



XL Insurance



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Transportation and storage of coffee beans: Best practices

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Product information



Green coffee beans are the seeds of the coffee shrub, which are disengaged completely from the husk and to a considerable extent from the seed coat (silver skin). In general, each coffee cherry contains two coffee beans, which lie with their flat sides together. In a crop of coffee, a small percentage of cherries contain a single bean, instead of the usual two. This is called a peaberry.

There are two methods of processing the coffee berries:

Wet processing

Usually carried out in Central America and areas of Africa. The flesh of the berries is separated from the seeds and then the seeds are fermented – soaked in water for about two days. This dissolves any pulp or sticky residue that may still be attached to the seeds. They are then washed and dried in the sun, or, in the case of commercial manufacturers, in drying machines.

Dry processing

Cheaper and simpler, this method is used for lower quality seeds in Brazil and much of Africa. Twigs and other foreign objects are separated from the berries and the fruit is then spread out in the sun on cement or brick for 2–3 weeks, turned regularly for even drying. The dried pulp is removed from the seeds afterward.

After processing has taken place, the husks are removed and the seeds are roasted, which gives them their varying brown color, and they can then be sorted for bagging.

After the coffee has been hulled, it is graded and bagged. The aim is to produce uniform commercial lots that meet defined quality criteria. However, there is no universally accepted grading and classification system for green coffee. Each producing country has developed its own classification and grade charts, which are often also used to set minimum standards for export.

The theory behind classification based on bean size is that coffees of the highest altitudes are denser and larger in size than those produced at lower altitudes. Similarly, coffee develops more slowly at higher altitudes and often have the best flavor profiles.



Risk factors



Temperature

The goods must be protected from frost (< 0°C or 32F). In general, temperatures should be between 10°C (50F) and 20°C (68F) during transport of green coffee beans.



Humidity/moisture

Preventing the formation of condensation water in the hold is absolutely essential and constitutes the number one priority.

If coffee beans have an excessively high moisture content, there is a risk of mustiness, mold growth and post- or overfermentation. Washed coffee frequently has a higher moisture content than unwashed coffee, due to the processing technique used.

Moisture damage (vapor damage, fresh and saltwater damage) does not generally become apparent until several days after the beans have come into contact with water and can be recognized by a musty odor and visible changes to the beans.

Exposure to wetness (excessive humidity, rain, sweat) turns the beans white, and sometimes subsequently black, moldy, and swollen. A relatively long period of exposure to wetness results in a musty/rotten odor.



Biotic activity

Respiration processes are essentially suspended, but biochemical and microbial processes continue. Despite the fermentation process, the embryo is preserved: the loss of the ability to germinate has an unfavorable effect on the contents and thus on the quality of the green coffee beans.

Inadequate ventilation may result in fermentation and rotting of the coffee beans because of increased CO₂ levels and inadequate supply of atmospheric oxygen.



Contamination

Green coffee beans are extremely sensitive to contamination and must be kept clean. They must be protected from cement and coal dust, as this penetrates through the jute bags.



Insect infestation / diseases

Containers and holds must be absolutely free from insects.

The coffee beetle is a typical storage pest, which easily spreads during relatively long periods of storage ashore. Coffee may additionally be infested with cockroaches, rats, and mice.

Fumigation is generally carried out in the countries of origin and requires a proof in the form of a Fumigation Certificate.



Packing

Coffee beans are sensitive to moisture and are usually shipped/packed in woven bags made from natural fiber which allows free circulation of air materials (e.g., jute or sisal). Their net weight is generally 60 kg but may be 69 kg in Central America/Colombia.

Coffee from Mexico is sometimes shipped in a sisal outer bag containing a plastic inner bag. This plastic inner bag is perforated. Woven plastic bags, as occasionally used for transport from West Africa, have no effect on the quality of the coffee, provided that they are air permeable.





Containerized transport



33%

Approximately 1/3 of containerized coffee is transported as bulk cargo in 20' standard containers

60°C

Extreme temperature differences on deck (up to 60°C between day and night) could result in container sweat during transport

12%

Water content of the wooden container flooring should be 12%, corresponding to a lumber equilibrium moisture content of 70%

Each container should be inspected prior to loading any coffee. The inspection typically shall take place at the shipper's factory or warehouse and is carried out to make sure the goods are correctly handled and safely loaded for safe transportation and delivery to the destination.

We recommend using the **AXA XL Container Inspection Form** and retain it as the record together with photos.

There are three types of containers used to transport coffee:

Standard containers

A standard container stuffed with coffee should be stowed below deck. The extreme temperature differences on deck (up to 60°C between day and night) could result in container sweat during maritime transport.

In addition, a sharp drop in temperature in the container during wintertime may result in considerable container and cargo sweat. These effects are considerably reduced whilst the container is stowed under deck.

The bottom, sides, and top areas of the cargo block in the container should be lined with packing paper. Incipient container sweat (initial drips) may be soaked up and distributed by the paper.

During wintertime, in the receiving countries, and for longer trading routes to countries with low acceptance level of wetted bags, it is recommended to include some desiccants, moisture absorbents (12 - 25kgs for FEU/ 40').

