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Agricultural
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Fruit and
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Fresh Products
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Grapes

Market Inspection Instructions

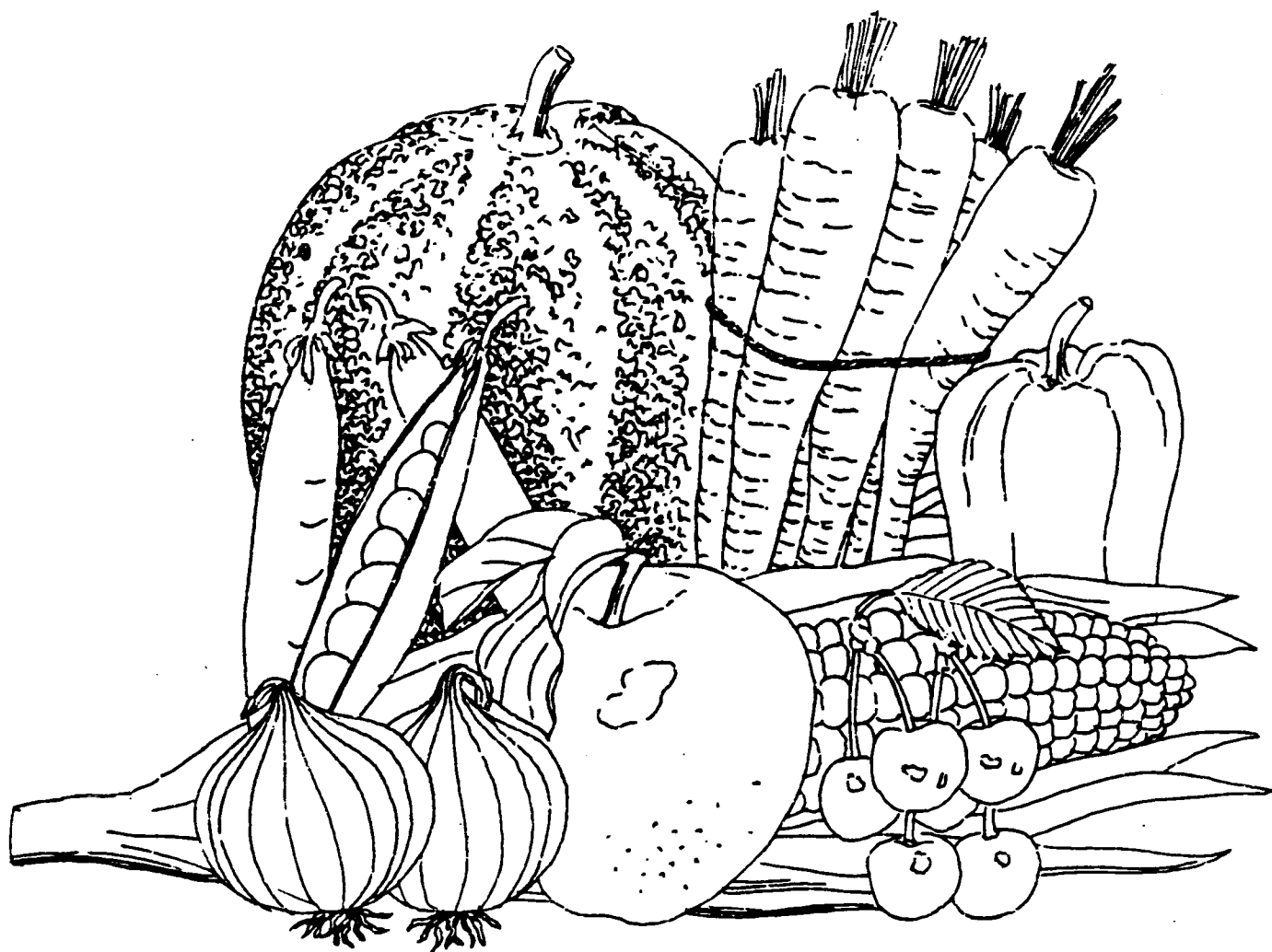


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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
FRUIT AND VEGETABLE DIVISION
FRESH PRODUCTS BRANCH

MARKET INSPECTION INSTRUCTIONS

FOR

GRAPES 1/ 2/

GENERAL

Detailed instructions pertaining to Date, Inspection Point, Kind of Car (Truck or Trailer), Condition of Car (Truck or Trailer), Lading, etc., which are not covered by this handbook, may be found in the General Market Inspection Instructions. (1)

TYPES

There are three basic species of grapes grown in the United States. First, *Vitis vinifera* (European or *Vinifera*), often referred to as the California grape, is by far the predominating commercial type. It is grown extensively throughout California and to a lesser extent Arizona. It is described in Part I of this handbook. (2)

The other species are *Vitis labrusca* (Fox type) and *Vitis rotundifolia* (Muscadines), the *Labrusca* or American type. They are represented by distinctly American varieties, and are generally grown for commercial use mainly in New York, Michigan, Washington, Pennsylvania and Ohio. They are described in Part II of this handbook.

Cultivars that combine the qualities of *V. vinifera* and the American species are increasing in popularity.****

1/ These instructions supersede "Market Inspection Instructions Grapes" issued May 1966.

2/ These instructions do not establish a new or revised substantive rule (United States Standards for Grades of Table Grapes, Juice Grapes (European or *Vinifera* Types) and American (Eastern Type) Bunch Grapes (Sec. 51.880 - 51.912, 51.4290 - 51.4307 and 51.3610 - 51.3624 respectively).

-1a-

The most appropriate method of deciding which standard to apply for these mixed parentage varieties would be by using the unique senses of an inspector and the characteristic of the individual grapes. The predominating characteristics shall determine the standard used for the basis of inspection. In other words, hybrids exhibiting primarily American type characteristics shall be based on the American (Eastern Type) standard and hybrids exhibiting primarily European type characteristics shall be based on the European (Vinifera type) standard.

To assist in determining which standard is more appropriate use the following criteria to determine the type of grapes. American (Eastern type) grapes are generally grown East of the Rocky Mountains. The pulp of the grape is usually soft and without form; its consistency often resembles that of soft set gelatin. Upon squeezing the individual grape between the thumb and fingers or between the teeth when biting, the pulp will usually expel easily from the skin as one shapeless mass. In addition, the skin may be slightly tough or chewy, especially upon separating from the pulp. The flavor may be described as "foxy," meaning the characteristic sweet, fruity flavor indicative of concord grape juice. Some American type grapes include the Concord, Catawba, Delaware, and Niagara varieties.

European (Vinifera) type grapes are often referred to as the "Old World" varieties. In the U.S. they are generally grown West of the Rocky Mountains or in other temperate areas. The pulp of the grape is usually firm and will retain its form. Its texture is not gelatinous at all, but more like the flesh of a ripe plum. The skin adheres to the pulp and upon squeezing, the grape will usually crunch without easy expulsion of the pulp. Also, because of the adhering skin, the skin seems to break and chew much more readily than that of the American types. The flavor is not "foxy," but may seem more like a neutral sweet flavor. Some European type grapes include the Thompson Seedless, Emperor, Tokay, Ribier, Cardinal, Perlette, and Almeria.

When writing certificates on American type table grape lots, it shall be necessary to include the type in the grade statement, for example: U.S. No. 1 Table, American (Eastern) Type. When writing the grade statement for European type table lots this qualification will not be necessary, for example: U.S. No. 1 Table. ****

PART I - EUROPEAN OR VINIFERA TYPE

PRODUCING AREAS AND CLASSIFICATION BY USE

- (3) European type grapes are grown commercially throughout California, except in some of the counties in the extreme north or in the higher mountain districts. The industry is most extensive in the San Joaquin and Sacramento Valley, in parts of the coastal counties and in San Bernardino, Riverside and Imperial counties. Early varieties of European type grapes are produced in considerable volume in the Phoenix and Yuma districts of Arizona.
- (4) Only varieties of the European or Vinifera type are grown commercially in California and Arizona. Over 100 varieties are listed as being of commercial importance and classified and described in Special Publication No. 25, "Descriptive Catalogue of California Grapes" issued by the California State Department of Agriculture, June 15, 1922. Also, classification and description of black juice varieties appears in a State of California Department of Agriculture publication entitled "Black Juice Grape Varieties in California" issued in 1929.
- (5) Classification of grapes is based primarily on their uses, yet in many cases typical varieties of one group are used for more than one purpose. For example, Thompson Seedless and Muscat grapes, outstanding raisin varieties, are frequently used for table or juice purposes. Likewise, Tokay, Emperor or Malaga are prominent table varieties, but strippings from the vines of these varieties are used for juice purposes. Also, selected bunches of grapes from varieties which are used principally for juice purposes are sometimes handled for table use.

IMPORTED GRAPES

- (6) During the late Winter and Spring months, considerable quantities of grapes from Argentina, Chile, and the Union of South Africa are imported into the United States. Most imports arrive at the port of New York and many lots are shipped by car or truck to other markets. Inspections are frequently requested upon them. Inspection procedure on these imported grapes is the same as for similar packs of American grapes.

Blank

SAMPLING

Samples should consists of the entire contents of containers. Representative sampling is fully as important as grade interpretation. If the samples are not representative of the lot, the results of the inspection may be incorrect regardless of how accurate the grade interpretations may be. Samples selected should cover all portions of the car or lot. Samples should be selected proportionately from each size, grower's lot, grade or brand. (7)

TOLERANCES

The tolerances in the U. S. Standards are applied on a weight basis except for color which is on a count basis. The following tables give the over-all tolerances and restricted tolerances permitted for the grades. (8)

TABLE GRAPES (EUROPEAN AND VINIFERA TYPE)

Table I TOLERANCES AT SHIPPING POINT 1/ (9)

Factor	U.S. Extra Fancy table	U.S. Fancy table	U.S. No. 1 table
	Percent	Percent	Percent
(A) For bunches failing to meet color requirements.	10	10	10
(B) For bunches failing to meet requirements for minimum diameter of berries	10	10	10
(C) For bunches failing to meet stem color requirements	10	--	--
(D) For undersize bunches and for bunches and berries failing to meet the remaining requirements for the grade. .	8	8	8
Including in (D):			
(a) For serious damage	2	2	2
And, including in (a):			
(i) For decay	$\frac{1}{2}$ of 1	$\frac{1}{2}$ of 1	$\frac{1}{2}$ of 1

(10)

Table II TOLERANCES EN ROUTE OR AT DESTINATION

Factor	U.S. Extra Fancy table	U.S. Fancy table	U.S. No. 1 table
	Percent	Percent	Percent
(A) For bunches failing to meet color requirements.	10	10	10
(B) For bunches failing to meet requirements for minimum diameter of berries	10	10	10
(C) For bunches failing to meet stem color requirements	10	--	--
(D) For undersize bunches and for bunches and berries failing to meet the remaining requirements for the grade. .	12	12	12
Including in (D):			
(a) For permanent defects.	8	8	8
(b) For serious damage	4	4	4
And, including in (b):			
(i) For serious damage by permanent defects	2	2	2
(ii) For decay	1	1	1

1/ Shipping point, as used in these standards, means the point of origin of the shipment in the producing area or at port of loading for ship stores or overseas shipment, or, in the case of shipments from outside the continental United States, the port of entry into the United States.

JUICE GRAPES (EUROPEAN OR VINIFERA TYPE)

(11)

	U. S. No. 1 Juice	U. S. No.2 Juice
(A) For raisining or raisined berries in any container	15*	
Including in (A)		
(a) For raisined berries	5	15
(B) For berries failing to meet remaining requirements of the grade	10	10
Including in (B)		
(a) For serious damage	5	
Included in (a)		
(b) For decay	2	5
(C) For bunches damaged by dried berries and/or immature shot berries	10	

* Any amount of raisining may be permitted if percentage of raisining is specified in connection with the grade.

APPLICATION OF TOLERANCES

The application of tolerances for each of the standards is basically the same: (12)

Based on sample inspection, individual packages in the lot are subject to the following limitations: Provided, That the averages for entire lot are within the tolerances specified for grade:

- A. For tolerances of 10 percent or more, individual packages may contain not more than one and one-half times the specified tolerances.
- B. For tolerances of less than 10 percent, individual packages may contain not more than double the specified tolerance.

DETERMINING PERCENTAGES

- (13) Percentages by weight. All percentages of defects used in reporting grapes are by weight. In order to simplify calculations, weight of samples should always be determined and entered on the note sheet as pounds or tenths of pounds. Since it is not possible to weigh all samples, each inspector must learn to estimate weights by using the number of berries required to weigh one-tenth of a pound for the variety.
- (14) The inspector should frequently check the weights of different varieties throughout the season, so as to make these estimates as accurate as possible. Frequent checks with a postal scale, or some other method, are necessary even for the experienced inspector in order to insure accuracy in estimating.
- (15) Care should be taken not to overestimate amounts of dried or shot berries which require a large number to make up any appreciable percentage on account of their light weight.
- (16) The following table shows the approximate number of berries required to weigh 1/10 of a pound, in the more common varieties, and is provided as a guide in estimating the amount of defects noted.

Revised, January 1994, HU-122-3(a)
Page 7, Para. 17, Grapes,
Market Inspection Instructions,
November 1971

-7-

VARIETY	SIZE OF BERRIES	NUMBER OR BERRIES PER 1/10 OF POUND
EMPEROR, CALMERIA, ALMERIA, CHRISTMAS ROSE & similar varieties.	Small	14 or more
	Medium	9 to 13
	Large	8 or less
	Average Size Shot Berries	39
RIBIER, CARDINAL, EXOTIC, ITALIA, QUEEN, ROUGE, & similar varieties	Small	11 or more
	Medium	8 to 10
	Large	7 or less
THOMPSON SEEDLESS, & similar varieties	Small	13 or more
	Medium	6 to 12
	Large	5 or less
RED GLOBE & similar varieties	Range 15/16 to 1- 1/4. Average 1 inch berry	5 berries

(17)

The inspector will note that in the definition of "damage" in the Table Grape standards, when individual damaged berries are present in quantities sufficient to materially affect the appearance of the bunch as a whole, the entire bunch is considered "damaged."

(18)

Grapes that are "seriously damaged" or decayed should be scored only on the basis of the individual berry and not on the appearance of the bunch.

(18-a)

While the wording is not the same in the Juice Grape standards, the intent is the same and the same interpretation should apply.

(19)

Added, June 1989, BN-104-7(b)

PRODUCTS

(20) The following information should be given under this heading:

Product (including Variety, when known)
Type of Container
Distinguishing Marks
Quantity Inspected.

(21) Products. First state under the "Products Inspected and Distinguishing Marks" heading the designation of the commodities as "Table Grapes" or "Juice Grapes".

(22) The variety is to be stated preceding the name of the product, only if known with certainty. It is not expected that the inspector will become sufficiently familiar with grape varieties to name all the table and juice varieties that appear on the market each season. He should, however, be able to identify the more common varieties which comprise most of the shipments.

(23) The U. S. Standards for all grades of grapes, with the exception of mixed variety grades, specify that they shall be of one variety, which is defined as "grapes showing the same varietal characteristics." The difficulty in identifying the juice grape varieties is due not only to the large number of varieties which are very similar in their characteristics, but also to the fact that many of these varieties behave in widely different ways when grown under different conditions. Soil texture, structure, composition and moisture all have an important effect, as well as climatic conditions, which vary between different seasons in the same district. Where the inspector is uncertain of the variety, but the containers show varietal markings, these may be shown on the certificate as follows:

"Juice Grapes in lugs stamps Zinfandel".

(24) Mixed Varieties of Juice Grapes. Because of the fact that many vineyards contain vines of different varieties in the same block, and since it is not always practicable to segregate these varieties while they are being picked, carloads of juice grapes often may contain most lugs of one variety, while part of the lugs or part of the grapes in the lugs may be of a different variety.

When it can be determined that a portion of the car or lot consists of lugs of one variety and the other portion consists of lugs of mixed varieties of the same color, general terms should be used unless the inspector knows the number of each portion. (25)

In order to accurately describe this condition under the "Products" and "Grade" headings on the certificate, statements such as the following should be used, when at least half of the containers show one variety: (26)

Product: "Black JUICE GRAPES in open lugs, labeled 'Black Bull,' most lugs contain Zinfandels, some lugs Zinfandels and Carignanes mixed. Manifested as 1170 lugs."

Grade: Most lugs U. S. No. 1 Juice
Some lugs U. S. No. 1 Mixed Juice.

Type of Container. Always state the type of container. Grapes are shipped in various containers, the most common being lugs or display lugs with some foam containers being used in recent years. (27)

If shipped in unlidded lugs (occasionally done with Juice Grapes) this fact should be mentioned on the certificate. (28)

Distinguishing Marks. The purpose of this is to identify the lot with the certificate. Include significant identifying brands, grower's or shipper's name and address, state lot stamps, export stencils or other distinguishing marks. (29)

Quantity Inspected. The number of packages in a lot must be stated on the certificate. This will usually be in the form of an applicant's count or manifest count. If the inspector can physically count the containers he may certify count on the certificate. (30)

(31) Examples of Products Statement.

1. "Thompson Seedless Table GRAPES in lugs labeled 'Diamond K. Brand, Shepherd Fruit Company, Dimuba, California.' Manifested as 945 lugs."
2. "Zinfandel Juice GRAPES in unlidded lugs labeled 'Testrite Brand, Jones Fruit Company, Guasti, California, U. S. No. 1 Juice,' Manifested as 1,170 lugs."
3. "Table and Juice GRAPES, manifested as 200 lidded lugs Tokays, labeled 'Fireflame California Grapes' and 800 unlidded lugs Carignane, labeled 'McK Brand.'"

CONDITION OF LOAD AND CONTAINERS

- (32) Under this heading should be noted the condition of the load and containers, the arrangement of the load with the number of rows and layers and the presence or absence of center bracing and stripping.
- (33) Any shifting of the load, broken bracing, wet, stained or otherwise damaged packages noted should be described as accurately as possible, giving the extent of the damage and the location in the load.
- (34) Stained or leaking containers are an indication of heavy decay or damaged stock somewhere in the load and should be accurately described. They have an important bearing on the sale value of the product. It frequently happens that the stains are old and dry, and are probably caused by handling with stained or wet hands in the packing house or loading station. These should be described as "dry stains" in order to differentiate from stains caused by recent leakage. The amount of staining or leaking can be shown by the use of such terms as "lugs leaking slightly from crushed berries," or "lugs badly stained and leaking from decayed berries" or "many lugs wet, with floor beneath and next to pile wet from leaking juice from decayed stock."
- (35) If the inspection is made after the car is unloaded, whether it be on the piers, auction platform or in a store, it is common practice to re-stack the load so that no stained or leaking packages are visible. It is important, therefore, in a case of this kind that the inspector should not base his judgment solely on the appearance of the outside rows of the pile in reporting on condition of the packages.

Often the condition of the floor underneath the pile or the presence of sawdust on the floor is an indication of leaking containers and warrants further investigation. Sometimes used containers are used for juice stock and this condition should be reported whenever found. (36)

CONDITION OF PACK

Under this heading the type of pack as well as the condition of the pack should be described. (37)

Some of the more commonly used packs are:

"Stem-up Pack". This is the most commonly used pack. In it bunches are placed in the container with the top bunches so arranged that they all have the stems up. (38)

"Faced Pack". Bunches are placed in the container with the top bunches so arranged that the face is smooth, with no stems exposed. (39)

"Semi-faced Pack". This is a combination of the "stem-up pack" and "faced pack". Each end of the container is "faced-packed" and from one or two bunches to the entire middle portion is packed "stem-up". (40)

The condition of the pack will be described by use of the following terms:

Well filled. This is the desirable condition of pack and means that the container is sufficiently filled to prevent movement within the container and between bunches. Lugs and crates will be filled so that the contents are in firm contact with the cover when it is raised by one cleat, or will be 1/2 inch or more above the top edges of the container if there is no cover. The edges considered should be the tops of the ends. (41)

- (42) Fairly well filled. This condition means that the pack is not quite full or that there may be a slight movement within the container. This term means that the pack is not ideal, but is not sufficiently slack to justify the use of the term "slack".
- (43) Lug and crates will be described as "fairly well filled" when the contents are not in contact with the covers, but not more than 1/2 inch below the covers.
- (44) Slack. This is used to describe those containers in which the contents are more than 1/2 inch below the cover. The amount of slackness should be reported in inches or fractions of an inch.
- (45) Grapes packed to meet the "Export" grade must be packed with one of the customary protective materials, such as: cushions, liners, wraps, or properly packed in sawdust or granulated cork..
- (46) When packed in sawdust or granulated cork the tightness of the grapes in the container should be described by use of one of the following terms:
- (47) Tight. If sawdust or cork fills the container and is through the bunches the term "tight" is used. Packs shaken with a mechanical shaker will usually meet this description.
- (48) Fairly Tight. The sawdust or cork may fill the container but not be fully through the bunches, or it may be fully through the bunches but not completely fill the container and be not more than 1/2 inch below the top edge of the container. These conditions should be described as "fairly tight."
- (49) Slack. When the sawdust or cork does not properly fill the container, the term "slack" is used and the distance below the tops of the containers should be shown in inches or fractions of an inch.
- (50) Occasionally a small amount of the sawdust will be placed in the bottom of a lined display lug and, after packing, sawdust will be put on top of the pack. This does not constitute approved protective packaging and grapes so packed are considered damaged by foreign material and would fail to meet any of the U. S. grades for grapes.

