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Cocoa beans — Sampling

Fèves de cacao — Échantillonnage

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Foreword

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This document was prepared by Technical Committee ISO/TC 34, *Food products,* Subcommittee SC 18, *Cocoa.*

This second edition cancels and replaces the first edition (ISO 2292:1973), which has been technically revised.

Introduction

The objective of sampling is to obtain a properly representative sample of a quantity of cocoa beans for the purpose of examination and analysis.

Correct sampling is a difficult operation that requires careful attention and planning as to how a representative sample can be drawn from a quantity of goods presented for sampling. It takes into account the existence of any prevailing constraints or conditions that may create complications for sampling.

The procedures described in this document are recognized as good practice to be followed whenever practicable. It is recognized that it is difficult to lay down a set procedure to be followed in every case and that particular circumstances may require some modification of the method adopted.

Cocoa beans — Sampling

1 Scope

This document specifies general conditions relating to sampling for the determination of the quality of cocoa beans. It also gives requirements and recommendations on the procedure to be followed for sampling cocoa beans in bags and in bulk.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2451, *Cocoa beans — Specification and quality requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2451 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
bill of lading quantity
quantity of goods confirmed in a document issued by a carrier/shipping line which details a shipment of goods and gives title of that shipment to a specified party

3.2
composite sample
mixed sample formed by combining all the *primary samples* (3.5) or *incremental samples* (3.3), as appropriate, drawn from the *lot* (3.4)

3.3
incremental sample
small quantity of beans not exceeding 1 kg taken from a *lot* (3.4) of bulk cocoa beans

Note 1 to entry: The requirements for sampling from bulk cocoa beans are specified in 5.4.

3.4
lot
quantity of cocoa beans in bags or in bulk established at any point in the cocoa supply chain and from which *primary samples* (3.5) and/or *incremental samples* (3.3) are drawn for quality analysis purposes

Note 1 to entry: The requirements for quality analysis are specified in ISO 2451.

3.5
primary sample
small quantity of cocoa beans taken at a single position from a randomly selected *sound* (3.10) bag

Note 1 to entry: The requirements for sampling from cocoa beans in bags are specified in 5.3.

3.6
quartering
process by which a *composite sample* (3.2) is reduced by use of an appropriate conical divider, quartering irons or other suitable dividing apparatus so that the resulting reduced material is proportionally the same in all aspects as the original composite sample

3.7
reference sample
representative sample prepared by successively *quartering* (3.6) the *composite sample* (3.2) such that a minimum of 2 kg net remains

3.8
sampler
person who is competent to draw samples

Note 1 to entry: The requirements on how to draw samples are specified in Clause 5.

3.9
sampling
process of drawing *primary samples* (3.5) and/or *incremental samples* (3.3), and thereafter preparing a *composite sample* (3.2) from which a *reference sample* (3.7) is established

3.10
sound
material that has not been damaged in transit or in storage

EXAMPLE Sound cocoa beans or bags.

3.11
warehouse
place that is suitable in all respects for the storage of cocoa beans

4 Apparatus

4.1 Sampling from bags

A sampling spear or sampling horn specially designed for bags should be used (see Figures A.1, A.2 and A.3 for examples).

4.2 Sampling from bulk

Bulk sampling spears (see Figure A.4 for an example) should be used for drawing samples from a stationary pile of cocoa beans (see 5.4.3 and 5.4.4). Sampling scoops (see Figures A.5 and A.6 for examples) should be used for drawing small samples periodically from a moving stream of cocoa beans.

4.3 Mixing and dividing

Conical dividers, quartering irons or other suitable dividing apparatus should be used.

