



United States Department of Agriculture

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Marketing and  
Regulatory  
Programs

# Frozen Onions

Agricultural  
Marketing  
Service

## Inspection Instructions

Specialty  
Crops  
Program

September 2017

Specialty  
Crops  
Inspection  
Division

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These instructions contain information and guidelines to help personnel of the U.S. Department of Agriculture's (USDA) Specialty Crops Inspection (SCI) Division uniformly apply and interpret U.S. grade standards, other similar specifications, and special procedures.

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Comments may be submitted to:

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## INSPECTION INSTRUCTIONS FOR FROZEN ONIONS

SECTION	PAGE No.
<b>GENERAL</b> .....	<b>1</b>
PRODUCT DESCRIPTION .....	1
PRODUCTION FLOW .....	1
<b>INSPECTION AND GRADING</b> .....	<b>2</b>
EQUIPMENT, INSPECTION AIDS, AND INSTRUCTIONS.....	2
SAMPLING .....	2
SAMPLE UNIT SIZE .....	3
TEMPERATURE .....	3
<b>NON-QUALITY FACTORS</b> .....	<b>4</b>
NET WEIGHT .....	4
STYLE.....	4
ENZYME ACTIVITY (IF APPLICABLE) .....	5
<b>PREREQUISITE QUALITY FACTORS</b> .....	<b>5</b>
VARIETAL CHARACTERISTICS .....	5
COLOR .....	6
FLAVOR AND ODOR.....	6
APPEARANCE .....	6
ABSENCE OF GRIT OR DIRT .....	7
<b>CLASSIFIED QUALITY FACTORS</b> .....	<b>7</b>
TABLE I ACCEPTANCE NUMBERS FOR SPECIFIED DEFECTS, WHOLE STYLE FROZEN ONION.....	8
TABLE II ACCEPTANCE NUMBERS FOR SPECIFIED DEFECTS, STRIPS, DICED OR OTHER STYLES FROZEN ONION .....	9
DARK GREEN UNITS .....	10
POOR COLORED UNITS .....	10
BLEMISH .....	10
MECHANICAL DAMAGE (WHOLE STYLE ONLY).....	10
CORE MATERIAL.....	10
PEEL .....	11
CHARACTER .....	11
EXTRANEOUS VEGETABLE MATERIAL (EVM).....	12

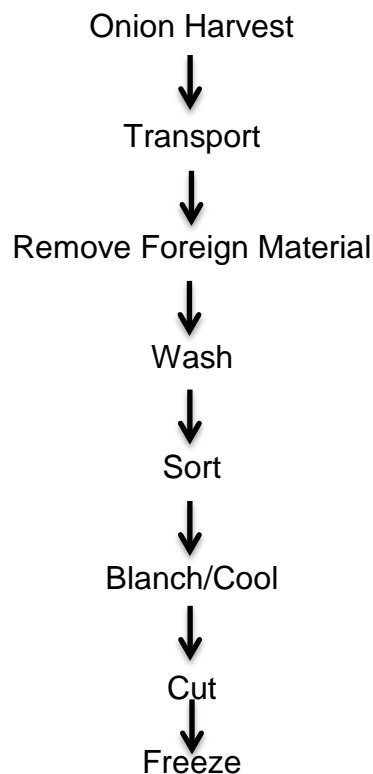
## GENERAL

The United States Standards for Grades of Frozen Onions is an Attributes standard. Attributes standards assign grades based on samples taken on-line (generally). No grade is assigned to an individual sample unit. The grade is assigned at the end of the production period. Attributes standards describe requirements for quality of products using Acceptable Quality Levels (AQLs) for lists of defects characteristic of the product. The defects described in the grade standard are accompanied by AQLs. Acceptance numbers at the AQLs given in the attributes standard would be found in sampling plan tables in the regulations 7 CFR 52.38b and 38c. Grading using attributes standards may be conducted on line while the product is being produced. As an alternative, samples for attributes inspection can be drawn from a lot in a storage facility or from a rail car, truck, or other conveyance. The minimum sample sizes are 6, 13, 21, and 29 sample units, for attributes standards.

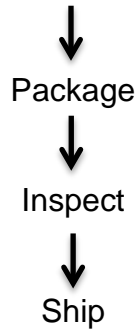
## PRODUCT DESCRIPTION

Frozen onions are the individually quick frozen product prepared from fresh, clean, sound, firm bulbs of the Grano, Sweet Spanish type, or other common commercial varieties of (*Allium cepa*) that have been properly prepared, washed, blanched or unblanched, and then frozen in accordance with good commercial practice and maintained at temperatures necessary to preserve the product.