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Example of Pack Statement:

(51)

1. "Stem up pack. Most lugs well filled, some fairly well filled."
2. "Faced pack; lugs well filled."
3. "Most chests fairly tight, some slack with sawdust approximately one inch below top edge of chests."
4. "Mostly fairly well filled, some slack with grapes 3/4 inch below top edge of lug. Net weight ranges from 25 to 30 pounds average 27 pounds per lug."

Reporting Net Weight of Containers. When certifying net weight of packages, it should be reported under "Pack." Report the nearest half-pound when weights are over 10 lbs. To 40 lbs., and to nearest 1/4 pound when weights are over 5 lbs. To 10 lbs. Refer to General Market Inspection Instructions for instructions on determining net weight.

(52)

SIZE

The size of bunches and berries is an important factor and should be reported on certificates. Size of bunches and berries should be described separately unless the size terms used for each are the same, in which case they can be combined.

(53)

Size of bunches: To describe the size of bunches a knowledge of the normal size for the variety is necessary. The following table can be used as a guide:

(54)

	<u>Small</u>	<u>Medium</u>	<u>Large</u>	
**** Most Table varieties	less than 3/4 lb.	3/4 to 1-1/4 lb.	Over 1-1/4 lb.	****
Most Juice varieties	less than 1/2 lb.	1/2 to 1 lb.	Over 1 lb.	

Size of berries. Sales are frequently based on the size of berries reported on certificates. For this reason inspectors are cautioned to use care in reporting this factor. They should use the following terms to describe berry size:

(55)

56) VARIETY	SMALL	MEDIUM	LARGE
Emperor, Malaga and Red Malaga	Under 11/16	11/16 to 13/16	Over 13/16
Ribier & Cardinal	Under 12/16	12/16 to 14/16	Over 14/16
Thompson Seedless & Similar Varieties	Under 10/16	10/16 to 12/16	Over 12/16
Tokay	Under 11/16	11/16 to 13/16	Over 13/16
Almerias	Under 11/16	11/16 to 13/16	Over 13/16
Alicante Bouschet, Zinfandel and Carignane	Under 9/16	9/16 to 11/16	Over 11/16

7) **Grade Requirements for Size of Bunches and Berries.**

Minimum Bunch Size: The U.S. Extra Fancy Table Grape grade requires that bunches weigh not less than 1/2 pound. The U.S. Fancy Table and U.S. No. 1 Table grades require that bunches weigh not less than 1/4 pound.

8) In all Table Grape grades there is no separate tolerance for underweight bunches. They are included in the tolerance for general grade defects.

Juice Grape grades contain no requirements as to bunch size.

Minimum Berry Size:

1) (a) **Table Grapes:**

Each of the table grape and Export grades requires that each bunch have a minimum percentage of berries of a specific minimum diameter. They are as follows:

U. S. Extra Fancy Table and U.S. Extra Fancy Export: At least (60)
90 percent of the berries on each bunch shall be at least 11/16
of an inch in diameter except:

Ribier	Exotic
Cardinal	Queen
Robin	Italia Muscat

And other similar varieties shall be at least
13/16 of an inch.

U. S. Fancy Table and U. S. Fancy Export: At least 90 percent (61)
of the berries on each bunch shall be at least 10/16 of an inch
in diameter except:

Ribier	Queen
Cardinal	Robin
Exotic	Italia Muscat

And other similar varieties shall be at least
12/16 of an inch in diameter and,

Thompson Seedless	Delight
Perlette	Beauty Seedless

And other seedless varieties shall have at least
75% of berries on each bunch having a minimum
diameter of at least 10/16 of an inch.

U.S. No. 1 Table: At least 75 percent of the berries on each (62)
bunch shall be at least 10/16 of an inch except:

Thompson Seedless	Delight
Perlette	Beauty Seedless

And other seedless varieties shall be at least 9/16
of an inch in diameter.

There is a separate 10%, by weight, tolerance in each of these grades (63)
for bunches which fail to meet the percentage, by count, requirement
for minimum diameter of berries.

(b) Juice Grapes:

The juice grape grades contain no requirements for size of berries, (64)
however, a general description of these factors should be reported on
the certificate.

(65) Examples of Size Statements.

(European or Vinifera type)

1. U. S. No. 1.

"Bunches and berries mostly medium, some large.
Bunches with undersize berries within tolerance."

2. U. S. Fancy Table.

"Bunches mostly large, some medium.
Berries mostly large, many medium. Bunches with undersize
berries within tolerance."

3. U. S. Extra Fancy, fails to grade.

"Bunches mostly medium, few large, few small.
Berries mostly medium; 8% to 17%, average 12% of bunches
fail to meet berry size requirement."

4. U. S. Extra Fancy.

"Bunches and berries mostly large, many medium. Bunches
with undersize berries within tolerance."

QUALITY

(66) Report the following factors under this heading:

Development.
Maturity.
Appearance.
Color.
Compactness and Filling of Bunches
Defects.

(67) Well Developed Grapes. Well developed grapes are defined as grapes which are not abnormally small for the variety. This requirement is included in the grade so that bunches containing sufficient abnormally small berries could be scored as defects, especially in the grades where

there are no size requirements for berries. Abnormally small berries not affecting the appearance of the bunch should be disregarded; however, if the appearance of the bunch is materially affected, the entire bunch should be scored.

In grades containing a berry size requirement, abnormally small berries present in amount sufficient to affect the appearance of the bunch will usually be scored under the berry size requirement. (68)

Maturity. The Table Grape standards require that the grapes be "Mature" as defined by the Agricultural Laws and Regulations of the state in which the grapes are produced. (69)

Since state laws require that maturity requirements be met before the grapes leave their respective state, it will not be necessary, in the markets, to run soluble solids determination of Table Grapes from California or Arizona. However, if specifically requested by the applicant to do so the procedure set forth by the states must be followed. Arizona's requirements are set forth in the standards while California's can be found in the rear of this handbook. (70)

On Table Grapes from foreign countries or on Juice Grapes, testing should be done to see if the maturity requirements are met. See the section on Soluble Solids Determination in this handbook. While the Standard states that soluble solid determination on Juice Grapes be made with a hydrometer, the refractometer may be used as long as the readings are not borderline or just below minimum sugar requirements. In such instances the hydrometer should be used. (71)

Uniformity of Appearance. This requirement is intended to eliminate wide variations in berry size and/or color within a container. This requirement means that not more than 1/10 of the containers in any lot may show sufficient variation in color or size of berries to materially detract from the appearance of the individual container. It also requires that the stems be well developed and strong. "Uniform in appearance" is a requirement of the U. S. Extra Fancy Table grade. (72)

All bunches in a container may be individually fairly uniform as to size or color but the appearance of the container may be materially (73)

-18-

affected by a wide variation between bunches. In other words, when bunches of uniformly small grapes are mixed with bunches of uniformly large grapes; or bunches of light color red grapes are mixed with bunches of very dark red grapes; or bunches of white grapes that are light green are mixed with bunches of predominately amber colored grapes, the contents of the container would not have a "fairly uniform appearance." The reverse situation would also be objectionable although the irregularity would have to be more pronounced before it becomes objectionable. In other words, it is not the relatively poor color or small size that is objectionable but the contrast. For example, one or two well colored bunches mixed with a container of general minimum colored bunches would be objectionable. If the grapes on the bottom of a container are of inferior color or size as compared to those packed in the top, it would not be considered fairly uniform in appearance or uniform in appearance, although poorer color or size showing in the face is more objectionable than the same amount in the bottom of the container.

) The inspector is cautioned not to be too technical in scoring this factor. The general appearance should be considered and, in the case of Tokays and Emperors particularly, it should be remembered that there is normally considerable variation in color in the same bunch.

) It will be necessary to remove a large part or all of the contents of a container before judging uniformity of color or size.

) Although not required by any of the remaining grades, if a lot meets the requirements as to uniformity of appearance it may be so described on the certificate.

) Color. The U.S. standards specify in detail the color required for red and black varieties of grapes in the Table Grape and U.S. No. 1 Juice Grape grades. There are no color requirements for white varieties of grapes in the standards for Table Grapes. However, applicant's often request that color be reported on white varieties; use the following terms: green, turning amber or amber. Report the facts at applicant's request, not affecting grade. Also, for white varieties of grapes in the U.S. No. 1 Juice Grape grade when sugar test shows that soluble solids are less than 20%, in which case they must meet the requirements of "fairly well colored" (refer to Color Requirements in Standards). If no test is made showing soluble solids of white grapes to be below 20%, no minimum color requirement should be applied to U.S. No. 1 Juice grapes, however, color should be described.

) In all cases the bunch is the unit for determining color. It is necessary to accurately estimate the percentage, by count, of the berries on each bunch which show the color in question. Care must be exercised

in judging minimum shades of characteristic color permitted in the grades as these minimums are sometimes difficult to determine.

The grades mentioned above as containing a color requirement also provide a 10% tolerance, by weight, for bunches that fail to show a sufficient percentage of adequately colored berries for the grade and variety involved. This is a separate tolerance in addition to the other tolerances of the grade. (79)

Color is an important factor in determining the market value of a lot of grapes. Material quantities of bunches that meet a higher color standard than that required by the grade should be reported in general terms on the certificate as the following examples illustrate: (80)

- (a) "Most bunches fairly well colored, some well colored."
 - (b) "Most bunches fairly well colored, many well colored."
- Or in the case of white varieties:
- (c) "Most bunches light green to turning amber, many amber color."

Lots which fail to meet the color requirements of the grade for which they are marked will seldom be encountered on the markets. However, when such lots are found, it will be necessary to report the range and average percentage of undercolored bunches. (81)

Examples:

1. U. S. Fancy.

"Most bunches reasonably well colored, 7 to 15%, average 12% fairly well colored bunches."

2. U. S. No. 1.

"Mostly fairly well, some reasonably well colored; from 8 to 20%, average 15% poorly colored bunches."

Poorly Colored and Green Color. Bunches failing to meet the requirements of "fairly well colored" may be reported as "poorly colored". When the term "green" is used in connection with the color statement, the word "color" should be used with it, as "green color". (83)

COLOR REQUIREMENTS OF THE GRADES

(84)

U. S. Extra Fancy Table	Well Colored
U. S. Fancy Table	Reasonably Well Colored
U. S. No. 1 Table	Fairly Well Colored
U. S. No. 1 Juice	Fairly Well Colored
U. S. No. 2 Juice and generally	
U. S. No. 1 Juice, White Varieties.	No Requirement

DEFINITION OF COLOR TERMS

TABLE GRAPES

(85)

<u>Color Term</u>	<u>Black Varieties</u>	<u>Red Varieties</u>	<u>White Varieties</u>
Well Colored (U. S. Extra Fancy)	95% of berries good characteris- tic color	75% of berries good characteris- tic color	No requirement
Reasonably well colored (U.S. Fancy)	85% of berries good characteris- tic color	66-2/3% of berries good characteristic color, except Tokay and Cardinal 75% characteristic color	No requirement
Fairly well colored (U.S. No. 1)	75% of berries characteristic color	60% of berries characteristic color	No requirement

1. Good characteristic color for black varieties means purple to black except that Ribier or similar varieties of grapes shall have at least two-thirds of the surface of the berry showing purple to black color.

For red varieties good characteristic color means at least two-thirds of the surface of the berry is light red through dark red color; except, for the Tokay variety pink through dark red, and for the Cardinal variety light red through purple shall be permitted.

2. Characteristic color for black varieties means reddish-purple to black except that Ribier or similar varieties of grapes shall have at least two-thirds of the surface of the berry showing reddish-purple to black color.

For red varieties characteristic color means at least two-thirds of the surface of the berry is pink to dark red; except, for the Tokay variety light pink through dark red and for the Cardinal variety light pink through purple color shall be permitted.

JUICE GRAPES

<u>Color Term</u>	<u>Black Varieties</u>	<u>Red Varieties</u>	<u>White Varieties</u>	(85)
Fairly well colored (U.S. No. 1 Juice)	85 or 75% of berries characteristic color according to variety	60% of berries 60% of surface characteristic color. 45% of berries for Tokay.	50% of berries light green, straw or amber color*	

* Required only when the grapes test less than 20% soluble solids.

Characteristic Color.

1. Black Varieties.

Purple to black is considered characteristic color for Malvoisie, Grenache, Trousseau, Ribier, Rose of Peru, Black Prince and Black Hamburg.

Reddish-purple to black for Cornichon, Aramon, Mission, Grignolino, Zante and Black Moriska.

2. Red Varieties.

Light pink, red, dark red or purple is considered characteristic color for red varieties.

- (87) Compactness and Filling of Bunches. The filling of berries in bunches of grapes and the compactness of bunches are related to some extent. Both of these factors vary considerably in different varieties.
- (88) Compactness applies to the overall tightness of the bunch. The degree of compactness is largely determined by the closeness of the berries to each other on the bunch and by the length and turgidity of the lateral stems. A bunch may be compact because stems are turgid but may be only fairly compact when the stems become wilted.
- (89) Filling applies to the plumpness or fullness of the bunch, or conversely, to the stringiness of the bunch; also to the number, development, and position of berries on the bunch in relation to its size. A bunch of Emperors may have lateral stems closely spaced on the main stem and have no open spaces or stringiness, yet the lateral stems may be of such length that the bunch is loose and the berries move freely. This bunch would be described as well filled with regard to filling, and loose regard to compactness.
- (90) Some of the most desirable varieties have bunches that are somewhat open in appearance, and at the most are only fairly compact, as compared with others that are normally compact to very compact.
- (91) Well filled Emperor bunches, with long pliable lateral stems, usually will be loose to fairly compact. Tokay bunches, on the other hand, usually are compact to very compact. When the bunches have been thinned by clipping out part of the stems, or when they are only fairly well filled, Tokay bunches may be fairly compact or even loose.
- (92) The terms to be used to describe compactness are:

Excessively tight means the berries are so closely wedged together that the appearance of the bunch is materially affected by berries on the lower portion being distinctly distorted from normal shape. Disregard very tight shoulders even though some distortion may be evident. Excessively tight bunches are defects of the U. S. Extra Fancy and U. S. Fancy Table grades. This condition occurs mostly in the Tokay variety and occasionally in Emperors from vines on resistant stock. (93)

Other terms used to describe compactness of bunches are: (94)

Compact, fairly compact, and loose.

In describing filling the following terms should be used: (95)

Well filled - berries closely spaced on main or lateral stem with no open spaces or stringiness. (96)

Fairly well filled - berries closely spaced on main or lateral stems. Bunch may be loose with regard to compactness but is not stringy. (Lower limit U. S. Extra Fancy and U. S. Fancy Table grades). (97)

Slightly straggly - berries not so closely spaced on main or lateral stems as in "fairly well filled" resulting in bunches which are slightly open or slightly stemmy in structure. (Lower limit U. S. No. 1 Table grade). (98)

Straggly - berries so widely spaced on main and lateral stems that the bunch is distinctly open or very stemmy in structure. Straggly bunches are defects of all grades except the Juice Grape grades. (99)

Excessively straggly - only a few scattered berries along the main stem. Such bunches are excessively stemmy in appearance and are defects of the U. S. No. 1 Juice grade. The definition of excessively straggly is intended primarily for the Muscat variety which characteristically has a high percentage of straggly bunches. (100)

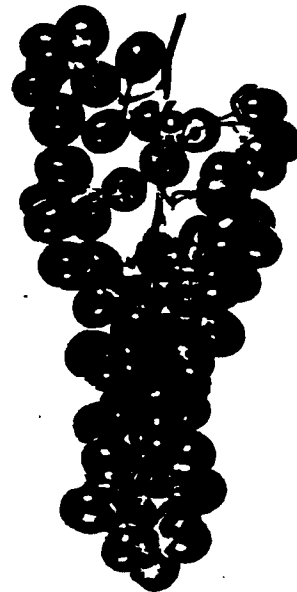
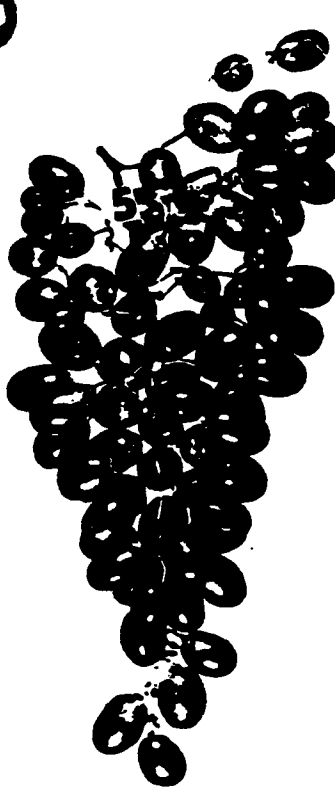
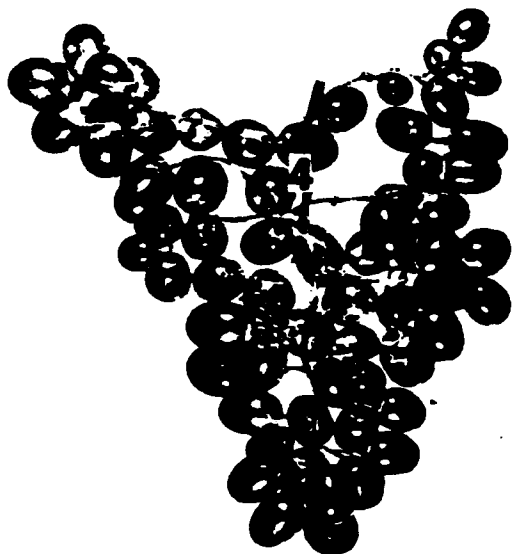
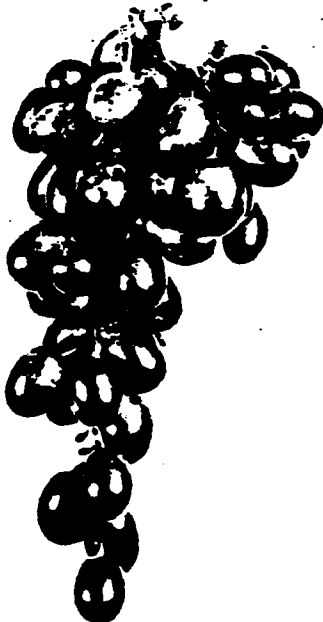


1. TABLE GRAPES, STRUCTURE OF BUNCHES - EMPEROR.

All bunches are straggly. Bunch No. 3 is just below the requirement for U.S.No.1 Grade.

(Upper row, bunches photographed hanging; lower row, same bunches spread out on flat surface)

5



2. TABLE GRAPES, STRUCTURE OF BUNCHES - EMPEROR.

Nos. 4 and 5 - Not straggly, not fairly well filled. (No. 5 not fairly well filled account upper laterals)
No. 6 - Minimum fairly well filled.

(Upper row, bunches photographed hanging; lower row, same bunches spread out on flat surface)

- (101) Defects. The term "grade defects" will be used on the certificate report all blemishes that are serious enough to affect grade. In reporting defects, there are three cardinal points to consider. These are: the amount, the particular type or nature of injury, and the approximate degree to which the individual specimens are affected. In order to avoid giving the certificate the appearance of a catalog of defects, they should be grouped into one percentage followed by their names. It is not necessary to name all defects found, but the three most important from the standpoint of percentage in order of their importance should usually be shown.
- (102) With the exception of a few factors, no attempt will be made to describe the insect injuries, diseases and defects of grapes in this handbook. This information is fully covered in Miscellaneous Publication No. 340.
- (103) Almeria Spot. A disease peculiar to grapes of the Almeria variety, characterized by purplish or brown spots. The discoloration appears to extend from the seed outward to the skin. The shape of the berry usually is distorted or flattened over the discolored area.
- (104) The cause is unknown; it does not seem to develop decay, and increases very little, if any, in transit or storage, although it definitely becomes more noticeable with time. The U. S. Extra Fancy and U. S. Fancy Table Grape grades specify "free from Almeria Spot," therefore any degrees affecting a berry should be scored against these grades. When distinctly sunken or dark in color, it should be scored as damage against the U. S. No. 1 Table Grape grade.
- (105) Bird Injury, Bee Injury. A form of injury consisting of small holes in the grape berries has been attributed to bird pecks. These lesions often develop decay. Bees also have been reported as causing injury but this is not probable, though bees are found at the site of other injuries, especially when grapes contain a large amount of sugar such as very ripe Muscats. This injury should be reported as "bird pecked," if not being scored as wet and leaking, or if it has not progressed into decay. It is a serious defect in all U. S. Standards for Grapes.

- **** **Discoloration.** The Table Grape grades require "free from damage by discoloration." The definition of the term includes as defects "Buckskin" berries of the Tokay variety and similar injury to other varieties. "Sunkissed" berries of the white Malaga variety which are amber or light brown in color are not considered as injured or damaged, however, when brown or dark brown, it should be scored as discoloration. Often this condition extends beyond the discoloration stage and is actually sunburn. Grape berries showing "ring-mildew" should be scored as discoloration. For instructions on reporting amber color on white varieties of grapes see "color" section under quality factors, paragraph 77. (106) ****
- Hail Injury.** Hail injury may occur as discolored bruised areas without rupture of the skin, or when very severe the skin may be broken causing serious damage. (107)
- Heat Injury.** This condition apparently is caused by drought and high temperature. Grapes on vines with poor foliage seem to suffer most. (108)
- Affected berries are very soft or flabby, and easily become loose and wet at the capstems. The brush shows brown discoloration, and the flesh of the berry is discolored or broken down. The skins are very tender and the berries crush easily in the bunches, in a manner similar to those affected by redberry, but they may not have the red color of the skin characteristic of redberry. When the condition occurs as described above, it must be scored as a serious defect. (109)
- However, grapes which have tough skins or which have lost considerable moisture may resemble "raisining" somewhat, but differ in that the berries are collapsed, not shrivelled and also lack the sweetness characteristic of raisining berries. Heat injury of this type may not result in the berries being soft and flabby or easily separated from the capstem. Although such a condition should be scored as a defect, it should not be considered as serious damage. (110)
- Injury of Bunches by Trimming Away Defective Berries.** Bunches of grapes, as they come from the vine, sometimes show small clusters of defective or undercolored berries. In the packing house these defective portions are trimmed off with clippers by cutting the lateral stems. When such trimming causes large holes to be left in the side of the bunch or otherwise injures its (111)

appearance, the bunch should be scored as a defect in all Table Grape grades. This is not a requirement of the Juice grape grades.

