



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 free of infestation and visual mold and sealed without staples, unless specified by the end user. Cardboard cartons must be a minimum of 200-pound test, 32 ECT.

Only food-grade CO₂ is permitted, at a minimum mix of 45% CO₂ and **55% Nitrogen**.

- 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. Use of/existence of methyl bromide, Naphthalene and any other chemicals that create a food safety risk and/or tainted taste are prohibited. Only chemicals approved in the receiving country may be used.

- D. All cartons must meet the importing country's labeling requirements and 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. Gross/net weight.
5. Country of origin.
6. ~~or marks Buyer's name.~~ **Product, i.e. cashews**
7. Other marks agreed to by buyer and seller.
8. Lot numbers/production/date codes **must be readily visible on the exterior of the packages.**

Shipper's packing list must detail lot/production/date codes and corresponding quantities for traceability and to ensure representative sampling.

- E. All shipments shall be inspected prior to loading.

- F. The moisture level of the cashews shall be 3%-5%, as **determined by a Loss on Drying Method using a moisture balance at 105°C, AACCI Method 44-15 (modified) or an**

equivalent loss on drying method that correlates with AOAC Official Method 925.40 Moisture in Nuts and Nut Products or equivalent vacuum oven method.

- G. If a roast test is required in a contract, it should be conducted in accordance with Appendix II. ~~(Serapes)~~

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

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

Technical Parameters

Tests for Free Fatty Acids (FFA) and Peroxide Value (PV):

- **Samples must be prepared by solvent extraction, Soxhlet or equivalent**
- **FFA: Max 1.5% +/- 0.5% as oleic. (Max 2% for broken). Test Method AOCS Ca 5a-40 or equivalent official method**
- **PV: Max 5 meq/kg, Test Method AOCS Cd 8b-90 or equivalent official method**

~~Nut oil must be extracted by cold solvent under nitrogen.~~

Technical Requirements

- A. Aflatoxin: Aflatoxin levels must meet the tolerance set forth by the country in which the goods are sold.
- B. *E. coli*: Non-Detectable
- C. *Salmonella*: Negative per 375g
- D. *Listeria monocytogenes*: Negative per 125g
- E. *Staphylococcus aureus*: Less than 10 CFU/g
- F. Storage Life: Two years when held in ideal cold storage conditions.
- G. Foreign Material: Hair, glass, metal, stones and other hard or sharp foreign objects are prohibited.
- H. **Harmless Extraneous Vegetable Matter <0.01%**

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, and 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 lines, swirls, loops or similar 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 lines, swirls, loops or similar blemishes on the surface, provided that not more than 20 percent of the pieces are affected.

Dessert, Blemished Wholes (BW) cashew kernels may be deep yellow, brown, amber or light to deep blue. Kernels may be slightly shriveled, immature or may show dark brown lines, swirls, loops or similar speckled or blemishes 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 or black speckled lines, loops, swirls or similar blemishes 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 filth; visible mold, rancid flavor, decay; imbedded 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 aroma.

OFF FLAVOR-AROMA - An off flavor-aroma is any atypical flavor or aroma, including those caused by rancidity, lipid decomposition, fermentation, microbial activity, infestation or chemical taint.

HARMLESS EXTRANEIOUS MATTER - includes but is not limited to soft vegetable matter, industrial fibers, paper and threads, that do not present any inherent hazards to health.

DEFECTS include superficial and intrinsic damage which adversely affects the appearance of the lot such as scorching,

blemishes, discoloration, immature or shriveled kernels, and 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 **overheating** during shelling or blanching.

BLEMISHES OR DISCOLORATION - **speckles or spots** in aggregate ~~in excess of~~ **>3 mm** on the kernels from causes other than shelling or blanching; **discolored curved lines, loops, or swirls on the kernel that are apparent after removal of testa.**

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 **for 50 lbs. Net cartons**

n is the number of cartons sampled (subsamples)

For supersacks or totes, use Plan C.

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~~ The Sampling Plan for a tightened inspection is 2n (double sampling).

Collect ~~a minimum of~~ approximately 275-500g for each subsample, **provided that the total sample is not less than 3,500g.** Samples should be collected randomly **from the lot, and without prejudice from 3 or more sites in each package.** ~~For supersacks, 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 200 whole kernels or 200g of broken grade. If the number of insect damaged kernels is greater than 0.5%, examine a second portion of 200 whole nuts or 200g of broken grade. By subsample: Examine a minimum of 100 whole kernels or 100g of broken grade kernels per subsample. **Only the most serious type of damage is counted, when a kernel is damaged by multiple types of serious damage. Never count the same kernel more than once for serious damage.**

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 **in a 1,000g composite sample** and defects in a 500g composite sample. Calculate percentages by weight. **Only the most serious lower grade defect is scored when a kernel is damaged by multiple defects. Never score the same kernel more than once.**

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 **with square openings.** Sieve a **200g** 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 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~~ **three** persons.
- B. From the composite sample take 40 kernels.
- C. If more than 2 kernels are found to have **chlorophenol-like off-flavor**, take another 60 kernels.
- D. If more than 5 kernels in the second sample are found to have **chlorophenol-like** flavor contamination, the lot is deemed to be contaminated. **Once the off-flavor is confirmed, no further sensory analysis is necessary and the testing is stopped.**

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 (**fried**) 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 **approximately** 300 - 310F (149C) and is kept on the heat source while cashews are immersed in the hot oil for a period of **2-3** 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. **The kernels must be stirred several times during roasting.** 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 – **superficial damage and** knife scratches greater than 5mm in diameter that show up as light spots on the surface of the **roasted** 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%. **A roast might also appear uneven due to mixed RCN or processing, resulting in a light and dark roasting kernels.**

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

	First Quality ¹ .	Second Quality ² .
Spotted	1.00%	2.50%
Scorched Tips/ 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

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

²On 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 **live** 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.