. Record the number of major and severe fiber defects on the defect tally.

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

CHOPPED BROCCOLI (continuation).

12. Fiber (continuation).

Example 66:

SEVERE	Blemished (Seriously)					
	Fiber (Woody)					19
	HEM (Class 1)					
	TOTAL SEVERE					
	CUSUM	Grade A	0.5	1.5	2	
		Grade B	1	2	2	
MAJOR	Blemished (Materially)					
	Fiber (Nonwoody)					38
	TOTAL MAJOR					
	CUSUM	Grade A	1	3	3	
		Grade B	1	6	4	

Woody fiber = $\frac{47}{2.5}$ g

Nonwoody fiber = $\frac{93}{2.5}$ g

13. Compare the total number of defects that you've found in the sample with the acceptance number for the applicable AQL and sample size in the "Regulations" (File Code 109-A-1, Tables XV-XIX).

14. Assign a grade to the sample based on the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan).

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

BROCCOLI PIECES

1. Follow the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan [Attributes]).

2. Use the same defect tally sheet for lot inspection as you would use for on-line inspection. Ignore the section of the tally devoted to CUSUM values.

3. Open each individual container that you've drawn for the sample. Keep the product in its container. On a container-by-container basis, without sorting through the product, tentatively evaluate the following prerequisites:

   a. Evaluate "brightness" and record the letter grade (A, B or SSTD) in the "prerequisites" section of the defect tally. The overall brightness may be slightly dull in grade B. Count "off-color" (yellowish or brownish discoloration) as Substandard.

   b. At the same time that brightness is evaluated, record in the "prerequisites" section of the defect tally the letter grade (A or SSTD) for similar varietal characteristics.

   c. Evaluate the broccoli for odor. Assign the letter grade (A, B or SSTD) for odor in the section for "prerequisites." Consider any objectionable "off-odor," ("hay-like," "straw-like," "smoke," "chemical" or "sour") as Substandard. But the sample must be edible in step 8. Permit a slight "hay-like" or "straw-like" odor in grade B.

   d. Assign the letter grade (A, B or SSTD) for freedom from grit in the section for "prerequisites."

   See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

BROCCOLI PIECES (continuation).

3. Prerequisites, container-by-container (continuation).

e. Evaluate the broccoli for development (head and bud cluster stages of maturity). Even though the USDA photoguides which show various stages of development, cover only spears, you may use these photoguides as an indication of the cut-off point between "reasonably well developed" and "poorly developed."

The development classifications of broccoli pieces are as follows:

a. Grade A - the broccoli may be only "reasonably well developed" (grade B); or

b. Grade B - the broccoli may be only "poorly developed" (SSTD) if the appearance is not materially affected. Poorly developed means the individual buds are in the flowering stage.

Assign the letter grade (A, B or SSTD) for development in the prerequisites section of the defect tally.

f. If any container is "suspect" because of "brightness," "odor," "grit" or "development," identify the container and its product for further examination.

Example 67: (Prerequisites on a container-by-container basis)

	Carton No. 1	Carton No. 2	Carton No. 3, etc.
Similar Varietal Char.	A	A	A
Brightness	A	A	A
Flavor and Odor	A	A	A
Grit and Silt	A	A	A
Development	A	A	A

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

BROCCOLI PIECES (continuation).

3. Prerequisites, container-by-container (continuation).

   The grade for a lot of broccoli pieces may not be higher than the grade of any "prerequisite" grade for any individual sample unit in the sample. If the sample should fail the anticipated grade because of a prerequisite factor, don't skip the other factors. Continue grading the sample but don't spend a lot of time on problem areas, such as blemishes or fiber.

4. Assemble (physically or mentally) into one sample all of the broccoli pieces from all of the cartons that were drawn. Adjust the entire sample (either by randomly removing pieces or adding pieces) to meet the closest possible weight in the lot single sampling plan. If any of the cartons are "suspect" in step 3, you may wish to assemble the broccoli mentally into one sample. This procedure would enable you to retain the identity of the "suspect" cartons.