- (112) Leaf Hopper Damage. When grape leaf hoppers are abundant, their residue is deposited as very numerous small dots on the grapes chiefly on the shoulders of the bunches, but they also may be found on other parts of the bunch. Much of the residue rubs off in handling, but when it occurs in bunches to the extent that appearance is damaged, it shall be scored against the Table Grape grades. On colored grapes this damage is harder to see, especially in dull light, but after packing and storage may become more noticeable.
- (113) Mealy Bug Injury. The presence of mealy bugs, or a deposit of honey dew secreted by the mealy bugs, shall be classed as a defect and reported as "insect injury", when appearing in noticeable amounts. The honey dew catches dust and dirt, which damages the appearance of the grapes, and also furnishes an excellent medium for the growth of various molds.
- (114) Mildew Scars. Mildew injury on the berries occurs as fine brown marking or russeting on the skin, and while not very noticeable on the black varieties, may seriously affect the appearance of white grapes. This condition does not result in decay or spread in transit.
- (115) The injury may also occur when the fruit is attacked by the disease while very young and result in misshapen and poorly developed berries; it also may cause the berry to split. This condition is very hard to differentiate from injury caused by sunburn, or mechanical injury, and is a more serious defect than the markings on the skin.
- (116) The light brown color often seen on Malaga grapes and known as "sunkissed" must not be confused with mildew injury.
- (117) The markings on berries caused by mildew shall be called "mildew scars" or "mildew discoloration". The word "mildew" is not sufficient. Mildew discoloration on the berries is not a defect in juice grapes, unless it damages the appearance or causes cracking of berries. In the Table Grape grades, when the

appearance of a bunch is materially affected, the entire bunch must be scored against grade, otherwise individual berries should be scored. When active powdery mildew is present, it must be scored as damage.

Scarred Berries. Scars generally are the result of leaf rubs caused by wind or thrip injury. Scarred berries are not important in juice grapes and they should not be scored against U. S. No. 1 Juice grade unless they seriously affect the appearance. In the U. S. Table Grape grades, berries are not scored unless they are damaged by scarring. This includes mildew scars on berries. Scars which materially affect the appearance of the berries or the appearance of the bunch are considered damage. (118)

Sometimes when grapes are sulphured during the growing season, the grape berries will be "burned" or damaged. The injury will appear as dark brown spots on irregular areas. The injury should be scored on the same basis as scarred. (119)

Shot Berries and Dried Berries. "Shot Berries" are very small grape berries resulting from insufficient pollination. They are usually seedless in those varieties that normally develop seeds. These berries may be entirely green and hard and are then termed "immature shot berries." They may be mature and color uniformly with the normal berries on the bunch in which case they are called "mature shot berries." (120)

"Dried berries" are berries that are dry and shrivelled to the extent that practically no moisture is present. (121)

In the Table Grape Standards, shot berries and dried berries are to be disregarded unless they are present in quantities to "damage the appearance of the bunch," in which case the entire bunch should be scored. (122)

The U. S. No. 1 Juice Grape grade specifies that "not more than a total of 10%, by weight, of the bunches in any container may be damaged by dried berries and/or immature shot berries." (123)

- (124) Spanish Measles or Black Mildew. As far as investigation has shown, this is a non-parasitic disease of grapes occurring in many varieties. It is characterized by small, irregular dark purple or dark brown dots or patches, scattered over the surface of the berry. These spots seldom are over an eighth of an inch across and are entirely superficial; they do not develop into decay and are of importance only on the basis of damage to appearance.
- (125) Spray Residue. Sprays of various kinds have been tried for the control of various insects and diseases, particularly on juice grapes.
- (126) Bordeaux mixture has been used to some extent with the result that the berries may show a coating of spray residue. Such grapes will not meet requirements of the Table Grape grades when the residue is heavy enough to materially affect the appearance, also will not grade U. S. No. 1 Juice when heavy enough to seriously affect the appearance. Score the entire bunch rather than individual berries on the basis of damage to the appearance. (Sulphur dust residue would come under these descriptions rather than as "sulphur spray" shown in the next paragraph).
- (127) A sulphur spray also has been used, and the grapes may show a heavy visible sulphur residue, with a very distinct odor and taste. These would have to be barred from the Table Grape grades and U. S. No. 1 Juice grade on the basis of appearance and taste, and from a U. S. No. 2 Juice grade on the basis of taste and odor.
- (128) In some cases an oil spray has been used. Where it is not noticeable the grapes are allowed in the U. S. No. 1 Juice grade. On the other hand, when the bloom is destroyed, and the grapes have an oily appearance as if they had been wiped with an oiled rag, they must be scored against all U. S. grades for Grapes, except U. S. No. 2 Juice. Also, oiled grapes may be covered with dust which adheres very closely and makes them dirty. Both of these conditions are factors of appearance and where the damage is not serious, should be allowed in a U. S. No. 2 Juice grade.

Sunburn berries are berries that are injured by exposure to the direct rays of the sun. This includes "sulfur burn" occurring as a sunken, and usually discolored and dried areas on the exposed surfaced. (129)

The more common form of sun injury occurs on white grapes and on these the effect is different. Malagas will show a darkening of the skin and in the first stages are considered as "sunkissed." A further stage is turning from amber to light brown or dark brown. They are then considered discolored (see preceding paragraphs). In severe cases the Malaga may go from this discolored condition to a sunburn in which the skin is a dark brown color and the flesh also shows discoloration. Such berries should be scored as damaged by sunburn. (130)

On Thompson Seedless, the "sunkissed" condition rarely, if ever, is found. Bunches exposed to the sun will turn from an amber into a light brown or dark brown color in which the flesh is affected both as to color and taste. In the Table Grape grades individual discolored berries are to be scored. When discolored berries are so numerous as to affect the appearance of the bunch (about 15%), score the entire bunch as damage. (131)

Thrip Injury. Thrips may cause a light scarring that is similar to leaf scars. They also may cause a more severe scar with a heavy corky russeting of the skin. Thrip scars shall be scored on the same basis as other scars. (132)

Weak berry, Waterberry and Redberry. These defects occur most frequently on the varieties Thompson Seedless, Malaga, Emperor and Tokay; and in Zinfandel, Cornichon and Mission in the black varieties. (133)

Weak berries are those which approach a waterberry or redberry in condition but are not so far advanced or affected. They are usually watery, slightly transparent and more or less soft to the touch. Weak berries are to be scored as damage. (134)

Waterberry or Redberry are conditions characterized by a soft flabby condition of a part or all of the berries on the bunch, usually at the tip or lower end, but occasionally scattered throughout the bunch. (135)

- (136) Affected berries test low in sugar content and are thin skinned. They are easily broken and liable to subsequent decay. The term waterberry is used almost exclusively when referring to the disease when affecting the white varieties of grapes. Redberry, which appears to be the same disease, is applied to the condition on black varieties. The color of the affected berries in black grapes is red or brownish red.
- (137) Waterberry and redberry are considered as serious defects, as crushing and decay often result from this condition.

(138) Examples of Quality Statements.

1. U. S. Fancy Table.

"Most bunches reasonably well colored, some well colored. Uniform in appearance. Grade defects average within tolerance."

2. U. S. No. 1 - Table. (Fails to grade due to excessive poorly colored bunches)

"Most bunches fairly well colored, some well colored; 10% to 20% average 15% poorly colored bunches. Other grade defects average 8%, including 6% straggly bunches, remainder mostly badly scaled berries."

3. U. S. No. 1 - Juice.

"Generally fairly well colored. Grade defects average within tolerance."

CONDITION

- (139) Under this heading report the following factors:

Condition of Berries.
Raisining and Raisined Berries.
Attachment to Stems (shattering).
Condition of Stems.
Defects that may have developed in transit or storage.
Decay.

Condition of Berries. The condition of berries should be described by using the terms: firm, wilted, slightly soft or rubbery, and soft. The Table Grape grades specify that the grapes shall be "firm" and in these grades any amount of berries which are other than "firm" would be condition defects. (140)

(a) Firm. Indicating that there has not been more than a slight change in the plump condition of fresh stock due to a slight loss of moisture. (141)

(b) Soft. As applied to grapes is a term used to designate berries in the Table Grape grades which do not meet the requirement of firm. In the more advanced stages are included berries in which the pulp has broken down, such as often occurs following freezing injury. (142)

(c) Wilted. This condition is generally only found in Juice Grapes and is generally manifested by a lack of plumpness and turgidity but with no appreciable loss in juice as in the case of "raisining" berries. The skin is still pliable, but frequently shows a fine wrinkling. This is usually the stage before raisining. Wilted berries and rubbery berries are not defects of the Juice Grape grades. (143)

Raisining and Raisined berries are grade defects in the Table Grape grades as these grades require the berries to be "firm". They are permitted in the Juice Grape grades as follows: (144)

(a) Raisining. Raisining is an early stage of the normal curing process which produces the true raisins. It may be due to extremely hot weather during the growing season, or to delay in removing the crop from the vines. The berry at this time usually has a high sugar content and in the case of white grapes assumes a much darker color, and develops to some extent the wrinkled appearance of a raisin. However, there is still sufficient juice to drop from the berry under ordinary pressure between thumb and finger. Wilting is an early stage of raisining process, but a berry that is simply wilted should (145)

not be reported as raisining. Wilting generally is manifested by lack of plumpness, and the skin frequently shows a fine wrinkling which can be distinguished from the deeper wrinkling characteristic of raisining.

- (146) (b) Raisined berries are not ordinarily found in Table Grapes. Raisined berries are an advanced stage of curing process that has progressed to a point where no juice can be made to drip from the berry when subjected to pressure between the thumb and finger. The berries show pronounced wrinkling and angular shape. Grapes reported as raisined should show decided characteristics of commercial raisins.
- (147) The U. S. No. 1 Juice grade allows not over 15% raisining or raisined berries but not over 5% may be raisined, except that any amount of raisining may be permitted if the percentage of raisining is specified in connection with the grade thus qualifying the grade. This is an additional tolerance which is separate from the 10% tolerance provided for grade defects.
- (148) It must be remembered that the qualified grade does not permit more than 5% raisined berries. In any case where there is an excess of 5% raisined berries, the U. S. No. 1 Juice grade or qualified grade cannot be given. In such case the grade statement should read as follows: "..... but fails to grade U. S. No. 1 Juice on account condition."
- (149) Reporting raisining and raisined berries on the certificate. The percentage of raisining and raisined berries of Juice Grapes must always be reported on the certificate. If the total is less than 1%, then the following statement may be used: "Practically no raisining or raisined berries." If the percentage of raisining and raisined berries is not over 5%, it may be combined into one figure, otherwise the percentage of each should be reported separately.
- (150) Examples:
1. "Average 4% raisining and raisined berries."
 2. "Ranging from 4% to 12%, average 7% raisining; 2% raisined berries."
 3. "In most lugs 2% to 5% raisining and raisined; in many lugs average 10% raisining and 3% raisined berries."

All inspectors are cautioned to be extremely careful in estimating the percentage of raisining and raisined grapes. These percentages are based on weight, and raisining and raisined berries weigh much less than normal grapes. Each inspector should check his judgment by weighing several bunches containing raisining and raisined berries, then picking these berries off and weighing the different stages separately, calculating the percentages and comparing them with his estimate. Remember that wilted berries are not scored against the Juice Grape grades. (151)

Review the definitions of raisining and raisined in the U. S. Standards, as well as the color photos C-3 illustrating raisining and raisined grapes. (152)

Reporting qualified raisining grades as failing to grade due to raisining or raisined. When a qualified raisining and raisined grade is being reported, or if it now fails to grade account of raisining or raisined berries, then the range and average for either (or both) should be reported. However, separate statements should be made when widely different conditions are encountered, particularly when a qualified raisining and raisined grade is being reported and part of the containers are within and part exceed the regular tolerance. (153)

Examples:

(154)

1. Ranging from 12% to 35%, averaging 20% raisining; 4% raisined berries. (Meets qualified grade).

Grade: "U. S. No. 1 Juice, 25% raisining and raisined berries."

2. Averaging 10% raisining and from 2% to 9%, averaging 7% raisined berries. (Fails to meet qualified grade due to excessive raisined berries).

Grade: "Meets quality requirements but fails to grade U. S. No. 1 Juice only account condition".

3. In most lugs average 10% raisining and 2% raisined berries; in many lugs from 15% to 25%, averaging 17% raisining and from 3% to 8%, averaging 5% raisined berries.

Grade: "Most lugs U. S. No. 1 Juice, many lugs U. S. No. 1 Juice, 20% raisining and raisined berries."

- (155) Attachment to Stems. (Shattering) The Table Grape grades and the No. 1 Juice Grape grade require that the berries be firmly attached to the capstem. The No. 2 Juice Grape grade require that the grapes not be detached from the capstem.
- (156) Shattered berries are those that have separated from the bunch due either to the breaking of the capstem or the removal of the capstem from the berry. This is a common defect of some varieties, particularly the Thompson Seedless.
- (157) When 2 or more berries attached together by stems are found in a container they should be scored as "small bunches" instead of shattered berries.
- (158) In all grades, Table and Juice, shattered berries are scored against the tolerance for grade defects. There is no restricted tolerance for shattering. Thus, a lot of Table Grapes may contain up to 12% shattered berries and still meet the requirements of the grade, depending upon the amount of other defects present.
- (159)* Use reasonable care in removing bunches from the container and in *
 * handling them during inspection. Upon completion of inspection, all *
 * shattered berries, including those which have fallen off during the *
 * inspection process, shall be scored against the tolerance for grade *
 * defects. Shattered berries which are affected by decay or are other- *
 * wise seriously damaged should be scored against the restricted tolerances *
 * for decay and serious damage. *
- (160) Sometimes, excessive shattering will be found in one or two upper layers in a car, especially over the wheels. The location and amount of shattering in such instances should be carefully described on the certificate.
- (161) Condition of Stems. An accurate statement of the condition of the stems is important on all Table Grapes. Suitable expressions which may be used in describing this condition are: "yellow," "yellowish green," "green," "turning brown," "brown," "dark brown," "black," "dry and pliable," "dry and brittle" or "moldy." On Juice grapes, especially in the case of some black varieties which have very compact bunches (Zinfandel, Carignans, etc.), the condition of stems may be omitted unless an unusual condition affecting their appearance occurs, such as mildew discoloration.

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****The U.S. Extra Fancy Table grade requires stems to be at least yellowish-green in color except for Cardinal, Robin, Exotic, and Beauty Seedless varieties.**** (162)

The following terms are used in the stem requirements of the grades: (163)

Well developed and strong stems are required by the U.S. Extra Fancy and U.S. Fancy Table grades.

Not weak or dry and brittle and not moldy or mildewed is a requirement of all Table grades. This is the only requirement for stems in the U.S. No. 1 grade.

Not moldy or damaged by freezing is the only requirement for stems of U.S. No. 1 Juice grapes.

There are no requirements for stems in U.S. No. 2 Juice.

White powdery mildew on stems is regarded as damaged by mildew and shall be scored against the general lot tolerance. Free from damage by mildew is defined as "free from active powdery mildew, or from any scars caused by this disease which constrict or weaken any part of the main or lateral stems." If the main stem of the bunch is "damaged by mildew" the weight of the entire bunch shall be scored. If only one or two laterals, or capstems on a lateral are affected, only the laterals involved shall be scored. When decay and/or mold affects stems only, it is to be scored against the total defects tolerance of 8% at shipping point and 12% at destination or enroute. (164)

Damage by freezing as affecting stems in the case of U.S. Table grapes means "the main or lateral stems are water-soaked and limp, or dried." The stems of grapes that have been frozen are likely to be shrivelled, dried, weak, probably dark brown or black in color and possibly moldy, especially at the capstem. In the case of U.S. No. 1 Juice, freezing, which causes only drying of the capstem, shall not be considered as damage, but freezing injury to main or lateral stems is considered damage. (165)

Grapes held in storage will lose moisture in the stems very slowly and will tend to "toughen" up rather than to wilt. A good stem will "cure" and turn light brown or brown while a stem that is not strong or mature will darken, and sometimes become a chocolate color especially if it is a weak stem. Weak stems or discolored black stems are defects of the U.S. Extra Fancy and U.S. Fancy Table grades. (166)

(167) Examples:

U. S. Fancy Table.

1. "Stems strong and well developed, light green to turning brown."

U. S. No. 1 Table.

1. "Stems light green."
2. "Most stems light green, some turning brown."
3. "Stems mostly turning brown, many dry and pliable."

U. S. No. 1 Juice.

1. "Stems slightly wilted."
2. "Most stems wilted, some partially dried."
3. "Stems generally light green, few show slight mildew discoloration."

(158) Defects That May Have Developed in Transit or Storage.

Factors of condition which may have developed in transit or storage should be reported in detail under the "Condition" heading. No attempt will be made to describe all the condition factors affecting grapes in this handbook since the information is fully covered in Miscellaneous Publication No. 340, which should be in each inspection office.

Some condition defects of most common occurrence, together with a brief description are listed below.

(169) Crushed Berries. Berries become crushed from rough handling in picking, packing or in transit. Certain varieties of grapes are thin skinned and unless considerable care is exercised in handling, the berries are easily crushed. For reasons which are obvious, this defect should be treated in the markets as a factor of condition. Berries that are flattened due to a well filled pack, which often occurs on both top and bottom of the container, when the skin is not broken, should not be scored as crushed berries. Crushed berries should be scored as serious damage. If they are wet, this fact should also be reported in connection with the

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the description of crushing, thus:

"2% berries crushed and leaking occurring adjacent lids."

Freezing Injury. Grape berries, when injured by freezing, lose their natural crispness and have a dull, wilted or flabby appearance. The pulp is watery and when the capstem is pulled from the berry, it will be noticed that less of the pulp adheres to the brush than in a normal berry. Damage to stems resulting from freezing has been described under "Condition of Stems."

(170)

**** **Internal Discoloration.** Grapes of the lighter skinned varieties such as Thompson Seedless sometimes exhibit an off-color appearance that is caused by discoloration of the flesh. This condition may be observed readily upon sight but confirmation of internal discoloration requires cutting the suspect berry in half to examine the flesh. If the flesh exhibits a darkened, off-color appearance it should be considered affected by internal discoloration. Keep in mind that only suspect berries should be cut for verification. There is no need for the inspector to cut berries for this defect without apparent external indications of a problem. Grapes affected by internal discoloration should always be scored as serious damage with scoring based on the individual berry.

(170a)

When grapes of the Almeria or Calmeria variety are encountered that exhibit internal discoloration please refer to paragraphs 103 and 104 for further information. ****

Mold. Mold on grape berries generally indicates the presence of decay, though it may be in early stages. It is desirable to state whether a heavy or light growth of mold is present, especially in connection with Rhizopus Rot. The slight surface development of green mold (Cladosporium) should not be considered as decay. For mold affecting stems see the paragraphs on "Condition of Stems".

(171)

Shrivelling. Shrivelling, especially occurring around the capstems, is frequently seen on grapes from storage late in the winter and in the early spring. Shrivelling around the capstems may also occur as one of the results of sulfur dioxide injury. The U.S. Extra Fancy and the U.S. Fancy Table Grape grades state "not shrivelled at capstems." More than slight wrinkling of the skin should be scored against the tolerance for general defects in these grades. The U.S. No.1 Table Grape grade states berries should not be materially shrivelled at capstems which means that the skin of the berry is definitely wrinkled adjacent to the capstems and the surface is materially sunken.

(172)

Split Berries. Split berries may result from some condition of growth, also rain or fogs may be responsible for small splits occurring near the capstems. At the time of shipping, the latter are found mostly in the raisining grapes, in which case they are not considered as serious damage and should be scored as raisining. Also, some varieties of grapes, especially Tokays, frequently show cracks at the blossom end which are not considered serious damage. Small splits in the European type grapes are not generally objectionable unless they are leaking.

(173)

- (174) Sulphur Dioxide Injury. In the treatment of loaded cars of grapes with Sulphur Dioxide gas, an excess of gas may cause injury to fruit. Instances occur frequently in market inspections of California grapes in which some berries show a dull or bleached color, and often a wet and sticky condition. Usually this condition is not general either throughout the load or throughout the entire contents of all packages.
- (175) This injury which also may result from treatment by Sulphur Dioxide at the time of packing, storing, or shipping somewhat resembles and is often attributed to freezing injury by receivers or shippers.
- (176) In addition to the discussion of injury from Sulphur Dioxide and from freezing that are to be found in Miscellaneous Publication 340, it is believed the following factors may assist in determining the cause. However, it is always advisable to send representative samples to pathologists, together with a full description of the appearance, nature, location, and extent of the injury.
- (177) Sulphur Dioxide injury is more likely to be found in the upper layers of the load, near the centerbracing and in the upper 2 layers over the car wheels. In injury from this cause the color and structure of the stems and capstems are likely to be better than in the case of freezing injury. Sulphur Dioxide gas tends to preserve the stems in their original condition and, therefore in any lots showing Sulphur Dioxide injury the stems will usually be more firm and of a bright, attractive color.
- (178) There may be a general bleaching or loss of color of the berries of black and red grapes following injury from Sulphur Dioxide. When severe, it may cause softening of the skin and leaking of juice causing part of or the entire contents of the lug to become wet and sticky. In white grapes only slight bleaching may be apparent but the other effects may be present. Grapes packed in sawdust which have powdered sodium bisulphite used in excessive amounts, may show similar injury to that described.
- (179) The dull, lusterless color, slight softening and wet and sticky condition of the berries may result from either freezing or Sulphur Dioxide injury. One of the best indications of injury from Sulphur Dioxide is a distinctly localized collapse or a bleaching of that part of the berries adjacent to the capstems,

or berries that are cracked or wet and loose from the capstems.

