United States Department of Agriculture

Agricultural Marketing Service

Fruit and Vegetable Programs

Fresh Products Branch

Apples

Shipping Point and Market Inspection Instructions

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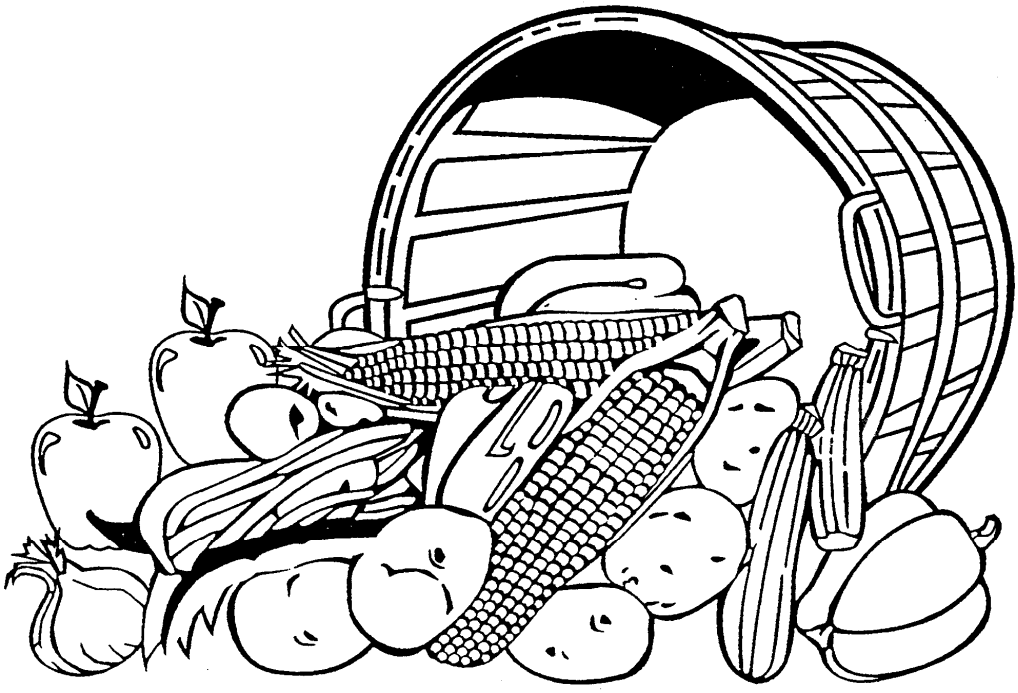

Shipping Point and Market Inspection Instructions for Apples

These inspection instructions are specifically developed and designed by the Fresh Products Branch to assist officially licensed inspectors in the interpretation and application of the U.S. Standards for Grades of Apples, Section 51.300.

These instructions do not establish any substantial rule not legally authorized by the official grade standards. This publication supersedes any previously issued inspection instructions.

Refer to General Inspection Instructions for additional information pertaining to date, inspection point, carrier, condition of carrier, lading, etc. not covered in these instructions. (Reference to "General Inspection Instructions" in all Fresh Products Branch publications refers to any one or all of the following - General Shipping Point Inspection Instructions, General Market Inspection Instructions, or Fresh Fruit and Vegetable Certificate Writing Handbooks.)

Any portion of these instructions beginning with a section number such as 51.--- and followed with **bold** print is material copied directly from the U.S. standards. The U.S. Standards for Grades of Apples is printed in the appendix of this instruction. All of the U.S. standards are available on the Internet under the USDA homepage.

March 2005

This replaces Market Inspection Instructions for Apples dated January 1978 and Shipping Point Inspection Instructions for Apples dated July 1978.

Factors noted with **(Q)** are considered quality only. Factors noted with **(C)** are considered condition at market. Factors noted with **(Q or C)** may be quality or condition depending on the circumstances. Factors not designated do not pertain to either category.

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REPRESENTATIVE SAMPLING

The importance of obtaining representative samples cannot be over emphasized. Accurate certification is possible only if the samples examined are truly representative of the entire lot or accessible portion. All portions of a lot or load should receive the same attention in sampling regardless of the difficulty involved in reaching all layers or parts of a lot or load. Anytime the entire lot requested is not accessible for sampling, the inspection and certificate must be restricted to the accessible portion.

Specimens shall be selected from various locations within the containers in order to ensure representative sampling. In selecting trays the inspector should follow a predetermined order of sampling, such as taking the top and second trays from the first sample carton, the second and third trays from the next sample carton, etc. In following this sequence the bottom tray from every fourth or fifth carton sampled will be included in a sample.

Number of Samples

As a general rule a minimum of 1% of the lot must be examined. For lots of less than 300 packages a minimum of 3 samples must be examined. It is the inspector's responsibility to examine additional representative samples when the quality, condition, or size in samples is decidedly different to ensure an accurate description of the lot.

Size of Sample

The tolerances in the U.S. Standards for Grades of Apples are applied on a container basis and determined by either a count or weight basis. The size of the sample will vary depending on the type of package and inspection performed. Refer to section “Method of Sampling and Calculation of Percentages” to determine whether a count or weight basis should be used in the calculation of percentages.

Method of Sampling and Calculation of Percentages

§51.308 *Methods of sampling and calculation of percentages.* (a) When the numerical count is marked on the container, [or] **containers are packed to weigh ten pounds or less, or in any container where the minimum diameter of the smallest apple does not vary more than 1/2 inch from the minimum diameter of the largest apple, percentages shall be calculated on the basis of count.**

(b) In all other cases except those listed in paragraph (a) of this section, they shall be calculated on the basis of weight.

Sample Size for Count Basis

In-line Certification.

For packages containing 25 or more fruit each sample shall be at least **25 apples.** When packages contain less than 25 fruit, examine the **entire container**. Whenever the sample size consists of less than the entire contents of the container and defects exceed the container or lot tolerances, the entire contents of the container must be examined.

Stationary Lots.

For packages containing 40 or more fruit each sample shall be at least **40 apples.** When packages contain less than 40 fruit examine the **entire container**. Whenever defects exceed the container or lot tolerances in one or more samples, the entire contents of at least one of those packages must be examined.

Consumer Packages.

The **entire contents** of the container is the sample size.

Sample Size for Weight Basis

In-line Certification.

For packages containing 20 pounds or more the sample size shall be at **least 20 pounds.** The **entire contents** of the container shall be examined when packages contain less than 20 pounds. Whenever the sample size consists of less than the entire contents of the container and defects exceed the container or lot tolerances, the entire contents of the container must be examined.

Stationary Lots.

For packages containing 20 pounds or more the sample size shall be at **least 20 pounds.** The **entire contents** of the container shall be examined when packages contain less than 20 pounds. Whenever defects exceed the container or lot tolerances in one or more samples, the entire contents of at least one of those packages must be examined.

Consumer Packages.

The **entire contents** of the container is the sample size.

Sample Size for Bulk Bins or Bulk Lots

The sample size shall be at **least 40 fruit** (contiguous) when the minimum diameter of the smallest apple does not vary more than 1/2 inch from the minimum diameter of the largest apple. When the apples do vary, the sample size shall be at **least 20 pounds** (contiguous). When tolerances are exceeded in bulk bins or bulk lots in one or more samples, the original sample size of at least one of those samples must be doubled.

Sampling for Internal Defects

When inspecting apples for internal defects cut a **minimum of two apples** selected at random. If no scorable defects are found it is not necessary to make additional cuts for internal defects in that sample. If scorable defects are found cut an additional 8 apples from the sample for a minimum of 10 apples. When container tolerance is exceeded cut an additional 10 apples for a total of 20 apples. If the container tolerance is exceeded then cut the **entire contents** (**100 count** for bulk bins) of at least one sample. If the lot fails to meet the container tolerances after an entire container has been cut, the remaining cut samples shall consist of 20 apples. If scorable defect is not detected in three successive samples, it is permissible to return to the cutting a minimum of two apples.

The percentage of internal defects shall be calculated on the basis of the cut sample. A column on the notesheet shall be kept to record the number of fruit cut per sample.

TOLERANCES AND APPLICATION OF TOLERANCES

§ 51.306 *Tolerances.* In order to allow for variations incident to proper grading and handling in each of the grades in 51.300, 51.301, 51.302, 51.303, and 51.304 the following tolerances are provided as specified:

(a) Defects:

(1) U.S. Extra Fancy, U.S. Fancy, U.S. No. 1, and U.S. No. 1 Hail grades: 10 percent of the apples in any lot may fail to meet the requirements of the grade, but not more than one-half of this amount, or 5 percent, shall be allowed for apples which are

seriously damaged, including therein not more than 1 percent for apples affected by decay or internal breakdown.

(2) U.S. Utility grade: 10 percent of the apples in any lot may fail to meet the requirements of the grade, but not more than one-half of this amount, or 5 percent, shall be allowed for apples which are seriously damaged by insects, and including in the total tolerance not more than 1 percent for apples affected by decay or internal breakdown.

(b) When applying the foregoing tolerances to Combination grades, no part of any tolerance shall be allowed to reduce, for the lot as a whole, the 50 percent of apples of the higher grade required in the combination, but individual containers shall have not less than 40 percent of the higher grade.

	U.S. Extra Fancy, U.S. Fancy, U.S. No. 1, and U.S. No. 1 Hail
Total Defects	10%
including serious damage,	5%
including decay or internal breakdown.	1%

	U.S. Utility
Total Defects	10%
including serious damage by insects,	5%
including in total tolerance decay or internal breakdown.	1%

Size

(c) *Size:* When size is designated by the numerical count for a container, not more than 10 percent of packages in the lot may fail to be [1]fairly uniform. When size is designated by minimum or maximum diameter, not more than 5 percent of the apples in any lot may be smaller than the designated minimum, and not more than 10 percent may be larger than the designated maximum. For

[1] "Fairly uniform" means the size of the fruit within the container does not vary more than 1/2-inch in diameter from the smallest to largest fruit.

Red Delicious or Golden Delicious varieties only, a combination of minimum diameter and/or weight may be used. When this designation is used, an individual apple will be considered to have met the minimum size requirement even if the apple is smaller than the minimum diameter, provided it is equal to or greater than the weight provided in Table II of this section. However, not more than 5 percent of the apples in any lot may fail to meet either the minimum diameter or minimum weight when so designated. In addition, when Red Delicious or Golden Delicious apples are designated with diameter/weight combinations, they may only be designated according to the following table:

Table II

Red Delicious	Golden Delicious
2 1/8 inches or 65 grams	63 grams
2 1/4 inches or 75 grams	70 grams
2 3/8 inches or 84 grams	82 grams
2 1/2 inches or 100 grams	95 grams
2 5/8 inches or 115 grams	109 grams
2 3/4 inches or 139 grams	134 grams

Size designation	Tolerance
Packages marked for **count**:	10% of the packages in the lot may fail to be fairly uniform.
Packages marked for **diameter**:	5% of the apples in any lot may be smaller than the designated minimum diameter, and 10% of the apples in any lot may be larger than the designated maximum diameter.
Packages marked for a **combination** of minimum **diameter** and/or minimum **weight**:	5% of the apples in the lot may fail to meet either the minimum diameter or minimum weight when so designated.

Size is **not** a requirement of the grade, these tolerances are provided for situations when size is designated.

Containers With Mixed Varieties

The U.S. standards permit more than one variety to be packed in a container when this fact is printed on the container. When containers are packed and marked with two or more varieties, the total defects of the varieties and the defects in each variety in the lot must be within the tolerances provided in the standards, including the application of tolerances to individual packages. For example, in a mixture of Golden Delicious and Red Delicious within the same containers marked “U.S. Fancy,” the

combined average defects may be no more than 10 percent (for example 7 percent defects in the Golden Delicious and 3 percent in the Red Delicious) including no more than 5 percent serious damage (for example 3 percent in the Golden Delicious and 2 percent in the Red Delicious) including 1 percent decay or internal breakdown (for example 1/2 of 1 percent for each variety). As another example, in a package containing ten pounds or less of apples, if three decayed Red Delicious apple representing 18 percent is present, no Golden Delicious apple showing decay, internal breakdown or serious damage by insects is permitted within the same package. The usual grade statements, such as "U.S. Fancy," "Fails to grade U.S. Fancy account quality defects" or "U.S. Extra Fancy, decay being a factor of condition" shall be used.

Application of Tolerances

§51.307 *Application of tolerances.* The contents of individual packages in the lot, are subject to the following limitations: *Provided*, That the averages for the entire lot are within the tolerances specified for the grade:

(a) Packages which contain more than 10 pounds:

(1) Shall have not more than one and one-half times a specified tolerance of 10 percent or more and not more than double a tolerance of less than 10 percent, except that at least one apple which is seriously damaged by insects or affected by decay or internal breakdown may be permitted in any package.

(b) Packages which contain 10 pounds or less:

(1) No package may have more than 3 times the tolerance specified, except that at least three defective apples may be permitted in any package: *Provided*, That not more than three apples or more than 18 percent (whichever is the larger amount) may be seriously damaged by insects or affected by decay or internal breakdown.

Packages which contain more than **10 pounds**:

Total defects	10% x 1-1/2 = **15%**
including serious damage	5% x 2 = **10%**
including decay or internal breakdown	1% x 2 = **2%**

Except at least one apple which is seriously damaged by insects or affected by decay or internal breakdown is permitted in any package.

Packages which contain **10 pounds or less:**

Total defects	10% x 3 = **30%**
including serious damage	5% x 3 = **15%**
including decay or internal breakdown	1% x 3 = **3%**

Except at least three defective apples are permitted in any package. *Provided*, That not more than three apples or more than 18 percent (whichever is larger) is seriously damaged by insects or affected by decay or internal breakdown.

NOTESHEET AND CERTIFICATE

Entries on the notesheet and certificate must be kept in a legible and accurate manner. It is mandatory that all information which appears on the certificate be supported by information on the notesheet. It is the responsibility of the inspector to ensure that all information is properly recorded. Notations shall be recorded so that anyone familiar with inspection procedures can interpret them and write a certificate. Also, remember that notesheets and certificates are prima facie evidence and must be able to withstand legal scrutiny.