## PRODUCTION FLOW



Inspection Instructions for Frozen Onions (September 2017)



## INSPECTION AND GRADING

### EQUIPMENT, INSPECTION AIDS, AND INSTRUCTIONS

- [U.S. Standards for Grades of Frozen Onions](#)
- [Inspection Aid #30 series for standard and metric grids and circles](#)
- AIM Inspection Series Manuals
  - [Certification Manual](#)
  - [Condition of Food Container Manual](#)
  - [Foreign Material Manual](#)
  - [General Procedures Manual](#)
  - [Safety Manual](#)
  - [Sampling Manual](#)
  - [Sanitation Manual](#)
  - [Technical Procedures Manual](#)
- [Cumulative Sum Sampling Plan \(CuSum\) Attribute Standards Only](#)
- [7 CFR 52.38b](#)
- [7 CFR 52.38c](#)
- [SC 364-91 Tally Sheet for Frozen Onions](#) (intranet link)
- Scale
- Thermometer
- Grading tray

### SAMPLING

Uniformity in the preparation and performance of sampling procedures are a fundamental part of Division services. Statistical sampling procedures for on-line inspection by attributes of processed fruits and vegetables is found in [7 CFR 52.38b](#).

The [Cumulative Sum Sampling Plan](#), referred to as “CuSum,” is used as the online sampling plan for attributes standards under the following conditions.

- The producer has designated the intended grade for the basic inspection period prior to the start of production.

- Inspection of the product is to be made during the basic inspection period at a point after which all product characteristics, subject to inspection, are fixed and will not be subject to change during final packaging.
- A shift to CuSum sampling plans from lot sampling plans during a basic inspection period is not permitted (or vice versa).

Tables VI through X contain the CuSum sampling plans for each of five different standard sample unit sizes. The plans within each table are listed according to increasing values of Acceptable Quality Levels (AQLs).

The AIM Sampling Manual section on Segregation - Attribute Type Standards provides guidance on the procedures used when a lot of frozen onions fails during production.

Statistical sampling procedures for lot inspection of processed fruits and vegetables by attributes is found in [7 CFR 52.38c](#). Single sampling plans must be used as the lot sampling plan for attributes standards under either of the following conditions:

- Sampling of the product will be made during the production period. No grade will be assigned to individual sample units. One grade determination only will be made at the end of the production period for the inspection lot.
- Sampling of the product will be made when the inspection lot is located in a warehouse, truck, railroad car, or other similar conveyance.

Sample size. Samples must be randomly selected from each inspection lot in the exact number of sample units indicated for the lot size in tables as applicable.

## **SAMPLE UNIT SIZE**

For varietal characteristics, color, flavor and odor, and appearance, the sample size is the entire container. For blemishes, character, specified defects, and mechanical damage, the sample size is 50 units by count for whole style, and 450 grams by weight for strips, diced, and other styles.

## **TEMPERATURE**

Accurately recording the packing temperature of frozen commodities is a critical part of inspection. In-depth instructions on various techniques for inspecting and reporting temperatures may be found in the Frozen and Refrigerated Product section of the [AIM Technical Procedures Manual](#).



## NON-QUALITY FACTORS

Evaluate and grade Non-quality factors on a container-by-container basis. Non-quality factors are not associated with the quality and condition of the commodity inspected. These factors speak to good commercial practices (net weight), and define the sample identity (style) for inspection purposes. Non-quality factors may also include technical procedures such as enzyme inactivation testing if requested by an applicant, or mandated by specification.

## NET WEIGHT

Processed foods are commonly packed to meet a prescribed net weight or content, and are labeled accordingly. This net weight or content may be specified in a purchase specification or contract. In-depth instructions on performing net weights may be found in the Net Weight section of the [AIM Technical Procedures Manual](#).