Slight deadening or dulling of the color without softening or definite bleaching of Table Grapes will not be scored as a defect. (180)
Injury that causes appreciable bleaching or loss of color of the berries of black or red grapes, and only slight bleaching but with the other effects apparent on white grapes, shall be scored as "Sulphur Dioxide injury." Also, berries which show shrivelling (sinking) at the capstems shall be scored as a defect.

Grapes which are severely injured by Sulphur Dioxide which have become wet and sticky from leakage of juice, and those that show a material portion of the berry affected by shrivelling and have a large sunken area at the capstem shall be scored as serious damage. (181)

Wet Berries. The grape standards define "wet" as moisture from rain or crushing. Wet berries are considered serious damage in all of the U. S. grades. (182)

At shipping point moisture from rain is scored as a serious defect because mold and "slip skin decay" usually accompanies or soon follows it. Grapes wet from rain are rarely encountered in the markets except possibly in markets near the shipping areas. (183)

Moisture from condensation is a normal condition found on any product moving from a cold to a warm atmosphere. Grapes wet from moisture of condensation should not be reported or scored as defects. (184)

In nearly all instances wet berries to be scored as defects in the markets are those that are wet from juice leaking from decayed or crushed berries, from berries damaged by sulfur dioxide injury or freezing injury or leaking from shattered berries or berries loose at the capstems. (185)

In cars, inspectors should carefully check grapes in the top layer lugs over the wheels and in the stacks nearest centerbracing as these are the locations that berries leaking at the capstems first develop due to transit conditions. (186)

(187) Examples:

1. "From 2 to 10%, average 5% of berries wet and sticky from juice of crushed berries occurring generally in bottom of lugs."
2. "In most lugs no wet berries, in lugs in 2 stacks next bunker in each end of car 1/4 to entire contents are wet and sticky due to juice from berries loose at capstems."
3. "In most lugs no wet berries, in few lugs 10 to 20%, average 2% of berries wet and sticky occurring in bunches in contact with decayed and leaking berries."

(188) Decay. Decay is of much more importance in Table Grapes than in juice stock. A small amount of decay occurring in Table Grapes seriously affects the market value of the product, whereas in juice stock it is a matter of opinion whether or not a small percentage of moldy berries or even a considerable number of berries showing mold around the capstems affects the quality of the juice. The amount and kind of decay are the most important features to be considered under this heading. In the Table Grape grades only 1% decay is permitted at destination (1/2 of 1% at shipping point). In the Juice Grape grade 2% decay is permitted in U. S. No. 1 with not over 15% of the bunches having decay on 3 or more contiguous berries. U. S. No. 2 Juice permits 5% decay.

(189) Decays most commonly found in grapes are: Gray Mold Rot, Black Mold Rot, Blue Mold Rot, Rhizopus Rot, and Green Mold Rot.

(190) For a detailed description of these decays and others, refer to Miscellaneous Publication No. 340, "Market Diseases of Fruits and Vegetables: Grapes and Other Small Fruits."

(191) After rains in the western growing areas, "slip skin decay" usually develops and is common on grapes during wet harvesting seasons. It occurs as a shallow infection, usually of Gray Mold Rot but sometimes possibly other infections. Bunches showing this decay must be examined carefully as the affected berries are often difficult to detect, especially in compact bunches. In such infections the mold spreads through the skin and the flesh just beneath it but does not appear on the surface. The term "slip skin" should not be used on certificates.

instead report Gray Mold or other identified disease.

Reporting and Scoring Decay. If any decay is present, mention always (192)
should be made on the face of the certificate, also "NO DECAY" is to
be shown when none is found.

In the past it has been the practice to report "Practically free from (193)
decay" when certain requirements were complied with. This practice
should be discontinued and the following instructions carried out:

- (a) In the case of Table Grapes, containers with 1 to 3 decayed (194)
berries are to have such facts stated numerically on the
face of the certificate; any decay in excess of 3 berries
in the entire container is to be reported as less than 1/2
of 1%, or such percentage that may be found, according to
the facts.

Example:

"In most lugs no decay, in some lugs 1 to 3 decayed berries."

- (b) In the case of Juice Grapes, containers with 1/2 of 1% (or (195)
less than 1/2 of 1%) decay are to have such facts stated on
the face of the certificate; any decay in excess of 1/2 of
1% is to be reported as less than 1%, or such percentage
that may be found, according to the facts.

Example:

"In most lugs 1/2 of 1% or less decay, many lugs no decay."

- (c) If no container exceeds the tolerance, it is sufficient to (196)
show in general terms the containers in which "decay" and
"no decay" were found, and the average need not be shown.

Examples:

1. Table Grapes: "In most lugs no decay, many lugs 1%
or less decayed berries."

2. Juice Grapes: "In most lugs 1%, some lugs 2% decay, in few lugs no decay."

(197) (d) If part of the containers exceed the tolerance but are within the container tolerance and the average for all containers is within the grade requirement, the average including all containers with "no decay" for the entire carload (or lot) must be shown.

(198) Examples:

1. Table Grapes: "Less than 1% decay."
2. Table Grapes: "In most lugs from 1 to 3 decayed berries, in many lugs 2%, averaging less than 1/2 of 1% decay."
3. Juice Grapes: "In most lugs from 1/2 of 1% to 3% decay, many lugs no decay, averaging 1% decay."

(199) (e) Although the above examples are intended to show the method of handling when the grade is met, the same methods may be used when the carload (or lot) fails to meet the grade account general defects. However, in case the grade is not met account decay in excess of the tolerance, similar statements to those in the set of examples just preceding would be used, showing full range of decay in containers in which decay occurs, containers free from decay, if any, and the average for the entire carload (or lot).

(200) Decay affecting the U. S. Table Grape grades may be scored by individual berries, up to and including 3 berries. For all practical purposes, individual berries should be scored by weight in tenths of pounds. (.01 for one berry, .02 for two berries, .03 for three berries.) If no lug has more than 3 decayed berries, the decay should be reported by count, however, if the containers show more than 3 decayed berries, the decay scored by weight should be reported on the certificate in percentages.

Drink

-44a-

The tolerance for decay in the U.S. Standards for Grades of Table (200x
Grapes (European or Vinifera Type) is 1/2 of 1% at shipping point
and 1% at destination or enroute, applies only to decay that
affects the berries.

****When decay and/or mold affects stems only it is to be scored (2001
against the total defects tolerances of 8% at shipping point and
12% at destination or enroute.****

When the main stem is affected the entire bunch is to be scored, 0
if only the lateral stem or stems are affected, score only that
portion of the bunch.

Examples:

1. "Most lugs no decay, some lugs 1 to 3 decayed berries." (201)
2. "Less than 1/2 of 1% decay."
3. "Most lugs 1 to 3 decayed berries, some less than 1/2 of 1% to 2%, average less than 1% decay."

The following table is provided as a guide for inspectors when reporting (202) decay in Emperor, Almeria, Malaga and Tokay Table Grapes in lugs weighing 25 to 28 pounds:

<u>Number decayed berries per lug</u>	<u>Report as</u>
1 to 3	1 to 3 berries per lug
4 to 13	Less than 1/2 of 1% decay
14 to 24	Less than 1% decay
25 to 34	1% decay
35 to 65	2% decay
66 to 90	3% decay

The Table is based on the fact that the average for practically all (203) varieties of Table Grapes is 1 berry = .01 lb. When inspecting varieties having normally small berries, or normally large berries, allowances obviously should be made for this size variation.

Decay affecting the U. S. Juice Grape grades usually will be scored in (204) tenths of a pound. The U. S. No. 1 Juice grade permits 2% of grapes affected by decay, but limits the weight of bunches to 15% which have spots of decay affecting three or more contiguous berries.

In scoring weight of decay in Juice grapes, it is sometimes necessary (205) to score berries which are in contact with the affected berries in addition to those that actually show decay at the time, for instance, a bunch of grapes with a large spot of decay on the side of the bunch theoretically would have the unaffected portion above and below the affected spot trimmed off, but the unsalvageable berries in contact with the spot of mold or decay would be scored with the weight of affected berries.

For heavier decay both in table and juice stock, which is generally (206)

nested, or in which the berries are matted together or leaking, a clear range is impractical. When in such condition, it will be found that many if not most of the bunches have lost so much of their original weight that the entire sample must be used as a basis in estimating. It is evident that no one could determine by estimate that there was 23 or 27% of this kind, fractional expressions rather than percentages should be used, such as "decay affects from 1/4 to 1/3 of contents of lugs" or "1/4 to 1/2 of the berries in the lugs examined show advanced decay."

(207) Inspections made in cars may often be reported by layers as it is frequently true that the upper layers of a car show much heavier decay than those nearer the floor. This is not necessarily true, however, and conditions are sometimes found which are impossible to explain as lugs showing 1/2 to 2/3 decay will be side by side with those showing practically none.

(208) Examples of Condition Statements:

1. Table Grapes.

Berries generally firm and firmly attached to capstems. Stems mostly light green to brown, some dry and pliable. In most lugs 1 to 3 decayed berries, in many 1 to 3% decay, average 2% Blue Mold Rot.

2. Table Grapes.

Berries are mostly firm, some slightly soft and shrivelled around the capstems. Stems mostly light green to turning brown, some dry and pliable, in some lugs many stems dry and brittle. In most lugs berries are firmly attached; less than 1% decay. In 3 stacks next B bunker and 2 stacks next A bunker from 10% to 25%, average 15% shattered berries; from 5 to 10%, average 8% decay and 10 to 25%, average 15% of berries wet and sticky with juice from shattered or decayed berries. Decay is Gray Mold Rot, mostly in advanced stages.

3. Juice Grapes.

Berries mostly firm and are firmly attached to capstems, stems mostly wilted, some fresh; ranging from 10% to 20%, averaging 15% raisining; 3% raisined berries. In most lugs less than 1/2 of 1% decay, some 2% to 5%; averaging 1%. Decay is Gray Mold Rot in various stages, mostly advanced.

GRADE

Under this heading is a definite statement showing which standard was used as the basis of the grade, i.e., Table Grapes or Juice Grapes. (209)
 When the lot inspected consists of different lots, part of which are up to grade and part of which fail to meet the grade requirements, it will be necessary to make separate statements for the different grades. In all such cases indicate grade on each lot and avoid grade statements that are indefinite, or that tend to contradict what has been reported under the previous headings of the certificate.

* Export Grape and Plum Act. When Vinifera type table grapes are exported (210) *
 * to countries, other than Canada and Mexico, they must be inspected and *
 * certified on an "Export Form Certificate" (FV-47, 303, or 184) as *
 * meeting the applicable grade for designated destinations and all other *
 * requirements of the Export Grape and Plum Act. Refer Export Apple- *
 * Pear and Grape Inspection Instructions and the Export Grape and Plum *
 * Act for the specific requirements of the Act. *

Grade Statement When Color Requirements Not Met. Lots failing to meet (211)
 the color requirements of the various grades for European Grapes should be reported as failing to grade due to that cause. The 10% tolerance for under colored bunches in the color requirements is separate from the tolerance for general defects.

Example:

"Fails to grade U.S. No.1 Table due to poorly colored bunches in excess of tolerance in some lugs."

No Percentage of U.S. No.1 Quality Reported for Grapes. Unlike other (212)
 commodities, grapes have never been reported as a percentage of U.S. No.1 quality, or other grade quality, when failing to meet a specified grade. Also, in grapes, the percentage of a higher quality should not be certified. The several appearance factors in the grade make such reporting impractical.

General Examples:

(213) (1) U. S. Fancy Table.

Pack: Stems up pack. Lugs well filled.

Size: Bunches and berries mostly medium, many large. Bunches with undersize berries within tolerance.

Quality: Generally well colored and uniform in appearance. Grade defects average 4% mostly scarred and sunburned berries.

Condition: Berries free from decay are generally firm, 3% slightly soft, rubbery and wrinkled. Berries generally firmly attached to capstems. From 3 to 10%, average 5% shattered berries. Stems mostly turning brown to brown, few dark brown, some dry and brittle. From 5 to 20%, average 10% by weight of bunches show moldy stems. From 3 to 20%, average 10% decay occurring irregularly throughout lugs. Decay is Gray Mold Rot in advanced stages, mostly occurring in nests.

Grade: Meets quality requirements but fails to grade U. Fancy Table only account condition.

(214) (2) U. S. Fancy Table (Tokays).

Pack: Stems up pack. Lugs well filled.

Size: Bunches and berries mostly medium, many large. Bunches with undersize berries within tolerance.

Quality: Most bunches reasonably well colored; 5 to 15%, average 12% poorly colored bunches. Other grade defects range from 8 to 20%, average 13% mostly bunches damaged by shot berries or trimming and bunches weighing less than 1/4 pound.

Condition: Berries are generally firm and firmly attached to capstems. 2% shattered berries. Stems generally well developed and strong; 3 to 10%, average 5%

of bunches show dry, black spindly stems. From 2 to 5%, average 4% Gray Mold Rot generally in initial stages.

Grade: Fails to grade U. S. Fancy Table account grade defects.

(3) U. S. No. 1 Table.

Pack: Faced pack, most lugs well filled, some fairly well filled. (215)

Size: Bunches generally medium, berries generally medium, few small. Bunches with undersize berries within tolerance.

Quality: Most bunches fairly well colored, range from 8 to 20%, average 15% poorly colored bunches. Other grade defects average 3%, mostly scarred berries and shot berries.

Condition: Berries are generally firm and firmly attached to capstems. Stems mostly turning brown, some dry and pliable. In most lugs no decay, in some lugs 1 to 3 decayed berries.

Grade: Fails to grade U. S. No. 1 Table account color.

(4) U. S. Fancy Export.

(216)

Pack: Most chests tight, some fairly tight, few slack with sawdust 1 inch below top edge of chests.

Size: Bunches and berries mostly medium, some large; from 5 to 25%, average 15%, of bunches fail to meet berry size requirements.

Quality: In most chests grapes are well colored, in many chests reasonably well colored. Grade defects range from 4 to 18%, average 12%, including 5% straggly bunches.

Condition: Berries generally firm and firmly attached to capstems. Stems strong and well developed, most green color, some turning brown. In most chests 1 to 3 decayed berries, in many 1% decay, average less than 1/2 of 1% decay.

Grade: Falls to grade U. S. Fancy Export account of bunches failing to meet berry size requirements and grade defects.

(217) (5) U. S. No. 1 Juice (Unlidded lugs).

Pack: Most lugs fairly well filled, many well filled.

Size: Berries and bunches mostly medium, some large.

Quality: Fairly well colored. Grade defects average 4% mostly excessively straggly bunches.

Condition: Berries firmly attached to capstems and mostly firm. Stems mostly slightly wilted, many fresh. Average 12% raisining, 3% raisined berries. In most lugs less than 1/2 of 1% decay in some 1 to 4%, in some 5 to 8%, average 1% decay. Decay is Gray Mold Rot in various stages.

Grade: Meets quality requirements but fails to grade U. S. No. 1 Juice account decay in some lugs.

SOLUBLE SOLIDS DETERMINATION

Soluble solids determination must be made on Juice Grapes and on those Table Grapes imported into this country. (218)

When it is necessary to determine the percent of soluble solids or sugar content of a lot of grapes, the following procedure should be followed. (219)

For Table Grapes. For the test select 10 percent, by weight, of the least mature appearing whole bunches found in that container having the least mature grapes. The standards provide that if the test from the first sample lug is below the grade requirement, the grapes from at least one more container must be tested before the lot may be certified as failing to meet the maturity requirement. (220)

If the test from the first sample lug meets the specified minimum maturity requirement the lot should be passed without further testing. If the first test is below the minimum requirement, make a similar test from the lug having the next least mature grapes. If this second test is also below the minimum requirement report the lot as failing to meet the maturity requirement. If the second test meets the requirement consider the first test a "tolerance for maturity" and report the lot as meeting the maturity requirement. (221)

The standards require that for Table Grapes from states not having established maturity requirements or from countries other than the United States the refractometer will be used in determining the percentage of soluble solids. (222)

Making the Sugar Test by Refractometer. Stir the juice well and with a spoon dip a small quantity onto the refractometer prism and make the reading. As a precaution wipe the instrument dry and take a second reading to guard against the possibility of error in reading. Record the reading and report as outlined in the hydrometer section. (223)

The hand refractometer should be graduated from 0 to 25% or 0 to 32% (International Sugar Scale). These instruments ordinarily are correct at 20 degrees Centigrade (68 degrees Fahrenheit) and are provided with an adjustment setting for standardizing at other temperatures. Manufacturers furnish a temperature correction chart and instructions for adjustment with each instrument. (224)

- (225) It is important that the refractometer be properly adjusted before starting the test. Otherwise it will be impossible to make an accurate determination of the sugar content. It will be found most convenient to adjust the instrument to read zero with distilled water at the temperature at which the test will be made. As the temperature changes during the day it will be necessary to readjust the instrument. A small supply of distilled water should be kept on hand for this purpose, and precautions taken to keep it clean. Tap water should not be used because it frequently contains enough minerals in solution to materially affect the reading. Distilled water may be obtained from drug stores, chemical supply houses or laboratories. The water that service stations put into auto batteries may not be distilled and should not be used.
- (226) The refractometer must be clean or the accuracy of the reading will be affected. It must be thoroughly cleaned after each use, as juice allowed to remain and dry on the instruments will materially affect the accuracy of the next test made. Care should be taken not to scratch the surface of the prism or the hinged plate.
- (227) The test for Table Grapes is a minimum sugar test; whereas for Juice Grapes it is an average sugar test.
- (228) For Juice Grapes. Theoretically, the average test would be that obtained from testing the blended juice squeezed from all of the grapes in the lot. As squeezing all of the grapes in the lot is naturally impractical, a sample container should be selected which represents nearly as possible the average sugar content of the lot. This container may be one containing the original pack or it may be one filled by selecting bunches to fill a container so that its contents would be representative of the lot. If there is a wide variation in maturity, more than one sample lug should be selected for testing and the results of the tests from the various lugs averaged.
- (229) In determining the percentage of soluble solids for Juice Grapes the hydrometer is the instrument to be used as specified by the Standards. However, the refractometer may be used provided the readings are not borderline or just below the minimum soluble solids requirements. In such instances the hydrometer should be used. If no hydrometer is readily available check with your supervisor.
- (230) Making the Sugar Test by Hydrometer. The most common method for obtaining juice for test consists of squeezing the grapes through muslin. The juice should be free from floating particles of pulp or other matter

as they will affect the test. The cylinder is filled with enough juice to cause it to overflow and float off any bubbles or foam present before the saccharometer is inserted. Care is taken that the instrument has been in the liquid a sufficient time to settle and allow the thermometer to act, (never less than three minutes). A reading of the scale is taken at a level with the liquid, care being taken not to read the thin film of liquid (meniscus) which tends to climb the stem. The thermometer is then read and corrections applied to the scale reading.

The saccharometer and tube must be clean, as any sugar or dirt adhering (231) will result in inaccurate readings. The Balling scale saccharometer used for this purpose has thermometer attached, together with a correction scale for temperatures. Most Fahrenheit instruments are standard at 60 or 68 degrees F., Centigrade instruments at 20 degrees C. When the temperatures are above these figures, the correction is additive; when below, subtractive.

It will be observed that some of the instruments now in use have no (232) decimal points printed on the temperature correction scale. The numbers, however, are decimals and should be used as such. Also, some instruments have the thermometer graduated by the Centigrade scale, which does not change the general method used.

The saccharometer should be read as closely as possible to the nearest (233) tenth degree, and this reading, together with the temperature correction shall be entered on the back of the note sheet, but in reporting the sugar test on the face of the certificate, the nearest half degree shall be used, as 18.5, 19, 19.5%, etc.

The following table lists the corrections for Brix Hydrometer readings (234) which may be used in offices that are not equipped with the Balling scale saccharometer:

CORRECTION FOR BRIX HYDROMETER RE
10° to 32° Centigrade
50° to 89.6° Fahrenheit

<u>Temperature</u>		<u>Subtract from Brix Reading</u>
<u>C.</u>	<u>F.</u>	
10.0	50.0	
11.0	51.8	.40
12.0	53.6	.35
13.0	55.4	.30
14.0	57.2	.25
15.0	59.0	.20
16.0	60.8	.15
17.0	62.6	.10
17.5 Std.	63.5	.05
		.00

		<u>Add to Brix Reading</u>
18.0	64.4	
19.0	66.2	.05
20.0	68.0	.10
21.0	69.8	.15
22.0	71.6	.20
23.0	73.4	.30
24.0	75.2	.35
25.0	77.0	.40
26.0	78.8	.50
27.0	80.6	.55
28.0	82.4	.60
29.0	84.2	.70
30.0	86.0	.75
31.0	87.8	.80
32.0	89.6	.90
		.95

Examples:

1. Scale reading 19.5 temperature 86 degrees; correction 0.8; (235)
then $19.5 + 0.8 = 20.3$, the corrected reading to be
shown on note sheet. Report as 20.5%, on the certificate.
2. Scale reading 18.5, temperature 50 degrees; correction
minus 0.4; then $18.5 - 0.4 = 18.1$, corrected reading
to be shown on note sheet. Report as 18.0% on the certificate.
3. Scale reading 19.5, temperature 77 degrees; correction 0.5;
then $19.5 + 0.5 = 20.0$, the corrected reading.
4. Scale reading 18.0, temperature 15 degrees Centigrade;
correction .15; then $18.0 - .15 = 17.85$; corrected
reading to be shown on the note sheet. Report as 18.0% on
the certificate.