Detailed instructions pertaining to date, inspection point, place of inspection, type of carrier, lading, etc., which are not covered by these instructions may be found in the General Inspection Instructions. Additional information and instructions may be given by your supervisor.

Product

"Apples" and the type such as Red, Yellow and Green shall be used to describe this commodity in the "Product" heading. The variety may be reported in the "Product/Variety" section on the shipping point notesheet and certificate or in the "Lot ID" section on the market notesheet and certificate.

Number/Type of Containers

The number of containers shall always be reported. In the market and at shipping point locations for stationary lot certification, the inspector shall always verify the container count provided by the applicant for each lot and report it as the "inspector's count." If the number of containers available for inspection does not match the application, it is the inspector's responsibility to confirm that the amount presented for inspection constitutes the lot. If an accurate count cannot be determined, the inspector may report the count at someone else's authority. However, the reason for

doing so must be reported on the notesheet (e.g., numerous pallets with mixed product).

At shipping point locations for “days-run” certification the applicant generally provides a manifest for count and it is acceptable to use this for the number of containers.

Apples are generally tray or cell packed in cartons. Apples may also be shipped in bags, bulk bins and various types of jumble filled containers.

Brands/Markings

The brand, variety, size, count, grade, weight, point of origin and other important information appearing on the container should be reported on the notesheet in the "Brands/Markings" section. Only the brand name and other key markings necessary to properly identify the lot for certification should appear in this section on the certificate.

Origin

The inspector should not make a positive statement on their own authority, but when container markings list the state or country of origin, it should be quoted in the appropriate space on the notesheet and the certificate. If origin is not marked, it is the inspector’s responsibility to make an effort to obtain this information from the applicant. This policy is necessary because some firms may use one mark on the same product packed in several states. The inspector can certify only to the marks and has no means of verifying in what state or country the apples are grown.

CONDITION OF PACK

When describing pack, report any liners or pads within the container, also report if apples are wrapped.

Tray and Cell Packed

The following terms shall be used to describe pack when apples are **tray** or **cell** packed:

Very tight means the apples are packed so tightly that it usually results in injury.

Fairly tight means the apples are the proper size for molds or cell compartments in which they are packed, and that the molds are filled in a way that no more than slight movement of apples within molds or cells is possible.

Fairly well filled means that the net weight of the apples in the containers ranging from 2,100 to 2,900 cubic inches capacity is not less than 37 pounds for Cortland, Gravenstein, Jonathan, McIntosh and Golden Delicious varieties and not less than 40 pounds for all other varieties.

Slack means that the contents are more than 3/4 of inch down from the top edge of the carton. The amount of slack shall be reported in inches or fractions of an inch.

Jumble Packed and Volume Filled

The following terms shall be used to describe pack when apples are **jumble-packed** or **volume-filled** in containers:

Very tight means the apples are packed so tightly that it usually results in injury.

Tight means the container is sufficiently filled to prevent any movement within the container.

Fairly tight means there is little or no movement of the apples within the container.

Slightly Slack means that the pack is not sufficiently full to prevent movement of the apples within the container.

Slack means container is not sufficiently full and free movement of the apples occurs. The contents are definitely below the top of the package. The amount of slack shall be reported in inches or fractions of an inch.

Packing Requirements

The grade requirements and the packing requirements in the U.S. Standards for Grades of Apples are separate and distinct. However, the U.S. Condition Standards for Export requires that "pack" comply with the following packing requirements. (Refer to "U.S. Condition Standards for Export" section.)

§51.310 *Packing requirements*.

(a) Apples tray packed or cell packed in cartons shall be arranged according to approved and recognized methods. Packs shall be at least fairly tight or fairly well filled.

(b) Closed cartons containing apples not tray or cell packed shall be fairly well filled or the pack shall be sufficiently tight to prevent any appreciable movement of the apples.

(c) Packs in wooden boxes or baskets shall be sufficiently tight to prevent any appreciable movement of apples within containers when the packages are closed. Each wrapped apple shall be completely enclosed by its individual wrapper.

(d) Apples on the shown face of any container shall be reasonably representative in size, color and quality of the contents.

(e) Tolerances: In order to allow for variations incident to proper packing, not more than 10 percent of the containers in any lot may fail to meet these requirements.

These pack requirements state that the apples shown on the face must be reasonably representative in size, color and quality of the contents. A reasonable difference would be approximately 1/2-inch variation in size, approximately 10 percent variation in quality and 20 percent variation in color (for apples that must meet color requirements) between the apples on the face and the apples beneath. Refer to previous section for definitions of "fairly tight" and "fairly well filled."

Important points to remember when determining pack requirements:

- The application of tolerances does not apply to pack requirements. Not more than 10% of the **containers** in a lot may fail to meet the packing requirements.
- A lot of apples can fail the packing requirements and still meet grade. The grade statement would be as follows: "U.S. No. 1. Fails to meet packing requirements."
- Packing requirements are a requirement of the U.S. Condition Standards for Export.

Marking Requirements

Marking requirements are not a requirement of the U.S. grade(s) for apples. Therefore, a lot can fail to meet the following requirements and still meet the requirements for the grade.

§51.311 *Marking requirements.* Variety (or varieties if more than one is packed in the container), grade, and the numerical count or minimum diameter of apples packed in a closed container shall be indicated on the container. For apple lots utilizing the combined diameter/weight designations for Red Delicious and Golden Delicious varieties, the minimum diameter and minimum weight of

apples packed in a closed container shall be indicated on the container.

(a) When the numerical count is not shown, the minimum diameter or, in the case of Red Delicious or Golden Delicious lots where minimum diameter/weight designations have been chosen, the minimum diameter and weight as designated in Table II, shall be plainly stamped, stenciled or otherwise marked on the container in terms of whole inches, or whole inches and not less than eighth inch fraction thereof in the following manner: "A" inches or "B" grams, where "A" corresponds to one of the diameter measurements in terms of inches listed in Table II and "B" corresponds to the weight measurement in grams as indicated in Table II. Both diameter and weight must be shown using the word "or" between the given measurements.

(b) The word "minimum," or its abbreviation, when following a diameter size marking, means that the apples are of the size marked or larger. (See §§51.306 and 51.307.)

Important points to remember when determining marking requirements:

- Closed containers must be marked with the variety (or varieties), grade and count or minimum diameter.
- There are no tolerances for packages not meeting the marking requirements.
- A lot of apples can fail the marking requirements and still meet grade. The grade statement would be: "U.S. No. 1. Fails to meet marking requirements."
- Only Red Delicious and Golden Delicious varieties may be marked to a combination of minimum weight and/or diameter using the size designation in Table II in U.S. Grade Standards. (For Table II refer to "Size" section.)

TEMPERATURE OF PRODUCT

Inspectors would not normally determine or report temperatures at shipping point. However, when in transit or at destination, due to the importance of the pulp temperature of fresh fruits and vegetables it is essential that the inspector accurately determine and report the temperature or range in temperatures on each lot. Pulp temperature should be reported regardless of the location of the product, whether in the carrier, warehouse, or stacked on the platform. Remember to pre-cool the thermometer in order to obtain true readings. Report all temperatures to the nearest whole degree.

A minimum of three temperatures for each lot must be taken and recorded on the notesheet. More temperatures must be taken if the lot is abnormally cold, heated, or there is a specific request for temperatures, and these must be reported in greater detail specifying location in lot or load.

SIZE

Size is not a requirement of the U.S. grade(s) for apples. However, when size is designated it must meet the designation. Apples are generally packed for count or minimum diameter. Red Delicious and Golden Delicious apples may be packed using a combination of minimum diameter and/or weight that is designated in Table II of the standards.

Marking as to Count

When count is marked on the containers, as is generally the case with boxes and cartons, no attempt should be made to show the range in inches or fractions except when there is a specific request to show this information. In reporting size of apples packed by count in containers the following terms should be used, unless the apples are packed on the basis of a state grade which contains other definitions for these terms:

Uniform means not more than 10% of the fruit in the container varies more than 1/4 inch from smallest to largest fruit.

Fairly uniform means not more than 10% of the fruit in the container varies more than 1/2 inch from smallest to largest fruit.

Irregular means more than 10% of the fruit in the container varies more than 1/2 inch between smallest and largest fruit. The word “irregular” shall be followed by a description of range in diameter and percentage exceeding 1/2-inch range.

Apples which are packed to count must be “fairly uniform” to meet size requirements.

Diameter and Table II Size Designations

> **§51.320 *Diameter.* When measuring for minimum size, “diameter” means the greatest dimension of the apple measured at right angles to a line from stem to blossom end. When measuring for maximum size, “diameter” means the smallest dimension of the apple determined by passing the apple through a round opening in any position.**

When apples are packed to a minimum and/or maximum diameter size or in case of Red Delicious and Golden Delicious minimum weight and/or diameter, it must

be reported in connection with the grade. Additionally, report the range of size and a mostly statement in the "Description of Product" section on the shipping point certificate and in the "Other" section on the market certificate. Size columns must be kept on the notesheet to substantiate the size reported. Diameter shall be reported in inches and fractions of inches. For example: "U.S. No. 1, 2-1/4 minimum, 3-1/4 maximum. As size is not a requirement of the grade, a lot may fail to meet size specifications and still meet the requirements of the U.S. grade. The grade statement would be as follows: "U.S. No. 1. Fails to meet 2-1/8 inches or 65 grams minimum account of excess undersize."

Red Delicious and Golden Delicious apples are the only varieties permitted to use the size designations in Table II. When a Table II size designation is used, an individual apple will meet the size requirement if it meets either the minimum weight **or** the minimum diameter.

Table II

Red Delicious	Golden Delicious
2 1/8 inches or 65 grams	63 grams
2 1/4 inches or 75 grams	70 grams
2 3/8 inches or 84 grams	82 grams
2 1/2 inches or 100 grams	95 grams
2 5/8 inches or 115 grams	109 grams
2 3/4 inches or 139 grams	134 grams

When Undersize and Oversize Specimens are Also Defective

Undersize and oversize specimens that are also defective should be scored twice; once for offsize and once for the defect. This is necessary because the grades have separate tolerances for size and defects. Generally, the percentage of offsize specimens that are also defective will be negligible, and will make no material difference in the grade certification. When the percentage of offsize specimens that are also defective is 1% or more, the percentage shall be cross-referenced on the notesheet and certificate. Report this information in the "Description of Product" section on the shipping point certificate and in the "Other" section on the market certificate. For example: "2% undersize also included in the 4% reported for quality defects."

DEFECTS (QUALITY AND CONDITION)

Statements pertaining to firmness, maturity, shape, color, the amount and type of defects, and the amount of decay are shown under the appropriate headings.

Factors noted with **(Q)** are considered as **QUALITY** only (**Quality,** sometimes referred to as **"permanent" defects**) means defects which do not change during storage or shipment (shape, scars, etc.).

Factors noted with **(C)** shall be reported as **CONDITION** on market certificates. (**Condition defects** are defects which are subject to change during shipment or storage, including but not limited to bruising, discoloration, shriveling and decay.)

Those factors noted with **(Q or C)** may be considered as **QUALITY or CONDITION,** depending on the circumstances.

Defects at Shipping Point

At shipping point all defects are considered quality factors at the time of packing. However, if the apples have been in storage for more than 7 days after packing, factors listed as condition, are scored as condition factors.

> **§51.309 *Condition after storage or transit.* Decay, scald, or any other deterioration which may have developed on apples after they have been in storage or transit shall be considered as affecting condition and not the grade.**

If in doubt whether the length of time has been sufficient to cause condition of the apples to change, submit facts to your supervisor.

Specific Defect Measurements

The following specific defect measurements are based on an apple three inches in diameter. Corresponding smaller or larger areas would be allowed on smaller or larger fruit. Any reference within a scoring guide to **"inch"** or **"inches in diameter"** refers to that of a circle of the specified diameter. Additionally, any reference within a scoring guide to **"aggregate area," "total area,"** or **"aggregate affected area"** means the gathering together of separate areas into one mass for the purpose of comparison to determine the extent affected. (Refer to visual aid Gen-CP-1.)

Bitter Pit and Jonathan Spot (C)

Bitter Pit is a physiological disorder that appears to be related to reduced calcium in developing fruit. Bitter Pit can affect many different apple varieties, however, it is most common on Granny Smith and Delicious. Bitter Pit appears as small, brown, soft, dried pits of collapsed tissue, 1/16 to 1/4 inch in diameter. Most of the pitting occurs just beneath the apple skin and typically is concentrated at the blossom half of the fruit. When the apple is peeled, a small round or oval mass of dry, brown spongy tissue is found below each surface pit.

Jonathan Spot (C)

Jonathan Spot is a physiological disease, but its exact cause is unknown. It is primarily a disease that occurs during storage or transit or on the market. The disorder was first noted on Jonathan and is perhaps most common on that variety. Other varieties, however, such as Rome Beauty, Winter Banana, and Golden Delicious may be affected. Jonathan spot originates at the lenticels. The lesions are typically deep brown to black, superficial, slightly depressed, and circular with a very definite border and 1/16 to 1/8 inch in diameter.

Scoring Guide

The U.S. Extra Fancy, U.S. Fancy, U.S. No. 1, and U.S. No. 1 Hail grades require apples to be free from damage by Bitter Pit and Jonathan Spot. The U.S. Utility grade requires apples to be free from serious damage by Bitter Pit and Jonathan Spot.

§51.317 *Damage.* (5) Bitter pit or Jonathan spot when one or more spots affects the surface of the apple.

§51.318 *Serious damage*. (5) Bitter pit or Jonathan spot which is thinly scattered over more than one-tenth of the surface.

Brown Surface Discoloration (C)

There are several defects of apples both pathological and physiological that result in the surface of the apple becoming discolored without affecting the underlying flesh. Some examples are surface scald (also known as slight or common scald) delayed sunburn and controlled atmosphere injury. It is often difficult to determine the cause of the discoloration. Therefore, the U.S. standard states that brown surface discoloration regardless of the cause (delayed sunburn, surface scald) shall be scored as “Brown Surface Discoloration.”

Scoring Guide

§51.316 *Injury.* (f) Brown surface discoloration when caused by delayed sunburn, surface scald, or any other means and affects an area greater than 1/4 inch in diameter.