## STYLE

The U.S. Standards for Grades of Frozen Onions cover the following styles:

- **Whole style:** Whole stemmed, peeled bulbs of the sizes listed below:
  - **Type I.** 7/8 inch (22 mm) to 1-7/8 inches (48 mm) in diameter at the greatest dimension of the onion at right angles to a line running from stem to root.
  - **Type II (Pearl).** 3/8 inch (10 mm) to 7/8 inch (22 mm) in diameter in the greatest dimension of the onion at right angles to a line running from stem to root.
- **Strips:** Stemmed, peeled bulbs that have been cut lengthwise into narrow pieces ranging from 3/4 inch (19 mm) to 2 inches (51 mm) in length. The width may vary from 1/4 inch (6 mm) to 3/4 inch (19 mm).
- **Diced:** Peeled bulbs which have been cut into approximately square pieces with a designated width ranging from 1/4 inch (6 mm) to 1 inch (25 mm) in width as determined by the width of the unit in the greatest cut dimension.
- **Other:** Any style designated as other, by style, description of size, shape, or other characteristic that differentiates it from the styles listed above.

The requirements for style are determined by count or weight as follows:

- **Whole Style**
  - **Type I.** The units are well shaped. By count, approximately 10 percent of the units (lot average) may be less than 7/8 inch (22 mm); 5 percent may be greater than 1-7/8 inches (48 mm) at the widest portion of the unit.
  - **Type II (Pearl).** The units are well shaped. By count, approximately 10 percent of the units (lot average) may be less than 3/8 inch (10 mm); 5 percent may be greater than 7/8 inch (22 mm) in the greatest portion of the unit.
- **Strips style.** A maximum of 25 percent of units, by weight, may be less than the minimum style requirement of 3/4 inch (19 mm) in length.
- **Diced style.** The units that are practically uniform in size. Less than 30 percent of the units, by weight, are noticeably smaller than one-half the area of an average sized unit (or the designated size). Less than 30 percent of all units are large or irregularly shaped units greater than 1-1/2 times the area of an average sized unit (or the designated size).
- **Other.** Units do not fall into any of the styles listed above, are reasonably uniform in size and shape, and overall appearance is not materially affected by other shapes and sizes.

## ENZYME ACTIVITY (IF APPLICABLE)

Frozen onions are not routinely tested for enzyme inactivation by inspection staff. If required by a specification, or requested by the applicant, enzyme inactivation inspection will be performed using the guidance found in the Enzyme Inactivation section of the [AIM Technical Procedures Manual](#).

## PREREQUISITE QUALITY FACTORS

Evaluate and grade prerequisite quality factors on a container-by-container basis. Prerequisite quality factors are typically inspected using subjective analysis of specific quality factors.

## VARIETAL CHARACTERISTICS

- **Similar** should be assigned to samples containing frozen onions of similar varietal characteristics.

- **SSTD** should be assigned to samples containing frozen onions of dissimilar varietal characteristics. See the Alien Vegetables section of the [AIM General Procedures manual](#) for additional guidance and allowances.

## COLOR

Color is evaluated immediately upon thawing as frozen products tend to oxidize rapidly after thawing, and may effect this determination.

Color refers to the predominant and characteristic color of the exterior surface of the frozen onions.

- **Good color:** The frozen onions have a good characteristic bright color typical of the variety.
- **Reasonably good color:** The frozen onions have a reasonably good color typical of the variety. The units individually or collectively may vary slightly from bright to slightly dull.
- **Poor color:** The frozen onions fail to meet the requirements of reasonably good color.

Any poor colored units found during this analysis are counted or weighed (depending on style), and recorded under Poor Colored Units as part of the classified quality factor evaluation.

## FLAVOR AND ODOR

Flavor and odor are determined before and after cooking. Cooking procedures are found in the Frozen and Refrigerated Product section, Cooking Procedures subsection of the [AIM Technical Procedures manual](#). All frozen sample units must be cooked for flavor and odor evaluation.

- **Normal flavor and odor:** The frozen onions, before and after cooking, have a flavor and odor that is normal and typical for the variety and is free from objectionable flavors and odors.
- **Off flavor and odor:** The frozen onions do not meet the requirements for normal flavor and odor listed above.

## APPEARANCE

Appearance of frozen onions is based on the overall appearance before thawing (free flowing), and immediately after thawing (brightness, uniformity of appearance). The factors for appearance include:

- **Free flowing:** The individual units in the frozen state are not stuck to one another, stuck together in blocks, to an extent that they cannot easily be separated in a frozen state.
- **Brightness:** The onions are bright in color and not affected by dullness. Brightness is evaluated immediately after thawing.
- **Uniformity of size:** The variation in size of the whole onion, or uniformity of cut size for strips, diced, or other.