PART II - AMERICAN BUNCH GRAPES (Labrusca Type)

PRODUCING AREAS

- (236) The Labrusca or American type grape, represented by the Concord, Worden, Champion, Moore, Niagara, Catawba and Delaware varieties, is grown quite extensively in New York, Pennsylvania, Michigan, Arkansas and Missouri. Also to some extent this type is grown commercially in some sections of the Central States, Washington and North Carolina.
- (237) Labrusca or American type grapes are used commercially for either juice or table purposes irrespective of variety. At the present time more are shipped for juice purposes than for table stock. Of the several hundred varieties of the American or Labrusca type of grapes recognized by pomologists, it is safe to assume that over 90% of the grapes shipped to terminal markets belong to the seven varieties which are listed above.

PRINCIPAL VARIETIES OF LABRUSCA OR AMERICAN TYPE GRAPES

- (238) Concord (Black). The Concord is the leading commercial variety among the American Eastern type grapes. Clusters large to medium, intermediate in length, wide, broadly tapering, usually single-shouldered, sometimes double-shouldered; medium to rather compact. Berries medium to large with attractive blue-black color and skin of average thickness, slightly adherent to pulp; contains small amount of wine colored pigment. Flesh pale green, translucent, juicy, slightly foxy. Not so good a shipper as some other varieties on account of the rather tender skin which causes the berries to shatter and crack. It also loses flavor soon after picking.
- (239) Worden (Black). A seedling of the Concord. Bunches and berries larger than those of the Concord; ripens one to two weeks earlier; better quality, clusters large, medium to long, broad tapering to cylindrical, usually single-shouldered, fairly compact. Berries large, roundish to oval. Skin tender, cracks easily, consequently adapted for nearby shipment or local consumption. Contains considerable dark red pigment. Pulp softer and more juicy than the Concord. Bunches often contain many small green shot berries, a distinguishing feature which may be found helpful in identifying this variety. The fact that the fruit

cracks badly with inability to heal over like the Concord sometimes prevents profitable marketing of the crop.

Moore (Black). Resembles the Concord closely but bunches generally smaller and inclined to looseness; bunches intermediate in length and breadth, irregularly cylindrical to tapering. Berries larger than those of the Concord but not of as good texture and quality. Ripens two to three weeks earlier than Concord. Skin intermediate in thickness; tender; adheres to pulp; contains dark, purplish-red pigment. Flesh greenish, translucent, juicy, fine grained and tough, slightly foxy. (240)

Champion (Black). An important variety for lighter soils of Michigan, where it assumes commercial proportions but not of commercial importance in other leading districts. Clusters medium to small, blunt, cylindrical to slightly tapering, usually not shouldered, medium to compact. Berries medium to fairly large, roundish, dull black; skin thick, tender adheres to pulp; contains small amount of light purplish pigment. Flesh light green, translucent, juicy, fine grained, tender, foxy. Poorest in quality of all commercially grown eastern black grapes due largely to its insipid flavor and dull black color. If allowed to reach maturity, the berries as a rule shatter easily. This variety has little to recommend it, save the fact that it matures early, being three to four weeks ahead of the Concord, which is about the only reason it is grown. Buyers who understand grapes avoid buying the Champion if possible, and therefore, it is often substituted for Concord. (241)

Niagara (White). The leading American White Grape, grown chiefly in the Lake Ontario District. Being vigorous, productive and adaptable, and ripening at about the same time, it holds the same place in white grapes that the Concord does in black grapes. It is a showy grape, with large well-filled bunches that are long to medium, somewhat broadly tapering, often cylindrical, frequently single-shouldered, compact or moderately so. Berries medium to large, light green changing to pale amber color or yellowish-green. Skin is tender, containing no pigment; does not crack easily, but berries often shatter easily from stems. Flesh light green, translucent, juicy, moderately tender, sweet, slightly foxy; seeds separate easily from pulp. A variety rather susceptible to fungus diseases, particularly Black Rot, which has caused heavy losses during unfavorable seasons. (242)

(243) Catawba (Red). The first American Grape; still popular after more than a century. Of high quality and attractive appearance. Often picked too soon and before fully matured. Of excellent keeping quality; does not shatter or split easily. Extensively grown on the Erie Shore of Ohio and in the Central Lake District of New York State. Bunches medium to large, rather long, usually broad, somewhat cylindrical to tapering, mostly single-shouldered, sometimes double-shouldered, varying from rather loose to compact. Berries medium size, roundish to oval, when fully matured are deep coppery red; skin rather thick, variable in toughness, adhering slightly to pulp; pulp green, translucent, juicy, finely grained, slightly tough to soft, with no pigment. Frequently matures very late, with subsequent danger from damage due to freezing being the chief reason that the Catawba has not been more popular.

(244) Delaware (Red). Regarded by many as the best American table grape. Ripens a few days ahead of the Concord. Bunches small, compact, slender, rather blunt, often cylindrical, regular, usually shouldered. Berries small, round, uniform in size and shape, light red covered with a thin lilac colored bloom. Skin thin, moderately tough, adheres somewhat to pulp. Flesh light green, translucent, very juicy, tender, very sweet.

U. S. STANDARDS FOR AMERICAN TYPE GRAPES

(245) In the American or Labrusca type grapes there are two classes, that is, Table and Juice, both of which are included in the same Standards. Each inspector should familiarize himself with the details of the U. S. Grades for the class of grapes he is inspecting and learn as much as possible about the characteristics of the leading varieties.

PRODUCTS INSPECTED AND DISTINGUISHING MARKS

(246) First under this heading should be the designation of the commodity to be preceded only by the variety, if known, or a classification as to type. Examples: AMERICAN TYPE TABLE GRAPES in 4 quart Climax baskets stamped "Concord", "Red AMERICAN TYPE GRAPES" or "Worden Grapes".

The type of container should always be stated as: 2 quart Climax basket, 4 quart Climax basket or 12 quart Climax basket, etc. (247)

For instructions on reporting distinguishing marks, state of origin and quantity inspected refer to the General Market Inspection Instructions. (248)

Examples:

1. Concord GRAPES in 12 quart and 4 quart Climax baskets marked "Benton Center Fruit Association Michigan Grapes". Lids also marked with various growers' names and addresses. Manifested as 300 12 quart and 700 4 quart baskets. (249)
2. AMERICAN TYPE GRAPES in 4 quart Climax baskets stamped "Champion U. S. Fancy Table Grapes". Labels under lids of most baskets show "George E. Prince, North East, Pa." Manifested as 3,816 4 quart Climax baskets.

CONDITION OF LOAD AND CONTAINERS

Refer to General Market Inspection Instructions and the same heading under Part I of this handbook. (250)

Example:

Through lengthwise offset load, 10 rows, 6 layers, 1 row of baskets along one side wall at an angle to take up space. 22 baskets noted in top layer show handles broken, including 8 with baskets badly crushed, lids off and contents spilling.

CONDITION OF PACK

See same heading in Part I of this handbook.

Filling of containers for Table and Juice Grapes should be described as follows: (251)

Well filled. This is the desirable condition of pack and means that the container is sufficiently filled to prevent movement within the container and between the bunches. Climax baskets (252)

will be level full, or trifle more than level full so that the contents are in firm contact with the cover.

- (253) Fairly well filled. This term means that the pack is not quite full, or that there may be a slight movement within the container. The pack is not ideal, but is not sufficiently slack to justify the use of the term "slack".
- (254) Climax baskets containing less than 12 quarts will be described as "fairly well filled" when slightly below the top edge, but not more than 1/4 inch below; and in 12 quart baskets or larger, when the contents are not more than 1/2 inch below the top edge."
- (255) Slack. Containers included in this classification are those that are not sufficiently filled to meet the requirements of "fairly well filled". The amount of slackness should be shown in inches or fractions of an inch.

SIZE

- (256) The size of bunches and berries is a very important factor and always should be shown on the certificate. To describe size, a knowledge of the normal size for the variety under consideration is necessary. bunches and berries should be described separately, unless the same term used for each is the same, in which case they may be combined. The terms "small", "medium" and "large" are to be used in describing the size of bunches and berries.
- (257) Bunches. The U.S. Fancy and U.S. No. 1 Table Grapes grades require that bunches must not be "excessively small" except that, in the U.S. Fancy Table Grapes grade, compact portions of bunches with 5 berries or more may be used to fill open spaces between whole bunches. The U.S. No. 1 Table Grapes grade allows portions of bunches with 3 berries or more to be used to fill open spaces between whole bunches.
- (258) The U.S. No. 1 Juice Grapes grade has no specific requirements for size of bunches.

Berries. The U.S. Fancy and U.S. No. 1 Table Grapes grades require (259)
that on each bunch of grapes at least 90%, by count, of the berries be
at least 9/16 inch in diameter. The 9/16 inch size may be specified
smaller or larger, but must be shown in connection with the grade when
so specified. There is a separate 10%, by weight, tolerance in each
of these grades for bunches which fail to meet the percentage, by
count, requirement for minimum diameter of berries.

The U.S. No. 1 Juice Grapes grade has no specific requirements for
minimum size berries.

Examples for Table Grapes:

"Bunches and berries, mostly medium, some large. Undersize (260)
berries within tolerance."

"Bunches generally medium; berries mostly medium; from 5% to
20% average approximately 15% of bunches show over 10%
undersize berries."

QUALITY

Refer to General Market Inspection Instructions and same heading of (261)
Part I in this handbook.

Under this heading refer to:

Maturity.
Color.
Compactness of bunches.
Defects.

Maturity. "Mature" means that the grapes are juicy, palatable and (262)
have reached that stage of development at which the skin of the berry
easily separates from the pulp. Frozen or slightly frosted stock
should not be confused with mature grapes.

Unlike the European grape standards, the American Bunch Grapes (263)
standards contain no requirements for sugar tests.

- (264) Color. The following terms are to be used in describing the color American type grapes:
- (265) Well colored is defined as meaning that the berries show full color characteristic of the variety. This is the minimum color requirement for U. S. Fancy Table Grapes.
- (266) Fairly well colored is defined as meaning that not less than 75% by weight shall show full characteristic color of the variety; 25% may show partially or poorly colored berries which are not characteristic of immature berries. This is the minimum requirement of U. S. No. 1 Table and U. S. No. 1 Juice grape grades.
- (267) Poorly colored applies to those grapes that fail to meet the requirements of "fairly well colored."
- (268) Grapes failing to meet the color requirements of the grade are to be scored against the tolerance for general defects as there is no separate tolerance for undercolored grapes in the standards for American type grapes.
- (269) Color should be reported in general terms unless the lot is out of grade due to undercolored bunches in which event the undercolored bunches should be reported in actual percentages.
- (270) Compactness of Bunches. A factor which should be described in connection with quality is the compactness of bunches. In describing compactness of bunches, the following terms should be used.
- (271) Compact. This means that the berries are closely arranged around the main and lateral stems with no open spaces between the berries, thus forming a compact cluster.
- (272) Fairly compact. This means that the bunches are well filled but that the berries are not so closely spaced as in "compact bunches." The arrangement is such that the cluster has a somewhat open or spreading appearance due to longer main or lateral stems than occur on compact clusters.

Straggly. This means that the bunch is decidedly open with large open spaces and very few berries, due to extended main or lateral stems or to the fact that many lateral stems have not developed berries. (273)

The U.S. Fancy Table Grapes grade requires that at least 50% of the bunches in any container shall be compact and the remainder shall be fairly compact. Bunches which are not fairly compact should be scored against the 5% tolerance in this grade for "straggly bunches". (274)

The U.S. No. 1 Table Grapes grade requires that in any container weighing more than 5 pounds at least 85% of the bunches must be fairly compact or better. This requirement is a container minimum and not subject to tolerances. Individual containers weighing 5 pounds or less must have at least 50% fairly compact bunches and the average of fairly compact bunches in the lot must be at least 85%. In either size container, the straggly bunches may not be scored against the general tolerance for grade defects. Any container having less than the specified minimum of fairly compact bunches will cause the lot to fail the grade. (275)

The U.S. No. 1 Juice Grape grade requires that not less than 60% of the bunches in any container shall be "fairly compact" or better. The remainder may be straggly. (276)

DEFECTS

Mildew. (See same heading Part I). Any visible mildew is to be scored against the U.S. Fancy Table Grapes grade. (277)

Mildew which is present in sufficient amounts to affect the appearance of the berries is considered "damage" and should be scored against the U.S. No. 1 Table Grapes grade. Berries are not to be regarded as damaged if they are firmly attached to the stems and show only slight traces of mildew on the inside of the bunch where it does not affect the appearance of the berries. (278)

The U.S. No. 1 Juice Grapes grade permits mildew that does not seriously affect the market quality and which would not be classed as serious damage. (279)

Shot berries. (See same heading Part I). Small immature shot berries, characteristic of the Worden variety, should be disregarded unless they are excessive in number and materially detract from the appearance of the lot. (280)

- (281) Dried berries are considered very objectionable. All grades restrict them with a separate 2% tolerance. Remember dried berries are light in weight. It takes a large number by count to weigh 1/10 of a pound.
- (282) Russetting. No russetting on berries is permitted in the U.S. Fancy Table Grapes grade.
- (283) The U.S. No. 1 Table Grapes grade permits russetting which does not injure the appearance of the berries. The U.S. No. 1 Juice Grapes grade permits russetting which does not seriously damage the appearance of the berries.
- (284) Hail, Disease, Insects and Other Damage. See the same heading in Part I of these instructions.
- (285) Example of Quality Statement for U.S. No. 1 Table Grapes:
"Mature, mostly well, some fairly well colored, over 85% of bunches fairly compact to compact, mostly compact. Grade defects within tolerances:"

CONDITION

- (286) Refer to General Market Inspection Instructions and same headings Part I in this handbook.
- (287) Condition of Berries. All grades in the standards for American type grapes require that the berries shall not be soft. Berries meeting grade requirements should be described as "firm."
- (288) * Attachment to Capstems and Shattered Berries. Each grade requires *
* that the berries be firmly attached to the capstems. This should be *
* reported in general terms and all individual berries separated from *
* the bunch reported in percentages as shattered berries. Shattered *
* berries may or may not have a capstem attached. The following *
* illustrates how these two factors should be reported. "Berries *
* mostly firmly attached to capstems. From 12% to 20%, average 16% *
* shattered berries." *
- (289) * Use reasonable care in removing bunches from the container and in *
* handling them during inspection. All shattered berries, including *
* any which have fallen off during the inspection process, are scored *
* as condition defects against the total lot tolerance. Shattered *
* berries that are decayed or otherwise seriously damaged shall be *
* separated and scored against the more restrictive tolerance. *

to describe this condition are the following: "Berries shatter slightly", "berries shatter readily", "berries shatter badly".

It is necessary to estimate carefully the weight of shattered berries (289) in each container in order to determine accurate percentages. Shattered berries are to be scored as condition defects against the general grade tolerance of 10% but are not to be scored as serious damage unless they are crushed or leaking.

Condition of Stems. There are no requirements for condition of stems (290) in the grades for American Bunch Grapes. However, unusual conditions such as dry, brittle stems following field freezing should be described.

Condition Defects.

Crushed Berries. Crushed berries should be scored as serious (291) damage. See Part I of this handbook.

Wet Berries. Market inspectors should not be too technical in (292) scoring this defect. Berries wet from moisture of condensation should not be scored as defects. An occasional berry wet from leaking juice is normal and should be disregarded, however, appreciable amounts of berries wet from leaking juice should be scored as seriously damaged. Generally berries to be scored as defects from this cause should be reported as "wet and sticky from leaking juice" in which case the cause of the leaking juice should be reported. Example: "From 3 to 12%, average 6% of berries wet and sticky from leaking juice of crushed berries occurring generally in bottom of containers."

Split Berries. Split berries are frequently seen on Concord (293) grapes and are not considered as objectionable on terminal markets unless they are badly split or are leaking.

(294) Freezing Injury. Grape berries, when injured by freezing, their natural crispness and have a dull, wilted or flabby appearance. The pulp is watery and when the capstem is pulled from the berry, it will be noticed that less of the pulp adheres to the brush than on a normal berry.

(295) Mold and Decay. Mold on grape berries generally indicates the presence of decay. The kind and degree of mold found should be reported.

(296) If any decay is present in a lot of grapes, mention of it should always be made on the face of the certificate; also "No decay" is to be reported if none is found. Amounts of decay should be estimated as accurately as possible. See same heading in Part I of this handbook.

(297) Example of Condition Statement:

"Berries are generally firm and mostly firmly attached, few shatter readily; 2 to 8%, average 5% shattered berries. In most baskets, 1 to 3 decayed berries, in many 1 to 3% decay, average 2% Blue Mold Rot".

GRADE

(298) Under this heading a definite statement should be made showing the grade of the lot and indicating which grade was used as the basis for the inspection.

(299) Any lot of grapes consisting of more than one variety which meets all other requirements of the grade may be certified as being mixed varieties as: "U. S. No. 1 Table Mixed" or "U. S. No. 1 Juice Mixed".

(300) Example:

Pack: Well filled.

Size: Bunches and berries mostly medium, some large. Undersize within tolerance.

Quality:

Most berries well colored, some fairly well colored; most bunches compact, some fairly compact, few straggly. Grade defects within tolerance.

Condition:

Berries are generally firm and firmly attached. 2% shattered berries. 1% decay occurring fairly uniformly in all baskets.

Grade:

U. S. No. 1 Table.

Blank

APPENDIX I

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ARIZONA MATURITY REGULATIONS

Arizona Fruit and Vegetable Standardization, 1982 Arizona Official
Compilation of Administrative Rules and Regulations, Title 3, Chapter
7, Article 1, Section R3-7-104, Subsection 7, Parts d through f.

d. "Mature" means that each bunch of grapes of the varieties known as Cardinals and Robins shall test not less than 14-1/2 percent soluble solids and Perlettes shall test not less than 15 percent soluble solids. Thompson Seedless variety shall be considered mature if they test 16 percent soluble solids, and the Exotic variety shall be considered as mature if they test 14 percent soluble solids; however, all varieties shall be considered mature if the juice contains soluble solids equal to, or in excess of, 18 parts to every part of acid contained in the juice (the acidity of the juice to be calculated as tartaric acid without water of crystallization).

e. In all varieties the testing of soluble solids in the juice shall be determined by the Balling or Brix scale hydrometer.

f. The maturity of varieties named in this regulation shall be determined by testing the juice of entire bunches representative of the least mature grapes in any container and consisting of not less than 10 percent by weight of the contents of the container; however, no lot of grapes shall be considered as failing to meet the maturity requirements of this section because the sample of grapes from one container fails to meet the required test.

CALIFORNIA MATURITY REGULATIONS

California Department of Food and Agriculture, 1981 Administrative Code - Title 3 of California, Group 4, Article 25, Parts 1436.3 through 1436.17.

1436.3 Grapes, Sampling and Testing Method.

Compliance with Sections 1436.12, 1436.13, 1436.14, 1436.15, 1436.16 and 1436.17 of the California Administrative Code, relating to the maturity of grapes included in Group A Table Grapes, shall be determined by examination of the grapes in a representative sample of containers taken at random from any lot of containers of grapes.

(a) A "lot" of grapes means any group of containers, containing grapes of the same variety, and the same grade or brand, and which is set apart or is separate from any other group or groups.

(b) The following procedure shall be used to determine whether grapes in a lot are in compliance with the maturity standards of this article.

(c) Sampling method. There shall be selected at random from the lot, the number of sample containers specified by the following table

100 containers or less	3
101 to 300	5
301 to 500	6
501 to 700	7

For lots of over 700 containers, one additional sample container shall be selected for each additional 200 containers or fraction thereof.

(d) From the sample containers selected in accordance with paragraph (c), select the three containers which appear to contain the least mature grapes; of these three containers, select the two that contain grapes which appear to be the least mature of the three. Remove from each of the two containers so selected 20% of the grapes, but not less than two bunches, from a contiguous area of each container which appears to be the least mature. Combine the grapes removed from both containers, crush and extract the juice for

testing. After extraction, agitate, and thoroughly mix the juice, and test. If the test result complies with the soluble solids standard specified in this article, no further testing is required.

(e) If the result of the soluble solids test, as specified in (d) above, fails to comply with the soluble solids standard specified for the variety, proceed to the second test as follows: thoroughly stir the juice used for the soluble solids test; measure out 10 c.c. of this juice and titrate to determine the ratio of soluble solids to acid; if this ratio is equal to or higher than the ratio standard of 20 to 1, and the minimum soluble solids as specified in this article, no further testing is required.

(f) If the soluble solids test provided in (d) above, or the ratio test provided in (e) above fails to equal the standard specified for the variety of grape being tested, proceed to the third test as follows: remove the least mature appearing grapes from the third sample container by the same procedure prescribed in (d) above, extract the juice of the grapes selected from this third container, thoroughly mix the juice, and proceed with the soluble solids test. Determine the mathematical average soluble solids percentage of the first test, (d) above, and this third test (f); this percentage shall be deemed the soluble solids percentage for the lot. If the result of this test complies with the soluble solids standard specified in this article, no further testing is required.

