



# Association of Food Industries, Inc.

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## Specifications for Cashew Kernels

### AFI Nut & Agricultural Products Section

#### General Requirements

A. Each shipment to the U.S. shall be of good quality and be stored in accordance with good commercial practice. No live infestation is permitted.

B. The cashews shall be packed in new, clean, dry, leak-proof, lead-free containers with an airtight (hermetic) seal and without internal paper liners. Packaging shall be of sufficient strength to assure the integrity of the product during normal shipment and storage.

The outer container shall be constructed of a new cardboard, free of infestation and visual mold and sealed without staples, unless otherwise specified by the end user. Cartons must be a minimum of 200-pound test, 32 ECT. Only food-grade CO<sub>2</sub> is permitted.

C. Only pesticides approved for use on cashews may be used and residues must be within the tolerances set by the government of the importing country. No detectable residue is permitted for any pesticide that is not approved for use on cashews in the importing country. In the United States, the only pesticides approved for use on cashews and the residue limits for those pesticides are as follows: Flutriafol - .02 ppm; Phosphine - .1 ppm. Fumigation with/use of methyl bromide and Naphthalene are prohibited.

D. All cartons shall be clearly marked with the following:

1. Name of the product and trade name or brand name, if any.
2. Name and address of producer or packer.
3. Grade.
4. Net weight.
5. Country of Origin.
6. Buyer's name or marks.
7. Destination.
8. Other marks agreed to by buyer and seller.

Lot numbers or production codes must be marked legibly on the outside of the cartons, in accordance with the laws of the country of destination.

E. Bill of Lading must list the number of cartons, source of origin, and the marks that are on the cartons.

F. All shipments shall be inspected prior to loading and shall be carried on conveyances suitable for transporting food

products in good condition, i.e. free of odors, insect or mold damage, rodent activity, and all other foreign materials.

G. The moisture level of the cashews shall be 3%-5%, as determined by the AOAC reference method.

H. If a roast test is required in a contract, it should be conducted in accordance with Appendix II. (Scrapes)

I. Strong blocking is not permitted. Strong blocking is defined as blocking which cannot be freed other than with the use of external tools.

J. Cashew kernels shall be free of hard or sharp foreign objects and hair.

#### Quality and Grading

Cashew kernels are classified as: First Quality Fancy; Second Quality Scorched; Lightly Blemished Wholes (LBW), Blemished Wholes (BW), Third Quality Special Scorched; Fourth Quality; and Dessert.

**FIRST QUALITY FANCY** cashew kernels have a uniform color which may be white, light yellow or pale ivory.

**SECOND QUALITY SCORCHED** cashew kernels may be yellow, light brown, light ivory, light ash-grey or deep ivory.

**THIRD QUALITY SPECIAL SCORCHED** cashew kernels may be deep yellow, brown, amber, and light to deep blue. They may be slightly shriveled, immature, light-brown speckled, blemished or otherwise discolored.

**FOURTH QUALITY** cashew kernels would qualify as First or Second Quality, except that they have pitted spots.

**Lightly Blemished Wholes (LBW)** cashew kernels may be light brown, light ivory, light ash-grey or deep ivory. Kernels may show light brown speckles or blemishes on the surface, provided that not more than 40 percent of the kernels are affected.

**Lightly Blemished Pieces (LP)** cashew pieces may be light brown, light ivory, light ash-grey or deep ivory. Pieces may show light brown speckles or blemishes on the surface, provided that not more than 20 percent of the pieces are affected.

**Blemished Wholes (BW)** cashew kernels may be deep yellow, brown, amber or light to deep blue. Kernels may be slightly shriveled, immature or may be brown speckled or blemished on the surface, provided that not more than 60 percent of the kernels are affected.

**DESSERT** cashew kernels may be scraped, deeply scorched, shriveled, deep-brown-speckled, black-speckled, blemished or otherwise discolored.

### Sizing

Sizing is compulsory in first quality/fancy cashew kernels but is optional for other whole grades.

Size Tolerance: Whole kernels of a lower size grade shall not exceed 10% by weight.

The quantity of broken kernels or pieces in whole kernels shall not exceed 10% by weight.

The quantity of pieces present in butts and splits shall not exceed 10% by weight.