§51.317 *Damage.* (h) Brown surface discoloration when caused by delayed sunburn, surface scald, or any other means and affects an area greater than 1/2 inch in diameter.

§51.318 *Serious damage*. (j) Brown surface discoloration when caused by delayed sunburn, surface scald, or any other means and affects an area greater than 3/4 inch in diameter.

Bruises (C)

Bruising may be caused by rough handling, or by the pack being too loose or too tight. The variety, stage of firmness, and type of pack can influence the amount of bruising found. Small bruises, which are slight and incident to proper handling and packing, should be disregarded unless excessively numerous. Do not hold fruit at angles to the light to search for bruising.

Scoring Guide

§51.316 *Injury.* (e) Bruises which are not slight and incident to proper handling and packing, and which are greater than:

(1) 1/8 inch in depth;

(2) 5/8 inch in diameter;

(3) any combination of lesser bruises which detract from the appearance or edible quality of the apple to an extent greater than any one bruise described in paragraphs (1) or (2) of this section**.**

§51.317 *Damage.* (g) Bruises which are not slight and incident to proper handling and packing, and which are greater than:

(1) 3/16 inch in depth;

(2) 7/8 inch in diameter;

(2) any combination of lesser bruises which detract from the appearance or edible quality of the apple to an extent greater than any one bruise described in paragraphs (1) or (2) of this section.

§51.318 *Serious damage.* (i) Bruises which are not slight and incident to proper handling and packing, and which are greater than:

(1) 3/8 inch in depth;

(2) 1-1/8 inches in diameter;

(3) any combination of lesser bruises which detract from the appearance or edible quality of the apple to an extent greater than any one bruise described in paragraph (i)(1) or (2) of this section.

The stage of firmness of the bruised fruit and the location within the pack and load should be reported (when applicable). Report this in general terms on the certificate in the "Description of Products" section on the shipping point certificates and in the "Other" section on the market certificates. For example, "Bruising generally affecting ripe fruit, few firm ripe fruit, scattered throughout pack of top layer cartons."

Broken Skins and Cuts (Q or C)

Broken skins and cuts may occur during harvest or when being packed. Healed skin breaks and cuts are scored as a quality factor; unhealed skin breaks are scored as a condition factor.

Scoring Guide

Score as injury *any* **healed** skin break, score as damage **healed** skin breaks exceeding 1/4 inch in diameter or when exceeding 1/8 inch in depth, and score as serious damage **healed** skin breaks exceeding 1/2 inch in diameter. Score any **unhealed** skin breaks as serious damage.

Stem punctures shall not be scored as skin breaks or cuts. Refer to the section entitled "Stem Punctures" for scoring guide.

Cedar Rust (Q)

Apple Cedar Rust usually appears on the calyx end of the fruit as grayish-yellow to yellow color. These spots vary in diameter from approximately 1/8 to 3/4 inch in diameter and extend in to the flesh 1/4 to 1/2 inch; in severe infections they extend into the core. The surface of the spots may be smooth; or roughened with the spore-producing bodies of the fungus, which are in the form of pimples or of open, cup-shaped receptacles with flaring, papery edges. The flesh beneath rust spots is woody and usually greenish in color, though in Winesap and Ben Davis varieties the green is sometimes intermixed with a pronounced brown color.

Quince-Cedar Rust

Quince-Cedar Rust can cause apples to be dwarf and distorted at the calyx end. Also, the internal discoloration caused by Quince-Cedar Rust penetrates the fruit tissue much deeper than Apple-Cedar Rust. Quince-Cedar Rust shall be reported as Apple-Cedar Rust.

Scoring Guide

§51.316 *Injury.* (g) Disease: (1) Cedar rust infection which affects a total area of more than three-sixteenths inch in diameter.

§51.317 *Damage.* (i) Disease: (2) Cedar rust infection which affects a total area of more than one-fourth inch in diameter.

§51.318 *Serious damage.* (g) Disease*:* (2) Cedar rust infection which affects a total area of more than three-fourths inch in diameter.

Cleanness (Q)

The U.S. grades for apples have the following requirements for cleanness:

U.S. Extra Fancy, U.S. Fancy, U.S. No. 1 & U.S. No. 1 Hail: Clean.

U.S. Utility: No requirement.

Definitions:

§51.314 *Clean.* "Clean" means that the apples are free from excessive dirt, dust, spray residue, and other foreign material.

Scoring Guide

Score dirt, dust and other foreign material, which materially affects the appearance of the individual apple against the total tolerance of the grade. Score spray residue on apples using visual aid APL-C-8.

Wax Residue (C)

Wax residue may be visible on the surface of apples for several reasons ranging from excessive application to blistering and peeling of wax. The wax is actually food grade shellac. Sometimes when apples have been cooled and then left out in warm, humid areas and cooled again, the shellac blisters and peels. Once condensed water evaporates from the shellac, a raised white, crusty or flaky residue may appear on an apple's surface.

Scoring Guide

Wax residue which materially affects the appearance of the apple shall be scored as injury when affecting 5% of the surface, score as damage when affecting more than 5% of the surface and score as serious damage when affecting more than 25% of the surface, exclusive of the stem cavity or calyx basin of the apple. Wax residue is considered materially detracting from the appearance of the apple if it appears as or equal to the bottom right photo in APL-C-8 Spray Residue.

Color (Q)

The U.S. grades for apples have the following color requirements only for Red Delicious, Red Rome, Empire, Idared, Winesap, Jonathan, Stayman, McIntosh, Cortland, Rome Beauty, Delicious, and York varieties in the U.S. Extra Fancy, U.S. Fancy and U.S. No. 1 grades:

> **§51.305 *Color requirements.* In addition to the requirements specified for the grades set forth in §§51.300 to 51.304, apples of these grades shall have the percentage of color specified for the variety in Table I appearing in this Section. All apple varieties other than those appearing in Table I shall have no color requirements pertaining to these grades. For the solid red varieties, the percentage stated refers to the area of the surface which must be covered with a good shade of solid red characteristic of the variety: *Provided*, That an apple having color of a lighter shade of solid red or striped red than that considered as a good shade of red characteristic of the variety may be admitted to a grade, provided it has sufficient additional area covered so that the apple has as good an appearance as one with the minimum percentage of good red characteristic of the variety required for the grade. For the striped red varieties, the percentage stated refers to the area of the surface in which the stripes of a good shade of red characteristic of the variety shall predominate over stripes of lighter red, green, or yellow. However, an apple having color of a lighter shade than that considered as a good shade of red characteristic of the variety may**

be admitted to a grade, provided it has sufficient additional area covered so that the apple has as good an appearance as one with the minimum percentage of stripes of a good red characteristic of the variety required for the grade. Faded brown stripes shall not be considered as color. (A) Color standards USDA Visual Aid APL-CC-1 (Plates a - e) consists of a folder containing the color requirements for apples set forth in this section and five plates illustrating minimum good shade of solid red or striped red color, minimum compensating color and shade not considered color, for the following 12 varieties: Red Delicious, Red Rome, Empire, Idared, Winesap, Jonathan, Stayman, McIntosh, Cortland, Rome Beauty, Delicious, and York.

Table 1[1]

Only the varieties listed below shall be required to meet a minimum color requirement.	U.S. Extra Fancy	U.S. Fancy	U.S. No. 1
Variety	Percent	Percent	Percent
Red Delicious.....	66	40	25
Red Rome.....	66	40	25
Empire.....	66	40	25
Idared.....	66	40	25
Winesap.....	66	40	25
Jonathan.....	66	40	25
Stayman.....	50	33	25
McIntosh.....	50	33	25
Cortland.....	50	33	25
Rome Beauty.....	50	33	25
Delicious.....	50	33	25
York.....	50	33	25

[1]Variations on varietal designations listed above must meet or exceed those color requirements listed.

Apples which have color of a lighter shade than that considered as a good shade of red required for the variety, provided it has sufficient additional area covered so that the apple has as good an appearance as one with the minimum percentage of good red characteristic of the variety required for the grade. This is commonly referred to as compensating color. As a guide, it takes twice as much compensating color to equal good red color characteristic of the variety. For example, an apple with 100% compensating color has as good an appearance as an apple with 50% of good red shade of red. Refer to visual aid USDA Visual Aid APL-CC-1.

Scoring Guide

Score apples of the varieties listed in Table I that do not meet the minimum specified color percentages against the total tolerance for the grade.

Firmness (C)

Firmness is an important factor when determining the overall condition of the fruit. Before an apple becomes overripe it will show varying degrees of firmness, depending upon the stage of the ripening process (Refer to "Overripe" section.) The degree of firmness shall be reported in general terms in the "Description of Products" section on shipping point certificates and in the "Other" section on market certificates using the following terms:

"Hard" means apples with a tenacious flesh and starchy flavor.

"Firm" means apples with a tenacious flesh but which are becoming crisp with a slightly starchy flavor, except the Delicious variety.

"Firm ripe" means apples with crisp flesh except that the flesh of the Gano, Ben Davis, and Rome Beauty varieties may be slightly mealy.

"Ripe" means apples with mealy flesh and soon to become soft for the variety.

Ground Color

Ground color can be an indicator of the ripeness of the fruit. Depending upon the variety, it may be the only color the apple possesses or it may be overspread with a blush. The terms for describing ground color for red varieties are: green, light green, yellowish-green and yellow. Normally the ground color of a hard apple is green or light green and as the apple advances toward the ripe stage it changes to yellow. However, there are many exceptions to the normal color changes, which necessitates exercising considerable judgment in using ground color as a firmness index. Under certain growing conditions, hard apples have a yellowish-green to yellow ground color. Firm ripe to ripe apples may retain their green ground color in cold storage. This is quite common in the Rome variety.

The ground color for Golden Delicious and other green or yellow varieties may be described color as: green, whitish-green, light green, yellowish-green, greenish-yellow, light yellow, whitish-yellow and yellow. Again, use caution in using ground color as a firmness index. It has been noted that ground color may not necessarily relate to firmness in Golden Delicious and other green or yellow varieties. Golden Delicious apples may be yellow and firm or light green and ripe.

The following information concerning thumb pressure, wax development, cutting, chewing (taste and texture), and pressure testing of apples can aid in determining the degree of firmness. These five "indices" of firmness shall be collectively used to

determine the firmness of the apple. Although the chew test is most likely the most accurate test to determine firmness, no one test (including the pressure test) shall hold precedence or predominate in determining firmness. The ultimate decision lies with the inspector based on the collective input of all of these indices.

Chewing Test

Chewing a thin slice of apple flesh is one of the best ways to determine firmness. Sweetness or sourness to the taste cannot be considered to any extent in determining the degree of firmness. However, the presence or absence of a starchy flavor and the texture of flesh can be good indices of firmness. A hard apple is generally starchy to the taste. It has a leathery texture, is tough, tenacious and not crisp. A firm apple is still highly tenacious or is becoming crisp. The Delicious variety will be somewhat starchy this degree of firmness. Other varieties, when firm ripe, will lose or practically lose all starchy flavor and break up readily in your mouth but are not mealy, or only slightly so, at the first bite. A hard or firm apple leaves a residue of pulp in your mouth after chewing; a ripe apple melts away with chewing. Cutting a thin slice for chewing rather than biting into an apple is recommended because the reaction of the cold on your teeth when biting into a cold storage apple of about 32° F can make the apple taste firmer than it is.

Thumb Pressure

The resistance of the apple flesh to pressure of the thumb is one of the quick and practical methods of determining firmness along with observation of ground color and wax development. Thumb pressure, as an index of firmness should be used in conjunction with cutting test, chewing test and pressure test.

Wax Development

With most fall and winter apple varieties, firmness decreases in storage and the skin of the fruit gives off a waxy film. This wax exudation is very noticeable in the firm ripe and ripe stages of such varieties as Winesap and Arkansas Black. This is the least dependable test due to the fact many apples have a mechanically applied film of oil or wax. This index should only be considered on apples known not to have a commercial wax, oil, or shellac applied.

Cutting Test

The resistance offered by the knife blade on cutting the flesh is one index of firmness. A hard apple cuts with resistance and snap, while a ripe apple cuts easily with little if any snap. The greatest variable affecting this index is the degree of sharpness of the knife being used. This factor must always be considered when using this method to determine firmness.

Pressure Testing

Pressure testing can be useful in determining the firmness of apples, especially in the case of "borderline" firmness of apples. However, as in the case of any of the indices that may be used to determine firmness, it should not be considered as the sole means or "absolute test" for determining firmness. As with the other indices there are variables that cannot be controlled precisely with this test that contribute to imprecise results. Nonetheless, this index used with other indices and the collective judgment of the inspector should provide a reasonably accurate determination of the degree of firmness of the fruit. USDA Circular 627, "Fruit Pressure Testers and Their Practical Application" describes the use of pressure testers and which contains the tables[1] of firmness to be used with the tester.

In order to perform a pressure test, at least 5 apples from each container must be selected and punctured. (Advise the applicant of this fact.) Each apple must be punctured twice on nearly opposite sides. Do not make the second puncture exactly opposite of the first puncture, as there may be damage to the tissue from the first test. The two readings are recorded individually. Only average two readings if specifically requested to do so by the applicant. Additionally, do not report readings on the certificate unless requested to do so by the applicant. Use the readings to determine firmness according to the "Lower Limits Table." Report the results in general terms using hard, firm, firm ripe, or ripe on the certificate in the "Description of Products" section on the shipping point certificate and in the "Other" section on the market certificate. For example, "Generally firm, few firm ripe." If the applicant requests the readings to be reported on the certificate, report a range and mostly statement in the "Description of Products" section on the shipping point certificate and in the "Other" section on the market certificate. For example, "Pressure Test Readings (pounds): 8.0 to 11.5, mostly 9.0 to 11.0." Also, report in the "Remarks" section of the certificate "Pressure test readings reported at applicant's request."

[1] The table shows the lower limit of firm ripe for Golden Delicious variety as 10 pounds of pressure. (11 pounds was previously shown in error.)

