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Processed  
Products  
Branch

# Grading Manual for Fruit Jelly Fruit Preserves

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

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Chief, Processed Products Branch  
Fruit and Vegetable Division, AMS  
U.S. Department of Agriculture  
P.O. Box 96456, Rm. 0709, So. Bldg.  
Washington, D.C. 20090-6456

## INTRODUCTION

Probably no other processed product offers the challenge to grade properly as does jelly and (jam) preserves. There are numerous flavors and types, both standardized and nonstandardized ingredients; and container sizes. Some processors control the manufacture of the product very closely, while others may target for mediocre quality to sell as price-competitive with other "sweet" foods. The quality of fruit and nonfruit ingredients determines to a great extent the quality of the finished jelly or jam. For many fruits, the grade of the finished jam or jelly is higher than the grade of the straight fruit ingredient. This condition complements the grades for "manufacturing" in fruit standards. It is not uncommon for the high-solids in jelly and jams to improve the "color" of the fruit ingredient; conversely, the high-solids may accentuate the "firmness" of unripe fruit and produce fruit particles which are "rubbery."

Jelly is a colloid; thus, physics and chemistry are involved in producing an acceptable product. Hydrogen activity (pH) affects the result of mixing fruit with sugar, adding pectin (usually slow-set and fast-set), cooking, cooling, buffering, and placing the mixture in a container.

Preserves (or jams) are the result of suspending fruit particles in a gel. Many of the conditions that affect the grading of jelly also affect the grading of preserves. Corresponding conditions include, but are not limited to, strength of gel (consistency), presence of fruit "bouquet" (flavor and odor), and crispness of appearance (color).

Human variability enters the grading of jelly and preserves. Among individuals, a distinct like or dislike for specific flavor characteristics is common. These "personal traits" must be suppressed, as nearly as practicable, to correctly evaluate fruit flavor. Flavors that may be particularly disliked include guava, corn cob, cactus, elderberry, mint, and other "astringent" varieties; however, it is necessary to taste these products.

Processed Products Branch personnel usually encounter the grading of jelly and preserves in one of the following situations: (1) lot grading; (2) in-plant, on-line grading; and (3) in-plant designated lot grading. Each of these situations requires some variation in grading technique. Special situations in grading are cited in this manual as they affect the quality factor under consideration.

This manual is intended to give helpful hints in grading jelly and jam. It is not a technical manual. Several technical manuals are available from the preserving industry for reference. Also, the language in this manual is spoken "as is". It is used to express "trade language" and "cook-room talk".

## JELLY

### Product description.

The Food and Drug Administration(FDA) has established standards of identity for fruit jelly. In short, these standards outline the fruits (standardized) that may be used in jelly; the soluble solids of each individual fruit; the soluble solids requirement of the finished product (fruit plus sugar); the permissible optional ingredients that may be used; and labeling statements.

The U.S. grade standards cover the product in the FDA standards (standardized jelly) plus a number of nonstandardized jellies. Also, the U.S. standards cover nonfruit jelly. Nonfruit jelly is usually a specialty product sold through mail order and other similar outlets, and is seldom submitted for official grading. "Low-sugar" spreads are available in the market place and may or may not meet the U.S. standards, depending upon the soluble solids of the finished product.

### Artificially sweetened fruit jelly is standardized by the FDA.

Our Branch is involed in grading noncarbohydrate sweetened jellies, usually only in the processing plants that are under contract. Lot inspection occurs infrequently. The lack of sugar (presence of cellulose gum) produces a characteristic "muddy" appearance in artificially sweetened fruit jelly. The flavor may be difficult to distinguish.

The flavor of noncarbohydrate sweetened jelly may have a "bitter," "bland" or "salty" trait. A refractometric reading of the soluble solids content of noncarbohydrate sweetened jellies represents the fruit solids of the in-going fruit plus optional ingredients that may or may not distort, slightly, the reflection of light through the prism. It may help to squeeze artificially sweetened jelly through a tissue paper to obtain a clear fluid to place on the prism of the refractometer. The term "grading" is used rather loosely in the context of grading artificially sweetened fruit jelly, and may represent special procedures used at each processing plant to report product quality to plant personnel.