Record appearance as follows:

- **Good appearance:** The product is practically free flowing, bright, and with practically uniform units. Markedly variable units, small specks, or other factors, do not significantly affect the overall appearance or edibility of frozen onions.
- **Reasonably good appearance:** The product is reasonably free flowing, reasonably bright, and has reasonably uniform units. The overall appearance or edibility of the frozen onions is slightly but not seriously affected by markedly variable units, small specks, or other factors.
- **Poor appearance:** The product fails to meet the requirements of reasonably good appearance.

### ABSENCE OF GRIT OR DIRT

Evaluation for grit or dirt is performed during organoleptic evaluation for flavor and during all visual inspection performed, including a visual analysis of the water remaining after cooking the frozen onions for flavor and odor.

There is no allowance for grit or dirt. The presence of grit or dirt during organoleptic evaluation, or any visual observance would render the sample SSTD.

Record absence of grit or dirt as **None**.

### CLASSIFIED QUALITY FACTORS

Classified quality factors are quantified by count and weight with allowances specified in the U.S Standards for Grades of Frozen Onions, §52.4078, Requirements for classified quality factors and defects, Tables I and II.

**TABLE I ACCEPTANCE NUMBERS FOR SPECIFIED DEFECTS, WHOLE STYLE FROZEN ONION**

**GRADE A (50 Plan)**

Sample Units X Sample Unit Size			1 x 50	6 x 50	13 x 50	21 x 50	29 x 50
Units of Product			50 <sup>1</sup>	300	650	1050	1450
DEFECTS	TOL	AQL <sup>2</sup>	ACCEPTANCE NUMBERS				
Dark Green Units	1	0.612	1	4	7	10	14
Poor Color Units	5	3.8	4	17	33	50	67
Major Blemish	2	1.3	2	7	13	20	26
Total Blemish (Major + Minor)	5	3.8	4	17	33	50	67
Mechanical Damage	2	1.3	2	7	13	20	26
Major Core Material	1	0.612	1	4	7	10	14
Total Core Material (Major + Minor)	2	1.3	2	7	13	20	26
Peel	2	1.3	2	7	13	20	26
Character "Reasonably Good"	2	1.3	2	7	13	20	26
Character "Poor"	1	0.612	1	4	7	10	14
EVM	1	0.612	1	4	7	10	14

**GRADE B (50 Plan)**

Sample Units X Sample Unit Size			1 x 50	6 x 50	13 x 50	21 x 50	29 x 50
Units of Product			50 <sup>1</sup>	300	650	1050	1450
DEFECTS	TOL	AQL <sup>2</sup>	ACCEPTANCE NUMBERS				
Dark Green Units	2	1.3	2	7	13	20	26
Poor Color Units	8	6.4	6	26	52	80	108
Major Blemish	3	2.9	3	13	26	39	53
Total Blemish (major + minor)	8	6.4	6	26	52	80	108
Mechanical Damage	3	2.9	3	13	26	39	53
Major Core Material	2	1.3	2	7	13	20	26
Total Core Material (major + minor)	3	2.9	3	13	26	39	53
Peel	3	2.9	3	13	26	39	53
Character "Poor"	2	1.3	2	7	13	20	26
EVM	2	1.3	2	7	13	20	26

<sup>1</sup> Unofficial Samples

<sup>2</sup> AQL calculated from tolerance (TOL) at 650 units

**TABLE II ACCEPTANCE NUMBERS FOR SPECIFIED DEFECTS, STRIPS, DICED OR OTHER STYLES FROZEN ONION**

**GRADE A (450 Gram Plan)**

Sample Units X Sample Unit Size			1 x 450	6 x 450	13 x 450	21 x 450	29 x 450
Total Weight of Product (in grams)			450 <sup>3</sup>	2700	5850	9450	13050
DEFECTS	TOL	AQL <sup>4</sup>	ACCEPTANCE NUMBERS				
Dark Green Units	0.11	0.056	1	3	6	9	12
Poor Color Units	0.88	0.696	6	26	51	79	106
Major Blemish	0.22	0.144	2	7	13	19	26
Total Blemish (major + minor)	0.88	0.696	6	26	51	79	106
Major Core Material	0.11	0.056	1	3	6	9	12
Total Core Material (major + minor)	0.44	0.325	3	13	26	40	53
Peel	0.22	0.144	2	7	13	19	26
Character "Reasonably Good"	1.0	0.9	7	32	64	100	135
Character "Poor"	0.5	0.4	4	16	31	48	64
EVM	0.11	0.056	1	3	6	9	12