LOWER LIMITS PRESSURE TEST AT INDICATED DEGREE OF FIRMNESS[1]

	Hard	Firm	Firm Ripe	Ripe
Delicious	to 16.5	to 14	to 11	to 8
Golden Delicious	to 16	to 13	to 10	to 8
Jonathan	to 16	to 13.5	to 10.5	to 8
Rome	to 18	to 15	to 11	to 9
Winesap	to 18	to 15	to 12.5	to 9.5
Yellow Newtown	to 18	to 15	to 12	to 10

[1] For varieties not listed firmness levels shall be determine by combination of ground color, thumb pressure, wax development, cutting, and chewing.

Flyspeck and Sooty Blotch (Q)

Flyspeck and Sooty Blotch will often appear together. Flyspeck appears as small, slightly raised, black specks on the surface of the fruit. The specks commonly occur in groups of 8 to more than 50. These specks can easily be scraped off, however, they are not usually removed in normal handling operations. Sooty Blotch is also superficial and can easily be removed by scraping or rubbing. Sooty Blotch appears as dark granular spots or smudges, which vary in size and shape with indefinite outlines.

Scoring Guide

§51.316 *Injury.* (2) Sooty blotch or fly speck which is thinly scattered over more than 5 percent of the surface, or dark, heavily concentrated spots which affect an area of more than one-fourth inch in diameter.

§51.317 *Damage.* (3) Sooty blotch or fly speck which is thinly scattered over more than one-tenth of the surface, or dark, heavily concentrated spots which affect an area of more than one-half inch in diameter.

§51.318 *Serious damage.* (3) Sooty blotch or fly speck which affects more than one-third of the surface.

Freezing and Freezing Injury (C)

Freezing injury may occur when temperatures drop below the freezing point of the fruits. The freezing points for all major apple varieties range from 27.3 to 29.4º F. and average 28.4º F. Inspectors must always clearly distinguish between fruit in a frozen condition and those affected by freezing injury. The term "frozen" should only be used when ice crystals are present. "Freezing injury" is the term that should be used when it is evident that the apple has been frozen but is not in a frozen condition at the time of inspection. It may be difficult to distinguish between bruising, freezing injury and internal breakdown.

The following four conditions may indicate freezing injury:

1. Few to all of the vascular bundles around the core may demonstrate various degrees of browning.
2. Extensive browning of the flesh and of both large and small vascular bundles. The affected flesh is watery and soft. (If it is mealy and rather firm and the flesh is affected mostly at the blossom end of the fruit, this indicates internal breakdown not freezing injury.)
3. Large (2 inches in diameter or larger) flattened areas in apples from the lower layer of bottom containers, the central portion of the areas being more sunken and rather soft.
4. Shriveling.

When reporting freezing or freezing injury it is important to give the following information:

- Record pulp temperatures taken at various locations.
- Determine and record extent of the injury in the load.
- Determine and record extent of the injury in the containers.
- Determine and record degree to which individual specimens are affected.
- Describe the **pattern** of freezing or freezing injury in clear, concise terms.

When the location of injury indicates where or when the freezing occurred this is to be stated. For example: "freezing injury so located as to indicate occurred after packing but not in present location."

Hail and Other Similar Depressions (Q)

Fruit that has been subjected to hail injury early in the growing season has a tendency to outgrow the internal condition, but the fruit may become slightly misshapen as it develops. When fruit is struck by hail late in the season, the cuticle covering the affected spots may be crushed or torn but often remains intact. Spots usually range from 1/8 to 1/2 inch in diameter and are slightly to sharply depressed. The flesh beneath the spots generally is brown and spongy and dry because of loss of water from the bruised area.

Scoring Guide

§51.316 *Injury.* (d) Hail marks, drought spots, other similar depressions or scars:

(1) When the skin is broken, whether healed or unhealed;

(2) When there is appreciable discoloration of the surface;

(3) When any surface indentation exceeds one-sixteenth inch in depth;

(4) When any surface indentation exceeds one-eighth inch in diameter; or

(5) When the aggregate affected area of such spots exceeds one-half inch in diameter.

§51.317 *Damage.* (d) Hail marks, drought spots, other similar depressions, or scars:

(1) When any unhealed mark is present;

(2) When any surface indentation exceeds one-eighth inch in depth;

(3) When the skin has not been broken and the aggregate affected area exceeds one-half inch in diameter; or

(4) When the skin has been broken and well healed, and the aggregate affected area exceeds one-fourth inch in diameter.

§51.318 *Serious damage.* (d) Hail marks, drought spots, or scars, if they materially deform or disfigure the fruit, or if such defects affect more than one-tenth of the surface in the aggregate: *Provided*, That

no hail marks which are unhealed shall be permitted and not more than an aggregate area of one-half inch shall be allowed for well healed hail marks where the skin has been broken.

When inspecting on the basis of "U.S. No. 1 Hail" grade keep in mind that hail marks where the skin has not been broken and well healed hail marks where the skin has been broken are permitted.

Insects and Worms (Q)

An insect sting is a small insect puncture, which extends only slightly below the skin of the fruit while a worm hole continues well into the flesh and is unusually larger. The larva of a codling moth is the most common insect causing stings and worm holes. Generally all insect feeding punctures and actual holes made by insects will be scored using the scoring guide for insect and worm holes. The exception to this would be the punctures made by the Plum Curculio for the purpose of laying eggs usually result in crescent-shaped, corky, russet scars, which shall be scored on the basis of russeting rather than insects.

Scoring Guide

§51.316 *Injury.* (h) Insects: (1) Any healed sting or healed stings which affect a total area of more than one-eighth inch in diameter including any encircling discolored rings.

(2) Worm holes.

§51.317 *Damage.* (j) Insects: (1) Any healed sting or healed stings which affect a total area of more than three-sixteenths inch in diameter including any encircling discolored rings.

(2) Worm holes.

§51.318 *Serious damage.* (h) Insects: (1) Healed stings which affect a total area of more than one-fourth inch in diameter including any encircling discolored rings.

(2) Worm holes.

Green Fruit Worm Injury

This injury usually occurs as large russet and corky scars occurring in scooped out areas or in the form of slightly raised or wavelike spots with some distortion of the fruits. Such injuries are usually the results of feeding early in the season when the apples are small. This injury should be scored on the same basis as russeting, but described on the certificate as insect injury.

Red-Banded Leaf Roller and Similar Injury

The larva of the Red-Banded Leaf Roller consumes areas of skin and outer flesh, usually in the calyx or the stem end where two apples touch or where a leaf is in contact with an apple. No scar caused by the Red-Banded Leaf Roller or similar type scar is permitted in U.S. Extra Fancy grade, 1/8-inch aggregate area of healed scars is permitted U.S. Fancy and U.S. No. 1; 1/4-inch aggregate area of healed scars is permitted in U.S. Utility.

Apple Maggot Injury

The Apple Maggot or Railroad Worm as it is sometimes called, may be found in all major apple growing sections of the Eastern and Midwestern States. The symptoms caused by the apple maggot depend on the time and severity of infestation, and to some extent on the variety of apple.

If infestation is early and heavy, the egg-deposit wounds and the extensive tunneling of the flesh by maggots will cause the apples to be severely deformed, with numerous deep depressions giving the apple a knobby appearance. Internally, several narrow, brown tunnels are found winding through the flesh. Apples with fewer eggs deposited may show only slight external evidence in the form of brown to black stings around the size of a fly speck, but will have small tunnels through the flesh.

Few if any maggots survive in late-maturing varieties. Apples injured by the egg-deposit, but with no injury from the maggot, form a small cone-shaped pit on the surface of the apple that is easy to recognize. In some winter varieties the maggot is able to make a short tunnel before death. There may be no external evidence other than the cone-shaped pit, while the flesh may show a brown streak where the maggot fed. These last two symptoms are probably the only types of maggot injury that will be found in the markets.

Apple maggot injury can be detected internally by slicing the fruit in thin cross-section slices and holding them up before good light which will show the small brown holes.

Scoring Guide

Maggot tunnels shall be scored against all grades regardless of the size of the tunnels, since they have to be considered worm holes. There are, however, some cases in which the eggs deposited under the skin have not hatched. These deposits make a slight depression or cone shape pit in the surface which can sometimes be felt even when they are not evident to the naked eye. In such cases where there is no development of the maggot and the injury does not extend to a depth which would indicate that the maggot is active, it should be treated as a sting.

Thrip Injury (Pansy Spot)

Thrip injury is a common problem on apples grown in the western states, especially green varieties such as Granny Smith and Newtown Pippin. This injury is commonly called pansy spot because of the shape characteristics of the affected areas causes by Thrip feeding just under the epidermis of the apple. The areas appear as whitish bleached areas, similar to the characteristic bleach spots on some Granny Smith varieties, only Thrip injury has a distinct pattern that looks like a pansy flower. In some cases, the very center may have a dark corky appearance. Rather than calling this defect Thrip injury or pansy spot it should be described on the certificate.

Scoring Guide

If the affected area has a dark scar tissue in the center, it should be scored on the same basis as dark limb rubs. However, if there is no scar tissue and only a bleached area, the following scoring guide shall be used; score as injury when distinct, bleached areas exceed an aggregate of 5/8 inch in diameter; as damage when aggregate area exceeds 7/8 inch in diameter, and as serious damage when aggregate area exceeds 1-1/4 inch in diameter.

Internal Browning (C)

Internal Browning may result from various factors such as carbon dioxide injury or the result of the apple being overripe. Growing conditions as well as variety characteristics determine susceptibility. It differs from internal breakdown in the fact that the affected tissues are not soft and that the browning first appears as somewhat elongated areas usually radiating out from the central portion of the apple and from the primary vascular bundles.

Scoring Guide

Internal browning is a “free from defect” and is scored on sight (i.e. any amount is scorable) against the 5% serious damage tolerance. Refer to “Sampling for Internal Defects” section for cutting procedures.

Internal Breakdown (C)

Internal breakdown occurs most often on large, over-mature apples at the end of the storage life of the fruit. It may, however, occur earlier in the season as a result of unfavorable growing, handling or storage practices and may follow water core, freezing or severe bruising. The entire fruit may be affected or it may be restricted to one side of the fruit or the flesh around a bruise. The riper side of the apple is more frequently affected than the greener side and the calyx half more than the stem half. There are two important factors to remember in the identification of internal breakdown (1) the affected tissues are brown; and, (2) the affected tissues are mealy or soft. If the tissue of an apple shows a discolored brown appearance, but the flesh is not soft or mealy, the apple should not be scored for internal breakdown.

Scoring Guide

Internal breakdown is a "free from defect" and is scored on sight (i.e. any amount is scorable) against the 1% tolerance for decay and internal breakdown. Refer to "Sampling for Internal Defects" section for cutting procedures.

Limb Rubs (Q)

Limb rubs are the result of fruit rubbing against the limbs or twigs of the tree.

§51.316 *Injury.* (c) Dark brown or black limb rubs which affect a total area of more than one-fourth inch in diameter, except that light brown limb rubs of a russet character shall be considered under the definition of injury by russeting.

§51.317 *Damage.* (c) Limb rubs which affect a total area of more than one-half inch in diameter, except that light brown limb rubs of a russet character shall be considered under the definition of damage by russeting.

§51.318 *Serious damage.* (c) Limb rubs which affect more than one-tenth of the surface in the aggregate.

Maturity (Q)

All U.S. grades for apples require apples to be mature.

§51.312 *Mature.* "Mature" means that the apples have reached the stage of development which will insure the proper completion of the ripening process.

Maturity is difficult to determine when apples are first harvested in the hard stage. There are a number of indications that will aid in determining maturity but no one alone which will suffice. The most reliable ones are taste; a "break" in the ground color from dark to lighter green; and, a change in flesh color from a greenish tinge to a whitish color and tan to dark brown seeds in open seed cavities. Shriveling of the fruit indicates immaturity. Other indications of immaturity are small-undeveloped seeds, closed seed cavities and failure of the stem to break evenly from the fruit spur.

Scoring Guide

Immature fruit are scored shall be scored as serious damage.

Moldy or Decayed Stems or Calyxes

Apples that show mold or decay affecting only the stems or calyxes (and not the flesh of the apple) shall not be scored against any U.S. grade. The apples may be described on the certificate at the request of the applicant with the statement "not affecting grade."

Mold Confined to Seed Cavity (C)

Apples having mold confined to the seed cavity are scored against U.S. Extra Fancy or U.S. Fancy and U.S. No. 1 when the mold is sufficiently severe to more than slightly (U.S. Extra Fancy) or materially detract (U.S. Fancy and U.S. No. 1) from the edible quality. Refer to "Sampling for Internal Defects" section for cutting procedures.

Scoring Guide

Refer to official slides number 426 and 427.

Overripe

All U.S. grades for apples require apples to be “Not Overripe.”

§51.313 *Overripe.* “Overripe” means apples which have progressed beyond the stage of ripe, with flesh very mealy or soft, and past commercial utility.

Apples, which are overripe, shall be scored as serious damage against all grades.

Red Skin Spots (Q)

Aphids, particularly the green apple aphid, sometimes cause red spots or specks on yellow or green varieties. These may be confused with red spots caused by San Jose Scale, but differ from them in that they have no light colored center. Red Skin Spot is particularly common on Yellow Newtown, Golden Delicious and other green or yellow varieties on the side that has been exposed to the sun. It consists of a narrow reddish halo or band surrounding some mechanical injury or even the lenticels if those have been torn by the growth of the fruit after they had corked over.

Scoring Guide

§51.316 *Injury.* (3) Red skin spots which are thinly scattered over more than one-tenth of the surface, or dark, heavily concentrated spots which affect an area of more than one-fourth inch in diameter.

§51.317 *Damage.* (4) Red skin spots which are thinly scattered over more than one-tenth of the surface, or dark, heavily concentrated spots which affect an area of more than one-half inch in diameter.

§51.318 *Serious damage.* (4) Red skin spots which affect more than one-third of the surface.

Russeting (Q)

Russeting is a brown, corky netlike condition on the skin of apples. It may appear on only a small portion of each fruit, or may cover its surface. Russeting has been associated with late frost and humid, rainy conditions, damage from chemicals, excess nitrogen, or infection by certain fungi, bacteria and viral organisms. The fruit of

younger or vigorously growing trees seem more prone to russeting than older and slower-growing trees.