### Essence

Manufacturers of high-quality jellies usually add essence (volatile flavoring materials) to their product. Essence enhances the flavor and odor. It adds a "bouquet." Essence is usually concentrated and designated as "2X," "4X," etc. The FDA has addressed the use of essence in fruit jelly. Basically, FDA permits essence to be added back from the concentration of the jelly mixture plus essence from any optional ingredient used. Any surveillance of the use of essence is impossible with lot grading of jelly; difficult with in-plant, on-line grading; and practical only by "Certificate of Conformance" under in-plant, designated lot grading.

Fruit jelly which contains added essence is expected to grade higher for the factor of "flavor." However, the use of essence which imparts a "perfume" or "medicinal" flavor trait would cause the grade to be lower. Essence is usually added at the cooling pan. Verification of the quality of the essence may be made at that point before the jelly is "dropped."

#### Nutritive carbohydrate sweeteners.

The choice of sweeteners in jelly formulation is influenced strongly by price. The "Trade" uses sweeteners derived from corn as the basic sweetener in jelly. Sucrose sweeteners may be added only as they are needed to control consistency, flavor and color. One hundred percent corn derived sweeteners may or may not impart undesirable qualities to jelly.. Other factors such as pH, ratio of slow-set to fast-set pectin, overshooting or undershooting the soluble solids target, will offset a "perfect" jelly sugar formulation.

When grading imported jelly, it is helpful to observe the ingredients statement as a clue for possible variations in normal quality attributes. Sweeteners that are not normally used in the United States, such as glucose sirup or honey, may impart a "too sweet" or "alien" flavor to jelly.

#### Soluble solids and unusual conditions.

Ordinarily upon opening any container of jelly, the first act of grading is to observe for any unusual conditions, and make a refractometric reading. If a water-cooled prism is being used, any condensate from too-humid atmospheric conditions in the grading lab would cause a possible error. This error may be reduced by drying the prism immediately before placing the jelly on the refractometer. Under in-plant conditions, cool the jelly in the unopened container prior to making the soluble solids reading. Unusual conditions to be alert to include: mold or yeast growth in the headspace, and the presence of foreign material. Under in-plant grading, it may be helpful to go to the stacks periodically and random sample jelly that has been processed for several months. In many plants, shipments may be made too close to the processing time to enable random sampling from the stacks. In this event, set aside samples periodically for examination at a later date (1 to 15 days). Specific fruits are more troublesome with adequacy of pasteurization than others. Grape jelly may be troublesome with yeast growth in the headspace, especially if the filled containers are not pasteurized.

### Consistency

The factor of consistency is the climax of formulating and processing the jelly. It is affected by many variables, to include: ratio of sucrose sweeteners to corn derived sweeteners; ratio of slow-set to rapid-set pectin; temperature at filling; pH; soluble solids variation away from the target of 65 percent; and vibration during transportation. Specific fruits cause problems more often in reaching a desirable consistency. One of the causes is the unknown quantity of natural pectin in the fruit. Some processors, through enzymatic action, depectinize the fruit ingredient and base consistency on the quantity of pectin added to the formulation. An alcohol test may be run on the fruit ingredient to verify the adequacy of depectinization. A suggested procedure for evaluating the factor of consistency is as follows:

#### Lot grading.

Since the jelly is already cooled, the maximum "set" is present in the gel. Give no allowance for "firmness" or "weakness" of gel. You should:

- 1) Hold all glass containers to a light prior to opening and observe for globules of undissolved pectin, excessive air bubbles or other similar conditions;
- 2) Remove the cover from the container and observe the top of the jelly for indications of "weeping";
- 3) Use a spatula and carefully break the pressure of the jelly against the side of the container by running the spatula around the inside of the container;
- 4) Decant the entire contents of the container onto a grading tray; and
- 5) Evaluate the consistency.

#### In-plant, on-line grading.

Since the jelly has not set, give allowance until verification of the gel is established. You should:

- 1) Hold all glass containers to light and observe for globules of undissolved pectin, excessive air bubbles or other similar conditions;

- 2) Remove the cover from the container and decant a thin layer of jelly onto a grading tray;
- 3) Use the jelly on the tray to determine soluble solids, color, flavor; and estimate consistency based upon how quickly a film begins to form on the layer of jelly;
- 4) In the order of production, retain the partially filled containers of jelly in a single row on the grading table until the gel is verified (you may wish to use the procedure in step 3, 4 and 5 cited under "lot grading" previously). If more than one production shift is coninon - at the same processing plant, the second shift grader can verify the gel for the last portion of the previous production shift. If only a single production shift is involved at the plant, retain the jelly from the last portion of production until the following day to verify gel strength;
- 5) As the gel strength is verified, in the order of production, record the score on the grading record. The score for consistency is the last quality factor to be recorded on the score sheet; and
- 6) Depending upon plant history, periodically, random sample old jelly from the stack. Verify the gel strength and compare to the original grading record. If the jelly is shipped too soon after processing to offer access for sampling, set aside samples for examination, later. You may wish to store the samples under warehouse conditions similar to the jelly normally produced. Score the factor of "consistency" as:

Grade A.