**GRADE B (450 Gram Plan)**

Sample Units X Sample Unit Size			1 x 450	6 x 450	13 x 450	21 x 450	29 x 450
Total Weight of Product (in grams)			450 <sup>3</sup>	2700	5850	9450	13050
DEFECTS	TOL	AQL <sup>4</sup>	ACCEPTANCE NUMBERS				
Dark Green Units	0.22	0.144	2	7	13	19	26
Poor Color Units	2.0	1.72	12	57	117	183	249
Major Blemish	0.67	1.72	5	20	39	60	81
Total Blemish (major + minor)	2.0	1.72	12	57	117	183	249
Major Core Material	0.22	0.144	2	7	13	19	26
Total Core Material (major + minor)	0.88	0.696	6	26	51	79	106
Peel	0.22	0.144	2	7	13	19	26
Character "Poor"	4.0	3.6	23	113	234	370	506
EVM	0.22	0.144	2	7	13	19	26

<sup>3</sup> Unofficial Sample

<sup>4</sup> AQL calculated from tolerance (TOL) at 5850 units

## DARK GREEN UNITS

Dark green units are units with dark green stripes across 50 percent or more of the onion unit. Any amount that reaches or exceeds 50 percent of the visible area is considered one unit. One unit is equivalent to one defect for all styles.

## POOR COLORED UNITS

Color in frozen onions is part of the prerequisite quality evaluation. Any poor colored units found during this analysis are counted or weighed (depending on style), and recorded as part of the classified quality factor evaluation.

## BLEMISH

Any unit that is affected or damaged by pathological injury, insect injury, or any other injury that affects the overall appearance or eating quality of the unit.

To perform this analysis use inspection aid 30 series measurement guides with either metric or standard circles.

- **Major blemish:** Any unit with tan to dark blemish(es) that, in the aggregate, are larger than the area of a circle 1/4 inch (6 mm) in diameter.
- **Minor blemish:** Any unit with tan to brown blemish(es) that, in the aggregate, are larger than the area of a circle 1/8 inch (3 mm) in diameter but smaller than 1/4 inch (6 mm) in diameter.
- **Total blemish:** The combined total of major and minor blemishes.

## MECHANICAL DAMAGE (WHOLE STYLE ONLY)

Mechanical damage means that the appearance of the unit is affected by gouging, or the unit is crushed or broken by mechanical means to the extent that the appearance is materially affected.

## CORE MATERIAL

Core material is the portion of the onion bulb that is part of the internal or external onion flesh. This material should not be discolored, excessively tough, fibrous, soft, or mushy. Core material may also include sprouts, seed stems, root crown, and root material.

To perform this analysis use inspection aid 30 series measurement guides with either metric or standard grids.

- **Major Core Material**
  - **In whole style:** Major core material is a unit that is more than 3/8 inch (10mm) in diameter or length, whichever is applicable. Each unit is the equivalent of one major defect.
  - **In strips, diced, and other styles:** Major core material exceeds 1/2 square inch (3.2 square centimeters). Each unit is the equivalent of one major defect.
- **Minor Core Material**
  - **In whole style:** Minor core material is a unit that is 3/8 inch (10mm) or less in diameter or length, whichever is applicable. Each unit is the equivalent of one minor defect.
  - **In strips, diced, and other styles:** Minor core material is 1/2 square inch (3.2 square centimeters) or less. Each unit is the equivalent of one minor defect.
- **Total core material:** The combined total of major and minor core material.

## PEEL

Peel is the thin outer skin of the bulb. Peel is usually creamy white to brown in color, tough, and tissue-like. Each equivalent of peel that is 1/2 square inch (3.2 square centimeters) is considered one defect.

To perform this analysis use inspection aid 30 series measurement guides with either metric or standard grids.

## CHARACTER

The analysis for character is performed on thawed product. Character refers to the firmness and texture of the individual onion unit and the lack of tough, soft, or mushy units.

- **Good character:** The onions are uniformly firm and tender, and practically free of soft and spongy units.
- **Reasonably good character:** The onions are reasonably firm and tender, and are not soft or spongy.
- **Poor character:** The product fails to meet the requirements of reasonably good character.



## **EXTRANEOUS VEGETABLE MATERIAL (EVM)**

**EVM** is any plant material of onions or other harmless plants including, but not limited to, the leaves or roots. Each equivalent of EVM of 1 inch in length is considered one defect in any style of frozen onion.

To perform this analysis use inspection aid 30 series measurement guides with either metric or standard grids, or a ruler as applicable.