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Indian Standard

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हरी कॉफी — भंडारण एवं परिवहन हेतु दिशानिर्देश

Green Coffee — Guidelines for Storage and Transport

ICS 65.120

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Price Group 2

Stimulant Foods Sectional Committee, FAD 6

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Stimulant Foods Sectional Committee had been approved by the Food and Agriculture Divisional Council.

Considerable quantities of coffee are exported from India. Globally, coffee is the second major traded commodity to oil and India is the 5th largest producer and exporter of coffee in the world. Green coffee is usually transported in jute bags. While green coffee may be usable for several years, it is vulnerable to quality degradation based on how it is stored. Jute bags are extremely porous, exposing the coffee to whatever elements it is surrounded by. Coffee that is poorly stored may develop a burlap-like taste known as "bagginess", and its positive qualities may get affected.

The standard is being formulated with a view to give guidelines for conditions aimed to minimize the risks of infestation, contamination, and quality deterioration of green coffee (also known as raw coffee) in bags, in bulk and in silos, being the subject of international commerce, from the time of its packing for export until the time of its arrival in the importing country. The standard is formulated on the lines of ISO 8455 : 2011 'Green coffee — Guidelines for storage and transport' with modifications in view of prevailing tropic climatic conditions at major processing and export zones of India after due consultation with stakeholders and current practices being followed.

In the formulation of this standard, due consideration has been given to *the Food Safety and Standards Act,* 2006 and Regulations framed thereunder and *Legal Metrology (Packaged Commodities*) *Rules*, 2011. The standard is however subject to restrictions imposed under these Rules, wherever applicable.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

GREEN COFFEE — GUIDELINES FOR STORAGE AND TRANSPORT

1 SCOPE

This standard gives guidelines for conditions aimed to minimize the risks of infestation, contamination, and quality deterioration of green coffee in bags and "big-bags" (*see* Note), in bulk and in silos, being the subject of international commerce, from the time of its packing for export until the time of its arrival in the importing country.

NOTE — The term "big bag" refers to modern flexible containers in woven plastics fibre, able to contain about 1 000 kg of loose coffee beans.

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

IS No.	*Title*
7236 : 2013	Glossary of terms for coffee and its products
10814 : 1984	Method for sampling green coffee in bags
16034 : 2012/ ISO 6673 : 2003	Green coffee — Determination of loss in mass at 105°C
16037 : 2012/ ISO 4149 : 2005	Green coffee — Olfactory and visual examination and determination of foreign matter and defects
16038 : 2012/ ISO 6667 : 1985	Green coffee — Determination of proportion of insect damaged beans
16040 : 2012/ ISO 1446 : 2001	Green coffee — Determination of water content — Basic reference method
ISO 6666 : 2011	Coffee sampling — Triers for green coffee or raw coffee and parchment coffee

3 TERMS AND DEFINITIONS

For the purposes of this standard, the terms and definitions given in IS 7236 shall apply.

4 CONDITIONS OF PUTTING INTO STORAGE

4.1 Quality Characteristics for Storage

4.1.1 Green coffee before storing should be free from signs of insect infestation, rodent contamination, mould and other contamination (determined in accordance with IS 16037 and IS 16034 as necessary). Coffee beans should be sufficiently dry so as not to be unnecessarily vulnerable to subsequent moulding, but not so dry as to cause unnecessary bean breakage. Coffee moisture content shall always be determined, in accordance with IS 16040 or IS 16034. The method used should be indicated.

Since upper and lower acceptable moisture limits depend on the method and apparatus used for measurement, they should be established by practical experience and made explicit in specifications and contracts. Separate moisture standard should be fixed for Monsooned Malabar green beans.

4.1.2 The bags, "big-bags", containers or silos in which the green coffee is to be stored should be inspected before use to ensure that they are odour free, free from signs of insect infestation, rodent contamination and other contamination, as well as being physically sound.

4.2 Putting Green Coffee into Storage

4.2.1 Green coffee intended for storage, after being packed for export should be moved with minimum delay to well-ventilated, well-maintained storage areas or facilities. The temperature and relative humidity of the air surrounding bagged coffee in store should be sufficiently constant and low enough (as determined by practical experience) to ensure that the original quality of the coffee is preserved throughout the duration of storage.

4.2.2 All inland transport vehicles should be inspected by a person in authority before loading green coffee, to ensure that they are in a good sanitary condition, defined as the absence of filth (fragments of insects, hair of rodents, etc), mould, chemical contamination or other contamination.

4.2.3 During inland transportation to and from storage facilities, the bagged green coffee should be protectively covered to prevent stray contamination and weather damage. Green coffee should be especially protected from rehydration. Airproof sealing of non-transpiring containers can lead to condensation, and should be avoided.

5 CONDITIONS FOR STORAGE

5.1 Location of the Warehouse

Warehouses should not be built in places where cold air

accumulation can occur; therefore low and humid areas should be avoided. They should be built on a high ground level, and wall and foundations should be waterproof insulated, in order to exclude external wetness.

5.2 Surroundings of the Storage Facilities

5.2.1 Spills should be cleaned up promptly.

5.2.2 Waste, dunnage, and refuse should be removed promptly.

5.2.3 Equipment should be stored in such a manner that it cannot provide harbourage for rodents, insects, or birds.

5.2.4 There should be no poor drainage areas, which could provide a breeding place for insects or other pests.

5.2.5 There should be a pest-control programme for the surrounding grounds and regular inspections of the area. A recognized pest control programme may be adopted.

5.2.6 Hard surface areas should be kept in a broom-clean condition.

5.3 Building and Interior of the Storage Facilities

5.3.1 To control the effects of solar irradiation, the warehouse may be well ventilated, preferably with turbo ventilators. To protect the quality of the highest stacks, a minimum distance of 2 m should be allowed between the last upper row of bags and the ridge height of the warehouse.