When the mound of jelly on the grading tray:

- 1) "Mushrooms" against the surface of the grading tray;
- 2) Does not break apart;
- 3) Shows no loss of liquid around the perimeter of the mound (weeping); and

- 4) Has a very delicate (fragile) "bounce" when pressure from a spatula is applied to the top of the mound. As the final check for a questionable "slightly firm" gel strength, try to spread the jelly on a fresh slice of bread. If the jelly cannot be spread easily, the gel strength is too firm to receive a grade A score.

#### Grade B.

When the mound of jelly on the grading tray:

- 1) Retains a rigid shape nearly the size of the container
- 2) Breaks apart but is not "free-flowing"; and
- 3) Has a stiff "bounce" when pressure is applied to the top of the mound, but is not rubbery.

As the final check for a questionable "rubbery" gel strength, try to spread the jelly on a fresh slice of bread. If the jelly cannot be spread without rolling into individual particles, or tends to "ball-up," the gel strength is too tough and rubbery to receive a grade B score.

#### Undissolved pectin.

If globules of undissolved pectin are noticeable in jelly, give the factor of "consistency" a lower score. Consider the size and number of pectin globules. Also, the background color (apple jelly as opposed to blackberry jelly) would influence the overall effect of the undissolved pectin. When undissolved pectin is easily noticeable don't give jelly a grade A score.

#### Excessive air bubbles.

Observe the overall effect of excessive air bubbles in jelly prior to releasing the vacuum in the container. Excessive air bubbles are very difficult to evaluate. If you encounter this condition, request assistance prior to rejecting any lot.

#### Institutional size containers.

Extra pectin is usually added to jelly packed in large containers (e.g., Number 10 cans) to compensate for the larger mass of gel. Firmer gel may be typical of large containers of jelly, but don't relax the score for this condition. Specific fruits, such as crabapple, are more troublesome than others.

### Color.

After you have evaluated the factor of consistency, score the factor of 11 color. " The score for color of fruit jelly is usually directly related to the quality of the in-going fruit ingredient. A wide range in color of fruit jelly is characteristic because of varietal differences among fruits (Yellow Delicious as opposed to Rome), regional growing conditions that affect fruit color and different methods of processing jelly. Consider the following points for these jellies.

#### Apple.

Almost without exception, apple jelly is made from concentrated apple juice (frozen concentrated apple juice). The concentrate usually runs about 65@ Brix. Apple concentrate is traded on the World market and the source of the supply could affect the quality. Usually, the lighter color juice is considered of higher quality and this is established in the U.S. Standards for Frozen Concentrated Apple Juice (FCAJ). Apple processors disagree with the statement that lighter is better, but until the FCAJ standards are revised, score apple jelly by the same criterion, "lighter is better." Apple juice is clarified by enzymatic action. If this process is not complete, it could cause jelly manufactured from cloudy juice to contain a "haze" or "flocculent material." Also, if apple jelly is processed following other jellies that are "less transparent," the flocculent material may be a carry-over from the previous batch. Score down jelly that contains a haze or flocculent material.

#### Apple base jellies.

These jellies are common as they are "cost competitive" with other "sweet" foods and retain some of the traits of the "nonapple" ingredient. The more popular apple base jellies, not counting the artificially colored type, are: apple-blackberry, apple-cherry, apple-grape, apple-raspberry, and apple-strawberry. These jellies have the typical color of the "nonapple fruit" but are weaker in color due to the dilution by the apple base. High quality jelly color has a bright sparkle.

Artificially colored jellies.