(g) If the soluble solids test provided in (f) above fails to equal the standard specified in this article for the variety being tested, proceed to the fourth test as follows: thoroughly stir the juice used for the soluble solids test provided in (d) above (the 2-box test) and (f) above (the 3-box test). Remove 10 c.c. of juice from each test and combine and thoroughly mix these two quantities of juice. When thoroughly mixed, remove 10 c.c. of this combined juice and titrate. If the result of this test complies with the ratio standard of 20 to 1, and the minimum soluble solids as specified in this article, no further testing is required.

(h) For grapes not included in Group A, the number of containers prescribed in (c) above shall be selected and not less than 10 percent of the grapes shall be selected at random from each of the containers. Then combine the samples and make one composite test of the total juice extracted.

1436.4 Grapes, Additional Samples.

Compliance or noncompliance, as to the maturity of grapes, shall be determined by the sample method described in Section 1436.3, California Administrative Code. a second official sample, taken as described in Section 1436.3, California Administrative Code, may be tested after the low-test grapes in the containers in the lot have been removed.

1436.5 Grapes, Method of Testing.

(a) All grapes in the sample shall be completely crushed without unnecessary crushing of the stems. The juice shall be poured through a sieve or metal screen strainer that will permit the juice to escape rapidly and at the same time not permit, under pressure, any pulp or solids to go through. In no case shall the screen or sieve be less than 8 mesh per lineal inch.

(b) When making a soluble solids test, a temperature compensated hand refractometer shall be used, the juice shall be thoroughly mixed and a small sample of the juice placed upon the prism and read immediately to avoid evaporation. When the hand refractometer is used as a dipping instrument, it shall be immersed to a depth that will insure complete coverage of the prism and remain in the juice 2 to 3 minutes for temperature equilibrium and the juice shall be thoroughly mixed prior to reading.

(c) Prior to each grape season, hand refractometers shall be checked for accuracy optically by using a standard solution. If the instrument is not accurate, it shall not be used in any official testing procedure.

(d) When a test has been completed, the juice shall be drained or dried from all equipment before the juice from a subsequent test is used. The refractometer shall be washed and dried after each use.

1436.6 Grapes, Equipment and Instruments.

(a) The hand refractometer shall be temperature compensated, read directly in Brix percentage scale with the smallest division 0.1 degree, have a sharp demarcation line (shadow) and be without interference by color or an indistinct line, and be sealed with acid proof material on the face where the juice is placed.

(b) Any equipment used shall be made of materials that will not affect, or be affected by the grape stems or grape juice being tested which would cause an incorrect test.

1436.7 Grapes, Titration to Determine Soluble Solids to Acid Ratio.

(a) In order to compute the ratio of soluble solids to acid the equipment necessary is as follows:

- (1) 10 c.c. pipettes
- (2) 250 c.c. Erlenmeyer flasks
- (3) 100 c.c. graduated cylinder
- (4) Dropping bottle for indicator - 1 oz. capacity

The additional necessary supplies are phenolphthalein indicator solution and sodium hydroxide standardized so that 1 c.c. is equivalent to 0.01 gram tartaric acid.

(b) Procedure for making the soluble solids to acid ratio test:

(1) The soluble solids content of the juice of the grapes in the sample is determined in accordance with present practice.

(2) 10 c.c. of the clear juice shall be pipetted into the Erlenmeyer flask.

(3) Add up to approximately 100 c.c. of distilled water to the juice in the flask.

(4) Add three to four drops of the indicator solution.

(5) Titrate by the addition of the sodium hydroxide (1 c.c. equivalent to 0.01 gram tartaric acid) until the end point is obtained as evidenced by the first definite color (pink) change.

(6) Calculate the ratio according to the following:

$$\frac{\text{Sodium hydroxide used}}{10} = \text{acid content}$$

Divide the acid content into the soluble solids percentage to obtain the ratio. An example is given as follows:

$$\begin{array}{r} 17.5 \text{ soluble solids} \\ 7.5 \text{ c.c. of NaOH or } 7.5 \div 10 = 0.75 \\ .75/17.500/23.3 \text{ ratio} \\ \hline 15 \ 0 \\ \hline 2 \ 50 \\ 2 \ 25 \\ \hline 250 \end{array}$$

1436.8 Grapes, Standards.

There are two standards for grapes. All grapes of the varieties in Group A shall be considered table grapes and all other varieties juice grapes. Except as otherwise provided in Section 1436.23 of this article, grapes of all varieties shall at least meet the standard for juice grapes.

1436.9 Grapes, White Varieties.

The following varieties of white grapes and other similar varieties are in Group A:

- | | |
|----------------------------|-----------------------|
| Almeria | Khandahar |
| Aspiran Blanc | Ladyfinger |
| Bicane | Malaga |
| Chasselas de Fontainebleau | Ohanez |
| Chasselas Napoleon | Olivette Blanche |
| Cornichon Blanc | Olivette de Vendemain |
| Crystal | Perlette |
| Dattier de Beyrouth | Persian 23 |
| Delight | Pizzutello di Roma |
| Dizmar | Rish Baba |
| Golden Queen | Rosaki |
| Italia (Italian Muscat) | Thompson Seedless |
| Khalili | |

1436.10 Grapes, Red Varieties.

The following varieties of red grapes and other similar varieties are in Group A:

- | | |
|-----------------|------------------------|
| Angelino | Maraville de Malaga |
| Cardinal | Molinera Gorda |
| Catawba | Pink Thompson Seedless |
| Flame Tokay | Piment |
| Hunisa | Queen |
| Chasselas Rose | Sultanina Rose |
| Esperor | Tokay |
| Red Malaga | Zabalkanski |
| Rose de Falloux | Zabalkanskoi |

1436.11 Grapes, Black Varieties.

The following varieties of black grapes and other similar varieties are in Group A:

Black Corinth	California Concord
Black Ferrara	Concord
Black Hamburg	Corinthe Noir
Blackrose	Cornichon
Black Zante	Danugue
Blue Grau	Drodelabi
Exotic	Olivette Noir
Frankenthal	Panariti
Fresno Beauty	Pierce
Gros Colman	Pierce Isabella
Gros Guillaume	Prizzutello Nero
Isabella	Prune de Cazouls
Isabella Regia	Purple Damascus
Black Monukka	Rose of Peru
Black Morocco	Ribier
Muscat Albarbient's	Servian Blue
Black Prince	Snow's Muscat Hamburg
Muscat Hamburg	Zante Currant

1436.12 Grapes, Maturity Standards.

Except as otherwise provided in Sections 1436.13 and 1436.14

"mature" means that:

(a) A variety of grapes in Group A (Section 1436.9, 1436.10, and 1436.11) test not less than 16-1/2 percent soluble solids in juice, and

(b) A variety of grapes not in Group A test not less than 19 percent soluble solids in juice, except the Alicante and Palomino varieties which shall test not less than 18 percent.

(c) Soluble solids content shall be as determined by the standard hand refractometer.

1436.13 Grapes, Maturity Standards by Variety.

The following varieties of grapes shall be considered mature if they test not less than that percent of soluble solids which is specified below:

<u>Percent of Soluble Solids</u>	<u>Variety</u>																								
19	All white varieties of Muscat type shipped as juice grapes																								
17-1/2	All white varieties of Muscat type shipped as table grapes and Malaga grown north and west of San Gorgonio Pass																								
15-1/2	Beauty Seedless grown south and east of San Gorgonio Pass Cardinal, Robin, Berenda Red, Imperial Cardinal, and Richards Black grown north and west of San Gorgonio Pass Robin grown north and west of San Gorgonio Pass																								
	<table border="0"> <tr> <td>Burger</td> <td>Fresno Beauty</td> </tr> <tr> <td>Emperor</td> <td>Servian Blue</td> </tr> <tr> <td>Gros Colman</td> <td>Pierce</td> </tr> <tr> <td>Bleu Grau</td> <td>Concord</td> </tr> <tr> <td>Drodelabi</td> <td>Dattier de Beyrouth</td> </tr> <tr> <td>Red Malaga</td> <td>Pierce Isabella</td> </tr> <tr> <td>Khalili</td> <td>Isabella Regia</td> </tr> <tr> <td>Persian 23</td> <td>California Concord</td> </tr> <tr> <td>Dizmar</td> <td>Perlette</td> </tr> <tr> <td>Ribier</td> <td>Queen</td> </tr> <tr> <td>Delight</td> <td>Blackrose</td> </tr> <tr> <td>Superior Seedless</td> <td></td> </tr> </table>	Burger	Fresno Beauty	Emperor	Servian Blue	Gros Colman	Pierce	Bleu Grau	Concord	Drodelabi	Dattier de Beyrouth	Red Malaga	Pierce Isabella	Khalili	Isabella Regia	Persian 23	California Concord	Dizmar	Perlette	Ribier	Queen	Delight	Blackrose	Superior Seedless	
Burger	Fresno Beauty																								
Emperor	Servian Blue																								
Gros Colman	Pierce																								
Bleu Grau	Concord																								
Drodelabi	Dattier de Beyrouth																								
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Khalili	Isabella Regia																								
Persian 23	California Concord																								
Dizmar	Perlette																								
Ribier	Queen																								
Delight	Blackrose																								
Superior Seedless																									
14-1/2	Cardinal, Robin, Berenda Red, Imperial Cardinal, and Richards Black grown south and east of San Gorgonio Pass																								
	<table border="0"> <tr> <td>Ladyfinger</td> <td>Khandahar</td> </tr> <tr> <td>Rish Baba</td> <td>Olivette Blanche</td> </tr> </table>	Ladyfinger	Khandahar	Rish Baba	Olivette Blanche																				
Ladyfinger	Khandahar																								
Rish Baba	Olivette Blanche																								
14	Exotic																								

It is hereby declared that the differences in climatic condition that exist north and west of San Gorgonio Pass cause Malaga, Thompson Seedless, Beauty Seedless, Robin, Cardinal, Berenda Red, Imperial Cardinal, and Richards Black varieties of grapes which are grown there to have, at maturity, a higher percentage of soluble solids than mature grapes of these varieties which are grown south and east of San Gorgonio Pass.

This Section shall apply to Robin variety of grapes only when shipped in containers specifically marked with a statement that the grapes are of that variety only.

1436.14 Grapes, Titration.

Any variety of grapes which are in Group A (Section 1436.9, 1436.10, and 1436.11), except all varieties of grapes shipped as juice grapes, Thompson Seedless, Perlette, and Superior Seedless varieties, shall also be considered mature if the juice contains soluble solids equal to or in excess of 20 parts to every part of acid contained in the juice (the acidity of the juice to be calculated as tartaric acid without water of crystallization).

The Thompson Seedless variety shall be considered mature if the juice contains not less than 15 percent soluble solids, and the Perlette and Superior Seedless varieties shall be considered mature if the juice contains not less than 14 percent soluble solids, provided the juice so tested for the three varieties shall also contain soluble solids equal to or in excess of 20 parts to every part acid contained in the juice.

Titration will not be permitted for any varieties of grapes when shipped as juice grapes.

1436.15 Grapes, Group A Standards.

Any variety of grapes which is included in Group A may be placed in the standard for juice grapes and any other variety may be placed in the standard which is established for table grapes, but regardless

of standard, the maturity of varieties included in Group A shall be determined by testing the juice from entire bunches representative of the least mature grapes in any lot and which constitute not less than 10 percent by weight, of the contents of each container that may be tested.

1436.16 Grapes, Not in Group A.

The maturity of every variety which is not included in Group A shall be determined by testing the juice from a composite sample which is representative of the average of the grapes in any container or bulk lot.

1436.17 Grapes, No Tolerances for Maturity Standards.

The standards which are provided by this article are minimum standards, and the tolerances allowed by Sections 1436.20 and 1436.22 shall not be applied to any test which is made in accordance with this article for the purpose of determining whether any lot of grapes complies with the maturity standards for the variety.

DETERMINING GRAPE MATURITY BASED ON
THE CALIFORNIA AGRICULTURAL CODE.

GENERAL: These instructions are for use when determining maturity of grapes grown in California or imported grapes that are subject to maturity requirements based on the California Code. All equipment should be rinsed in distilled water before using. Rinsing in tap water will generally give a higher reading because of minerals present. Save the juice left over from each test. Some or all of it is used in subsequent tests.

SAMPLING: Containers shall be randomly drawn from throughout the lot according to the following chart:

LOT SIZE	CONTAINERS DRAWN
100 containers or less	3
101 - 300	5
301 - 500	6
501 - 700	7
Select one additional container for each additional 200 containers or fraction thereof.	

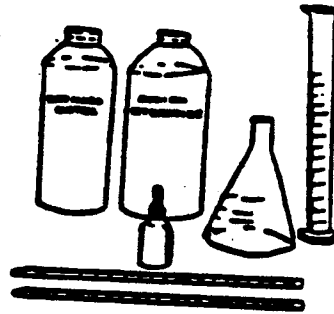
From the containers drawn, select the 3 containers which appear to contain the least mature grapes. Out of these 3 containers, select the 2 containers appearing to have the least mature grapes. From the 2 containers, remove 20%, but not less than 2 bunches, of the least mature appearing grapes from a contiguous area of each container. Completely crush all grapes selected, taking care to avoid unnecessary crushing of the stems. After crushing, pour the juice through a sieve or metal screen strainer that will permit the juice to freely run into the container, but not allow pulp or large solids through.

TEST 1: Thoroughly mix the juice. Place a clean dipping type refractometer into the juice to allow it time to adjust to the juice temperature. Use other types of refractometers as instructions direct.

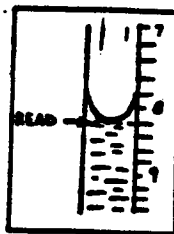
Read the percent of soluble solids on the refractometer scale and record the reading on the notesheet. If the variety tested is considered mature according to this test, the lot may be passed. If the soluble solids reading is below the minimum, proceed to TEST 2. The soluble solids reading obtained here will be used for calculations in later tests.

TEST 2: This test is a titration process using a portion of the juice remaining from TEST 1. The equipment necessary for this test is as follows:

1. Two 10 milliliter (ml.) pipettes.
2. One 250 ml. Erlenmeyer flask.
3. Distilled water.
4. .1333 sodium hydroxide solution.
5. Phenolphthalein indicator solution.
6. One 100 ml. graduated cylinder.



- A. One of the pipettes is used for measuring juice, the other for measuring sodium hydroxide. It is very important to always use the same one for juice and the other for sodium hydroxide. To read the liquid level, hold the pipette in a vertical position and sight across the meniscus (See inset). In the "juice pipette" measure exactly 10 ml. juice.



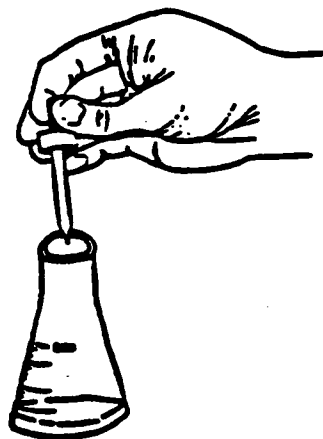
- B. Let the juice run freely into the Erlenmeyer flask. Do not blow out the small amount remaining in the tip.



- C. Add to the juice 100 ml. distilled water.



- D. Add to the juice and distilled water 3 drops phenolphthalein indicator solution and swirl to mix.



- E. In the "sodium hydroxide pipette" measure 10 ml. sodium hydroxide. It is advisable to transfer approximately this amount from the main sodium hydroxide container into a clean container before filling the pipette. This reduces the possibility of contaminating the main container. Discard any excess sodium hydroxide. Do not return it to the main container.



F. Titrate by adding sodium hydroxide from the pipette drop by drop until the endpoint is reached. The endpoint is when the solution changes to a light pink color and will not change back when mixed. Record the exact amount of sodium hydroxide used. Do not round up or down.



G. Calculate the acid content by dividing the amount of sodium hydroxide used by 10. *

EXAMPLE:

7.5 ml. sodium hydroxide /10 = .75 acid content.

H. Calculate the soluble solids to acid content ratio by dividing the soluble solids content, obtained by refractometer reading in TES 1, by the acid content. *

EXAMPLE:

16% soluble solids / .75 acid content = 21.3

In this example the lot would be passed. Under California regulations most varieties of grapes are considered mature if the ratio is 20 to 1 or higher. If the ratio is less than 20 to 1, proceed to TEST 3.

Before proceeding to TEST 3, wash or rinse refractometer and titration equipment in distilled water. Using tap water may cause test results to be inaccurate.

* These mathematical calculations are not necessary when chart II at the end of these instructions is used.

TEST 3: The third test uses the remaining box of the original 3. Select 20% of the grapes, but not less than 2 bunches from a contiguous area of the container which appears to be the least mature. Crush the grapes and pour the juice through the strainer or sieve as was done in TEST 1. Test the juice with the refractometer and record the percent of soluble solids. Average the percent of soluble solids from TEST 1 with the percent of soluble solids from this test. If this average is equal to or more than the minimum soluble solids specified for the variety, the lot shall be considered mature. Proceed to TEST 4 if the average soluble solids is less than the minimum.

TEST 4: Thoroughly mix the juice left over from the first two tests. Combine 10 ml. of it with 10 ml. of the juice from TEST 3. Thoroughly mix the 20 ml. of juice and extract 10 ml. Titrate this 10 ml. and calculate the soluble solids to acid content following steps A through G under TEST 2 above. If the ratio is 20 to 1 or higher, the lot shall be passed as mature. If the ratio is less than 20 to 1, the lot is considered immature and no further testing is required.

CHART I
TABLE GRAPE MATURITY CHART

Percent Soluble Solids	Arizona Agricultural Code <u>1/</u>	California Agricultural Code <u>2/</u>	U.S. Standards for Origins Outside California & Arizona <u>3/</u>
17.5		All white varieties Muscat type. Malaga-NW San Geronio Pass.	Muscat
17.0		Thompson Seedless-NW San Geronio Pass.	
16.5		All varieties not listed in this column.	All varieties not listed in this column.
16.0	Thompson Seedless		
15.5		Beauty Seedless-SE San Geronio Pass. Cardinal, Berenda Red, Imperial Cardinal, Richards Black, Robin - NW San Geronio Pass. Burger Dismar Dattier de Beyrouth Emperor Ribier Pierce Isabella Gros Colman Delight Isabella Regia Bleu Grau Fresno Beauty Superior Seedless Drodelabi Servian Blue CA. Concord Red Malaga Pierce Perlette Khalili Concord Queen Persian 23 Blackrose	Cardinal, Emperor, Perlette, Ribier, Olivette Blanche, Rish Baba, Red Malaga, and similar varieties.
15.0	Perlette		
14.5	Cardinal, Robin	Cardinal, Robin, Berenda Red, Imperial Cardinal, Richards Black-SE San Geronio Pass. Ladyfinger, Rish Baba, Khandahar, Olivette Blanche.	
14.0	Exotic	Exotic	

1/ Varieties listed, when tested by hydrometer, are mature when meeting or exceeding the specified soluble solids. All varieties, regardless of hydrometer reading, are mature at 18 to 1 or higher titration ratio.

2/ All varieties, when tested by refractometer, are mature when meeting or exceeding the specified soluble solids. Thompson Seedless at 15 percent or more refractometer reading, Perlette or Superior Seedless at 14 percent or more, and all other varieties, regardless of refractometer reading are mature at 20 to 1 or higher titration ratio. Thompson Seedless below 15, and Perlette or Superior Seedless below 14 percent refractometer reading may not be titrated and are immature.

3/ All varieties, when tested by refractometer, are mature when meeting or exceeding the specified soluble solids.

CHART II20 to 1 Soluble Solids - Acid Ratio Chart

Column A lists refractometer readings in terms of percent of soluble solids. Column B lists amounts of sodium hydroxide in milliliters. When the amount of sodium hydroxide used during titration exceeds the amount in Column B for the corresponding percent of soluble solids in column A, the soluble solids/acid ratio is less than 20 to 1. SEE EXAMPLES.

<u>Column A</u> % Soluble Solids	<u>Column B</u> ml. NaOH used	<u>Column A</u> % Soluble Solids	<u>Column B</u> ml. NaOH used
13.0	6.5	15.5	7.7
13.1	6.5	15.6	7.8
13.2	6.6	15.7	7.8
13.3	6.6	15.8	7.9
13.4	6.7	15.9	7.9
13.5	6.7	16.0	8.0
13.6	6.8	16.1	8.0
13.7	6.8	16.2	8.1
13.8	6.9	16.3	8.1
13.9	6.9	16.4	8.2
14.0	7.0	16.5	8.2
14.1	7.0	16.6	8.3
14.2	7.1	16.7	8.3
14.3	7.1	16.8	8.4
14.4	7.2	16.9	8.4
14.5	7.2	17.0	8.5
14.6	7.3	17.1	8.5
14.7	7.3	17.2	8.6
14.8	7.4	17.3	8.6
14.9	7.4	17.4	8.7
15.0	7.5	17.5	8.7
15.1	7.5	17.6	8.8
15.2	7.6	17.7	8.8
15.3	7.6	17.8	8.9
15.4	7.7	17.9	8.9

EXAMPLE 1: 15.2 soluble solids (Column A) from refractometer reading.
6.8 ml. used for titration. Lot passes.

EXAMPLE 2: 14.9 soluble solids (Column A) from refractometer reading.
8.2 ml. used for titration. Lot fails.