The quantity of the next lower size grade in pieces shall not exceed 5% by weight.

| Size Designation | Count per |         |
|------------------|-----------|---------|
|                  | Kilo      | Pound   |
| 180 (or SLW)     | 266-395   | 140-180 |
| 210 (or LW)      | 395-465   | 180-210 |
| 240              | 485-530   | 220-240 |
| 320              | 660-706   | 300-320 |
| 450              | 880-990   | 400-450 |

### Whole (W)

A cashew kernel is classified as whole if it has the characteristic shape of a cashew kernel and not more than 1/8th of the kernel has been broken off. This grade may also be designated as W. An excessive number 7/8th kernels or splits that detract from the appearance of the sampled lot may be the basis for claim.

### Butts (B)

Kernels which have been broken crosswise, are less than 7/8 but not less than 3/8 of a whole kernel and the cotyledons are still naturally attached. This grade may also be designated as B.

### Splits (S)

One half of a cashew kernel that has been split lengthwise, provided not more than 1/8 of this cotyledon has been broken off. This grade may also be designated as S.

Pieces – See Table 2

### Definitions

**SERIOUS DAMAGE** includes but is not limited to insect, rodent or bird damage, visible mold - rancidity – decay or adhering dirt - solder - shell - or mesocarp. Examples include:

**ADHERING MATTER** - cashew meal or extraneous matter on the surface of the kernel causing permanent discoloration.

**INSECT DAMAGE** - is visible damage to the kernel from live or dead insects, mites in any stage of development, insect excreta or fragments - frass - webbing - boring - powdery residue - cast larval casings and/or the evidence of insects or insect activity in the packaging.

**RODENT DAMAGE** - evidence of rodent activity.

**BIRD DAMAGE** - pieces of feather, bird excreta.

**VISIBLE MOLD** - mold filaments detectable with the naked eye.

**RANCIDITY** - is a breakdown of the oils in the kernel giving it an off-flavor or odor. An off-flavor aroma is any atypical flavor or aroma, including those caused by rancidity, decomposition, fermentation, microbial activity, infestation or chemical taint.

**FOREIGN MATTER** - includes but is not limited to shell, mesocarp, stones, dirt, glass, metal, solder, straw, twigs, sticks, plastic, hair, industrial fibers, paper and threads.

**DEFECTS** include superficial and intrinsic damage which adversely affects the appearance of the lot such as scorching, blemishes, discoloration, immature or shriveled kernels, kernels with pitted black or brown spots, adhering testa, scrapes, flux marks and speckles. Defects vary by grade. The presence of kernels of a lower grade is scored as a defect. Examples of defects include:

**SCORCHING** - a discoloration due to over heating during shelling or blanching.

**BLEMISHES OR DISCOLORATION** - spots in aggregate in excess of 3 mm on the kernels from causes other than shelling or blanching.

**IMMATURE** - kernels are underdeveloped and do not have the characteristic shape of a cashew kernel.

**SLIGHTLY SHRIVELED** - a slight withering of the outer surface of the kernel.

**SCRAPED** – damage to the outer surface of the kernel by knife scratches affecting an aggregate area >5mm. Scrapes on the inside of the natural curve of the kernel are not counted as scrapes.

SHRIVELED - a complete withering of the kernel that distorts its characteristic shape.

PITTED SPOTS - black, brown, or other colored spots in aggregate in excess of 1 mm caused by pre-harvest attack on the kernel.

ADHERING TESTA – Testa is the natural integument of the cashew seed. Kernels are scored as affected by adhering testa when a surface area greater than 2mm in aggregate is affected; provided, that not more than 1/16 of the surface of a whole or equivalent, or 1/8 of a split or butt, in aggregate, are damaged by adhering testa; in which case, the affected kernels shall be scored as “seriously damaged” by adhering testa.”

SUPERFICIAL DAMAGE - deep knife cuts on the surface of the kernel that change the characteristic shape of the nut.

FLUX MARKS - black or brown marks on the surface of the

kernels caused by flux dripping onto them when a tin container is sealed.

SPECKLED - a brown stain which appears after removal of the testa on some kernels.

SPOTTING AFTER ROASTING – Brown spots on the surface of the kernel that are not apparent when the kernels are raw but when the kernels are roasted.

SCRAPES AFTER ROASTING – Damage to the surface of the kernel when testa and other defects are removed by the use of a knife. The scraped areas are lighter after roasting and give an uneven appearance to the roast.

BLOCKING – Bonding of cashew kernels in the presence of high moisture and high vacuum pressure.