Apple is usually the base for artificially colored jelly. it should have all of the traits of apple jelly plus contribute the characteristic coloring. Be alert for undissolved specks of coloring. You may hold the jelly to a light source prior to opening the container and observe for this condition. If any specks are noticeable, don't give the jelly a grade A score. Mint and cinnamon are two of the more popular jellies that have color added. The coloring should not contribute an overly "deep" coloration to the jelly. When jelly is packed in large containers, you need to remove an amount equal to a 10 or 12 ounce jar to make this comparison. Otherwise, the sheer mass of the jelly in a large container would give a false impression of the true "deepness" of color. If poor quality apple juice (dull, cloudy, etc.) is used as the base for jelly, don't give it a high score, regardless of the color contributed by the artificial source. Usually, jelly of this quality is apparent even with the presence of artificial coloring.

Blackberry,

Consider high quality blackberry jelly to be a deep blackish-red color. Reddish-black color is an indicator of dewberries or varietal types other than blackberries. The color should be deep for a high score. Don't overlook brightness and crispness of luster. Blackberry jelly is enjoyed for its delightful flavor, and the color should complement the flavor.

Cherry.

Cherry jelly is usually made from red tart cherry juice. it should have a clear, crisp, red color to receive a grade A score. Be alert for an opaque-like color. Score this condition as grade B, or lower.

Crabapple.

High quality crabapple jelly has a pinkish-red color. It should be clear, like apple jelly. Be alert for a slightly dull color, easily masked by the red color. Brownness of color is not grade A.

Elderberry.

High quality elderberry jelly is a purplish-black color. The color is almost so black that you should base the color score on luster (sheen), alone.

### Grape.

High quality grape jelly is a deep, reddish-purple color. Concord jelly is considered the top-of-the-line. Lower quality grape jelly may have prune juice or vinefera grape juice added. These grape jellies are usually more red and less purple color. Concord grapes are sensitive to unusual growing conditions and are typically less purple during a cool, short growing season. This condition is reflected in the color of the jelly made from grape juice. Grape jelly is subject to formation of tartrate crystals. Examine the bottom of the container for the white crystals that are representative of this condition. Under in-plant grading, set samples aside for examination at a later date because tartrates may form after packing.

### Mixed fruit.

The color of mixed fruit jelly varies with the ratio of fruit ingredients, but should be a pleasing color. The color of the various fruit ingredients should complement each other. You may have to judge the color based on luster and clearness only. Yet, the color should not be opaque or dull. Usually, the typical color of mixed fruit jelly is a deep, cherry color. If the predominance of a single fruit ingredient produces a "muddy" color, lower the score.

### Strawberry.

The color of high quality strawberry jelly should be a "rosy-red" appearance. Strawberry jelly is one of the most light-sensitive jellies. If it has been stored for any length of time, be alert for a dull, loss of luster, and generally unappealing appearance. Under in-plant grading, you may wish to set aside samples or pull samples from the warehouse stacks that have been packed for some time. Verify the retention of the typical strawberry jelly color. Don't expose set aside samples to light.

### Flavor.

Except under in-plant grading, score flavor last. You should be able to detect the flavor of the fruit, upon tasting, without any hesitation, for a grade A score. If the jelly is "sweet," but has no detectable fruit flavor, score it as grade B or lower. Personal dislike for specific fruit flavors should be suppressed, as nearly as practicable, when you evaluate the flavor. It is possible to have some degree of reliability in scoring flavor without tasting the jelly. Under in-plant conditions, or when a large number of samples are being graded under lot inspection, you may "sniff" the fruit bouquet. Even under these situations, select representative samples, or "suspect" samples, to taste for caramelization and other similar conditions. "Sniffing" will help prevent fatigue or

saturation of your taste buds. It is a temptation to eat jelly when you grade it. Don't do it. Eating will further saturate your ability to detect slight or questionable flavor qualities. The use of essence will improve the flavor of jelly and should be given a higher score. Essence adds a fruit "bouquet" to the jelly. Consider the following points for these jellies:

#### Apple.

The flavor of high quality jelly has a "delicate" apple bouquet." Don't second guess the kind of jelly that you're tasting if you're giving a grade A score. Be alert for apple jelly made from poor quality apple concentrate, such as "musty," "astringent" or "looverripe."

#### Apple base jellies.

It may be difficult to distinguish any single fruit ingredient "liaroma" or "bouquet." However, the fruit flavor should be detectable, and not just "sweet." Specific fruits will be much stronger in flavor and easier to detect than others. Blackberry and raspberry will predominate over the apple flavor. Grape should be easy to pick up over the apple flavor. Be alert for poor quality apple concentrate that might contribute a "musty" flavor.