Scoring Guide

§51.316 *Injury.* (a) Russeting in the stem cavity or calyx basin which cannot be seen when the apple is placed stem end or calyx end down on a flat surface shall not be considered in determining whether an apple is injured by russeting. Smooth net-like russeting outside of the stem cavity or calyx basin shall be considered as injury when an aggregate area of more than 10 percent of the surface is covered, and the color of the russeting shows no very pronounced contrast with the background color of the apple, or lesser amounts of more conspicuous net-like russeting when the appearance is affected to a greater extent than the amount permitted above.

§51.317 *Damage.* (a) Russeting in the stem cavity or calyx basin which cannot be seen when the apple is placed stem end or calyx end down on a flat surface shall not be considered in determining whether an apple is damaged by russeting, except that excessively rough or bark-like russeting in the stem cavity or calyx basin shall be considered as damage when the appearance of the apple is materially affected. The following types and amounts of russeting outside of the stem cavity or calyx basin shall be considered as damage:

(1) Russeting which is excessively rough on Roxbury Russet and other similar varieties.

(2) Smooth net-like russeting, when an aggregate area of more than 15 percent of the surface is covered, and the color of the russeting shows no very pronounced contrast with the background color of the apple, or lesser amounts of more conspicuous net-like russeting when the appearance is affected to a greater extent than the amount permitted above.

(3) Smooth solid russeting, when an aggregate area of more than 5 percent of the surface is covered, and the pattern and color of the russeting shows no very pronounced contrast with the background color of the apple, or lesser amounts of more conspicuous solid russeting when the appearance is affected to a greater extent than the above amount permitted.

(4) Slightly rough russeting which covers an aggregate area of more than one-half inch in diameter.

(5) Rough russeting which covers an aggregate area of more than one-fourth inch in diameter.

§51.318 *Serious damage.* (a) The following types and amounts of russeting shall be considered as serious damage:

(1) Smooth solid russeting, when more than one-half of the surface in the aggregate is covered, including any russeting in the stem cavity or calyx basin, or slightly rough, or excessively rough or bark-like russeting, which detracts from the appearance of the fruit to a greater extent than the amount of smooth solid russeting permitted: *Provided*, That any amount of russeting shall be permitted on Roxbury Russet and other similar varieties.

The U.S. No. 1 grade requires apples to be free from excessive damage caused by russeting which means that apples must meet the russeting requirements defined under the definitions of "damage by russeting." However, the U.S. No. 1 grade states apples with smooth net-like russeting are allowed an aggregate area of 25 percent, and apples with smooth solid russeting are allowed an aggregate area of 10 percent. Yellow Newtown or similar varieties apples, covered with smooth solid russeting are allowed an aggregate area of 20 percent.

Visual Aids

Refer to APL-C-4, APL-CP-3 and APL-CP-3 (continued).

Scab (Q or C)

This disease appears as irregular circular spots usually 1/8 to 3/4 of an inch in diameter, having a dark green to nearly black surface, or in later stages a brown, russeted, rough surface with merely a fringe of dark green or black around the margin. Spots are typically dark green and velvety, generally show a ragged, papery fringe of the outermost part of the skin, which has been loosened from the tissue beneath by the growth of the fungus.

Storage Scab

Apple Scab lesions present on fruit when picked frequently enlarge as much as 1/4 inch in diameter during the normal storage period, and the fungus on the spots becomes black and more easily seen. The greatest change found in Scab during storage is often in the appearance of new lesions. Such lesions are initiated during long wet periods in the latter part of the summer, but are not visible at picking time. Sometimes these new lesions are not readily distinguishable from old lesions of small

size. Both become jet-black and often produce a low tuft of fungus growth in the center of the lesion. Many of the storage lesions do not break through the cuticle at all but develop in the cells beneath, producing black shiny spots. This characteristic and the small size of the lesions are helpful in identifying storage scab. Corky tissue occurs in the center of the orchard lesion but is not present in the storage spots. However, cork is not easily identified in small lesions. There is no evidence that Scab spreads from one fruit to another in storage. Slight variations in humidity and temperature of the storage room have little effect on the development of Scab. New lesions may appear earlier on fruit in common storage than on fruit in storage at 31-32º F., but eventually fruit in cold storage may show as heavy an infection.

Scoring Guide

Scab spots, which show corked over areas, should be considered **quality** defects report as "scab." Lesions that are not corked over and show the black growth of fungus shall be scored as **condition** and reported as **storage scab**.

§51.317 *Damage.* (i) Disease: (1) Scab spots which affect a total area of more than one-fourth inch in diameter.

§51.318 *Serious damage.* (g) Disease: (1) Scab spots which affect a total area of more than three-fourths inch in diameter.

Scale and Scale Marks (San Jose, Forbes and Other Similar Types of Scale) (Q)

Typical scale marks are small reddish areas about 1/8 inch in diameter. At the center of each of these areas is usually a light colored spot, marking the place formerly occupied by the tiny scale insect before it was rubbed off in handling. The adult scale is less than 1/16 inch in diameter, gray to grayish brown with a small dirty yellow nipple-like center surrounded by a depressed ring. Occasionally a small black scale insect, the stage that lives through the winter, will be found.

Scoring Guide

Score scale and/or scale marks which are readily apparent occurring outside of the calyx basin when affecting the **red surface** of the apple as injury when more than two are present, score as damage when more than five are present. Scale and/or scale marks affecting the **yellow or green surface** of the apple shall be scored as injury when more than one is present and as damage when more than three are present. Scale and/or scale marks are scored as serious damage when scattered over more than 10% of the surface of the fruit (regardless of the color of the surface).

Score scale and/or scale marks when present on the red and green surface on the same apple, when affecting the appearance of the apple to a greater degree than allowed for the grade. Scale and/or scale marks occurring within the calyx basin are not considered as affecting the appearance to the same degree as those occurring outside the calyx.

Shape (Q)

The U.S. grades for apples have the following requirements for shape:

U.S. Extra Fancy, U.S. Fancy, U.S. No. 1 & U.S. No. 1 Hail: Fairly well formed.

U.S. Utility: Not seriously deformed.

Definitions:

"Well Formed" means the fruit has the normal shape characteristic of the variety, except that the shape may be slightly irregular provided it does not more than slightly detract from the appearance of the apple.

§51.315 *Fairly well formed.* "Fairly well formed" means that the apple may be slightly abnormal in shape but not to an extent which detracts materially from its appearance.

"Slightly deformed" means the fruit may be more irregular in shape than fairly well formed, but the appearance is not seriously affected.

§51.319 *Seriously deformed.* "Seriously deformed" means that the apple is so badly misshapen that its appearance is seriously affected.

In determining whether the shape of an apple is well formed, fairly well formed, slightly deformed, or seriously deformed, be sure to take into consideration the shape particular to the variety.

Visual Aids

Refer to models WB-1 through WB-5, MS-2, MS-3, S1, and DS-1 through DS-6.

Similar Varietal Characteristics (Q)

The U.S. grades for apples require that the fruit be of one variety in the container, except when more than one variety is printed on the container. (Refer to "Containers with Mixed Varieties section.") Apples that are dissimilar from the other apples in the container (in containers not marked to more than one variety) would be scored as dissimilar varietal characteristics. Dissimilar varietal characteristics shall be scored against the total tolerance for the grade.

Stem Punctures (Q or C)

Stem punctures may be a quality or condition factor depending on the type of pack. Stem punctures on apples place packed, such as in trays, cells and consumer size over-wrap trays shall be scored as a **quality** factor. Stem punctures in bag or bulk pack are considered **condition** factors.

Scoring Guide

Place packed (Q)

All apples having one stem puncture shall be scored as damage. Score as serious damage when more than two stem puncture are present on a single fruit.

Packed in bags or bulk (C)

A separate allowance of 10% is provided for apples that have one stem puncture. When the 10% allowance is exceeded the lot would fail and the total percentage of ******** apples having one stem puncture shall be reported in the average defects column on the certificate. For example a lot with 12% of the apples having one stem puncture would be reported as 12% Single Stem Punctures on the certificate. If the 10% allowance is not exceeded, do not report the percentage on the certificate in average defects column. However, the percentage may be reported in the "Description of Product" section on the shipping point certificate and in the "Other" section on the market certificate at applicant's request, not affecting grade. For example: 4% of apples have one stem puncture, not affecting grade, reported at applicant's request.

All apples with **more than one stem** puncture are scored against the 10% total tolerance for the grade in the U.S. Extra Fancy, U.S. Fancy and U.S. No. 1 grades. Apples having **more than two** stem punctures are scored as serious damage in the U.S. Extra Fancy, U.S. Fancy and U. S. No. 1 grades and against the total tolerance for the grade in the U.S. Utility grade. ********

Stem or Calyx Cracks (Q or C)

Score stem or calyx cracks as a quality defect when healed and as condition when not well healed.

§51.317 *Damage.* (e) Stem or calyx cracks which are not well healed, or well healed stem or calyx cracks which exceed an aggregate length of one-fourth inch.

§51.318 *Serious damage.* (e) Stem or calyx cracks which are not well healed, or well healed stem or calyx cracks which exceed an aggregate length of one-half inch.

Sunburn/Sprayburn (Q)

Apples that are exposed to direct intense sunlight while on the trees may become sunburned. The exposure causes the skin to become **golden** or **bronze** in color. Generally the discoloration will be confined to one side of fruit. The flesh in the sunburned area may be firmer than the rest of the fruit at harvest, but it tends to soften rapidly in storage. After prolonged storage, sunburned areas sometimes darken turning tan to light brown to dark brown in color which is commonly called delayed sunburn. For scoring instructions for delayed sunburn refer to section entitled “Brown Surface Discoloration.”

Scoring Guide

§51.316 *Injury.* (b) Sunburn or sprayburn, when the discolored area does not blend into the normal color of the fruit.

§51.317 *Damage.* (b) Sunburn or sprayburn which has caused blistering or cracking of the skin, or when the discolored area does not blend into the normal color of the fruit unless the injury can be classed as russeting.

§51.318 *Serious damage.* (b) Sunburn or sprayburn which seriously detracts from the appearance of the fruit.

Watercore (Q)

This disease occurs in practically all apple growing regions of the United States but is of greatest importance in those regions having an arid or semi-arid climate. Watercore is a non-parasitic disease characterized by hard, glassy, water-soaked regions in the flesh of the apple, which may show through to the surface of the fruit.

******** Visible watercore is a free from defect in U.S. Extra Fancy, U.S. Fancy and U.S. No. 1 grades and any amount of watercore that is visible externally shall be scored against the total tolerance for the grade. Score visible watercore that exceeds an area of 1/2-inch as serious damage.

Invisible Watercore

U.S. Extra Fancy and U.S. Fancy grades must be free from damage by invisible watercore after January 31st of the year following the year of production. However, invisible water core shall not be scored against the Fuji variety of apples under any circumstances.

> **§51.317 *Damage.* (f) Invisible water core existing around the core and extending to water core in the vascular bundles, or surrounding the vascular bundles when the affected areas surrounding three or more vascular bundles meet or coalesce, or existing in more than a slight degree outside the circular area formed by the vascular bundles. *Provided,* That invisible water core shall not be scored as damage against the Fuji variety of apples under any circumstances.**

Without cutting the fruit, internal water core is often difficult to detect and is impossible to determine as to the degree affected. There are external characteristics that **may** be associated with invisible water core. These may include a "heavier" feel of the fruit, or a much more firm feel of the apple, even to the extent that the flesh does not snap or yield under thumb pressure. Refer to section entitled “Sampling for Internal Defects” for cutting procedures.

Reporting Invisible Watercore

The illustrations in diagram 1, on page 40, are guides for describing the degree of invisible watercore when requested by the applicant, whether or not the apples would be considered as “damage by water core.” Any invisible watercore designated as “severe” in the illustrations is considered “damaged” **after January 31** of the year following production.

Prior to February 1st

If an applicant requests that invisible watercore be reported on the certificate prior to February 1, three categories should be reported if present; slight, moderate and severe as not affecting grade reported in the “Description of Product” section on the shipping point certificate and in the “Other” section on the market certificate. For example: Invisible water: 4% slight, 2% moderate, and 1% severe, not affecting grade determined and reported at applicant’s request. (Severe corresponds to the definition of damage by invisible watercore as written in the U.S. grade standards.)