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Appendix II

United States Standards



Deleted, March 1997, HU-136-4(a)
Page 2, U.S. Standards for Grades of Table Grapes (European or Vinifera Type)
Grapes, Market Inspection Instructions, November 1971

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**United States
Department of
Agriculture**

**Agricultural
Marketing
Service**

**Fruit and
Vegetable
Division**

**Fresh
Products
Branch**

United States Standards for Grades of Table Grapes (European or Vinifera Type)

Effective April 18, 1996
(Reprinted - February 1997)

United States Standards for Grades of Table Grapes (European or Vinifera Type)

Grades

- 51.880 U.S. Extra Fancy Table.
- 51.881 U.S. Extra Fancy Export.
- 51.882 U.S. Fancy Table.
- 51.883 U.S. Fancy Export.
- 51.884 U.S. No. 1 Table.
- 51.885 U.S. No. 1 Institutional.

Tolerances

- 51.886 Tolerances.

Application of Tolerances

- 51.887 Application of tolerances.

Maturity Requirements

- 51.888 Maturity requirements.

Definitions

- 51.889 Well developed grapes.
- 51.890 One variety.
- 51.891 Uniform in appearance.
- 51.892 Color terms.
- 51.893 Firm.
- 51.894 Weak.
- 51.895 Shriveled at capstem.
- 51.896 Shattered.
- 51.897 Wet.
- 51.898 Decay.
- 51.899 Waterberry.
- 51.900 Sunburn.
- 51.901 Damage.
- 51.902 Fairly well filled.
- 51.903 Excessively tight.
- 51.904 Shot berries.
- 51.905 Dried berries.
- 51.906 Well developed and strong.
- 51.907 Diameter.
- 51.908 Serious damage.
- 51.909 Materially shriveled at capstem.
- 51.910 Straggly.
- 51.911 Container.

51.912 Export.

51.913 Clusters.

Metric Conversion Table

51.914 Metric conversion table.

Grades

§51.880 U.S. Extra Fancy Table.

"U.S. Extra Fancy Table" consists of bunches of well developed grapes of one variety, except when designated as assorted varieties, which are uniform in appearance, well colored, and which meet the following requirements:

(a) Basic requirements for berries:

- (1) Mature;
- (2) Firm;
- (3) Firmly attached to capstem;
- (4) Not weak;
- (5) Not shriveled at capstem;
- (6) Not shattered;
- (7) Not split or crushed;
- (8) Not wet.

(b) Basic requirements for bunches:

- (1) Fairly well filled;
- (2) Not excessively tight for the variety.

(c) Basic requirements for stems:

- (1) Well developed and strong;
- (2) Not dry and brittle;
- (3) At least yellowish-green in color except for Cardinal, Robin, Exotic, and Beauty Seedless varieties.

(d) Berries free from:

- (1) Decay;
- (2) Waterberry;
- (3) Sunburn;
- (4) Almeria Spot.

(e) Stems free from:

- (1) Mold;
- (2) Decay.

(f) Berries not damaged by:

- (1) Any other cause.

(g) Bunches not damaged by:

- (1) Shot berries;
- (2) Dried berries;
- (3) Other defective berries;
- (4) Trimming away of defective berries;
- (5) Any other cause.

(h) Stems not-damaged by:

- (1) Freezing;
- (2) Any other cause.

(i) Size:

(1) For berries: Exclusive of shot berries and dried berries, not less than 90 percent, by count, of the berries on each bunch shall have the minimum diameters indicated for varieties as follows:

(i) Ribier, Cardinal, Robin, Exotic, Queen, Italia Muscat, and other similar varieties thirteen-sixteenths of an inch.

(ii) Other varieties eleven-sixteenths of an inch.

(2) For bunches:

(i) Not less than one-half pound.

(j) For tolerances see §51.886.

§51.881 U.S. Extra Fancy Export.

"U.S. Extra Fancy Export" consists of grapes which meet the requirements for U.S. Extra Fancy Table and, in addition, meet the packaging requirements set forth in §51.912.

§51.882 U.S. Fancy Table.

"U.S. Fancy Table" consists of bunches of well developed grapes of one variety, except when designated as assorted varieties, which are at least reasonably well colored, uniform in appearance when so specified in connection with the grade, and which meet the following requirements:

(a) Basic requirements for berries:

- (1) Mature;
- (2) Firm;
- (3) Firmly attached to capstem;
- (4) Not weak;
- (5) Not shriveled at capstem;
- (6) Not shattered;
- (7) Not split or crushed;
- (8) Not wet.

(b) Basic requirements for bunches:

- (1) Fairly well filled;
- (2) Not excessively tight for the variety.

(c) Basic requirements for stems:

- (1) Well developed and strong;
- (2) Not dry and brittle.

(d) Berries free from:

- (1) Decay;
- (2) Waterberry;
- (3) Sunburn;
- (4) Almeria Spot.

(e) Stems free from:

- (1) Mold;
- (2) Decay.

(f) Berries not damaged by:

- (1) Any other cause.
 - (g) Bunches not damaged by:
 - (1) Shot berries;
 - (2) Dried berries;
 - (3) Other defective berries;
 - (4) Trimming away of defective berries;
 - (5) Any other cause.
 - (h) Stems not damaged by:
 - (1) Freezing;
 - (2) Any other cause.
 - (i) Size:
 - (1) For berries: Exclusive of shot berries and dried berries, the following percentages, by count, of the berries on each bunch shall have the minimum diameters indicated for varieties as follows:
 - (i) For Ribier, Cardinal, Robin, Exotic, Queen, Italia Muscat, and other similar varieties, 90 percent shall be at least twelve-sixteenths of an inch;
 - (ii) For Thompson Seedless, Perlette, Delight, Beauty Seedless, Superior Seedless, Flame Seedless and other seedless varieties, 75 percent shall be at least ten-sixteenths of an inch; and,
 - (iii) For other varieties 90 percent shall be at least ten-sixteenths of an inch.
 - (2) For bunches:
 - (i) Not less than one-fourth pound.
 - (j) For tolerances see §51.886.
- §51.883 U.S. Fancy Export.**
 "U.S. Fancy Export" consists of grapes which meet the requirements for U.S. Fancy Table, except that bunches shall weigh not less than one-half pound, and in addition meet the packaging requirements set forth in §51.912.
- §51.884 U.S. No. 1 Table.**
 "U.S. No. 1 Table" consists of bunches of well developed grapes of one variety, except when designated as assorted varieties, which are at least fairly well colored, uniform in appearance when so specified in connection with the grade, and which meet the following requirements:
- (a) Basic requirements for berries:
 - (1) Mature;
 - (2) Firm;
 - (3) Firmly attached to capstem;
 - (4) Not weak;
 - (5) Not materially shriveled at capstem;
 - (6) Not shattered;
 - (7) Not split or crushed;
 - (8) Not wet.
 - (b) Basic requirements for bunches:
 - (1) Not straggly.
 - (c) Basic requirements for stems:
 - (1) Not weak, or dry and brittle.
 - (d) Berries free from:

- (1) Decay;
 - (2) Waterberry;
 - (3) Sunburn.
 - (e) Stems free from:
 - (1) Decay;
 - (2) Mold.
 - (f) Berries not damaged by:
 - (1) Any other cause.
 - (g) Bunches not damaged by:
 - (1) Shot berries;
 - (2) Dried berries;
 - (3) Other defective berries;
 - (4) Trimming away of defective berries;
 - (5) Any other cause.
 - (h) Stems not damaged by:
 - (1) Freezing;
 - (2) Any other cause.
 - (i) Size:
 - (1) For berries: Exclusive of shot berries and dried berries, 75 percent, by count, of the berries on each bunch shall have the minimum diameters indicated for varieties as follows:
 - (i) Thompson Seedless, Perlette, Delight, Beauty Seedless, Superior Seedless, Flame Seedless and other seedless varieties nine-sixteenths of an inch.
 - (ii) Other varieties ten-sixteenths of an inch.
 - (2) For bunches:
 - (i) Not less than one-fourth pound.
 - (j) For tolerances see §51.886.
- §51.885 U.S. No. 1 Institutional.**
- "U.S. No. 1 Institutional" grapes must have no less than 95 percent of the containers in the lot legibly marked "Institutional Pack." Further requirements for this grade include grapes which consist of clusters and/or bunches of well developed grapes of one variety, except when designated as assorted varieties, which are at least fairly well colored, uniform in appearance when so specified in connection with the grade, and which meet the following requirements:**
- (a) **Basic requirements for berries:**
 - (1) Mature;
 - (2) Firm;
 - (3) Firmly attached to capstem;
 - (4) Not weak;
 - (5) Not materially shriveled at capstem;
 - (6) Not shattered;
 - (7) Not split or crushed;
 - (8) Not wet.
 - (b) **Basic requirements for stems:**
 - (1) Not weak, or dry and brittle.

(c) Berries free from:

- (1) Decay;**
- (2) Waterberry;**
- (3) Sunburn.**

(d) Stems free from:

- (1) Mold;**
- (2) Decay.**

(e) Berries not damaged by:

- (1) Any other cause.**

(f) Bunches not damaged by:

- (1) Shot berries;**
- (2) Dried berries;**
- (3) Other defective berries;**
- (4) Any other cause.**

(g) Stems not damaged by:

- (1) Freezing;**
- (2) Any other cause.**

(h) Size:

(1) For berries: Exclusive of shot berries and dried berries, 75 percent, by count, of the berries on each bunch shall have the minimum diameters indicated for varieties as follows:

(i) Thompson Seedless, Perlette, Delight, Beauty Seedless, Superior Seedless, Flame Seedless and other seedless varieties nine-sixteenths of an inch.

(ii) Other varieties ten-sixteenths of an inch.

(2) For clusters/bunches: In this grade grapes shall consist of at least a two berry cluster ranging to clusters and/or bunches of grapes not greater than five ounces in weight. See Section 51.913.

(i) For tolerances see Section 51.886.

Tolerances

§51.886 Tolerances.

(a) No tolerances are provided in these standards for grapes which fail to meet the applicable maturity requirements other than the allowances specified in §51.888 or in the sampling and testing procedures of State maturity regulations.

(b) In order to allow for variations incident to proper grading and handling in each of the foregoing grades except U.S. No. 1 Institutional, tolerances, by weight, other than for maturity, are provided as set forth in Tables I and II.

Table I – Tolerances at Shipping Point¹

[Percent]

Factor	U.S. Extra Fancy Table	U.S. Fancy Table	U.S. No. 1 Table
(A) For bunches failing to meet color requirements _____	10	10	10
(B) For bunches failing to meet requirements for minimum diameter of berries _____	10	10	10
(C) For bunches failing to meet stem color requirements _____	10		
(D) For offsize bunches and for bunches and berries failing to meet the remaining requirements for the grade _____	8	8	8
Including in (D):			
(a) For serious damage _____	2	2	2
And, including in (a):			
(i) For decay _____	½ of 1	½ of 1	½ of 1

Table II Tolerances En Route or at Destination

[Percent]

Factor	U.S. Extra Fancy Table	U.S. Fancy Table	U.S. No. 1 Table
(A) For bunches failing to meet color requirements _____	10	10	10
(B) For bunches failing to meet requirements for minimum diameter of berries _____	10	10	10
(C) For bunches failing to meet stem color requirements _____	10		
(D) For offsize bunches and for bunches and berries failing to meet the remaining requirements for the grade _____	12	12	12
Including in (D):			
(a) For permanent defects _____	8	8	8
(b) For serious damage _____	4	4	4
And, including in (b):			
(i) For serious damage by permanent defects _____	2	2	2
(ii) For decay _____	1	1	1

¹Shipping Point, as used in these standards, means the point of origin of the shipment in the producing area or at port of loading for ship stores or overseas shipment, or, in the case of shipments from outside the continental United States, the port of entry into the United States.

(c) In order to allow for variations incident to proper grading and handling in the U.S. No. 1 Institutional grade only, tolerances, by weight, other than for maturity, are provided as set forth in Tables Ia and IIa of this section.

TABLE Ia – TOLERANCES AT SHIPPING POINT FOR U.S. NO. 1 INSTITUTIONAL GRADE ONLY ¹

Factor	U.S. No. 1 Institutional
(A) For clusters/bunches failing to meet color requirements _____	10
(B) For clusters/bunches failing to meet requirements for minimum diameter of berries _____	10
(C) For offsize clusters/bunches _____	4
(D) For clusters/bunches and berries failing to meet the remaining requirements for the grade _____	8
Including in (D):	
(a) For serious damage _____	2
And, including in (a):	
(i) For decay _____	½ of 1

TABLE IIa – TOLERANCES EN ROUTE OR AT DESTINATION FOR U.S. NO. 1 INSTITUTIONAL GRADE ONLY

Factor	U.S. No. 1 Institutional
(A) For clusters/bunches failing to meet color requirements _____	10
(B) For clusters/bunches failing to meet requirements for minimum diameter of berries _____	10
(C) For offsize clusters/bunches _____	4
(D) For clusters/bunches and berries failing to meet the remaining requirements for the grade _____	12
Including in (D):	
(a) For permanent defects _____	8
(b) For serious damage _____	4
And, including in (b):	
(i) For serious damage by permanent defects _____	2
(ii) For decay _____	1

¹Shipping Point, as used in these standards, means the point of origin of the shipment in the producing area or at port of loading for ship stores or overseas shipment, or, in the case of shipments from outside the continental United States, the port of entry into the United States.

Application of Tolerances

§51.887 Application of tolerances.

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

- (a) For tolerances of 10 percent or more, individual packages may contain not more than one and one-half times the specified tolerance.
- (b) For a tolerance of less than 10 percent, individual packages may contain not more than double the specified tolerance.

§ 51.888 Maturity requirements.

(a) In the case of grapes grown in Arizona or California, "mature" means grapes in any lot shall meet the maturity requirements for the variety as set forth in the applicable State Agricultural Laws and Regulations referenced in this section. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from, in the case of Arizona maturity regulations, Arizona Department of Agriculture, Citrus, Fruit and Vegetable Standardization, 1688 W. Adams, Phoenix, AZ 85007 or in the case of California maturity regulations, California Department of Food and Agriculture, Fruit and Vegetable Quality Control, Standardization Section, 1220 N Street, P.O. Box 942871, Sacramento, California 94271-0001 or copies of both regulations may be inspected at USDA, AMS, F&VD, FPB, Standardization Section, Room 2065-S, 14th and Independence Ave., Washington, DC 20250 or at the Office of the Federal Register, Suite 700, 800 North Capitol, Washington, DC.

(1) Arizona maturity regulations are contained in Chapter 4 - Plant Services Division, Article 7. Fruit And Vegetable Standardization, Section R3-4-733 Table Grape Standards, Effective January 6, 1994.

(2) California maturity regulations are contained in The California Code of Regulations, Title 3, Subchapter 4, Fresh Fruits, Nuts and Vegetables, Article 25 Table Grapes and Raisins, February 28, 1992.

(b) Grapes subject to U.S. import regulations shall meet the maturity requirements specified in such regulations.

(c) Grapes produced in States other than Arizona or California, or grapes imported from countries outside the United States during periods in which U.S. import regulations do not apply, shall meet the minimum percentage of soluble solids set forth in Table III as determined by use of a standard hand refractometer.

Table III

Variety	Percent of soluble solids
Muscat	17.5
All varieties not listed in this table	16.5
Cardinal, Emperor, Perlette, Ribier, Olivette Blanche, Rish Baba, Red Malaga, and similar varieties	15.5

(1) The minimum percentage of soluble solids for any lot shall be determined from the juice of at least 10 percent, by weight, of whole bunches of the least mature grapes in that container which appears to have the least mature grapes. No lot shall be considered as failing to meet these requirements unless samples from two containers which appear to have the least mature grapes test below the required percentage of soluble solids.

Definitions

§51.889 Well developed grapes.

"Well developed" grapes means grapes which are not abnormally small for the variety.

§51.890 One variety.

"One variety" means that the grapes show similar varietal characteristics.

§51.891 Uniform in appearance.

"Uniform in appearance" means that not more than one-tenth of the containers in any lot show sufficient variation in color or size of berries to materially detract from the appearance of the contents of the individual container, and that the stems are well developed and strong.

§51.892 Color terms.

The color terms "well colored," "reasonably well colored," and "fairly well colored" are defined in Table IV.

Table IV

Color terms	Black varieties	Red varieties	White varieties
Well colored (U.S. Extra Fancy).	Each bunch shall have not less than 95 percent, by count, of berries showing good characteristic color. ¹	Each bunch shall have not less than 75 percent, by count, of berries showing good characteristic color. ¹	No requirement.
Reasonably well colored (U.S. Fancy).	Each bunch shall have not less than 85 percent, by count, of berries showing good characteristic color. ¹	Each bunch shall have not less than 66-2/3 percent, by count, of berries showing good characteristic color ¹ except the Tokay and Cardinal varieties shall have not less than 75 percent, by count, of berries showing characteristic color. ²	No requirement.

¹ Good characteristic color for black varieties means purple to black except that Ribier or similar varieties of grapes shall have at least two-thirds of the surface of the berry showing purple to black color.

For red varieties good characteristic color means at least two-thirds of the surface of the berry is light red through dark red color; except, for the Tokay variety pink through dark red, and for the Cardinal variety light red through purple shall be permitted.

Fairly well colored (U.S. No. 1).	Each bunch shall have not less than 75 percent, by count, of berries showing characteristic color. ²	Each bunch shall have not less than 60 percent, by count, of berries showing characteristic color. ²	No requirement.
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§51.893 Firm.

"Firm" means that the berry does not yield more than slightly to moderate pressure and is not flabby or wilted.

§51.894 Weak.

"Weak" means that individual berries are somewhat translucent, watery and soft, may have relatively low sugar content, inferior flavor, or are of poor keeping quality.

§51.895 Shriveled at capstem.

"Shriveled at capstem" means that the berry shows more than slight wrinkling of the skin surrounding the capstem.

§51.896 Shattered.

"Shattered" means that the berry is separated from the bunch and may or may not have the capstem attached.

§51.897 Wet.

"Wet" means that the grapes are wet from moisture from crushed, leaking, or decayed berries or from rain. Grapes which are moist from dew or other moisture condensation such as that resulting from removing grapes from a refrigerator car or cold storage to a warmer location shall not be considered as wet.

§51.898 Decay.

"Decay" means any soft breakdown of the flesh or skin of the berry resulting from bacterial or fungus infection. Slight surface development of green mold (*Cladosporium*) shall not be considered decay.

§51.899 Waterberry.

"Waterberry" means a watery, soft, or flabby condition of the berry. Affected berries are low in sugar content, have tender skins, and are easily crushed. This is an advanced or more pronounced stage of the condition referred to as "weak".

§51.900 Sunburn.

"Sunburn" means injury to the berry caused by exposure to the sun, including "sulphur burn," usually occurring as a sunken and discolored or dried area on the exposed surface.

§51.901 Damage.

"Damage" means any specific defect described in this section; or an equally objectionable variation of any one of these defects, or any other defect, or any combination of defects which materially detracts from the appearance, or the edible or marketing quality of the individual berry, the appearance of the bunch as a whole, or the marketing quality of the stems.

²Characteristic color for black varieties means reddish-purple to black except that Ribier or similar varieties of grapes shall have at least two-thirds of the surface of the berry showing reddish-purple to black color.

For red varieties characteristic color means at least two-thirds of the surface of the berry is pink to dark red; except, for the Tokay variety light pink through dark red and for the Cardinal variety light pink through purple color shall be permitted.

(a) The following shall be considered as damage to the individual berry:

(1) Scarring such as that caused by thrips, mildew, rubs, and similar injuries when materially detracting from the appearance of the berry;

(2) Discoloration when any light brown, tan, or darker discoloration of the skin materially detracts from the appearance of the berry: Provided, That "sunkissed" berries of the white Malaga variety which show discoloration of amber or light brown color shall not be considered as damaged. "Buckskin" berries of the Tokay variety, and similar injury to other varieties, shall be considered as damaged by discoloration;

(3) Heat when the flesh of the berry is affected;

(4) Almeria Spot when any spot is distinctly sunken or dark in color;

(5) Mildew when active powdery mildew is present;

(6) Freezing when the berry is frozen or when the flesh of the berry is affected by freezing;

(7) Insect injury when penetrating the skin of the berry or when there is noticeable insect infestation on the bunch; when mealybug residue or aphid honeydew are present in noticeable amounts; or when leafhopper residue materially detracts from the appearance of the individual berry or of the bunch.

(b) The following shall be considered as damage to stems:

(1) Active powdery mildew or any other disease when present on the stems to the extent that it detracts from the appearance of the bunch or when scars caused by mildew or other disease constrict or weaken any part of the main or lateral stems; and,

(2) Freezing when the stems are frozen or the capstems are swollen or dried, or when the main or lateral stems are water-soaked and limp, or dried, as a result of freezing.

§51.902 Fairly well filled.

"Fairly well filled" means that the berries are reasonably closely spaced on main and lateral stems and that the bunch is not very loose or stringy.

§51.903 Excessively tight.

"Excessively tight" means that the berries are so wedged together that the bunch is extremely compact for the variety and resulting distorted berries materially detract from the appearance of the bunch.

§51.904 Shot berries.

"Shot berries" means very small berries resulting from insufficient pollination, usually seedless in those varieties which normally develop seeds.

§51.905 Dried berries.

"Dried berries" means berries which are dry and shriveled to the extent that practically no moisture is present.

§51.906 Well developed and strong.

"Well developed and strong" means that the main and lateral stems are firm, fibrous, and pliable; not distinctly immature or spindly or threadlike at time of packing.

§51.907 Diameter.

"Diameter" means the greatest dimension of the berry taken at right angles to a line running from the stem to the blossom end.

§51.908 Serious damage.