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## APPENDIX I

### Sampling Plan for Cashews

Where,

N is the lot size

n is the number of cartons sampled (subsamples)

| Plan | N        | n* |
|------|----------|----|
| A    | <51      | 3  |
| B    | 51-350   | 6  |
| C    | 351-800  | 13 |
| D    | 801-2100 | 21 |

\*An acceptable sampling is either n or 2n

Collect a minimum of 500g for each subsample. Samples should be collected randomly without prejudice from 3 or more sites in the package. For bulk boxes, Gaylords and totes, used plan B.

#### **AFI Methods for Determining Infestation, Serious Damage, Grade and Moisture**

##### **AFI ANALYTICAL METHOD FOR INSECT INFESTATION AND SERIOUS DAMAGE**

Determine presence of live or dead insects by sieving entire contents of each sample carton over a No. 4 mesh sieve. Determine internal or external insect damage by random sampling and macroscopic analysis. Calculate percent of serious damage by count for grades of whole kernels and by weight for broken grades. For macroscopic analysis, the minimum test sample sizes are:

By composite sample: Examine a minimum of 250 whole kernels or 250g of broken grade. If the number of insect damaged kernels is greater than 0.5%, examine a second portion of 250 whole nuts or 250g of broken grade. By subsample: Examine a minimum of 100 whole kernels or 100g of broken grade kernels per subsample.

##### **AFI ANALYTICAL METHOD FOR GRADE**

Assuming that the samples collected from the lot are reasonably similar in appearance, a well mixed composite sample (raw or roast) may be examined for grade.

Determine breakage and defects in a 500g composite sample. Calculate percentages by weight.

Determine percentage of smaller and larger grade whole cashews in a 500g composite sample. Calculate percentages by weight. Determine the count in a one-pound (454g) composite sample of whole kernels.

Determine the size range of pieces with specified and calibrated wire mesh sieves. Sieve a 250g composite sample for 2 minutes using a mechanical sieve shaker. Calculate percentages by weight.

Determine defects after roasting a 500g composite sample. Calculate percentages by weight.

Off-flavor aroma and confirmation of rancidity is determined by a sensory panel. An off-flavor aroma is any atypical flavor-aroma including those caused by rancidity, decomposition, fermentation, microbial activity, infestation or chemical taint.

Color analysis of samples must be done under full spectrum lighting with a Color Rendering Index (CRI) of not less than CRI 91.

#### **Sensory Test for Raw Kernels**

A taste test should be done on the composite sample to test for the presence of Chlorophenol /flavor contamination (distinctive antiseptic taste). In the event it is found, the seller has the option of replacing the lot within 30 days.

#### **Sensory Test Procedure:**

- A. Have a taste panel of two persons.
- B. From the composite sample take 40 kernels.
- C. If more than 2 kernels are found to have chlorophenol flavor contamination, take another 60 kernels.
- D. If more than 5 kernels in the second sample are found to have chlorophenol flavor contamination, the lot is deemed to be contaminated.

## APPENDIX II

### Test for Roasted Kernels

Almost all cashew kernels are sold to the consumer in the US after roasting. The appearance of the roasted kernel is critical for consumer acceptance. An uneven roast is never appealing to the consumer.

It is therefore recommended that shippers roast cashew samples prior to packing to determine the appearance that a lot will have after roasting. This is simply good manufacturing practices.

The roast test also confirms the proper classification of a lot, as to whether it should be sold as first, second, or third quality.

**Roasting Procedure:** The kernels should be roasted in a clear vegetable oil, e.g. peanut oil, which should be replaced as soon as it starts to deteriorate (when free fatty acids exceed 1%). The oil is brought to a temperature of 300 - 310F (149C) and is kept on the heat source while cashews are immersed in the hot oil for a period of 3 minutes. Any lowering of the temperature of the oil by the immersion of the cashews will not require any lengthening of the 3-minute roasting period. Adjustments in time and temperature are recommended when roasting butts, splits, and small kernels.

#### **Defects:**

**Spotting after Roast** - brown spots that appear on the surface of the kernel after roasting, but which are not visible in the raw.

**Scorched tip** - a tip that is significantly darker than the remainder of the kernel due to a scorching during shelling or blanching.

**Color Variation** - any discoloration, other than a scorch mark, which detracts from the uniform appearance of the kernel.

**Dark roast** - a light to medium brown color in some kernels that detracts from the uniform appearance of kernels that are significantly lighter.

**Deep roast** - a deep brown color in some kernels that detracts from the uniform appearance of kernels that are significantly lighter.

