GHANA STANDARD

DGS IG 2: 2023

First Edition 2023

National Implementation Guide for GS ARS 1000 — Part 2: Requirements for Cocoa Quality and Traceability

Reference No. DGS 2:2023(E) ICS 67.140.30

Preface

Conformity to the requirements of ARS 1001 is necessary for instituting and implementing a management system for achieving continuous production of sustainable and traceable cocoa. This system is vital for the acceptance of the cocoa beans the farm produces, both the national and international market, as sustainably produced and to be sold as such. In Ghana as well as within the African Region, the implementation of management systems for a food produce commodity is a relatively new concept especially for primary production companies. With the adoption of these regional standards, ARS 1001:2021 series, by Ghana as the national standards for the implementation of sustainable and traceable cocoa production (STMS) in cocoa farms, these documents are intended to provide guidance on the requirements of the ARS 1001 series of standards and recommendation on how the requirements of the standards should be implemented throughout the local cocoa industry.

Acknowledgements

This document was developed by a Technical Working Group comprising key stakeholders and experts including the Ghana Cocoa Board, Ghana Standards Authority, farmers, World Cocoa Foundation, Fairtrade International and Mondelez Ghana. We acknowledge their time and dedication to the development of this document. Special acknowledgement goes to the management of Ghana COCOBOD for funding the development process.

Introduction

1. Cocoa plant, varieties grown in Ghana

Cocoa, *Theobroma cacao* L, is an essential crop in the provision of raw materials, food, employment, income, poverty reduction [1] and also serves as a support to the multibillion global chocolate industry. Cocoa thrives well in areas with rainfall between 1100mm and 3000mm per annum but for optimum production, preference is given to areas with rainfall between 1500mm-2000mm and a dry season of not more than three months with less than 100mm rain per month. In addition, cocoa requires maximum temperatures ranging between 30-32^{0}C and minimum 18-21^{0}C with relative humidity of 100% at night and about 70-80% during the day. Cocoa is successfully grown in the forested areas of Ghana. Types of cocoa grown in Ghana are the forastero (Eg. Amelonado), criollo, Trinitario and the hybrid.

Forastero cocoa has its origin from high Amazonia (Peru, Ecuador and Colombia) and the Amazon basin (Brazil) and is commonly used for selection of breeding varieties. The criollo which has its origin from Mexico, Nicaragua, Guatemala, Colombia, Venezuala and Indonesia possesses pleasant aroma but is vulnerable to diseases. The trinitario which originated from Trinidad and Venezuela is an intermediate between Forastero and Criollo and also known to be highly susceptible to black pod disease. Hybrid cocoa presents several advantages over other cocoa types. Hybrid cocoa yields more pods per tree; has more than two harvest seasons in a year (compared with “Amelonado”); and has a shorter gestation period of three years as opposed to at least five years for older cocoa varieties. The introduction of the hybrid cocoa in Ghana is one of the numerous agricultural innovations to improve yield for sustainable cocoa production. The average yield of cocoa in Ghana is about 400 kilograms per hectare which falls below the expected optimal production level.

In Ghana, majority of the farmers operate individually as owners of the farms, with few operating collectively as cooperative or contract farming. Cocoa production serves as a major source of livelihood for most rural dwellers in the ten (10) cocoa growing regions of the country in the provision of income to sustain farm families. The dry cocoa beans produced are sold to COCOBOD through the Licensed Buying Companies (LBC's). Private partners play instrumental role in the cocoa value chain including service provision, input credit and global market accessibility through certification for sustainable cocoa production. In Ghana, the cocoa industry is regulated by Ghana Cocoa Board; the only government institution mandated by law to monitor and control the activities of actors in the cocoa value chain.

2. Farming practices and challenges

The contribution of Africa to the chocolate industry is well emphasized as about 70% of production is generated from the continent. This remarkable contribution had its source from smallholders that strive for daily improvement of livelihoods in their bid for sustainable production.

Ghana became the leading cocoa producer and exporter of dried cocoa beans from 1939 to mid-1960 [3] but currently is the second in the world's cocoa production and export after Cote D'Ivoire. The cocoa sector plays a major role in the development of the economy of Ghana as the sector contributes over 30 percent of the overall foreign earnings and also has the potential of reducing poverty and income insecurity in the country [4, 5]. To improve productivity of cocoa, adherence to good agronomic practices such as pruning, integrated soil fertility and pest management, timely weeding, timely harvesting and proper fermentation is required.

The assessment of global cocoa economy between 2011/2012 and 2022/2023 identified steady decline in cocoa stock [2]. The cocoa sector just like the other sectors has some challenges that if not addressed are likely to militate against the realization of the sectors objectives. Factors that affect cocoa production include low cocoa productivity, declining soil fertility, pests and diseases, unavailability of inputs, high cost of inputs, planting of low yielding varieties, outdated production systems, inefficient marketing systems, poor farm management practices, adverse effects of weather, low adoption of innovations and agronomic practices, technology and knowledge transfer as well as inadequate extension and advisory services.

The production of cocoa is largely dominated by smallholders who operate at very low levels of productivity due to limited resources. In the past, most of the increases in agricultural production were achieved through the expansion of cultivated land and intensive use of labour, rather than the use of improved farming technologies. As agricultural land becomes scarce due to increased population growth coupled with the rise in environmental problems, and the migration of economically active rural dwellers to the urban areas, the adoption of innovative farm technologies, for instance, hybrid seeds and new farm practices to increase output, has become necessary. Nevertheless, where there is the introduction of new crop varieties, the expectation of increased output has not been fully achieved since adoption remained slow across farmers. Pests and diseases have emerged to threaten cocoa production as well as

sustainability to the farmer, environment and industry [6, 7]. Pests and diseases could reduce crop yield from 20 to 86% in West Africa [8].