   Example 68:

		NUMBER OF CARTONS			
		6	13	21	29
		Total Weight of Broccoli 1/ (grams)			
5 g INCREMENTS	6	180	390	630	870
	13	390	845	1365	1885
	25	750	1625	2625	3625
	50	1500	3250	5250	7250
	100	3000	6500	10500	14500

1/ Sample size x 5 g increments = weight of broccoli pieces equal to the number of sample units times the standard sample unit size.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

BROCCOLI PIECES (continuation).

5. Separate all of the blemished units into 3 categories:

   a. Slightly; or

   b. Materially; or

   c. Seriously.

   Place each category, separately, on to a suitable scale. Record the weight. Each 5 g increment of this weight is 1 defect.

   Blemished broccoli is the most common defect. Usually blemishes are:

   a. Discolored hollow or pithy stalks (Don't count hollow or pithy stalks unless they're associated with discoloration);

   b. Yellow leaves;

   c. Orange buds (3 or more orange buds in a single area is the cut-off point between blemished and nonblemished);

   d. Olive-green leaf stem (petiole);

   e. Record on the defect tally the number of blemished defects (each 5 g increment is 1 defect) as follows:

      i. Minor; or
      ii. Major; or
      iii. Severe.

      ← Use photoguides for spears, if available.

See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

BROCCOLI PIECES (continuation).

5. Blemished (continuation).

Example 69:

SEVERE	Blemished (Seriously)					4
	Fiber (Woody)					
	HEM (Class 1)					
	TOTAL SEVERE					
	CUSUM	Grade A	0.4	0.8	1.6	
		Grade B	1	1	2	
MAJOR	Blemished (Materially)					10
	Fiber (Nonwoody)					
	TOTAL MAJOR					
	CUSUM	Grade A	1.5	1.5	3	
		Grade B	1	3	3	
MIN	Blemished (Slightly)					20
	TOTAL MINOR					
TOTAL	TOTAL ALL CLASSES					
	CUSUM	Grade A	1	4	3	
		Grade B	1	9	4	
	SAMPLE UNIT GRADE					
	FINAL GRADE					

Slightly = $\frac{100}{5}$ g

Materially = $\frac{50}{5}$ g

Slightly = $\frac{20}{5}$ g

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

BROCCOLI PIECES (continuation).

6. Separate all of the pieces of harmless extraneous material (HEM) into 2 categories as follows:

   a. Severe (Class 1); or

   b. Critical (Class 2).

   Count pieces of other similar plants, such as cauliflower or brussels sprouts, as class 1 HEM. Place each piece of HEM, by class, end-to-end (use the longest dimension) in a continuous row. Measure each class separately. Record on the defect tally the number of HEM defects (each 2.5 cm increment is 1 defect).

   Example 70:

CRITICAL	HEM (Class 2)					2
	TOTAL CRITICAL					
	CUSUM	Grade A	0	0.5	0.5	
		Grade B	0.4	0.8	1.6	
SEVERE	Blemished (Seriously)					
	Fiber (Woody)					
	HEM (Class 1)					4
	TOTAL SEVERE					
	CUSUM	Grade A	0.4	0.8	1.6	
		Grade B	1	1	2	

Class 1 = $\frac{10}{2.5}$ cm

Class 2 = $\frac{4}{2.5}$ cm

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

BROCCOLI PIECES (continuation).

7. Cook a representative portion of the broccoli as outlined in File Code 130-A-38. You may wish to select only "suspect" units (step 3) for the cooking test. Also, it isn't necessary to cook the entire sample.

8. Evaluate the cooked broccoli to verify the tentative grade given for odor in step 3.

9. Evaluate the cooked broccoli by chewing representative portions. This should verify the tentative grade given for grit and silt in step 3.

10. Evaluate the cooked broccoli for fiber. Be alert for fiber located in the pieces that are made from the base end of the stalk. Fiber is a "fooler." It's usually more tender after cooking than would be expected. Cook enough of the "suspect" pieces to set your sights.