5 Sampling

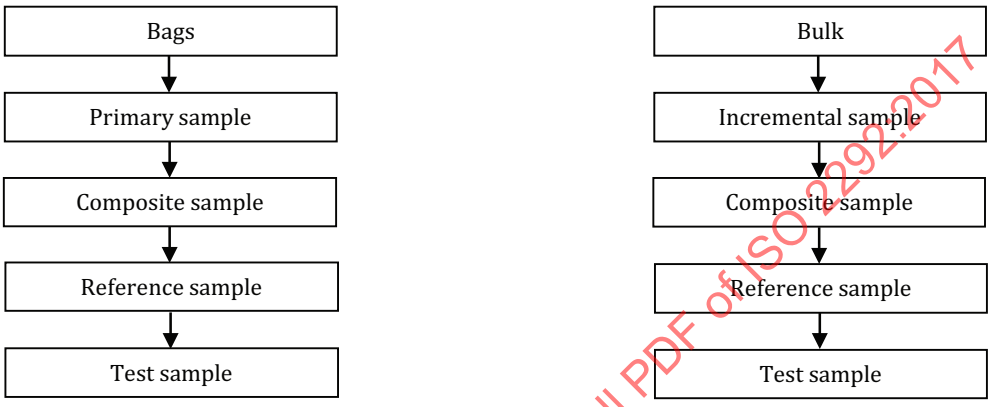
5.1 General

The objective of sampling is to obtain a properly representative sample of a lot of cocoa beans. Sampling shall be carried out by a sampler. A sufficient number of primary samples or incremental samples (as appropriate) shall be taken to provide a representative composite sample. The different types of samples in case of sampling from bags and bulk are shown in Figure 1 a) and Figure 1 b), respectively.

Reference samples shall be promptly sealed by the interested parties; interested parties are usually buyers and sellers or their respective representatives/agents.

Where a lot contains material that is not sound, it shall be segregated from the sound material pending a decision on how such damaged material is to be dealt with. Where the handling of the lot has created any loose whole cocoa beans and/or sweepings of cocoa material other than whole beans then this material shall be recovered, sampled separately and stored in separate bags adjacent to the sound cocoa of the lot.

Reference samples shall only be prepared from the sound material.



a) Sampling from bags **b) Sampling from bulk**

Figure 1 — Flowcharts of derivative samples when sampling from bags or bulk

5.2 Minimum and maximum size to be represented by a sample

5.2.1 Minimum

When the bill of lading or warehouse warrant refers to more than one main shipping mark, each of the quantities represented by those marks shall be subject to separate sampling, provided that each mark individually represents 25 t or more.

When the bill of lading or warehouse warrant refers to several main shipping marks, one or more of which represents less than 25 t, interested parties may choose to have only one sample to represent all those marks.

Samples shall be sealed and labelled in accordance with 5.5.

5.2.2 Maximum

A single reference sample shall not represent a lot of more than 250 t. Lots larger than 250 t shall be represented by separate samples each representing no more than 250 t.

5.3 Cocoa beans in bags

A minimum of 30 % of the sound bags shall be sampled. The amount drawn shall be a minimum of 300 beans per tonne. One primary sample shall be drawn from each sound bag selected for sampling. The position of the sampling point within each sound bag selected at random shall ensure an equal distribution of samples drawn from the top, centre or bottom of the bags within the lot.

Upon completion of the loading or discharge of the bill of lading quantity, all primary samples shall be emptied on to a thoroughly clean flat surface and in an area free from any possible contamination.

The composite sample is to be thoroughly and carefully mixed using dry, clean equipment immediately after the primary samples have been drawn.

Unless otherwise required, sampling holes should be closed to avoid spillage of cocoa.

Annex B provides additional guidance for sampling of bags.

5.4 Cocoa beans in bulk

5.4.1 General

Incremental samples each not exceeding 1 kg shall be taken uniformly, systematically, appropriately and concurrently with loading or discharge. The sample amount shall be a minimum of 300 beans per tonne drawn at the nearest practicable point to the hold or container, preferably from a moving stream when loading or discharging, or to/from silo, vessel, truck, barge, or other means of transport, from the whole of the bill of lading quantity.

Incremental samples shall be taken by ordinary sampling scoop or by other mutually agreed equipment (including automatic sampler) throughout loading or discharge and placed in (a) mutually agreed suitable container(s), to be kept closed and secure.

The sampling point is to be carefully selected and agreed between the sampler and the representatives of the interested parties, at a place where the incremental samples drawn are representative of the cocoa beans loaded or discharged.

In the event that the method of loading or discharge precludes access to a mutually agreed acceptable sampling point, the interested parties may interrupt the loading or discharge in order to draw incremental samples.

If samples are to be drawn from bagged cocoa prior to loading as bulk then samples shall be randomly drawn from a minimum of 30 % of the sound bags (see 5.3) presented to the interested parties for sampling.