5.3.2 Buildings should be structurally sound, free of leaks, rodent-proof, and bird-proof.

5.3.3 Buildings should be kept in a broom-clean condition; there should be a clean-up programme both for spills and for routine cleaning to avoid accumulation of dirt and debris on the floor.

5.3.4 Cargo spillage should be collected immediately.

5.3.5 Rubbish should be regularly removed and properly disposed of.

5.3.6 An adequate bird, rodent, insect, and other pest-control programme should be maintained and supervised.

5.3.7 There should be regular inspection of buildings in support of the clean-up programme by a person in authority.

5.3.8 Any toilet facilities should be separated from the coffee storage area, totally enclosed, and maintained in a sanitary condition.

5.4 Storage and Handling

5.4.1 Bagged coffee should be stored well away from outside walls, separated by a distance which at least allows inspection and sanitary maintenance of the floor between coffee and walls; moreover, said distance favours adequate ventilation. The recommended distance between bagged coffee and the walls is more than 0.8 m.

5.4.2 Both air temperature and humidity are important and basic items for the conservation of coffee beans, and may be maintained at appropriate levels. A room temperature of about 25 ± 5°C and relative air humidity upto 70 percent are recommended. Product moisture should be monitored, in order not to exceed the conservation limits recommended in **4.1.1**.

5.4.3 Storage near openings (windows, doors, etc) subject to effects of the weather should be avoided.

5.4.4 Illumination control, both natural and artificial, is critical for the quality and conservation of coffee, light being one of the degradation factors of colour and quality. Coffee beans shall be maintained the majority of the time with minimum illumination, the conditions nonetheless being compatible with those of a safe working environment. Artificial illumination should preferably be placed in alleys and corridors only, and switched on by sections in order not to harm the quality of the coffee beans.

5.4.5 No bagged coffee should be in direct contact with the flooring, pallets or other separating devices, which should be clean and dry throughout; waterproofing of the floor is recommended.

5.4.6 Storage of green coffee next to or in the area of potentially contaminating cargo (for example chemicals, odorous or dusty materials and other commodities that might possibly be infested), should be avoided.

5.4.7 Coffees of different qualities should be kept in distinct places within the warehouse to avoid any cross mixing of varieties. A different place is recommended for storage of organic coffee, to avoid possible cross-contamination with coffees that require any kind of fumigation.

5.4.8 The entry of vehicles into the warehouse should be minimized, in order to avoid changes in temperature, humidity, and light levels, as well as harmful fuel gases. If vehicle entry into the warehouse is unavoidable, there should be a system to avoid exhaust fumes contaminating the product. There are several possible methods; one of them is an antechamber for loading and unloading with two gates, where only the outer one is opened for the entering vehicle. Another method is to utilize shelters situated just outside the warehouse doors.

5.4.9 Dispersed load, fallen from the bags or blocks, should be collected immediately; accidents of this type

occur rarely when the conditions of storage of the coffee are correct.

5.4.10 Inside the warehouse, the use of machines or any other activity that may interfere with the complete storage process of the product should be avoided. If there is machinery to process or reprocess coffee, or any other machinery, it should be guaranteed that they are properly isolated from places where coffee is stored.

5.4.11 Bagged coffee and reserve pallets should be maintained in a clean condition and in exceptional cases provided with a protective covering (if necessary). Covering practices and cover materials that restrict ventilation of bagged coffee or that adversely affect coffee quality should be avoided.

5.4.12 Bagged coffee in store should be sampled (in accordance with IS 10814 and ISO 6666) and regularly inspected for any evidence of damage or quality deterioration (determined in accordance with ISO 16037 and IS 16038, as applicable).

5.4.13 Bagged coffee should always be protected from rain and spray water by protective covering during transport.

6 CONDITIONS OF MARITIME TRANSIT

6.1 Ports of Embarkation and Disembarkation

6.1.1 The waiting time for green coffee loaded on vehicles or in freight containers to be transferred to a ship should be kept to the extent possible. Loaded vehicles or containers should be kept in the shade where possible; additionally, to minimize increases in the temperature of the coffee beans, light-coloured protective coverings should be used.

6.1.2 Green coffee should not be loaded into leaky, odorous, or unsanitary containers, nor into containers whose ceilings, walls or floor are wet or show sign of dampness. They should preferably be inspected by a person in authority before being loaded. It is recommended that the containers be constructed to generate an isothermal environment where the external environment has little influence on the temperature of the load.

6.1.3 During loading and unloading, green coffee cargo should be protected from contact with other potentially contaminating cargo.

6.1.4 Green coffee in bags should not be placed on an unclean or contaminated wharf surface.

6.1.5 It is recommended that the transferring time in the harbour be kept to the minimum possible time.

6.2 Maritime Transport

6.2.1 Cargo holds of ships should be cleaned prior to loading.

6.2.2 Only clean, dry pallets or Marino-type slings should be used if cargo is unitized. Rope-type slings, when used, should be clean.

6.2.3 Green coffee cargo should be protected from salt-water damage and ship sweat. Stowage of green coffee next to, or in the area of, potentially contaminating cargo (for example chemicals, odorous or dusty materials, or other commodities that might possibly be infested) should be avoided to the extent possible.

6.2.4 An adequate pest-control programme should be maintained.

6.2.5 Bagged green coffee, whether containerized or not, should be stowed below deck in ventilated holds well away from heated or refrigerated areas, to the extent possible.

6.2.6 Samples from the load next to the walls of the container should be randomly collected; it is recommended to make at least one moisture measurement before loading and another one in the same bags on arrival.

Bureau of Indian Standards

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Review of Indian Standards

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