    If any detectable fiber is to be counted against the sample, cook all of the "suspect" units. Follow this procedure:

    a. Separate all of the pieces with major fiber (nonwoody-noticeable fiber but can be eaten without difficulty) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 major defect;

    b. Separate all of the pieces with severe fiber (woody) and place them on a suitable scale. Record the composite weight. Count each 5 g increment of this weight as 1 severe defect; and

    c. Record on the defect tally the number of major and severe defects.

    See also the next page.

SUGGESTED ORDER OF GRADING A SAMPLE UNDER LOT INSPECTION

BROCCOLI PIECES (continuation).

10. Fiber (continuation).

Example 71:

SEVERE	Blemished (Seriously)					
	Fiber (Woody)					19
	HEM (Class 1)					
	TOTAL SEVERE					
	CUSUM	Grade A	0.4	0.8	1.6	
		Grade B	1	1	2	
MAJOR	Blemished (Materially)					
	Fiber (Nonwoody)					26
	TOTAL MAJOR					
	CUSUM	Grade A	1.5	1.5	3	
		Grade B	1	3	3	

Woody fiber = $\frac{62}{5}$ g

Nonwoody fiber = $\frac{128}{5}$ g

11. Compare the total number of defects that you've found in the sample with the acceptance number for the applicable AQL and sample size in the "Regulations" (File Code 109-A-1, Tables XV-XIX).

12. Assign a grade to the sample based on the procedure outlined in File Code 120-A-7 (Lot Single Sampling Plan).

SPECIAL LOT INSPECTION SITUATIONS

1. INSPECTION OF LARGE CARTONS (2-1/2 lb., etc.) OR OTHER LARGE CONTAINERS.

   File Code 120-A-6 permits you to drawn a minimum of 3 cartons for inspection of small lots if Inspection Aid No. 42 specifies the 3 sample size. Although the lot single sampling plan is designed for a minimum of 6 sample units, you may use the maximum number of units of broccoli in the 3 cartons and adjust the sample to 36, 78, 126, 150, 169, etc., or more units. However, you must have at least 36 units in the sample to perform a lot inspection. If 3 cartons give fewer than 36 units, draw 4 or more cartons. The same thing would hold true for a sample drawn by weight. For example, for "cut" or "pieces," adjust the sample to 180 g, 390 g, 630 g, 845 g, 870 g or more. Or, for "chopped," adjust the sample to 90 g, 195 g, 315 g, 423 g, 435 g or more.

   CAUTION: REMEMBER THAN INSPECTION AID NO. 42 SPECIFIES ONLY THE MINIMUM SAMPLE SIZE. YOU MAY INCREASE THE SAMPLE SIZE FOR "SUSPECT" OR BORDERLINE LOTS.

2. INSPECTION OF SMALL CARTONS (8 oz or 10 oz) OR LARGE UNITS (Spears) PACKED IN SMALL CARTONS.

   If lot inspection covers small cartons or large units packed in small cartons, it may be necessary to increase the number of cartons that are to be drawn from the lot. Without the increase in sample size, you would not have enough product to meet the minimum sample size, such as 36 broccoli spears. If the approximate number of broccoli units in each carton is unknown, open one carton at the sampling point to get this information.

3. HOW TO ADJUST A DEFECT TALLY.

   If a sample fails to meet the requirements of grade A, adjust the defect tally before comparing the defects against the acceptance numbers for grade B. This must be done because "reasonably good" defects are not counted against grade B. A grade B lot could have all "reasonably good" defects. The preceding examples in this manual have been simple -- the following example is complex.

   See also the next page.

HOW TO REEVALUATE A DEFECT TALLY

It is possible to reevaluate a defect tally for frozen broccoli. You may encounter this situation if past production is compared against a more restrictive specification, such as a buyers' specification, after the original inspection has been completed.

Use the general procedure to reevaluate a defect tally as outlined in File Code 120-A-6 (Appendix). However, with frozen broccoli, it is not possible to reevaluate against all grade levels. This will depend upon the processors designated grade.

If the original grade was against designated grade A, it is possible to reevaluate the tally for grades A and B. This is because all of the "reasonably good" units <u>have been</u> tallied against grade A.