Upon completion of the loading or discharge of the bill of lading quantity, all incremental samples shall be emptied on to a thoroughly clean flat surface and in an area free from any possible kind of contamination.

The composite sample is to be thoroughly and carefully mixed with dry, clean equipment immediately after the incremental samples have been drawn.

5.4.2 Moving stream

When sampling takes place while the lot is in motion, incremental samples shall be taken across the whole section of the flow, perpendicular to the direction of the flow, and at time intervals depending on the rate of flow.

If automatic instruments are used for sampling the beans when in motion, they shall have a slot opening that is at least 7,5 cm.

5.4.3 Stationary

When it is impossible to draw moving stream samples and samples are required to be taken from wagons or vehicles, incremental samples shall be drawn from the following:

a) not less than 5 sampling points from each wagon or vehicle containing up to 15 t;

b) not less than 9 sampling points from each wagon or vehicle containing 15 t to 30 t;

c) not less than 15 sampling points from each wagon or vehicle containing 30 t to 50 t.

Incremental samples drawn at each sampling point shall be derived from three levels within the vehicle or wagon and shall be approximately 1 kg per sampling point. Sampling points shall be from the middle of the wagons or vehicles and approximately 50 cm from the sides of the wagons or vehicles.

5.4.4 Discharge from containers

When it is impossible to draw moving stream samples, and samples are required to be taken from shipping containers then incremental samples may be drawn in accordance with the following procedure. The contents of the container should be emptied on to the clean dry floor of a suitable warehouse or other storage location and kept separate from all other goods. The pile of cocoa formed in this way by the emptying of the container should not exceed 25 t and should be accessible on all sides for the purpose of sampling.

Incremental samples should be drawn using suitable long-handled sampling equipment to draw representative samples from not less than 9 sampling points from the pile. The sampling points are to be selected as appropriate to the shape and size of the pile including a proportionate number from as close to the centre of the pile as reasonably possible. The sampling rate of a minimum of 300 beans per tonne shall apply to this rule.

5.5 Reference sample

At least two reference samples shall be prepared and sealed by the interested parties. The samples shall be retained in safe custody, preferably by a mutually agreed neutral entity. See Annex C for more information on sample retention.

The reference sample shall be as follows.

a) Formed immediately after the preparation of the composite sample by successively quartering the composite sample such that a minimum of 2 kg remains and ensuring that the material forming the reference sample represents as closely as possible that of the composite sample. Excess sample material shall be bagged, labelled and stored with the original lot.

b) Of a minimum mass of 2 kg net, packed and sealed in woven bags in accordance with ISO 2451.

c) Marked or labelled to show that it is drawn in accordance with 5.3 and 5.4, as applicable, and shall state as much information as possible from the following list:

   1) name of vessel;
   2) country of origin;
   3) port of shipment;
   4) port of discharge and, if different, place of final delivery;
   5) shipping mark(s);
   6) number of bags;
   7) date of sampling;
   8) final day of landing at port of discharge or, if different, last day of discharge at the place of final delivery;
   9) bill of lading number and date;
   10) warehouse name;
   11) name of sampler.

For quantities of cocoa beans less than 4 t interested parties should agree on the mass of material required to be drawn to form the composite sample and the reference sample, but which should in any case result in a reference sample of not less than 1 kg.

5.6 Sampling period

5.6.1 General

It is important that the process of sampling is not unduly interrupted such that the samples drawn reflect the condition of the lot at a definite point in time. Accordingly, the duration of the discharge or loading process can be of the utmost importance within the sampling process. By way of further guidance, see 5.6.2 and 5.6.3.

5.6.2 Discharge

When sampling cocoa beans (not in bags or other form of container) that are being discharged from the hold of a vessel, the sampling process shall be conducted during the period of time from when the hatches are opened and the ship's notice of readiness has been given to when the hold is emptied of the bill of lading quantity.

When sampling cocoa beans that are loose in a shipping container(s) (not in bags), the sampling process shall be conducted during the period of time from when the doors of the first container are opened until the last container of the bill of lading quantity is emptied.

5.6.3 Loading

When sampling cocoa beans (not in bags or other form of container) that are being loaded into the hold of a vessel, the sampling process shall be conducted during the period of time from when the hatches are opened and the ship's notice of readiness has been given to when the hold is filled with the bill of lading quantity.