February 1st and Later

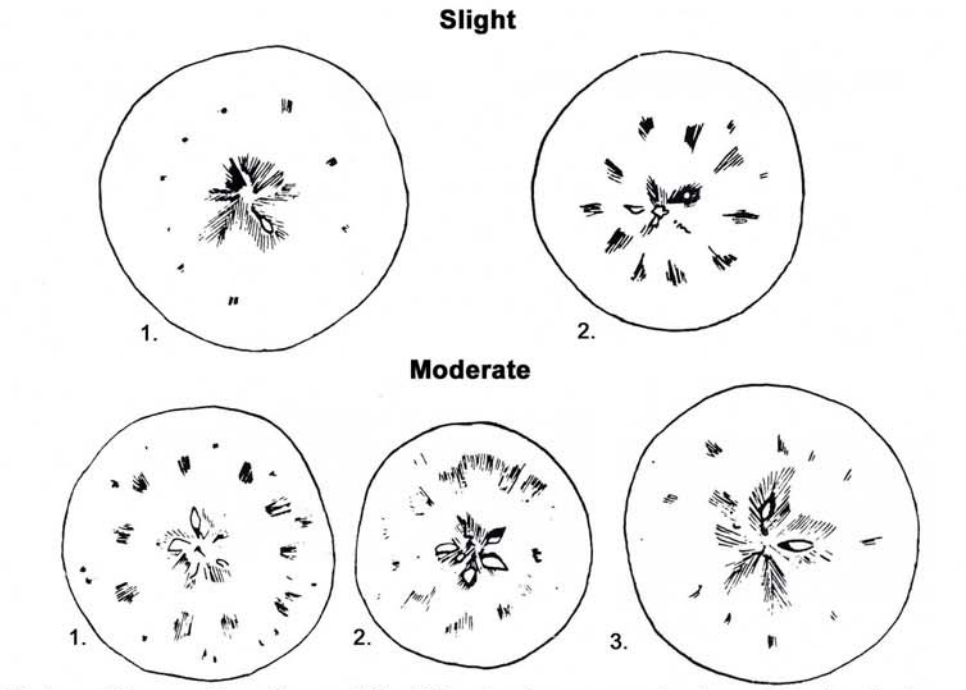
Invisible watercore that is severe shall be scored as damage against the U.S. Extra Fancy and U. S. Fancy after January 31st of the year following the year of production (except for the Fuji variety of apples). Any percentage of damage (severe) is to be reported in the average defects column on the certificate. At applicant’s request

the percentages of slight and moderate invisible watercore may be reported in the "Description of Product" section on the shipping point certificate and in the "Other" section on the market certificate and noted as not affecting grade. ****

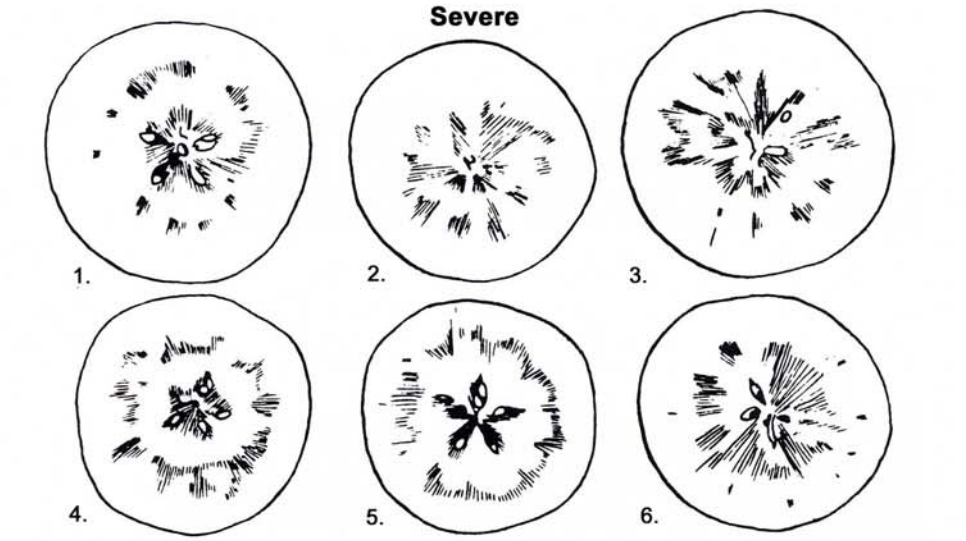
Decay (C)

All grades require that apples be free from decay; any amount is scorable against the 1% tolerance. The most common types affecting apples are: Alternaria Rot Blue Mold Rot, Bull's Eye Rot, Brown Rot, Gray Mold Rot, Mucor Rot and Side Rot. Do not report the type of decay on the certificate. However, when the decay is in excess of the tolerance report the degree of advancement as early, moderate or advance

Diagram 1 – Invisible Watercore



No.1 would be considered "severe" if additional watercore was showing outside the circular area formed by the vascular bundles; No. 2 would be considered "severe" if another vascular bundle was involved at top of drawing, or if watercore around the core extended in to any vascular bundle; No. 3 would be considered "severe" if watercore in the core area extended in to one or more bundles.



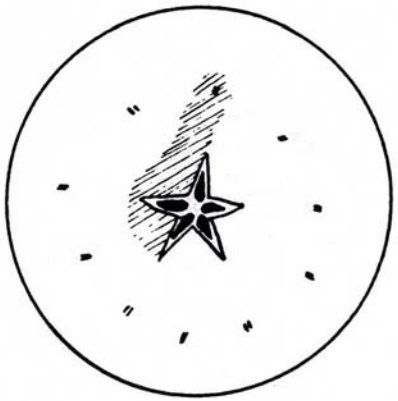
In No. 1, 2, and 3 the watercore around the core extends to one or more vascular bundles; in No. 4 and 5 the watercore in 3 or more bundles is coalesced (in No. 4 if one less bundle was involved at the bottom of the drawing it would be considered "moderate"); in No. 6 watercore around the core extends to bundles also the watercore in 3 or more bundles is coalesced.

Diagram 2 - Invisible Watercore

Damage by Invisible Watercore

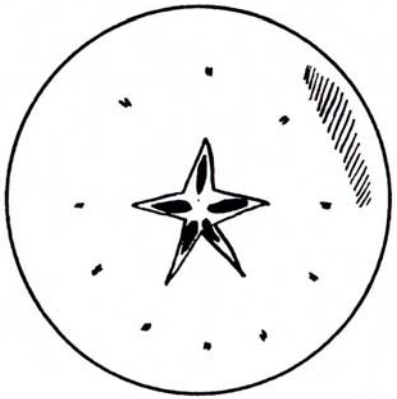
U S. Extra Fancy and U.S. Fancy grades apples, except apples of the Fuji varieties will be considered damage by invisible watercore after January 31 of the year following production and anytime the U.S. Condition Standards are being applied.

1. When existing around core and extending to watercore in vascular bundles.



2. When surrounding vascular bundles when affected areas around three or more bundles meet or coalesce.

3. When more than slight degree outside circular area formed by vascular bundles.



Washington State Grades

When inspecting based on the Washington State grades keep in mind although Washington State has adopted the United States Standards for Grades of Apples, effective December 19, 2002, as they apply to U.S. Extra Fancy, U.S. Fancy, U.S. No. 1 and U.S. No. 1 Hail there are some differences in the grades. The following outlines the main differences between the U.S. and Washington State grades.

****

- The Washington State "Marking Requirements" for variety or varieties are as follows: The containers shall bear the correct name of the variety or when more than one variety or commodity is in the container, each variety and commodity must be shown.

- Washington State grades have color requirements for all red, partial red and blush varieties. (Refer to "Color Requirements for Washington Grades" section.) ****

Color Requirements for Washington Grades

The following is an excerpt from the Washington State standards for apples.

WAC 16-403-155 Color requirements. (1) **Solid red varieties.** For the solid red varieties the percentage stated refers to the area of the surface which must be covered with a good shade of solid red characteristic of the variety: Provided, That an apple having color of a lighter shade of solid red or striped red than that considered as a good shade of red characteristic of the variety may be admitted to a grade provided it has sufficient additional area covered so that the apple has as good an appearance as one with the minimum percentage of good red characteristic of the variety required for the grade, subject to the limitations set forth below.

VARIETY	EXTRA FANCY PERCENT	FANCY PERCENT
Black Ben	66(1)	40(3)
Gano	66(1)	40(3)
Winesap	66(1)	40(3)
Other similar varieties	66(1)	40(3)
Red sport varieties(2)	66(4)	40(3)

(1) Must have at least 50 percent good shade of red color characteristic of the variety.
(2) When the red sport varieties are marked as such, they shall meet the color requirements of red sport varieties, and the containers must also bear the name of the parent variety.
(3) Must have at least 33 percent good shade of red color; characteristic of the variety
(4) Must have at least 66 percent good shade of red color; characteristic of the variety.

(2) **Striped or partial red varieties.** For the striped or partial red varieties the percentage stated refers to the area of the surface in which the stripes of a good shade of red characteristic of the variety shall predominate over stripes of lighter red, green or yellow. However, an apple having color of a lighter shade than that considered as a good shade of red characteristic of the variety may be admitted to a grade, provided it has sufficient additional area covered so that the apple has as good an appearance as one with the minimum percentage of stripes of a good red characteristic of the variety required for the grade, subject to the limitations set forth below. Faded brown stripes shall not be considered as color.

VARIETY	EXTRA FANCY PERCENT	FANCY PERCENT
Delicious	50	25
Rome Beauty	50[1]	33[2]
Wealthy	50	25
Stayman	50	33
Other similar varieties	50	25
Jonathan	66[1]	33[2]
McIntosh	50[1]	33[2]
Cortland	50	33
Akane	33 1/3	15
Jonamac	50	33
Nittany	25	10
Vista Bella	25	10
Other similar varieties	50	33
Red sport varieties[5]	66[4]	40[3]

[1] Must have at least 35 percent good shade of red color characteristic of the variety.
[2] Must have at least 15 percent good shade of red color characteristic of the variety.
[3] Must have at least 33 percent good shade of red color characteristic of the variety.
[4] Must have at least 66 percent good shade of red color characteristic of the variety.
[5] When the red sport varieties are marked as such, they shall meet the color requirements of red sport varieties, and the containers must also bear the name of the parent variety.

(3) **Red cheeked or blushed varieties.**

VARIETY	EXTRA FANCY PERCENT	FANCY PERCENT
Braeburn	Blush Cheek	Tinge of color
Elstar	Blush Cheek	Tinge of color
Fuji	Blush Cheek	Tinge of color
Gala, (Royal Gala)	Blush Cheek	Tinge of color
Jonagold	Blush Cheek	Tinge of color
Winter Banana	Blush Cheek	Tinge of color
Other similar varieties	Blush Cheek	Tinge of color

U.S. Condition Standards for Export

The U.S. Condition Standards for Export is not mandatory. It will be necessary for applicants to indicate when the inspection is requested whether or not they desire the U.S. Condition Standards for Export statement be made on the certificate.

Do not confuse the requirements for Export Form Certificate with those for U.S. Condition Standards for Export. The U.S. Conditions Standards for Export apply only to the condition of the fruit and are not mandatory under the Export Apple Act. A lot may show too much worm injury to meet the Export Act yet still meet the U.S. Condition Standards. Also, it is important to note that the "U.S. Condition Standards for Export" can be applied to domestic lots as well as export lots and may be referred to as "U.S. Condition Standards."

U.S. Condition for Export Requirements

The following are requirements of the U.S. Condition for Export Requirements:

§51.321 *U.S. Condition Standards for Export.*

(a) Not more than 5 percent of the apples in any lot shall be further advanced in maturity than firm ripe.

(b) Not more than 5 percent of the apples in any lot shall be damaged by storage scab.

(c) Not more than a total of 5 percent of the apples in any lot shall be affected by scald, internal breakdown, freezing injury, or decay; or damaged by bitter pit, Jonathan spot, water core except that invisible water core shall not be scored as damage when these condition standards are applied to the Fuji variety of apples, or other condition factors: *Provided,* That:

(1) Not more than a total of 2 percent shall be allowed for apples affected by decay and soft scald;

(2) Not more than 2 percent shall be allowed for apples affected by internal breakdown;

(d) Container packs shall comply with packing requirements specified in §51.310 of the United States Standards for Grades of Apples.

(e) Any lot of apples shall be considered as meeting the U.S. Condition Standards for Export if the entire lot averages within the requirements specified: *Provided,* That no package in any lot shall have more than double the percentages specified, except that for packages which contain 10 pounds or less, individual packages in any lot may have not more than three times the tolerance or three apples (whichever is the greater amount).

For defect scoring guides refer to the appropriate section in these instructions.

Apples Exported to Canada

Apples for shipment to Canada must comply with the Canadian Import Requirements, which require compliance with U.S. Condition Standards for Export in addition to the Export Apple Act. Although the Export Apple Act exempts small lots not exceeding 5,000 pounds gross or 100 packages, Canadian Import Requirements requires U.S. certification on all shipments in excess of 15 packages or 250 kg (551 pounds). Refer to Canadian Import Requirements Inspection instructions for further information.

Export Apple Act Requirements

The inspector should read carefully Revised Regulations Issued Under Authority of the Export Apple Act, as amended (7 CFR Part 33) and always have a copy available for ready reference. Also, the Inspection Instructions for Apples for Export must be followed.

Exemption to Export Form Certificate

The Act requires that Export Form Certificates accompany all shipments of apples in containers handled by transportation companies intended for export to any foreign country except as designated in §33.12.

§33.12 *Apples not subject to regulation.* Except as otherwise provided in this section, any person may, without regard to the provisions of this part, ship or offer for shipment, and any carrier may, without regard to the provisions of this part, transport or receive for transportation to any foreign destination:

(a) A quantity of apples to any foreign country not exceeding a total of 5,000 pounds gross weight or 100 boxes of apples packed in standard boxes on a single conveyance:

(b) Apples to Pacific ports west of the International Date Line which do not meet maturity standards of the grade specified in §33.10, if the packages are conspicuously marked or printed with the words "Immature Fruit;" (in letters at least two inches high) if inspected and certified as meeting all other requirements of §§33.10 and 33.11.

(c) Apples for processing which do not meet the grade standards specified in §33.10, if such apples grade at least U.S. No. 1 as specified in the U.S. Standards for Apples for Processing (§§ 51.340 to 51.344 of this chapter), and if the containers are conspicuously marked "Cannery" (in letter at least two inches high) if inspected and certified as meeting all other requirements of §§33.10 and 33.11.

It is important to note apples grown outside of the United States but moving through United States ports on through bills of lading to foreign destinations do not require Export Form Certificates.

Export Requirements

The following are requirements for issuance of Export Form Certificates:

§33.12 *Minimum requirements.* No person shall ship, or offer for shipment, and no carrier shall transport, or receive for transportation, any shipment of apples to any foreign destination unless:

(a) Apples grade at least U.S. No. 1 grade […] as specified in the United States Standards for Apples (§§51.300-51.323 of this chapter), do not contain apple maggot and do not have more than 2 percent, by count, of apples with apple maggot injury, nor more than 2 percent, by count, of apples infested with San Jose scale or scale of similar appearance:

(b) Each package of apples is packed so that the apples in the top layer shall be reasonably representative in size, color and quality of the contents of the package; and

(c) Each package of apples is marked plainly and conspicuously with (1) the name and address of the grower, packer, or domestic distributor: Provided, That the name of the foreign distributor may be placed on consumer unit package shipped in a master container if such master contain is marked with the name and address of grower, packer, or domestic distributor; (2) the variety of the apples; (3) the name of the U.S. grade or name of a state grade if the fruit meets each minimum requirement of a U.S. grade specified in this section; (4) the numerical count or minimum size.