**Scrapes** - knife scratches greater than 5mm in diameter that show up as light spots on the surface of the kernel.

**Uneven roast** - a roast with more than 7% total of the following defects: spotted, scorched tips/color variations, deeply scorched tips, dark roast, and deep roast. A roast is also uneven if more than 10% of the kernels show scrapes after roasting or the combination of roast defects and scraped kernels is greater than 15%.

#### **Maximum Tolerances for Defects in First and Second Quality Roasted Cashew Kernels**

|                                    | <b>First Quality<sup>1</sup></b> | <b>Second Quality<sup>2</sup></b> |
|------------------------------------|----------------------------------|-----------------------------------|
| Spotted                            | 1.00%                            | 2.50%                             |
| Scorched Tips/<br>Color Variations | 2.00%                            | No Limit                          |
| Deeply Scorched Tips               | 1.00%                            | 2.50%                             |
| Dark Roast                         | 5.00%                            | No Limit                          |
| Deep Roast                         | 2.00%                            | 10.00%                            |
| Scrapes                            | 10.00%                           | No Limit                          |

<sup>1</sup>The Total Defect Level for First Quality cannot exceed 7% for defects other than scrapes.

<sup>2</sup>On Second Quality there are only limits for spotted, deeply scorched tips and deep roast. No total defect level is necessary for second quality.

#### **Suggested Remedies for Non-Conforming Product**

The following are suggested remedies for product found not to meet the AFI standard:

**Infestation** – If infestation is found in two or more cartons, the entire shipment should be frozen.

**Severe Blocking** – If severe blocking exists in two or more cartons, the entire shipment should be frozen.

**Table 1. Tolerances for Defects and Damage in Raw Cashew Kernels**

The following tolerances establish the maximum limits for damage and defects in raw cashew kernels. To determine compliance with these tolerances, one should follow the Sampling Plan found in Appendix I, and use established analytical procedures. Tolerances for a lower grade include the kernels defined by the lower grade but not the defects that are specific to the lower grade. Percentages are determined by weight.

|                                                | First Quality | Second Quality<br>Scorched | Third Quality<br>Special Scorched | Dessert                                   |
|------------------------------------------------|---------------|----------------------------|-----------------------------------|-------------------------------------------|
| <b>Serious Damage</b>                          |               |                            |                                   |                                           |
| Insect Damage                                  | 0.5%          | 1.0%                       | 1.0%                              | 1.0%                                      |
| Mold rancidity, decay,<br>adhering matter      | 0.5%          | 1.0%                       | 1.0%                              | 1.0%                                      |
| Foreign Matter <sup>1.</sup>                   | 0.01%         | 0.01%                      | 0.01%                             | 0.01%                                     |
| <b>Maximum Serious Damage</b>                  | <b>1.0%</b>   | <b>2.0%</b>                | <b>2.0%</b>                       | <b>2.0%</b>                               |
| <b>Defects</b>                                 |               |                            |                                   |                                           |
| Second Quality Scorched                        | 5.0%          | B                          | B                                 | B                                         |
| Third Quality Special Scorched/                | 1.5%          | 5.0%                       | B                                 | B                                         |
| Lightly Blemished Pieces                       | 1.5%          | 5.0%                       | (*20% Light Brown Speckled)       |                                           |
| Lightly Blemished Wholes                       | 1.5%          | 5.0%                       | (*40% Light Brown Speckled)       |                                           |
| Blemished Wholes                               | 0.5%          | 2.5%                       | (*60% Brown Speckled)             |                                           |
| Dessert                                        | 0.5%          | 2.5%                       | 7.5%                              | B <sup>2.</sup>                           |
| Superficial Damage (scrapes)                   | 1.0%          | 2.0%                       | 5.0%                              | B                                         |
| Adhering Testa/Seriously Damaged <sup>3.</sup> | 3.0%/1.5%     | 3.0%/1.5%                  | 3.0%/1.5%                         | 3.0%/1.5%                                 |
| Black Speckled Kernels                         |               |                            |                                   | 0.05%                                     |
| <b>Maximum Defect Level</b>                    | <b>8.0%</b>   | <b>11.0%</b>               | <b>14.0%</b>                      | <b>(*Maximum speckled for LBW and BW)</b> |

<sup>1.</sup>The tolerance for foreign matter is in addition to the tolerance for maximum serious damage.