When sampling cocoa beans that are loose in a shipping container(s) (not in bags), the sampling process shall be conducted during the period of time from when the doors of the first container are opened until the last container is filled to complete the bill of lading quantity.

6 Sampling report

On completion of the sampling process it is recommended to prepare a report. See Annex D for an example of a sampling report for cocoa beans in bags.

Annex A
(informative)

Sampling apparatus

A.1 Sampling of bags

Sampling from bags can be done using either a sampling spear or a sampling horn. Sampling spears should be at least according to the following parameters:

— length: 35 cm to 45 cm;

— diameter (inside): 2,8 cm to 3,0 cm (maximum 2 mm thick);

— diameter (outside): 3,0 cm to 3,2 cm (maximum 2 mm thick);

— weight: approximately 230 g;

— material: aluminium/alloy construction;

— angle: approximately 20°.

Figure A.1 shows an example of a sampling spear (also known as “trier”). Examples of a sampling horn are shown in Figures A.2 and A.3.

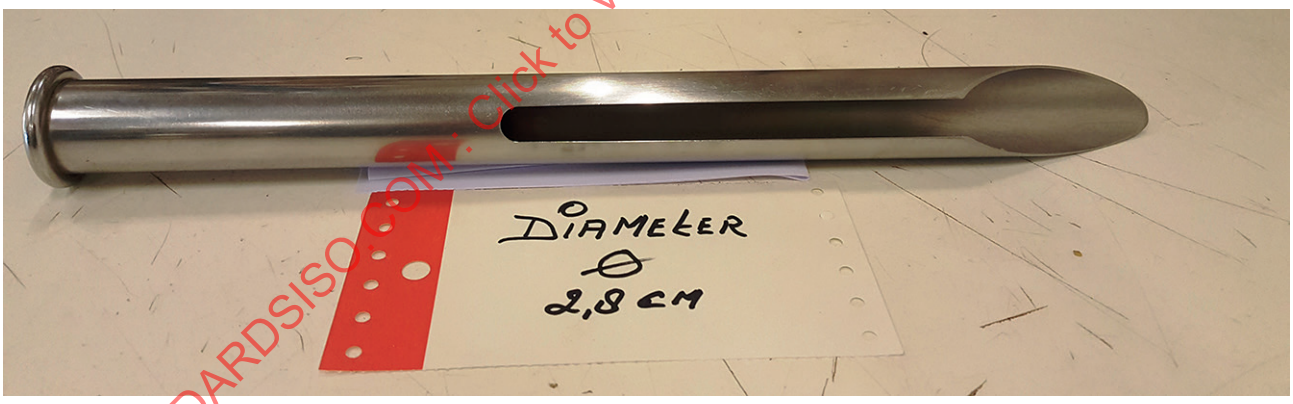


Figure A.1 — Example of a sampling spear (also known as “trier”) for sampling of bags