No Export Form Certificate will be issued on any lot of apple in storage, on a truck, on a platform, or on a pier (unless for immediate shipment) until a State lot stamp, or public storage lot number, or inspector's lot number that specifically identifies this particular PLI number. However, no certificate may be issued on any part lot unless the portion to be certified is segregated and identified by a separate lot number. Furthermore, each package must bear the identifying mark. If a lot is inspected as it is being loaded into a conveyance vehicle then no lot number need be affixed.

Inspection and Certificate

§33.11 *Inspection and certificate.* (a) Each person shipping, or offering for shipment, apples to any foreign destination shall cause them to be inspected by Federal or Federal State Inspection Service in accordance with regulations governing the inspection and certification of fresh fruit and vegetables and other products (Part 51 of this chapter) and certified as meeting the requirements of the act and this part. No carrier shall transport, or receive for transportation, apples to any foreign destination unless they have been so inspected and certified. Inspection and certification may be obtained at any time prior to exportation of the apples. Such a Federal or Federal-State certificate shall be designated as an "Export Form Certificate" and shall include the following statement: "Meets requirements of Export Apple Act." The shipper shall deliver a copy of the Export Form Certificate […] to the export carrier. Whenever apples are inspected and certified at any other point other than the port of exportation, the shipper shall deliver a copy of the Export Form Certificate or Memorandum of Inspection to the agent of the first carrier that thereafter transports such apples and such agent shall deliver such copy to the proper official of the carrier on which the apples, covered by such certificate or memorandum, are to be exported. A copy of the Export Form Certificate or Memorandum of Inspection shall be filed by the export carrier for a period of not less than three (3) years after date of export.

(b) If the inspector has reason to believe that samples of a lot of apples have been obtained for a determination as to compliance with tolerances for spray residue, established under the Federal Food, Drug and Cosmetic Act, as amended (52 Stat.1040; 21 U.S.C. 301 et seq.), shall not issue a certificate on the lot unless it complies with such tolerances.

Export Form Certificates must not be restricted and must show the number of packages and the grade as well as condition. When an Export Form is requested on a lot that has been given an Export Form at shipping point and shipping point certificate cannot be confirmed as to grade and applicant does not want an appeal, then it will be satisfactory to restrict to condition and place on a Export Form stating under “Remarks” that it covers condition only and that an inspection for grade was made at shipping point and reported as U.S. Fancy, or U.S. No. 1 as the case may be.

Appendix I -- U. S. Grade Standards

United States Standards for Grades of Apples [1]

Latest Issue 12/19/02

Grades

§51.300 U.S. Extra Fancy.

"U.S. Extra Fancy" consists of apples of one variety (except when more than one variety is printed on the container) which are mature but not overripe, clean, fairly well formed, free from decay, internal browning, internal breakdown, soft scald, scab, freezing injury, visible water core, and broken skins. The apples are also free from injury caused by bruises, brown surface discoloration, smooth net-like russeting, sunburn or sprayburn, limb rubs, hail, drought spots, scars, disease, insects, or other means. The apples are free from damage caused by bitter pit or Jonathan spot and by smooth solid, slightly rough or rough russeting, or stem or calyx cracks, as well as damage by invisible water core after January 31st of the year following the year of production except for the Fuji variety of apples. Invisible water core shall not be scored against the Fuji variety of apples under any circumstances. For the apple varieties listed in Table I

[1]Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug and Cosmetic Act, or with applicable State laws and regulations.

of §51.305, each apple of this grade has the amount of color specified for the variety. (See §§51.305 and 51.306.)

§51.301 U.S. Fancy.

"U.S. Fancy" consists of apples of one variety (except when more than one variety is printed on the container) which are mature but not overripe, clean, fairly well formed, and free from decay, internal browning, internal breakdown, soft scald, freezing injury, visible water core, and broken skins. The apples are also free from damage caused by bruises, brown surface discoloration, russeting, sunburn or sprayburn, limb rubs, hail, drought spots, scars, stem or calyx cracks, disease, insects, bitter pit, Jonathan spot, or damage by other means, or invisible water core after January 31st of the year following the year of production, except for the Fuji variety of apples. Invisible water core shall not be scored against the Fuji variety of apples under any circumstances. For the apple varieties listed in Table I of §51.305, each apple of this grade has the amount of color specified for the variety. (See §§51.305 and 51.306.)

§51.302 U.S. No. 1.

"U.S. No. 1" consists of apples which meet the requirements of U.S. Fancy grade except for color, russeting, and invisible water core. In this grade, less color is required for all varieties listed in Table I of §51.305. Apples of this grade are free from excessive damage caused by russeting which means that apples meet the russeting requirements for U.S. Fancy as defined under the definitions of "damage by russeting," except the aggregate area of an apple which may be covered by smooth net-like russeting shall not exceed 25 percent; and the aggregate area of an apple which may be covered by smooth solid russeting shall not exceed 10 percent: *Provided,* That, in the case of the Yellow Newtown or similar varieties, the aggregate area of an apple which may be covered with smooth solid russeting shall not exceed 20 percent. Each apple of this grade has the amount of color specified in §51.305 for the variety. Invisible water core shall not be scored in this grade. (See §§51.305 and 51.306.)

(a) **U.S. No. 1 Hail:** "U.S. No. 1 Hail" consists of apples which meet the requirements of U.S. No. 1 grade except that hail marks where the skin has not been broken and well healed hail marks where the skin has been broken, are permitted, provided the apples are fairly well formed. (See §§51.305 and 51.306.)

(b) [Reserved]

§51.303 U.S. Utility.

"U.S. Utility" consists of apples of one variety (except when more than one variety is printed on the container) which are mature but not overripe, not seriously deformed and free from decay, internal browning, internal breakdown, soft scald, and freezing injury. The apples are also free from serious damage caused by dirt or other foreign matter, broken skins, bruises, brown surface discoloration, russeting, sunburn or sprayburn, limb rubs, hail, drought spots, scars, stem or calyx cracks, visible water core, bitter pit or Jonathan spot, disease, insects, or other means.
(See §51.306.)

§51.304 Combination grades.

(a) Combinations of the above grades may be used as follows:
(1) Combination U.S. Extra Fancy and U.S. Fancy;
(2) Combination U.S. Fancy and U.S. No. 1; and
(3) Combination U.S. No. 1 and U.S. Utility.

(b) Combinations other than these are not permitted in connection with the U.S. apple grades. When Combination grades are packed, at least 50 percent of the apples in any lot shall meet the requirements of the higher grade in the combination. (See §51.306.)

Color Requirements

§51.305 Color requirements.

In addition to the requirements specified for the grades set forth in §§51.300 to 51.304, apples of these grades shall have the percentage of color specified for the variety in Table I appearing in this Section. All apple varieties other than those appearing in Table I shall have no color requirements pertaining to these grades. For the solid red varieties, the percentage stated refers to the area of the surface which must be covered with a good shade of solid red characteristic of the variety: *Provided,* That an apple having color of a lighter shade of solid red or striped red than that considered as a good shade of red characteristic of the variety may be admitted to a grade, provided it has sufficient additional area covered so that the apple has as good an appearance as one with the minimum percentage of good red characteristic of the variety required for the grade. For the striped red varieties, the percentage stated refers to the area of the surface in which the stripes of a good shade of red characteristic of the variety

shall predominate over stripes of lighter red, green, or yellow. However, an apple having color of a lighter shade than that considered as a good shade of red characteristic of the variety may be admitted to a grade, provided it has sufficient additional area covered so that the apple has as good an appearance as one with the minimum percentage of stripes of a good red characteristic of the variety required for the grade. Faded brown stripes shall not be considered as color. (A) Color standards USDA Visual Aid APL-CC-1 (Plates a - e) consists of a folder containing the color requirements for apples set forth in this section and five plates illustrating minimum good shade of solid red or striped red color, minimum compensating color and shade not considered color, for the following 12 varieties: Red Delicious, Red Rome, Empire, Idared, Winesap, Jonathan, Stayman, McIntosh, Cortland, Rome Beauty, Delicious, and York.

These color standards will be available for examination and purchasing information in the Fresh Products Branch, Fruit and Vegetable Programs, AMS, U.S. Department of Agriculture, South Building, Washington, D.C. 20250; in any field office of the Fresh Products Branch; or upon request of any authorized inspector of the Fresh Fruit and Vegetable Inspection Service.

Table 1[1]

Only the varieties listed below shall be required to meet a minimum color requirement.	U.S. Extra Fancy	U.S. Fancy	U.S. No. 1
Variety	Percent	Percent	Percent
Red Delicious.....	66	40	25
Red Rome.....	66	40	25
Empire.....	66	40	25
Idared.....	66	40	25
Winesap.....	66	40	25
Jonathan.....	66	40	25
Stayman.....	50	33	25
McIntosh.....	50	33	25
Cortland.....	50	33	25
Rome Beauty.....	50	33	25
Delicious.....	50	33	25
York.....	50	33	25

[1]Variations on varietal designations listed above must meet or exceed those color requirements listed.

Tolerances

§51.306 Tolerances.

In order to allow for variations incident to proper grading and handling in each of the grades in 51.300, 51.301, 51.302, 51.303, and 51.304 the following tolerances are provided as specified:

(a) *Defects:* (1) U.S. Extra Fancy, U.S. Fancy, U.S. No. 1, and U.S. No. 1 Hail grades: 10 percent of the apples in any lot may fail to meet the requirements of the grade, but not more than one-half of this amount, or 5 percent, shall be allowed for apples which are seriously damaged, including therein not more than 1 percent for apples affected by decay or internal breakdown.

(2) *U.S. Utility grade:* 10 percent of the apples in any lot may fail to meet the requirements of the grade, but not more than one-half of this amount, or 5 percent, shall be allowed for apples which are seriously damaged by insects, and including in the total tolerance not more than 1 percent for apples affected by decay or internal breakdown.

(b) When applying the foregoing tolerances to Combination grades, no part of any tolerance shall be allowed to reduce, for the lot as a whole, the 50 percent of apples of the higher grade required in the combination, but individual containers shall have not less than 40 percent of the higher grade.

(c) *Size*: When size is designated by the numerical count for a container, not more than 10 percent of packages in the lot may fail to be fairly uniform[1]. When size is designated by minimum or maximum diameter, not more than 5 percent of the apples in any lot may be smaller than the designated minimum,

[1]"Fairly uniform" means the size of the fruit within the container does not vary more than ½ inch diameter from the smallest to largest fruit.

and not more than 10 percent may be larger than the designated maximum. For Red Delicious or Golden Delicious varieties only, a combination of minimum diameter and/or weight may be used. When this designation is used, an individual apple will be considered to have met the minimum size requirement even if the apple is smaller than the minimum diameter, provided it is equal to or greater than the weight provided in Table II of this section. However, not more than 5 percent of the apples in any lot may fail to meet either the minimum diameter or minimum weight when so designated. In addition, when Red Delicious or Golden Delicious apples are designated with diameter/weight combinations, they may only be designated according to the following table:

Table II

Red Delicious	Golden Delicious
2 1/8 inches or 65 grams	63 grams
2 1/4 inches or 75 grams	70 grams
2 3/8 inches or 84 grams	82 grams
2 1/2 inches or 100 grams	95 grams
2 5/8 inches or 115 grams	109 grams
2 3/4 inches or 139 grams	134 grams

Application of Tolerances

§51.307 Application of tolerances.

The contents of individual packages in the lot, are subject to the following limitations: *Provided,* That the averages for the entire lot are within the tolerances specified for the grade:

(a) Packages which contain more than 10 pounds:

(1) Shall have not more than one and one-half times a specified tolerance of 10 percent or more and not more than double a tolerance of less than 10 percent, except that at least one apple which is seriously damaged by insects or affected by decay or internal breakdown may be permitted in any package.

(2) [Reserved]

(b) Packages which contain 10 pounds or less:

(1) No package may have more than 3 times the tolerance specified, except that at least three defective apples may be permitted in any package: *Provided*, That not more than three apples or more than 18 percent (whichever is the larger amount) may be seriously damaged by insects or affected by decay or internal breakdown.

(2) [Reserved]

Methods of Sampling and Calculation of Percentages

§51.308 Methods of sampling and calculation of percentages.

(a) When the numerical count is marked on the container, containers are packed to weigh ten pounds or less, or in any container where the minimum diameter of the smallest apple does not vary more than 1/2 inch from the minimum diameter of the largest apple, percentages shall be calculated on the basis of count.

(b) In all other cases except those listed in paragraph (a) of this section, they shall be calculated on the basis of weight.

Condition After Storage or Transit

§51.309 Condition after storage or transit.

Decay, scald, or any other deterioration which may have developed on apples after they have been in storage or transit shall be considered as affecting condition and not the grade.

Packing Requirements

§51.310 Packing requirements.

(a) Apples tray packed or cell packed in cartons shall be arranged according to approved and recognized methods. Packs shall be at least fairly tight[2] or fairly well filled.[3]

(b) Closed cartons containing apples not tray or cell packed shall be fairly well filled[3] or the pack shall be sufficiently tight to prevent any appreciable movement of the apples.

(c) Packs in wooden boxes or baskets shall be sufficiently tight to prevent any appreciable movement of apples within containers when the packages are closed. Each wrapped apple shall be completely enclosed by its individual wrapper.

(d) Apples on the shown face of any container shall be reasonably representative in size, color and quality of the contents.

(e) Tolerances: In order to allow for variations incident to proper packing, not more than 10 percent of the containers in any lot may fail to meet these requirements.

Marking Requirements

§51.311 Marking requirements.

Variety (or varieties if more than one is packed in the container), grade, and the numerical count or minimum diameter of apples packed in a closed container shall be indicated on the container. For apple lots utilizing the combined diameter/weight designations for Red Delicious and Golden Delicious varieties, the minimum diameter and minimum weight of apples packed in a closed container shall be indicated on the container.

(a) When the numerical count is not shown, the minimum diameter or, in the case of Red Delicious or Golden Delicious lots where minimum diameter/weight designations have been chosen, the minimum diameter and weight as designated in Table II, shall be plainly stamped, stenciled or otherwise marked on the container in terms of whole inches, or whole inches and not less than eighth inch fractions thereof in the following manner: "A" inches or "B" grams, where "A" corresponds to one of the diameter measurements in terms of inches listed in Table II and "B" corresponds to the weight measurement in grams as indicated in Table II. Both diameter and weight must be shown using the word "or" between the given measurements.