<sup>2.</sup>Dessert quality is the lowest grade but the defects cannot be so severe that the product is not merchantable. A delivery is acceptable provided it is equal or better than the approved pre-shipment sample. Two sealed pre-shipment samples are to be sent to the buyer for approval, one of which shall remain sealed for possible use in settling a dispute on quality at arbitration.

<sup>3.</sup>Maximum of 3% by weight for testa greater than 2mm in aggregate, but not more than 1.5% seriously damaged by adhering testa.

**Table 2.**  
**Tolerances for Defects and Damages in Small Pieces**

|                                                    | SP1-SSP1<br>G1 | SP2-SSP2<br>G2 | SP3-SSP3<br>G3 |
|----------------------------------------------------|----------------|----------------|----------------|
| <b>Serious Damage</b>                              |                |                |                |
| Insect Damage                                      | 0.5%           | 1.0%           | 1.0%           |
| Mold, rancidity, decay                             | 0.5%           | 1.0%           | 1.0%           |
| Foreign Matter <sup>1</sup> .                      | 0.01%          | 0.01%          | 0.01%          |
| <b>Maximum Serious Damage</b>                      | <b>1.0%</b>    | <b>2.0%</b>    | <b>2.0%</b>    |
| <b>Defects</b>                                     |                |                |                |
| Second Quality Scorched/<br>Color Variation        | 5.0%           | B              | B              |
| Third Quality Special Scorched/<br>Color Variation | 2.0%           | 5.0%           | B              |
| Fourth Quality                                     | 0.5%           | 1.0%           | B              |
| Dessert                                            | 0.5%           | 2.5%           | 10.0%          |
| Superficial Damage (scrapes)                       | B              | B              | B              |
| Adhering Testa                                     | 3.0%           | 3.0%           | 5.0%           |
| <b>Maximum Defect Level</b>                        | <b>10.0%</b>   | <b>10.0%</b>   | <b>12.0%</b>   |

1. The tolerance for foreign matter is in addition to the tolerance for maximum serious damage.

**Table 3. Cashew Pieces - Size Descriptions**

| <u>Grade</u>                                                                                                                                                                                                                                                                                | <u>Name</u>                       | <u>Passing through Sieve Number</u>              | <u>Retained on Sieve Number</u>                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------|--------------------------------------------------|
| LWP, SP, SPS, LP, DP, P1, P2, P3                                                                                                                                                                                                                                                            | large pieces                      | Tyler No. 2.5 (USA No. 5/16) NMT 50%             | Tyler No. 0.25 (USA No. 1/4)<br>opening = 6.3 mm |
| SWP, SSP, DSP, SP1, SP2, SP3                                                                                                                                                                                                                                                                | small pieces                      | Tyler No. 0.25 (USA No. 1/4)<br>opening = 6.3 mm | Tyler No. 7 (USA No. 7)<br>opening = 2.80 mm     |
| CHIPS, or SSP1, SSP2, SSP3                                                                                                                                                                                                                                                                  | chips, or<br>special small pieces | Tyler No. 7 (USA No. 7)<br>opening = 2.80 mm     | Tyler No. 8 (USA No. 8)<br>opening = 2.36 mm     |
| BB or G1, G2, G3                                                                                                                                                                                                                                                                            | grains, granules,<br>or baby bits | Tyler No. 8 (USA No. 8)<br>opening = 2.36 mm     | Tyler No. 10 (USA No. 12)<br>opening = 1.70 mm   |
| X                                                                                                                                                                                                                                                                                           | fine grains                       | Tyler No. 10 (USA No. 12)<br>opening = 1.70 mm   | Tyler No. 14 (USA No. 16)<br>opening = 1.18 mm   |
| FE                                                                                                                                                                                                                                                                                          | fines                             | Tyler No. 14 (USA No. 16)<br>opening = 1.18      | N/A                                              |
| P1M, P2M, P3M                                                                                                                                                                                                                                                                               | mixed pieces                      | Pass through 6.3 mm Sieve                        | Retained on a 4.75 mm Sieve                      |
| <p><b>TOLERANCE</b> <sup>B</sup> For lower grade pieces - 5.0% with not more than 1.0% from the next lower grade size. Further, the grades SWP/SP1, SSP1/Chips, G1/BB, and X must also be reasonably uniform in appearance, that is, with not more than 5.0% from the grade size above.</p> |                                   |                                                  |                                                  |
| <p>NB. The grade SSP as used above is a Brazilian grade designation for special small pieces, not to be confused with the Indian grade SSP, “small scorched pieces.”</p>                                                                                                                    |                                   |                                                  |                                                  |