#### Artificially flavored jellies.

Apple is usually the base for artificially flavored jelly. Mint and cinnamon are the predominant flavors. Correct use of the artificial flavoring should yield a jelly which is strongly flavored but not "bitter" or "astringent." If poor quality apple concentrate is used for the base, it is possible that the artificial flavoring would conceal the objectionable attributes of the concentrate. In this case, the color may also be poor, and the color score could be used to control the grade.

#### Blackberry.

High quality blackberry jelly has a flavor unlike any other fruit jelly. It is obviously blackberry. It is one of the most pleasing flavors of any fruit jelly. Absolutely no "bitterness" should be tolerated in grade A flavor.

#### Cherry.

Cherry jelly is usually "tart" (sour) but has a "perfume-like flavor that is pleasing. If the jelly is just "tart" (sour), without the fruit bouquet, score it grade B or lower. Cherries are a stone fruit susceptible to "rot." Be alert for cherry jelly made from juice that is pressed from moldy fruit.

Currant.

Black.

Black currant growing is prohibited by State law in many areas; thus, the juice usually comes from foreign sources. Likewise, black currant jelly is usually an import item. The flavor of black currant may be too strong to receive a grade A score. The standards permit an adjustment in the percentage of fruit solids ratio because of this characteristic.

Red.

The flavor of red currant jelly is somewhat like that of cranberry. It has a typical "bitter" quality.

Elderberry.

Elderberry is too astringent to use full-strength in jelly. Therefore, it is "cut-back" with other fruit solids or with additional sugar solids. Many people don't like the flavor of elderberry jelly.

Grape.

High quality concord grape jelly has a distinct, "foxy" flavor. The jelly from concord grape has an "aroma" or "bouquet" that is typical of the fox grape. Nonconcord grape jelly (nonlabrusca grapes) has a flavor that is milder. Be alert for grape jelly that is just "sweet." Also, the mixing of other grape juices or other fruit juices with concord grape juice to cut costs, may affect the flavor. While you are testing grape jelly, be alert

## PRESERVES

### Product description.

The Food and Drug Administration (FDA) has established standards of identity for fruit preserves (jams). These standards list two fruit groups; the finished soluble solids requirement for each fruit group; the ratio of fruit to sugar; the permissible optional ingredients that may be used; and labeling statements.

The U.S. standards for fruit preserves cover the product listed in the FDA standards. You will usually encounter one of two different broad categories of products when grading preserves (jams) -- a product made from essentially whole fruit particles, called preserves; and a product made from seeded fruit or pulped fruit, called jam or seedless preserves. The FDA standards permit preserves to be made from concentrated fruit. "Concentrated fruit" is usually the fruit ingredient in "seedless preserves." Preserves and jams contain the fruit pulp. They are unlike fruit jelly which is made from pressed, filtered fruit juices; thus, the standards for preserves contain a quality factor for "defects." Due to the "unfiltered" nature of fruit preserves, there is a greater incidence of foreign material in preserves.

### Essence.

Essence may be used in fruit preserves and the discussion of essence in the jelly section of this manual is applicable to preserves.

### Nutritive carbohydrate sweeteners.

The discussion of sweeteners in the jelly section of this manual is applicable to preserves.

### Soluble solids.

The discussion of soluble solids in the jelly section of this manual is applicable to preserves. The process of bringing the solids of preserves up to 65" Brix is considered adequate equalization of solids. The only case where some variability in solids reading might occur in preserves packed in the same container is in the case of "floating" fruit. However, it is considered that any difference in the solids between floating fruit and the gel is negligible.

### Consistency.

The factor of "consistency" in fruit preserves is everything discussed in the jelly section of this manual, plus the dispersion of fruit particles in the gel. If the fruit particles are mostly grouped at the top or bottom of the container, the factor of consistency is "substandard". You may use the general discussion of consistency in

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## JELLY

Flavor (continuation).

Grape (continuation).

for tartrates that may be detected by a gritty texture. Ordinarily, preservers are careful to observe the juice in the bottom of barrels for tartrates as the jelly is being mixed in the cook-room. If these tartrates are present, and are not removed, they will be carried into the jelly or will reform after the jelly is stored. The jelly standards do not have a factor for "defects". Therefore, handle tartrate crystals as an objectionable condition.

Mixed fruit.

It should have a "fruit" flavor and aroma, and not be just "sweet". If grape juice is used in the formula, the flavor of the jelly may be expected to have a predominance of grape "bouquet." Cherry juice in the formula will contribute a "tart" trait to the overall flavor.