(b) The word "minimum," or its abbreviation, when following a diameter size marking, means that the apples are of the size marked or larger. (See §§51.306 and 51.307.)

Definitions

§51.312 Mature.

"Mature" means that the apples have reached the stage of development which will insure the proper completion of the ripening process. Before a mature apple becomes overripe it will show varying degrees of firmness, depending upon the stage of the ripening process. The following terms are used for describing different stages of firmness of apples:

(a) *"Hard"* means apples with a tenacious flesh and starchy flavor.

(b) *"Firm"* means apples with a tenacious flesh but which are becoming crisp with a slightly starchy flavor, except the Delicious variety.

(c) *"Firm ripe"* means apples with crisp flesh except that the flesh of the Gano, Ben Davis, and Rome Beauty varieties may be slightly mealy.

(d) *"Ripe"* means apples with mealy flesh and soon to become soft for the variety.

§51.313 Overripe.

"Overripe" means apples which have progressed beyond the stage of ripe, with flesh very mealy or soft, and past commercial utility.

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[2] "Fairly tight" means that apples are of the proper size for molds or cell compartments in which they are packed, and that molds or cells are filled in such a way that no more than slight movement of apples within molds or cells is possible.

[3] "Fairly well filled" means that the net weight of apples in containers ranging from 2,100 to 2,900 cubic inch capacity is not less than 37 pounds for Cortland, Gravenstein, Jonathan, McIntosh and Golden Delicious varieties and not less than 40 pounds for all other varieties.

§51.314 Clean.

"Clean" means that the apples are free from excessive dirt, dust, spray residue, and other foreign material.

§51.315 Fairly well formed.

"Fairly well formed" means that the apple may be slightly abnormal in shape but not to an extent which detracts materially from its appearance.

§51.316 Injury.

"Injury" means any specific defect defined in this Section or an equally objectionable variation of any one of these defects, any other defect, or any combination of defects, which more than slightly detract from the appearance or the edible or shipping quality of the apple. In addition, specific defect measurements are based on an apple three inches in diameter. Corresponding smaller or larger areas would be allowed on smaller or larger fruit. Any reference to *"inch"* or *"inches in diameter"* refers to that of a circle of the specified diameter. Any reference to *"aggregate area," "total area,"* or *"aggregate affected area"* means the gathering together of separate areas into one mass for the purpose of comparison to determine the extent affected. The following specific defects shall be considered as injury:

(a) Russeting in the stem cavity or calyx basin which cannot be seen when the apple is placed stem end or calyx end down on a flat surface shall not be considered in determining whether an apple is injured by russeting. Smooth net-like russeting outside of the stem cavity or calyx basin shall be considered as injury when an aggregate area of more than 10 percent of the surface is covered, and the color of the russeting shows no very pronounced contrast with the background color of the apple, or lesser amounts of more conspicuous net-like russeting when the appearance is affected to a greater extent than the amount permitted above.

(b) Sunburn or sprayburn, when the discolored area does not blend into the normal color of the fruit.

(c) Dark brown or black limb rubs which affect a total area of more than one-fourth inch in diameter, except that light brown limb rubs of a russet character shall be considered under the definition of injury by russeting.

(d) Hail marks, drought spots, other similar depressions or scars:

(1) When the skin is broken, whether healed or unhealed;

(2) When there is appreciable discoloration of the surface;

(3) When any surface indentation exceeds one-sixteenth inch in depth;

(4) When any surface indentation exceeds one-eighth inch in diameter; or

(5) When the aggregate affected area of such spots exceeds one-half inch in diameter.

(e) Bruises which are not slight and incident to proper handling and packing, and which are greater than:

(1) 1/8 inch in depth;

(2) 5/8 inch in diameter;

(3) any combination of lesser bruises which detract from the appearance or edible quality of the apple to an extent greater than any one bruise described in paragraphs (1) or (2) of this section.

(f) Brown surface discoloration when caused by delayed sunburn, surface scald, or any other means and affects an area greater than 1/4 inch in diameter.

(g) Disease: (1) Cedar rust infection which affects a total area of more than three-sixteenths inch in diameter.

(2) Sooty blotch or fly speck which is thinly scattered over more than 5 percent of the surface, or dark, heavily concentrated spots which affect an area of more than one-fourth inch in diameter.

(3) Red skin spots which are thinly scattered over more than one-tenth of the surface, or dark, heavily concentrated spots which affect an area of more than one-fourth inch in diameter.

(h) Insects: (1) Any healed sting or healed stings which affect a total area of more than one-eighth inch in diameter including any encircling discolored rings.

(2) Worm holes.

§51.317 Damage.

"Damage" means any specific defect defined in this section or an equally objectionable variation of any one of these defects, any other defect, or any combination of defects, which materially detract from the appearance, or the edible or shipping quality of the apple. In addition, specific defect measurements are

based on an apple three inches in diameter. Corresponding smaller or larger areas would be allowed on smaller or larger fruit. Any reference to *"inch"* or *"inches in diameter"* refers to that of a circle of the specified diameter. Any reference to *"aggregate area," "total area,"* or *"aggregate affected area"* means the gathering together of separate areas into one mass for the purpose of comparison to determine the extent affected. The following specific defects shall be considered as damage:

(a) Russeting in the stem cavity or calyx basin which cannot be seen when the apple is placed stem end or calyx end down on a flat surface shall not be considered in determining whether an apple is damaged by russeting, except that excessively rough or bark-like russeting in the stem cavity or calyx basin shall be considered as damage when the appearance of the apple is materially affected. The following types and amounts of russeting outside of the stem cavity or calyx basin shall be considered as damage:

(1) Russeting which is excessively rough on Roxbury Russet and other similar varieties.

(2) Smooth net-like russeting, when an aggregate area of more than 15 percent of the surface is covered, and the color of the russeting shows no very pronounced contrast with the background color of the apple, or lesser amounts of more conspicuous net-like russeting when the appearance is affected to a greater extent than the amount permitted above.

(3) Smooth solid russeting, when an aggregate area of more than 5 percent of the surface is covered, and the pattern and color of the russeting shows no very pronounced contrast with the background color of the apple, or lesser amounts of more conspicuous solid russeting when the appearance is affected to a greater extent than the above amount permitted.

(4) Slightly rough russeting which covers an aggregate area of more than one-half inch in diameter.

(5) Rough russeting which covers an aggregate area of more than one-fourth inch in diameter.

(b) Sunburn or sprayburn which has caused blistering or cracking of the skin, or when the discolored area does not blend into the normal color of the fruit unless the injury can be classed as russeting.

(c) Limb rubs which affect a total area of more than one-half inch in diameter, except that light brown limb rubs of a russet character shall be considered under the definition of damage by russeting.

(d) Hail marks, drought spots, other similar depressions, or scars:

(1) When any unhealed mark is present;

(2) When any surface indentation exceeds one-eighth inch in depth;

(3) When the skin has not been broken and the aggregate affected area exceeds one-half inch in diameter; or

(4) When the skin has been broken and well healed, and the aggregate affected area exceeds one-fourth inch in diameter.

(e) Stem or calyx cracks which are not well healed, or well healed stem or calyx cracks which exceed an aggregate length of one-fourth inch.

(f) Invisible water core existing around the core and extending to water core in the vascular bundles, or surrounding the vascular bundles when the affected areas surrounding three or more vascular bundles meet or coalesce, or existing in more than a slight degree outside the circular area formed by the vascular bundles. *Provided,* That invisible water core shall not be scored as damage against the Fuji variety of apples under any circumstances.

(g) Bruises which are not slight and incident to proper handling and packing, and which are greater than:

(1) 3/16 inch in depth;

(2) 7/8 inch in diameter;

(3) any combination of lesser bruises which detract from the appearance or edible quality of the apple to an extent greater than any one bruise described in paragraphs (1) or (2) of this section.

(h) Brown surface discoloration when caused by delayed sunburn, surface scald, or any other means and affects an area greater than 1/2 inch in diameter.

(i) Disease: (1) Scab spots which affect a total area of more than one-fourth inch in diameter.

(2) Cedar rust infection which affects a total area of more than one-fourth inch in diameter.

(3) Sooty blotch or fly speck which is thinly scattered over more than one-tenth of the surface, or dark, heavily concentrated spots which affect an area of more than one-half inch in diameter.

(4) Red skin spots which are thinly scattered over more than one-tenth of the surface, or dark, heavily concentrated spots which affect an area of more than one-half inch in diameter.

(5) Bitter pit or Jonathan spot when one or more spots affects the surface of the apple.

(j) Insects: (1) Any healed sting or healed stings which affect a total area of more than three-sixteenths inch in diameter including any encircling discolored rings.

(2) Worm holes.

§51.318 Serious damage.

"Serious damage" means any specific defect defined in this section; or an equally objectionable variation of any one of these defects, any other defect, or any combination of defects which seriously detract from the appearance, or the edible or shipping quality of the apple. In addition, specific defect measurements are based on an apple three inches in diameter. Corresponding smaller or larger areas would be allowed on smaller or larger fruit. Any reference to *"inch"* or *"inches in diameter"* refers to that of a circle of the specified diameter. Any reference to *"aggregate area," "total area,"* or *"aggregate affected area"* means the gathering together of separate areas into one mass for the purpose of comparison to determine the extent affected. The following specific defects shall be considered as serious damage:

(a) The following types and amounts of russeting shall be considered as serious damage:

(1) Smooth solid russeting, when more than one-half of the surface in the aggregate is covered, including any russeting in the stem cavity or calyx basin, or slightly rough, or excessively rough or bark-like russeting, which detracts from the appearance of the fruit to a greater extent than the amount of smooth solid russeting permitted: *Provided,* That any amount of russeting shall be permitted on Roxbury Russet and other similar varieties.

(2) [Reserved]

(b) Sunburn or sprayburn which seriously detracts from the appearance of the fruit.

(c) Limb rubs which affect more than one-tenth of the surface in the aggregate.

(d) Hail marks, drought spots, or scars, if they materially deform or disfigure the fruit, or if such defects affect more than one-tenth of the surface in the aggregate: *Provided,* That no hail marks which are unhealed shall be permitted and not more than an aggregate area of one-half inch shall be allowed for well healed hail marks where the skin has been broken.

(e) Stem or calyx cracks which are not well healed, or well healed stem or calyx cracks which exceed an aggregate length of one-half inch.

(f) Visible water core which affects an area of more than one-half inch in diameter.

(g) *Disease:* (1) Scab spots which affect a total area of more than three-fourths inch in diameter.

(2) Cedar rust infection which affects a total area of more than three-fourths inch in diameter.

(3) Sooty blotch or fly speck which affects more than one-third of the surface.

(4) Red skin spots which affect more than one-third of the surface.

(5) Bitter pit or Jonathan spot which is thinly scattered over more than one-tenth of the surface.

(h) *Insects:* (1) Healed stings which affect a total area of more than one-fourth inch in diameter including any encircling discolored rings.

(2) Worm holes.

(i) Bruises which are not slight and incident to proper handling and packing, and which are greater than:

(1) 3/8 inch in depth;

(2) 1-1/8 inches in diameter;

(3) any combination of lesser bruises which detract from the appearance or edible quality of the apple to an extent greater than any one bruise described in paragraph (i)(1) or (2) of this section.

(j) Brown surface discoloration when caused by delayed sunburn, surface scald, or any other means and affects an area greater than 3/4 inch in diameter.

§51.319 Seriously deformed.

"Seriously deformed" means that the apple is so badly misshapen that its appearance is seriously affected.

§51.320 Diameter.

When measuring for minimum size, "diameter" means the greatest dimension of the apple measured at right angles to a line from stem to blossom end. When measuring for maximum size, "diameter" means the smallest dimension of the apple determined by passing the apple through a round opening in any position.

U.S. Condition Standards for Export

§51.321 U.S. Condition Standards for Export.[4]

(a) Not more than 5 percent of the apples in any lot shall be further advanced in maturity than firm ripe.

(b) Not more than 5 percent of the apples in any lot shall be damaged by storage scab.

(c) Not more than a total of 5 percent of the apples in any lot shall be affected by scald, internal breakdown, freezing injury, or decay; or damaged by bitter pit, Jonathan spot, water core[5] except that invisible water core shall not be scored as damage when these condition standards are applied to the Fuji variety of apples, or other condition factors: *Provided,* That:

(1) Not more than a total of 2 percent shall be allowed for apples affected by decay and soft scald;

(2) Not more than 2 percent shall be allowed for apples affected by internal breakdown;

(d) Container packs shall comply with packing requirements specified in §51.310 of the United States Standards for Grades of Apples.

(e) Any lot of apples shall be considered as meeting the U.S. Condition Standards for Export if the entire lot averages within the requirements specified: *Provided,* That no package in any lot shall have more than double the percentages specified, except that for packages which contain 10 pounds or less, individual packages in any lot may have not more than three times the tolerance or three apples (whichever is the greater amount).

Metric Conversion Table

§51.322 Metric conversion table.

Inches	**Millimeters (mm)**
1/16 equals	1.6
1/8 equals	3.2
3/16 equals	4.8
1/4 equals	6.4
3/8 equals	9.5
1/2 equals	12.7
5/8 equals	15.9
3/4 equals	19.1
7/8 equals	22.2
1 1/8 equals	28.6
2 1/8 equals	54.0
2 1/4 equals	57.2
2 3/8 equals	60.3
2 1/2 equals	63.5
2 3/4 equals	69.9
Cubic Inches	**Cubic Centimeters (cc)**
2100 equals	34,412.7
2900 equals	47,522.3
Pounds	**Grams (g)**
10 equals	4,536.0
37 equals	16,783.2
40 equals	18,144.0

[4]These standards may be applied to domestic shipments of apples as well as export lots, and may be referred to as "U.S. Condition Standards."

[5]Note: "Damage by water core" means externally invisible water core existing around the core and extending to water core in the vascular bundles, or surrounding the vascular bundles when the affected areas surrounding three or more vascular bundles meet or coalesce, or existing in more than slight degree outside the circular area formed by the vascular bundles, or any externally visible water core.