"Serious damage" means any defect or any combination of defects which seriously detracts from

the appearance, or the edible or marketing quality of the grapes and includes berries which are split, crushed, wet, affected by decay or waterberry, or affected by heat or freezing. Grapes which show healed cracks at the blossom and shall not be considered as seriously damaged.

§51.909 Materially shriveled at capstem.

"Materially shriveled at capstem" means that the skin of the berry is definitely wrinkled adjacent to the capstem and the surface is materially sunken.

§51.910 Straggly.

"Straggly" means that the berries are so widely spaced on main and lateral stems that the bunch is distinctly open or very stemmy or stringy in structure.

§51.911 Container.

"Container" as used in these standards shall, for the purposes of determining maturity and other factors of grade of grapes in packages containing 5 pounds or less, mean the master container in which the individual packages are packed for shipment.

§51.912 Export.

When designated as Export, grapes shall be packed with any of the customary protective materials such as cushions, liners, or wraps, or properly packed in sawdust or granulated cork. The so-called "semi-sawdust packs" which are cushioned and/or covered with sawdust are not approved as protective packaging for export.

§51.913 Clusters.

"Clusters" as used in these standards in reference to the U.S. No. 1 Institutional grade only shall be defined as two or more berries sharing a common point of attachment.

Metric Conversion Table

§51.914 Metric conversion table.

Inches	Millimeters (mm)
3/16 equals	4.8
8/16 equals	12.7
9/16 equals	14.3
10/16 equals	15.9
11/16 equals	17.5
12/16 equals	19.1
13/16 equals	20.6
14/16 equals	22.2
15/16 equals	23.8
1 equals	25.4
Pounds	Grams
1/4 equals	113.4
1/2 equals	226.8
3/4 equals	340.2
1 equals	453.6
2 equals	907.2
3 equals	1,360.8
4 equals	1,814.4

5 equals 2,268.0
 10 equals 4,536.0

Table Grape Maturity Chart

Percent Soluble Solids	Arizona Agricultural Code ¹	California Agricultural Code ²	U.S. Standards for Origins Outside California & Arizona ³
17.5		All white varieties of Muscat and White Malaga grown NW of San Gorgonio Pass	Muscat
17.0		Thompson Seedless grown NW of San Gorgonio Pass	
16.5		All varieties not listed elsewhere in this column	All varieties not listed in this column
16.0	Thompson Seedless Flame Seedless		
15.5		Beauty Seedless grown SE of San Gorgonio Pass. Berenda Red, Cardinal, Imperial Cardinal, Richards Black, and Robin grown NW of San Gorgonio Pass Blackrose, Isabella Regia, Bleu Grau, Khalili, Burger, Perlette, California Concord, Persian 23, Concord, Pierce Isabella, Dattier de Beyrouth, Queen, Delight, Red Malaga, Dizmar, Ribier, Drodela, Servian Blue, Emperor, Superior Seedless, Fresno Beauty	Cardinal, Emperor, Perlette, Ribier, Olivette, Blanche, Rish Baba, Red Malaga, and similar varieties.
15.0	Perlette, Beauty Seedless		
14.5		Cardinal, Robin, Berenda Red, Imperial Cardinal, and Richards Black grown SE of San Gorgonio Pass; and Lady finger, Rish Baba, Khandahar, Olivette Blanche	
14.0	Exotic	Exotic	

¹ Varieties listed, when tested by refractometer, are mature when meeting or exceeding the specified soluble solids. All varieties, regardless of refractometer reading, are mature at 18 to 1 or higher titration ratio.

² All varieties, when tested by temperature compensated hand refractometer, are mature when meeting or exceeding the specified soluble solids percentage. The Thompson Seedless at 15 percent or more soluble solids and Perlette or Superior Seedless at 14 percent or more soluble solids and all other varieties regardless of refractometer reading are mature, provided that the juice contains a minimum of 20 parts soluble solids to every part acid in the juice as determined by titration. Thompson Seedless below 15 percent soluble solids, and Perlette or Superior Seedless below 14 percent soluble solids may not be titrated. They are immature with out further testing. The California Agricultural Code should be consulted for official sampling guidelines and titration procedures.

³ All varieties, when tested by refractometer, are mature when meeting or exceeding the specified soluble solids.

Blank

UNITED STATES STANDARDS FOR GRADES OF
AMERICAN (EASTERN TYPE) BUNCH GRAPES¹

Amended, Effective September 8, 1983 (48 F.R. 40509)

GRADES	
Sec.	
51.3610	U.S. Fancy Table Grapes.
51.3611	U.S. No. 1 Table Grapes.
51.3612	U.S. No. 1 Juice Grapes.
UNCLASSIFIED	
51.3613	Unclassified.
APPLICATION OF TOLERANCES	
51.3614	Application of tolerances.
DEFINITIONS	
51.3615	Mature.
51.3616	Firm.
51.3617	Well colored.
51.3618	Fairly well colored.
51.3619	Shattered.
51.3620	Compact.
51.3621	Fairly compact.
51.3622	Damage.
51.3623	Serious damage.
51.3624	Straggly.

AUTHORITY: The provisions of this subpart issued under secs. 203, 205, 60 Stat. 1067, as amended, 1090 as amended; 7 U.S.C. 1622, 1624.

GRADES	
§ 51.3610	U.S. Fancy Table Grapes.

"U.S. Fancy Table Grapes" consists of bunches of grapes of one variety (except when designated as assorted varieties) which are mature and well colored. The berries are firm, firmly attached to capstems, and are not split, shattered, crushed, dried or wet, and are free from decay, mold, mildew, berry moth, russeting and hail, and from damage caused by freezing, disease, insects, or other means.

(a) *Bunches.* At least 50 percent of the bunches in each container are compact, the remainder fairly compact. They are not excessively small, except that compact portions of bunches consisting of not less than five berries may be used to fill open spaces between whole bunches.

¹ Packing of the product in conformity with the requirements 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.

(b) *Size of berries.* Not less than 90 percent, by count, of the berries, exclusive of dried berries, on each bunch shall have a minimum diameter, unless otherwise specified, of $\frac{1}{16}$ of an inch.

(c) *Tolerances.* In order to allow for variations incident to proper grading and handling, the following tolerances, by weight, are permitted:

(1) 5 percent for bunches in any lot which are straggly;

(2) 10 percent for bunches in any lot which fail to meet the requirement for minimum diameter of berries; and

(3) 10 percent for bunches and berries in any lot which fail to meet the remaining requirements of this grade, including therein not more than one-half of this amount, or 5 percent, for berries which are seriously damaged: *Provided*, That included in this latter amount not more than 1 percent may be permitted for berries affected by mold or decay, and not more than 2 percent for dried berries or those affected by berry moth.

§ 51.3611	U.S. No. 1 Table Grapes.
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"U.S. No. 1 Table Grapes" consists of bunches of grapes of one variety (except when designated as assorted varieties) which are mature and fairly well colored. The berries are firm, firmly attached to capstems, and are not split, shattered, crushed, dried or wet, and are free from decay, mold and berry moth, and from damage caused by freezing, russeting, hail, mildew, other disease, insects, or other means.

(a) *Bunches.* At least 85 percent of the bunches in each container are fairly compact; except that for packages which contain 5 pounds or less, at least 50 percent of the bunches in any container are fairly compact, provided that the average for the lot is not less than 85 percent. Bunches shall not be

excessively small, except that portions of bunches consisting of not less than three berries may be used to fill open spaces between whole bunches.

(b) *Size of berries.* Not less than 90 percent, by count, of the berries, exclusive of dried berries, on each bunch shall have a minimum diameter, unless otherwise specified, of $\frac{1}{16}$ of an inch.

(c) *Tolerances.* In order to allow for variations incident to proper grading and handling, the following tolerances, by weight are permitted:

(1) 10 percent for bunches in any lot which fail to meet the requirement for minimum diameter of berries; and

(2) 10 percent for bunches and berries in any lot which fail to meet the remaining requirements of this grade, including therein not more than one-half of this amount, or 5 percent, for berries which are seriously damaged: *Provided*, That included in this latter amount not more than 2 percent may be permitted for berries affected by mold or decay and not more than 2 percent for dried berries or those affected by berry moth.

§ 51.3612 U.S. No. 1 Juice Grapes.

"U.S. No. 1 Juice Grapes" consists of bunches of grapes of one variety (except when designated as assorted varieties) which are mature and fairly well colored. The berries are firm, firmly attached to capstems, and are not split, shattered, crushed, dried or wet, and are free from mold, decay and berry moth, and from serious damage caused by freezing, russeting, hail, mildew, other disease, insects, or other means.

(a) *Bunches.* At least 80 percent of the bunches in each container are fairly compact.

(b) *Tolerances.* In order to allow for variations incident to proper grading and handling, not more than 15 percent, by weight, of the bunches and berries in any lot may fail to meet the requirements of this grade, including therein not more than 6 percent for berries which are seriously damaged: *Provided*, That included in this latter amount not more than 3 percent may be permitted for berries affected by mold or decay, and not more than 2 percent for dried berries or those affected by berry moth.

§ 51.3613 Unclassified.

"Unclassified" consists of grapes which have not been classified in accordance with any of the foregoing grades. The term "unclassified" is not a grade within the meaning of these standards, but is provided as a designation to show that no grade has been applied to the lot.

§ 51.3614 Application of tolerances.

The contents of individual packages in the lot, based on sample inspection, are subject to the following limitations, provided that the averages for the entire lot are within the tolerances specified for the grade:

(a) Individual packages which contain more than 5 pounds: Shall contain not more than one and one-half times a specified tolerance of 10 percent or more and not more than double a specified tolerance of less than 10 percent.

(b) Individual packages which contain 5 pounds or less: Shall contain not more than three times the specified tolerance.

DEFINITIONS

§ 51.3615 Mature.

"Mature" means that the grapes are juicy, palatable, and have reached that stage of development at which the skin of the berry easily separates from the pulp. Frozen or slightly frosted stock is not to be confused with mature stock.

§ 51.3616 Firm.

"Firm" means that the berry is reasonably turgid and does not yield more than slightly to moderate pressure.

§ 51.3617 Well colored.

"Well colored" means that the berries show full color characteristic of the variety.

§ 51.3618 Fairly well colored.

"Fairly well colored" means that not less than 75 percent, by weight, of the berries show full color characteristic of the variety; 25 percent of the berries may be partially or poorly colored but not characteristic of immature berries.

§ 51.3619 Shattered.

"Shattered" means that the berry is separated from the bunch and may or may not have the capstem attached.

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§ 51.3620 Compact.

"Compact" means that the bunches are well filled and have no open spaces.

§ 51.3621 Fairly compact.

"Fairly compact" means that the bunches are well filled but that the berries are not closely spaced as in "compact" bunches.

§ 51.3622 Damage.

"Damage" means any specific defect described in this section; or an equally objectionable variation of this defect, any other defect, or any combination of defects, which materially detracts from the appearance, or the edible or shipping quality of the individual berry or the bunch as a whole. The following specific defect shall be considered as damage:

(a) Mildew when detracting from the appearance of the individual berry or the bunch as a whole. Berries on the inside of the bunch which show only slight traces of mildew are not considered as damaged.

§ 51.3623 Serious damage.

"Serious damage" means any defect, or any combination of defects, which seriously detracts from the appearance, or the edible or shipping quality of the individual berry or the bunch as a whole.

§ 51.3624 Straggly.

"Straggly" means that the bunches are decidedly open with large open spaces and very few berries. Small immature shot berries, characteristic of the Worden variety, should be disregarded unless they are excessive in number and detract materially from the appearance.

**UNITED STATES STANDARDS FOR GRADES OF
JUICE GRAPES (EUROPEAN OR VINIFERA TYPE)¹**

Source: 32 FR 8875, June 22, 1967, unless
otherwise noted. Redesignated at 42 FR
32514, June 27, 1977 and at 46 FR 63203,
Dec. 31, 1981.

Effective July 20, 1939

Sec.	GRADES
51.4290	U.S. No. 1 Juice Grapes.
51.4291	U.S. No. 1 Mixed Juice Grapes.
51.4292	U.S. No. 2 Juice Grapes.
51.4293	U.S. No. 2 Mixed Juice Grapes.

UNCLASSIFIED

51.4294	Unclassified.
APPLICATION OF TOLERANCES	
51.4295	Application of tolerances.
COLOR REQUIREMENTS	
51.4296	Color requirements.
MATURITY REQUIREMENTS	
51.4297	Maturity requirements.

DEFINITIONS

51.4298	One variety.
51.4299	Waterberry.
51.4300	Weak berries.
51.4301	Redberry.
51.4302	Damage.
51.4303	Raisining berries.
51.4304	Raisined berries.
51.4305	Decay.
51.4306	Serious damage.
51.4307	Wet.

AUTHORITY: The provisions of this subpart issued under secs. 208, 205, 60 Stat. 1087, as amended, 1090 as amended; 7 U.S.C. 1622, 1624.

GRADES

§ 51.4290 U.S. No. 1 Juice Grapes.

"U.S. No. 1 Juice Grapes" consists of bunches of well developed grapes of one variety² which are fairly well colored and mature, which are not weak, loose at capstems, shattered, split, crushed, or wet; which are free from waterberry, redberry, mold, or decay, and from damage caused by freezing, heat, sunburn, mildew or other disease, insects, or other means: *Provided*, That there shall be no color requirement in this grade for white varieties when the grapes test not less than 20 percent soluble solids in juice. Not more than a total of 15 percent, by

² 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.

weight, of the berries in any container may be raisining or raisined but not more than 5 percent may be raisined, except that any amount of raisining may be permitted if the percentage of raisining is specified in connection with the grade.

(a) Bunches shall not be excessively straggly, or damaged by dried berries, or by immature shot berries.

(b) Stems shall not be moldy, or damaged by freezing.

(c) In order to allow for variations incident to proper handling, not more than 10 percent, by weight, of the grapes in any container may be below the requirements of this grade, but not more than a total of 5 percent, by weight, may be seriously damaged, and not more than two-fifths of this amount, or 2 percent, may be affected by decay, but in no case shall more than 15 percent, by weight, of the bunches in any container have spots of decay affecting three or more contiguous berries: *And provided further*, That an additional tolerance of not more than a total of 10 percent, by weight, of the bunches in any container may be damaged by dried berries and/or immature shot berries. No part of this tolerance shall be allowed for berries which are raisining or raisined.

§ 51.4291 U.S. No. 1 Mixed Juice Grapes.

"U.S. No. 1 Mixed Juice Grapes" consists of grapes of mixed varieties of the same color which meet the remaining requirements of U.S. No. 1 Juice Grapes.

§ 51.4292 U.S. No. 2 Juice Grapes.

"U.S. No. 2 Juice Grapes" consists of grapes of one variety² which are mature; which are not detached from the capstems, split, crushed, or wet; which are free from raisined berries, sunburned or dried berries, waterberry, redberry, mold or decay, and from serious damage caused by heat, freezing, or other means.

(a) In order to allow for variations incident to proper handling, not more than 15 percent, by weight, of the grapes in any container may be raisined, and in addition not more than 10 percent, by

weight, of the grapes in any container may be below the remaining requirements of this grade, but not more than a total of 5 percent, by weight, may be affected by decay.

§ 51.4293 U.S. No. 2 Mixed Juice Grapes.

"U.S. No. 2 Mixed Juice Grapes" consists of mixed varieties of the same color which meet the remaining requirements of U.S. No. 2 Juice Grapes.

UNCLASSIFIED

§ 51.4294 Unclassified.

"Unclassified" grapes shall be mature and shall not include in excess of 10 percent, by weight, of the berries in any one container which are affected by decay.

APPLICATION OF TOLERANCES

§ 51.4295 Application of tolerances.

(a) The tolerances for the standards are on a container basis. However, individual packages in any lot may vary from the specified tolerance as stated below: *Provided*, The averages for the entire lot, based on sample inspection, are within the tolerances specified.

(1) For a tolerance of 10 percent or more, individual packages in any lot may contain not more than one and one-half times the tolerance specified.

(2) For a tolerance of less than 10 percent, individual packages in any lot may contain not more than double the tolerance specified.

COLOR REQUIREMENTS

§ 51.4296 Color requirements.

(a) "Fairly well colored" means in the case of:

(1) "Black varieties" that each bunch shall have not less than 85 percent, by count, of berries showing characteristic color, excepting that in order to allow for variations incident to proper grading and handling, not more than 10 percent, by weight, of the bunches in any container may fall to meet this requirement: *Provided*, In the case of the following varieties: Zinfandel, Ribier, Rose of Peru, Black Prince, Black Hamburg, Blue Elba, Grignolino, Aramon, Mission, Zante, and Black Monukka, each bunch shall have not less than 75 percent, by count, of berries showing characteristic

¹Mixed grapes of the Alicante Bouschet, Alicante Gamza, Petit Bouschet, and Grand Noir varieties shall be considered as Alicante Bouschet type, and may be admitted to this grade.

color, excepting that in order to allow for variations incident to proper grading and handling, not more than 10 percent, by weight, of the bunches in any container may fall to meet this requirement. Purple to black shall be considered characteristic color for Malvoise, Grenache, Trouseau, Ribier, Rose of Peru, Black Prince, and Black Hamburg; and reddish purple to black shall be considered characteristic color for Cornichon, Aramon, Mission, Grignolino, Zante, and Black Monukka.

(2) "Red varieties" that each bunch shall have not less than 60 percent, by count, of fairly well colored berries, excepting that in order to allow for variations incident to proper grading and handling, not more than 10 percent, by weight, of the bunches in any container may fall to meet this requirement: *Provided*, That in the case of the Flame Tokay variety each bunch shall have not less than 45 percent, by count, of fairly well colored berries, excepting that in order to allow for variations incident to proper grading and handling, not more than 10 percent, by weight, of the bunches in any container may fall to meet this requirement. Red grape berries shall be considered fairly well colored when at least 60 percent of the surface shows characteristic color. Light pink, red, dark red, or purple are considered characteristic color for red varieties.

(3) "White varieties" that each bunch shall have not less than 50 percent, by count, of berries showing light green, straw, or amber color, excepting that in order to allow for variations incident to proper grading and handling, not more than 10 percent, by weight, of the bunches in any container may fall to meet this requirement.

MATURITY REQUIREMENTS

§ 51.4297 Maturity requirements.

"Mature" means that the average or composite test of a representative sample of all the grapes in each container shall be not less than 17 percent soluble solids in juice, as determined by the Balling or Brix scale hydrometer, except that the varieties Emperor, Gros Colman (Dedre-lah), Blue Grau, Servian Blue, Fresno Beauty), Pierce Isabella (Pierce, Isabella Regia, California Concord), Olivette Blanche, Blancy White (Rich Baba, Humphrey Ladyfinger), Red Malaga (Molinera Gordo), Ribier, Khalili, and

Dixmar (Persian 23), and Burger, shall test not less than 16 percent and except Muscat varieties which shall test not less than 18 percent.

DEFINITIONS

§ 51.4298 One variety.

"One variety" means grapes showing the same varietal characteristics.

§ 51.4299 Waterberry.

"Waterberry" means a disease characterized by a watery, soft, or flabby condition of the berries. Such affected berries are low in sugar content, have tender skins and are very easily crushed.

§ 51.4300 Weak berries.

"Weak berries" are those which approach a waterberry in condition but are not so far advanced or affected.

§ 51.4301 Redberry.

"Redberry" means a condition closely resembling waterberry generally found in black varieties. Such grapes show a red or brownish red color in addition to the general characteristics of waterberry.

§ 51.4302 Damage.

"Damage" means any defect or injury which materially affects the shipping or market quality or seriously affects the appearance. The following shall be considered as damage:

(a) Freezing, when the flesh of the berries is discolored or broken down. Freezing which causes only drying of the capstems shall not be considered as damage in grades for juice grapes, but freezing injury to main or lateral stems is considered damage.

(b) Heat, when the flesh of the berries is discolored or broken down.

(c) Sunburn, when the skin shows dark brown discoloration, or any hardening or depression of the skin.

(d) Mildew, when any active powdery mildew is present on berries or stems; or mildew scars which cause cracking or deformity of the berries, or seriously affect the appearance of the bunch.

(e) Dried berries, when the appearance of the bunch is seriously affected by berries which are completely dried and hard.

(f) Immature shot berries, when the appearance of the bunch is seriously affected.

§ 51.4303 Raisining berries.

"Raisining berries" means grape berries in a stage of normal curing process, which have developed to some extent the characteristic shriveled or wrinkled appearance of a raisin, but which contain sufficient juice to drop from the berry under ordinary pressure between thumb and finger. Change of color and flavor are in some cases, additional characteristics of raisining berries.

(a) While wilting is prerequisite to the raisining process, berries which merely are wilted, or which show the fine wrinkling of the skin characteristic of advanced maturity without distinct shriveling, or change of color or taste, are not considered as raisining.

§ 51.4304 Raisined berries.

"Raisined berries" means grape berries which are fully cured, resembling raisins, which do not contain sufficient juice to drop from the berry under ordinary pressure between thumb and finger.

§ 51.4305 Decay.

"Decay" means any infection of rhizopus, blue mold, gray mold, or black mold, and does not include slight surface development of green mold (*Cladosporium*).

§ 51.4306 Serious damage.

"Serious damage" means any defect or injury which seriously affects the shipping or market quality, including grapes which are split, crushed, wet, or affected with redberry, waterberry, or decay, excepting that raisining grapes which are cracked or split, and grapes which show cracks at the blossom end shall not be considered as seriously damaged. Serious damage by heat or freezing means that the flesh of the berries is discolored or broken down.

§ 51.4307 Wet.

"Wet" means moisture from crushing or rain.