Raspberry.

Black.

There should be no doubt about the flavor source of the jelly as you open the container of black raspberry jelly. The "aroma" should jump out. Otherwise, the flavor is considered as lower quality.

Red.

Many people do not like the flavor of red raspberry jelly. High quality red raspberry jelly has a characteristic taste and "aroma" and is easily distinguishable as red raspberry without hesitation. The typical, "strong" fruit flavor is different from any other fruit.

Strawberry.

The flavor of high quality strawberry jelly should have a slight "perfume" trait. This will usually be provided by the addition of essence, as freezing tends to destroy the very delicate "bouquet" that is typical of strawberries. There is a wide range in flavor among different varieties of strawberries, usually high-acid or low-acid. These characteristics will carry-over to the jelly. Thus, some strawberry jelly may not be tart while other strawberry jelly has a "bite." Strawberries are highly susceptible to decay; thus, be alert for a "musty" taste that could come from moldy berries.

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Consistency (continuation).

Blackberry.

Whole berry.

Be alert for "Pre-jel," excessive flow and floating fruit.

Seedless.

Be alert for "Pre-jel," grainy texture, rubbery consistency to the overall gel and excessive flow.

Ch

Cherry is the most troublesome preserve for floating fruit. Observe for this condition by examination of the dispersion of fruit particles prior to opening the container.

Grape.

Grape jam may "pre-jel," show excessive flow, become grainy or rubbery.

Peach.

Be alert for floating fruit particles and rubbery consistency. Peach preserves processed from firm-ripe fruit are especially susceptible to excessively rubbery individual fruit particles. Score down for this condition.

Pineapple.

Core material in crushed pineapple may become very objectionable in pineapple preserves. If the core material is hard, objectionable and constitutes any volume of the preserves, score down for the factor of consistency.

Ra

Essentially the same conditions occur in black raspberries and red raspberry preserves as described previously for blackberry preserves.

## PRESERVES

### Consistency (continuation).

the jelly section of this manual as a guide for grading consistency under in-plant or lot situations. Some processors use "flow sheets" to measure the consistency of their preserves. They have established time/distance criteria for the flow of specific preserves. Even though these criteria have not been included in the standards, they are generally reliable as basis for establishing quality levels for preserves. The standards have relaxed the requirements for specific fruits with respect to fruit particle size and consistency requirements; and for small, individual serving containers used by the "fast-food" business. Pureed fruit may be used in the small containers. Also, ripe fruit which tends to cook apart may be used in preserves.

### Pre-jel.

"Pre-jel" in fruit jam or fruit jelly is an abnormal "set" or gel" of portions of the product ahead of the normal "set" or gel ".It is a gel of the product that has happened before it should.It is first noted at the cooling pan and during the fillingoperation. Pre-jel is generally noted upon spreading of the product and upon eating the product. Occasionally, pre-jel is objectionable as a "hard, rubbery or crystalline" condition.

The causes or pre-jel include:

- 1)Improper processing -- inaccurate time/temperature;
- 2)Too much acid with too much pectin, or just too much acid;
- 3)Improper order of addition of ingredients;
- 4)Drying out of the surface preserves in unsealed containers; and
- 5)When "standard phosphoric acid solution" is used, instant gel will occur -- care must be exercised in its use.

"Pre-jel" can occur in any high acid fruit, but generally problems occur in blackberries, grape, strawberries, and orange marmalade.

Consider the condition listed for the following preserves:

### Apricot.

Be alert for floating fruitparticles and rubbery consistency. If apricot preserves are made from firm-ripe fruit, there is tendency for individual fruit particles to become rubbery. Even though the gel strength is high quality, rubbery fruit particles are considered undesirable.

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### Color (continuation).

This is an asset in grading preserves. Under lot grading, the quality of the fruit is unknown or assumed. As a general guide for evaluating the "color" of fruit preserves, you should expect the finished preserves to resemble the appearance of high quality fruit, if the preserves are to receive a high score. Consider these points:

#### Apricot.

In high quality apricot preserves, you should expect some greenish-yellow fruit particles. These are permitted by the standards for frozen apricots. However, the greenish-yellow units should not be dull .

#### Blackberry

Be alert for an excessive number of red berries or undercolored berries. If these units are present, they may also tend to become rubbery under high sugar concentration and are considered under li c o n s i s t e n c y , t o o . Also, the berries should look like blackberries and not some other similar berries, such as boysenberries or dewberries.