If the original grade was against designated grade B, it is not possible to reevaluate the tally against grade A -- only grade B. This is because the "reasonably good" units <u>have not</u> been tallied against grade A.

If there is any chance the processor would ask that a tally be reevaluated against a grade higher than the designated grade, it would be well to prepare for this situation. You could keep a record of all "reasonably good" units, even though the broccoli is graded against grade B, but figure the CuSum values against grade B only for the original grade. If the tally is to be reevaluated later, figure the CuSum values against grade A by including all "reasonably good" units in the tally.

See also the next page.

Example No. 72: (Failed grade A, adjusted for grade B)

PREQ.	Similar Varietal Characteristics					
	Brightness					
	Flavor/Odor					
	Grit/Silt					13x50 = 650
CRIT	TOTAL CRITICAL					2
	CUSUM	Grade A	0.2	0.2	0.8	
		Grade B	0.5	0.5	1.5	
SEVERE	Color (Poor)					1
	Blemished (Seriously)					2
	Fiber (Woody)					1
	HEM (Class 1)					1
	TOTAL SEVERE					5
	CUSUM	Grade A	0.5	0.5	1.5	
		Grade B	1.5	1.5	3	
MAJOR	Color (Reas. Good) In grade A					~~10~~
	Size (Length)					2
	Detached Fragments					
	Blemished (Materially)					20
	Trim (Poor) In grade A					5
	Development (Poor)					10
	Fiber (Nonwoody)					
	TOTAL MAJOR					32 ~~47~~
	CUSUM	Grade A	1	4	3	
		Grade B	1	6	4	
MINOR	Size (Diameter)					
	Loose Leaves					
	Broken					
	Damaged					
	Blemished (Slightly)					50
	Trim (Reas. Well) In grade A					~~25~~
	Trim (Poor) In grade B					5
	Development (Reas. Well) In A					35
	TOTAL MINOR					90 ~~140~~
TOTAL	TOTAL ALL CLASSES					129 ~~164~~
	CUSUM	Grade A	2	12	5	
		Grade B	2	14	7	
SAMPLE UNIT GRADE						
FINAL GRADE						B

Failed grade A

Example 75: (Originally designated grade B, reevaluated against bottom grade A)

PREQ.	Similar Varietal Characteristics				A	A	A
	Brightness				A	A	A
	Flavor/Odor				A	A	A
	Grit/Silt				A	A	A
CRIT	TOTAL CRITICAL				0	0	0
	CUSUM Grade A	0.2	0.2	0.8	0	0	0
	CUSUM Grade B	0.5	0.5	1.5	0	0	0
SEVERE	Color (Poor)						
	Blemished (Seriously)				1	1	1
	Fiber (Woody)						
	HEM (Class 1)						
	TOTAL SEVERE				1	1	1
	CUSUM Grade A	0.5	0.5	1.5	1	1.5	1.5
	CUSUM Grade B	1.5	1.5	3	1	0.5	0
MAJOR	Color (Reas. Good) In grade A						
	Size (Length)						
	Detached Fragments				1		
	Blemished (Materially)				2	2	3
	Trim (Poor) In grade A				1	2	2
	Development (Poor)				1	1	
	Fiber (Nonwoody)					1	
	TOTAL MAJOR				5 4	6 4	5 3
	CUSUM Grade A	1	4	3	2	3	3
	CUSUM Grade B	1	6	4	0	0	0
MINOR	Size (Diameter)						
	Loose Leaves					1	
	Broken						
	Damaged						
	Blemished (Slightly)				4	4	3
	Trim (Reas. Well) In grade A				2	3	2
	Trim (Poor) In grade B				~~1~~	~~2~~	~~2~~
	Development (Reas. Well) In A				2	5	4
	TOTAL MINOR				8 5	12 7	9 5
TOTAL	TOTAL ALL CLASSES				14 10	19 12	15 9
	CUSUM Grade A	2	12	5	4	5	5
	CUSUM Grade B	2	14	7	0	0	0
	SAMPLE UNIT GRADE				B	B	B
	FINAL GRADE				B		