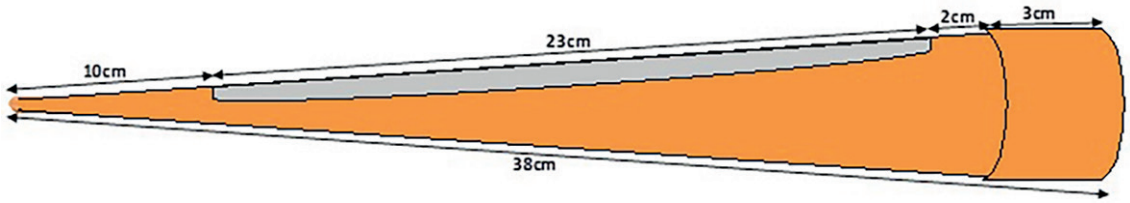


Figure A.2 — First example of sampling horn for sampling of bags

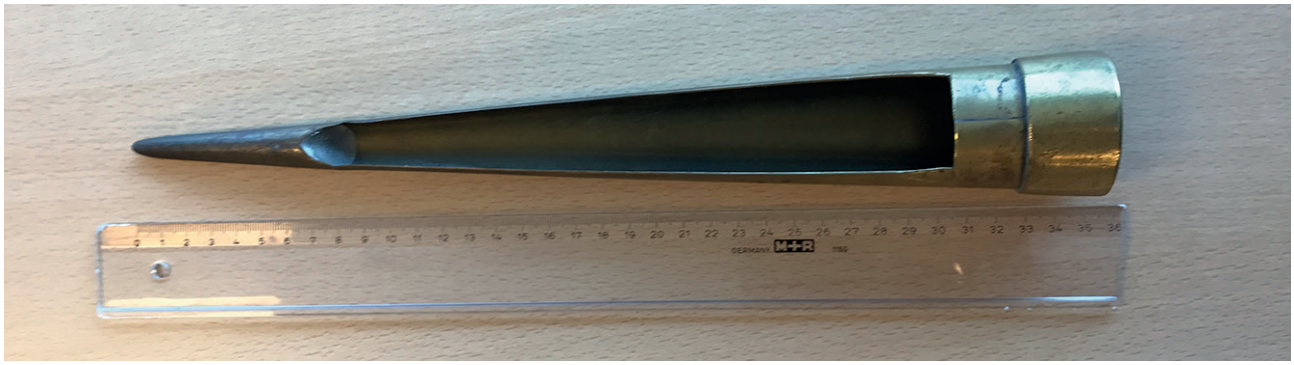


Figure A.3 — Second example of sampling horn for sampling of bags

A.2 Sampling of bulk

The length of the sampling spear (see Figure A.4) is to a great extent determined by the depth of the pile to be sampled. The number of openings/closures within the sampling spear will also depend upon the length of the sampling spear.

The diameter inside of the sampling spear can be 2,8 cm to 4,1 cm but should be a minimum of 3,5 cm. Most importantly, the method to be employed for its use is to have the chambers closed when probing the pile and to have the chambers opened prior to/during withdrawal from the pile.

Sampling spears should be at least according to the following parameters (static sampling cylindrical probes):

— length: 150 cm to 250 cm;

— diameter (inside): 3,5 cm to 4,1 cm (maximum 2 mm thick);

— diameter (outside): 3,6 cm to 4,2 cm (maximum 2 mm thick);

— compartments: minimum 5 chambers × 10 cm × 2,5 cm;

— weight: no recommendation;

— material: aluminium;

— angle: not applicable, otherwise approximately 20°.

If the length of the probe is more than 250 cm it is difficult to manipulate within the bulk pile. Another example of sampling apparatus is a sampling scoop (see Figures A.5 and A.6).

Figure A.4 — Example of a sampling spear for sampling of bulk

Figure A.5 — First example of a sampling scoop for sampling of bulk

Figure A.6 — Second example of a sampling scoop for sampling of bulk

Annex B
(informative)

Additional guidance for sampling of bags

The sampling of bags should be conducted carefully in order to respect the objective of providing a sample that is representative to the lot from which it relates. Appropriate equipment should be used in accordance with a methodology that will avoid compromising the sample due to failure of sampling in accordance with this document. This includes failure to ensure that, when difficulties of access or stacking occur, time is taken to work out the appropriate sampling method. The interested parties trust the sampler to help with the proper determination of quality whether or not one of the parties has appointed a superintendent as an independent party to observe the work of the sampler.

A key area of concern is that samples drawn do not contain cocoa related matter (including broken beans) created by the act of sampling itself. This is difficult to build into a standardized sampling procedure due to the wide variety of situations that samplers (and superintendents) may encounter.

EXAMPLE In stored/palletized cocoa the pressure on the jute bags filled with cocoa is higher on the lower level pallets than on those stored at a the higher levels. In such circumstances, the samples from bags accessible at normal height (say 2 m) need to be drawn from the corner-side of the bags, because at that point the bags are best accessible for sampling without causing too much damage to the beans within.

A solution can be found by carefully making a sampling hole into the bag from which the first flow of beans (and broken beans due to the force of the sampling probe) will fall out. After this the bag is ready for the actual sampling via the created hole, which will result in properly representative sampling. This will also minimize excessive sampling-hole damage to the bag. After taking a sample from a bag, the sampling hole should be closed (unless otherwise required) using the sampling probe to tap the jute around the sampling point to get as good a closure of the hole as possible. The higher the bags are in the stack, the less the pressure on the bags will be. For bags at higher levels, longer type sampling probes could be used (see Figure B.1 for an example).

Figure B.1 — Specially adapted probe for use at higher levels