#### Blueberry.

There should not be an excessive number of "red" berries in high quality blueberry preserves. Blueberry preserves manufactured in the U.S. by the large companies are usually made from cultivated blueberries. Imported blueberry preserves or "mail order" blueberry preserves could have been maufactured from the liwild" type blueberry. The source of the blueberry, wild or cultivated, would account for considerable color variability.

#### Cherry

High quality cherry preserves are bright in appearance, like the appearance of high quality RTP cherries or sweet cherries. Be alert for the presence of "scald" in the fruit ingredient. Also, be alert for "bruise" which is contributed by mechanical harvesting equipment.

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\_ Consistency (continuation).

Strawberry,

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Be alert for "pre-jel excessive flow, failure to set, floating fruit and excessively rubbery berries. Rubbery berries could go hand-in-hand with undercolored and "cat-faced" fruit. If the berries are too firm, score down for the factor of consistency.

Failure to set.

If preserves fail to set, they're substandard. Under in-plant grading, these lots are usually set aside and placed on "hold." Lots placed on "hold" because of consistency may never set, or they may set as much as 30 to 60 days after processing. When resampling lots placed on "hold," draw the samples from the stack and not from set aside samples. Resample each time you reevaluate the lot.

Excessive air bubbles.

Excessive air bubbles are objectionable in fruit preserves. See the discussion of excessive air bubbles in the jelly section of this manual.

Institutional size containers.

Fruit preserves packed in large, institutional size containers may have "stiffer" consistency because of additional pectin added to the formulation. The standards do not relax the requirements for consistency to allow for this condition. See the discussion of institutional size containers in the jelly section of this manual.

Color.

The color of fruit preserves will range over a wide number of hues because of varietal differences in each individual fruit, regional growing conditions and methods of processing. It is common to expect the quality grade of fruit preserves to be better than the quality grade of the ingoing fruit. This is because sugar is a "color enhancer." The primary source of the fruit ingredient for preserves is frozen fruit. Some preserves, such as tomato, are derived from canned fruit. Under in-plant conditions, with USDA certification of the fruit ingredient, it is possible to know the quality grade of the fruit.

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Color (continuation).

### Strawberry.

Strawberry preserves are probably one of the most popular preserves on the market. Therefore, they're encountered more frequently in grading. Frozen strawberries from Mexico comprise

the basic fruit ingredient. Usually, frozen strawberries that are grade B for color will yield grade A preserves. Frozen strawberries from Mexico are typically "dull". Whether this condition is caused by slow freezing is unimportant, the point to consider is that during sugaring the brightness must be restored to receive a high score. Green and white-tipped frozen strawberries are typical of lower quality strawberries from Mexico. If these berries are used in preserves you should expect the units to become "dull" -- lower the score. Strawberries vary in intensity of color because of varietal differences. If varieties of strawberries are mixed in the same preserves they should yield a pleasing appearance. However, the color range should not be so wide as to yield a range from "materially darkened" to "pinkish-red."

### Tomato.

Canned tomatoes that are grade A or grade B should yield a grade A preserve. This is because of the increase in redness contributed by sugaring, and the absence of green and yellow tomatoes in grade A and B. If canned tomatoes have too many green shoulders or too many yellow areas, the grade of the preserves will be other than grade A. The seed of specific varieties of tomatoes differ in color. Since the seed in tomato preserves are highly visible, they should be pleasing in appearance. If the seeds are discolored or affected by any abnormal condition, lower the score. The core of "coreless" varieties of tomatoes will also be visible. The "button" should blend with the overall appearance of the tomato tissue and seed. If the "button" is discolored, score down for the factor of color.

### Defects.

Since the fruit ingredient in preserves is not filtered, the standards provide a factor for defects. The factor of defects gives a handy "linchpin" for abnormal occurrences by providing Table 1, but it does not answer all of the abnormal conditions that may be found in preserves. Some of these conditions or defects that occur but are not described in the standards, specifically, are mud balls in strawberry preserves, core material in pineapple preserves or "huckleberry" seed in

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## PRESERVES

### Color (continuation).

#### Grape.

High quality grape jam is almost black in appearance. This basic background will vary, depending upon the growing season of the grape. Cool, rainy summers may produce grapes which are not blue-black in color, but more reddish-blue. It is generally agreed that this condition should receive a lower score, at the bottom of grade A.