Record kept but not counted against grade B

Fails Grade A

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Example 74: (Originally designated grade B, reevaluated against a tighter grade B) xxx Foods, Top B Label

PREQ	Similar Varietal Characteristics				A	A	A
	Brightness				A	A	A
	Flavor/Odor				A	A	A
	Grit/Silt				A	A	A
CRIT	TOTAL CRITICAL				0	1	0
	CUSUM	Grade A	0.2	0.2	0.8		
		Grade B	0.5	0.5	1.5	0	0.5	0
SEVERE	Color (Poor)				1	1	
	Blemished (Seriously)					1	1
	Fiber (Woody)						
	HEM (Class 1)						
	TOTAL SEVERE				1	2	1
	CUSUM	Grade A	0.5	0.5	1.5		
		Grade B AQL = 1.5	~~1.5~~ 1	~~1.5~~ 1	~~3.2~~ 2	1	~~1.5~~ 2	~~1.2~~ 2
MAJOR	Color (Reas. Good) In grade A						
	Size (Length)				1		
	Detached Fragments				1		
	Blemished (Materially)					3	2
	Trim (Poor) In grade A						
	Development (Poor)				1	1	2
	Fiber (Nonwoody)				1		1
	TOTAL MAJOR				4	4	5
	CUSUM	Grade A	1	4	3		
		Grade B AQL = 8.5	1	~~8.5~~ 5	4	0	0	0
MINOR	Size (Diameter)						1
	Loose Leaves				1		
	Broken						
	Damaged						
	Blemished (Slightly)				1	3	4
	Trim (Reas. Well) In grade A						
	Trim (Poor) In grade B				2	2	1
	Development (Reas. Well) In A						
	TOTAL MINOR				4	5	6
TOTAL	TOTAL ALL CLASSES				9	12	12
	CUSUM	Grade A	2	12	5		
		Grade B AQL = 20.0	2	~~14~~ 12	~~7.5~~ 5	0	0	0
SAMPLE UNIT GRADE						B	B	B
FINAL GRADE						B →		

Meets →

Example 73: (Originally designated grade A, reevaluated against a tighter grade A) XXX Foods, Top A Label

PREQ.	Similar Varietal Characteristics					A	A	A
	Brightness					A	A	A
	Flavor/Odor					A	A	A
	Grit/Silt					A	A	A
CRIT	TOTAL CRITICAL					0	1	0
	CUSUM	Grade A	0.2	0.2	0.8	0	0.8	0.6
		Grade B	0.5	0.5	1.5			
SEVERE	Color (Poor)							
	Blemished (Seriously)					1		
	Fiber (Woody)							
	HEM (Class 1)							
	TOTAL SEVERE					1	0	0
	CUSUM	Grade A	0.5	0.5	1.5	1	0.5	0
		Grade B	1.5	1.5	3			
MAJOR	Color (Reas. Good) In grade A					1		
	Size (Length)							
	Detached Fragments							
	Blemished (Materially)					1	2	1
	Trim (Poor) In grade A					1	1	
	Development (Poor)						1	1
	Fiber (Nonwoody)							
	TOTAL MAJOR					3	4	2
	CUSUM	Grade A AQL = 5.0	1	~~4~~ 3	3	~~0~~ 1	~~0~~ 2	~~0~~ 1
		Grade B	1	6	4			
MINOR	Size (Diameter)							
	Loose Leaves							1
	Broken							
	Damaged							
	Blemished (Slightly)					4	2	1
	Trim (Reas. Well) In grade A					4		1
	Trim (Poor) In grade B							
	Development (Reas. Well) In A						2	
	TOTAL MINOR					8	4	3
TOTAL	TOTAL ALL CLASSES					12	9	5
	CUSUM	Grade A AQL = 15.0	~~2~~ 1	~~12~~ 9	~~8~~ 4	~~2~~ 4	~~0~~ 4	~~0~~ 0
		Grade B	2	14	7			
	SAMPLE UNIT GRADE					A	A	A
	FINAL GRADE					A →		

Meets →