Ventilated containers

Ventilated containers have ventilation openings over the entire length of their side walls in the floor and roof areas. This ventilation is passive and must be actively forced from outside. The ventilation can only take place when the hatch is closed. Upwardly directed air flow may be produced by extracting the hold air at the top and supplying fresh air in the area of the hold floor.

The ventilated containers must be loaded below deck. On deck, the airflow through such containers might not be sufficient and the containers would also be exposed to considerable temperature fluctuations. Furthermore, on deck the additional ventilation openings in the container create the risk of seawater spray deposition.

The container floor should be lined with paper. There must be no dunnage at the sides and in the top area, since the ventilation action would otherwise be impaired or completely prevented.

The wooden flooring of the containers must be absolutely clean. If washed, it must be completely dried; the water content of the flooring should be 12%, corresponding to a lumber equilibrium moisture content of 70%, so that the flooring does not constitute an additional source of water vapor to dampen the coffee cargo and container atmosphere.

Bulk containers

Approximately 1/3 of containerized coffee is transported as bulk cargo in 20' standard containers. Liner bags of plastic fabric are suspended in the containers. The container and liner bag are filled in a tilted position, and both are then closed. The dunnage recommendations for "bulk containers" are the same as those for standard containers.

Storage



Follow these guidelines to ensure adequate space for sampling, inspection, and effective fire protection, to assist ventilation, to aid in circulation and generally provide ample space for appropriate pest control programs:

- Coffee should be stored on pallets that provide a minimum of (four) 4 inches distance from the floor. In no event should any coffee bag touch the floor or overhang the edge of a pallet more than four (4) inches.
- The pallets, including those stored for future use, must be kept clean and in good repair.
- Before each use pallets must be cleaned of all foreign matter, including, but not limited to, dirt, dead or live insects, pupal cases, webbing, etc.
- Coffee should be stored a minimum of 24 inches from the ceiling, and a minimum of 18 inches below any sprinkler head.
- Coffee should be stored a minimum of 24 inches from any wall.
- Twenty (20) inches of space should be maintained between coffee piles. The coffee piles should be stored in such a manner as to permit at least two faces (front or back and one long side) of each lot to be available for inspection and/or sampling. Coffee should not be stored higher than five pallets high or 100 bags high, whichever is less.
- The equipment aisles should have at least 13.5 feet of space for equipment to operate without contacting bags of coffee.
- Slack bags must be placed on a separate pallet in front of the pile.
- All space requirements should be measured from the bag or the pallet; whichever is closer, to the sprinkler, ceiling, or wall, etc.



24"

Coffee should be stored a minimum of 24 inches from any wall

20"

20 inches of space should be maintained between coffee piles

13.5'

Equipment aisles should have at least 13.5 feet of space for equipment to operate without contacting bags of coffee

18"

Coffee should be stored a minimum of 18 inches below any sprinkler head

Warehouse selection criteria



When selecting a warehouse for coffee storage, be sure whatever facility you choose adheres to the following criteria. The warehouse should:

- Be weather tight and rodent proof as to roof, walls, doors and windows. Any hole or opening that allows access to weather, rodents, or birds must be sealed. Floors must be free of cracks, seep holes, and crevices. Holes that are screened are considered rodent proof.
- Comply with all applicable federal, state and local laws, including any pertinent fire regulations and have sufficient floor load limits.
- Have light sufficient to permit cleaning crews to work and weighing and sampling to be performed efficiently and to identify storage deficiencies and problems without the need for any supplemental lighting, but it need not have natural light.
- Have proper ventilation to the outside. Proper ventilation may include screened openings positioned to allow ventilation using prevailing winds. Windows, ventilators, or other ventilating openings should be screened at all times.
- Not be artificially heated except to a minimum level to prevent freezing of pipes.
- Be free of leaking pipes.
- Have (and the warehouse should maintain) a sufficient number of material handling devices (e.g., forklift trucks, elevators, etc.), which are operable and available to perform the warehouse's duties in an orderly and efficient fashion.
- Be equipped with operational toilet facilities, which are clean, in good repair and supplied with proper soaps, towels, etc. Alternatively, public toilet facilities must be located within 100 yards of the warehouse facility.
- Have signs, clearly visible in all toilets, requiring employees to wash hands after use of the toilet facilities.
- Have signs, clearly visible at all entrances, prohibiting smoking, eating or drinking in the warehouse except in designated areas which are closed off and separated from the storage areas.
- Have signs or postings, clearly visible throughout the warehouse, marking storage locations within the building.
- Be physically segregated from any non-coffee storage areas by walls and doors sufficient to prevent access by rodents, insects, or odors.
- Have a fire and theft deterrent alarm system connected to a central monitoring service.

Additional resources

ICE Regulation Rules Book
#8 Coffee: COFFEE, SUGAR & COCOA EXCHANGE, INC (ice.com)
#9 Cocoa: COFFEE, SUGAR & COCOA EXCHANGE, INC (ice.com)

The German Insurance Association Coffee –
Transport Informations Service: tis-gdv.de

Green Coffee Association Professional Resources:
www.greencoffeeassociation.org/professional-resources/

Grain and Feed Trade Association: www.gafta.com/

Federation of Oils, Seeds and Fats Associations: www.fosfa.org/

North of England P&I Club Carrying-Coffee-Beans-in-Containers-
Briefing (1).pdf

National Coffee Association of U.S.A., Inc. National Coffee
Association: www.ncausa.org