#### Peach.

The source of the peach fruit, clingstone or freestone, will cause the color of preserves to vary accordingly. Freestone peaches, affected by abnormal "pit burn," may cause the finished preserves to have an excessive amount of discolored "rag." Score down for this condition, and it could cause the preserves to grade no higher than grade B. It is typical for frozen peaches to have some greenish-red-yellow color. However, these units should not become discolored during sugaring. When you observe peach preserves in the container, look also for the presence of "fruit flies." The "blush" of red color in freestone peaches, will cause some units in the finished preserves to appear "darker." This is typical.

#### Raspberry,

#### Seedless.

The appearance of seedless black raspberry and red raspberry preserves will differ from that of the regular, whole fruit preserves. Seedless preserves are usually manufactured from concentrated fruit; thus, the overall appearance of seedless preserves are "darker." With seedless preserves, the color of the entire container will be uniform - uniformly good or uniformly bad. Luster and sparkle are the keys to evaluating the appearance of these preserves.

#### Whole berry.

High quality raspberries (both black and red) are usually uniformly colored. You should expect the same characteristics of high quality raspberry preserves. Even though deformed berries are considered under the factor of "defects," these units could become discolored upon sugaring and cause the color score to be decreased, too.

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## PRESERVES

### Defects (continuation).

#### Pineapple.

Table I does not mention core material and dark eyes. These defects are considered under the "umbrella" clause in the Table -linot specifically mentioned."

#### Plum.

"Gummosis" could cause an objectionable condition, especially if the gum has surfaced.

#### Strawberry.

Mud balls may be a problem. Many processors use a "salmon ladder" to catch the flow of preserves as they leave the cooling pan. The steps in the ladder will catch many of the "earthy materials."

#### Tomato.

A condition which causes sprouted seed in tomatoes could be a problem in tomato preserves. The sprouted seeds resemble "worms." Since the seeds in tomato preserves are highly visible, sprouted seeds are objectionable because of their possible misidentification by consumers.

#### Light box.

Some processors use a light box or "lighted runway" over which the preserves flow on the way to the filler. Hand-picking at this point, reduces the expected frequency of occurrence of defects in preserves. Preserves could be expected to be almost defect-free.

#### Flavor.

You may use the discussion of "flavor" in the jelly section of this manual as a guide for the flavor in preserves. The quality of the ingoing fruit, the method of processing and the care and handling of the preserves during packing will determine to a great extent the flavor score of the finished preserve. Just as in grading jelly, you should not eat the preserves during grading. Eating will saturate your tolerance for sweet food and before the end of an 8-hour shift or the completion of grading several samples, the very best preserves will become tasteless. One good procedure is to set aside samples for evaluation several months after packing. This procedure will enable you to compare what you're doing now to what you did before to help overcome "drift" in evaluation of flavor or any of the other quality factors.

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## PRESERVES

### Defects (continuation).

blueberry preserves. Also, when a mixture of fruits are used, such as pineapple and strawberry preserves, occurrences of defects in combination are not answered. Use of the proviso in the standards, "not specifically mentioned," is totally subjective, and varies in interpretation among graders. Other situations may cause problems. One of these is that allowances in Table I are geared to specific allowances in individual fruit standards. It is possible for a "rock bottom" grade fruit ingredient to fail the grade allowance in Table I that is comparable to the fruit standard. In addition to the specific defects cited in Table I, consider the following:

### Apricot.

Be alert for San Jose Scale or "freckles." Also, observe for fruit flies, worms, hoppers, and pit fragments.

### Caneberries.

Be alert for "moldy" berries and insects, such as thrip.

### Blueberry.

Be alert for "huckleberries" (preserves that are made from "wild" blueberries). Also, observe for maggots. If you have access to the fruit ingredient prior to preserving, and the berries are not IQF, observe the top layer of the drums for maggots that crawl to the top.

### Grape.

Be alert for tartrates. Jam is an unfiltered product. The tartrate crystals in the grape pulp, if any, are transferred from the drum into the preserves. Also, be alert for mold or yeast that may form on the top layer of the jam (headspace) after packing. You may want to random sample from the stack, periodically, and check for this condition. Set aside samples occasionally if product is shipped immediately after processing.

### Peach.

Be alert for fruit flies. Also, "pit burn" may cause a unit of fruit to be considered as "blemished." Cite the standards and grading manuals for peaches (clingstone and freestone) to grade this condition if it is found in the preserves.

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