Another challenge to the sustainability of Ghana's cocoa is agricultural land use conflict between cocoa farming and gold mining. Gold mining has taken precedence over cocoa farming due to the higher and quick returns to gold mining as land use [9]. The competition for agricultural land between cocoa farmers and illegal miners remains a challenge to the cocoa sector as land used for cocoa are converted by illegal miners for mining purposes. The influx of miners in the coca growing communities has also resulted in the shift in labour from the agricultural sector to the mining sector leading to high cost of labour which adversely affects cocoa farmers. The pollution of water bodies in farming communities results in difficulty in nursery establishment and spraying of pesticides on farms.

The land tenure in most cocoa growing areas may not favour cocoa farmers as farms are mostly held under tenure arrangements as customary land owner's cocoa farms and tenant cocoa farms. One of the challenges that confronts cocoa production is the low adoption of good agronomic practices on the part of cocoa farmers. Information related to good agronomic practices such as pruning, weeding, integrated pest management, fertilizer application, harvesting and fermentation are propagated by Extension Agents of Cocoa Health and Extension Division. Cocoa farmers are educated and trained in good agronomic practices from land preparation to harvesting and drying which are categorized into training modules for the operational year. This serves as a means to improve Ghana's premium quality cocoa through sustainable production systems.

Child labour being one of the relevant social issues is a major concern to Ghana Cocoa Board as farmers are sensitized through the various extension media platforms.

Ghana Cocoa Board has rolled out productivity enhancement programmes namely: mass pruning, cocoa rehabilitation programme for the control of cocoa swollen shoot virus disease, irrigation, cocoa disease and pest control and fertilizer subsidy. In addition, farmers are also trained in climate smart agriculture to ensure resiliency and adaptation in the face of climate change.

To ensure farmers livelihood enhancement in the cocoa sector, there is the need to strengthen coordination of sustainable livelihood programmes among stakeholders. Developing Africa standards for cocoa would ensure the production of sustainable cocoa through improved farming systems, quality and traceable cocoa. This would complement the efforts of stakeholders in addressing the challenges in the cocoa sector.

3. Local cocoa production volumes

VOLUME OF COCOA PRODUCTION IN GHANA

YEAR	VOLUME (TONNES)
2016/17	969,510.69
2017/18	904,740.00
2018/19	811,746.50
2019/20	770,694.44

2020/21	1,045,074.38

4. Why the need for ARS series?

The ARSO Standard is being implemented to promote the production of sustainable cocoa beans in response to demands from consuming countries for sustainably produced cocoa. The Standards therefore addresses the three pillars of sustainability, namely: economic, social and environmental. The standards therefore address challenges such as: deforestation, climate change, worst forms of child labour, building farmers' capacity to run their farms as businesses to improve their livelihoods and ensuring the traceability and quality of cocoa produced. The Standard is practicalized with a country implementation guide that takes cognizance of traditions, cultures, land tenure systems & laws of the relevant country.

The ARSO series have been developed with the welfare of the cocoa farmer at the Centre, to protect their ownership and access to land for farming, build their capacity as an entrepreneur to access financial options that are available and protect and improve their incomes and livelihoods.
The Standards further recognizes the regulatory power of COCOBOD as a legal entity responsible for the development of the Implementation Guide and approval of Certification bodies to implement the Certification Scheme.

5. Development of the ARS series

The ARS 1001 series was developed from the ISO 34101 series which stipulated requirements for the production of sustainable and traceable cocoa at the international level. It was noted however that there were critical issues bordering on the different farming practices for different regions of the world. Since Africa comprises the world's largest cocoa producers, it was necessary to initiate the development of home-grown standards which would address unique issues that face cocoa farmers in Africa. Both series of standards are extensive in addressing various aspects of cocoa farming and trade. Compliance to the standards will be the optimal approach to assuring sustainable quality in cocoa production. The standards outline the controls required to manage risks that may impact on the quality of cocoa beans as well as tools to help the cocoa farmers to improve upon their operations, become more profitable and ensure customer satisfaction.

In 2019, shortly after the publication of ISO 34101 series, the governments of Ghana and Cote d'Ivoire formed a joint presidential technical committee to tease out critical issues for the proper implementation of these standards in the African context. The Ghana Cocoa Board and Conceil de Café de Cacao engaged a consultant to prepare working draft documents in this regard. They presented a proposal to ARSO Secretariat for the development of regional standards for sustainably produced cocoa and requirements for its equivalent certification scheme.

In January 2020 the process commenced for the development of regional standards for sustainable and traceable cocoa production in Africa. It was agreed by ARSO TMC that all countries within the region involved in cocoa production will be engaged in the work of the Technical Committee. In June 2021, the documents were approved and published by ARSO.

Purpose And Scope

The purpose of this document is for use as a guideline for establishing and implementing a cocoa farming management system that ensures production of sustainable and traceable cocoa beans. It also gives guidance to certification bodies and scheme owners on implementing a certification scheme and auditing the cocoa farm management system to ensure compliance to regulatory and other quality requirements.

References

The following references are the source material used in the development of this implementation guide:

ARS 1001-1 Sustainable cocoa — Part 1: Requirements for Cocoa Farmer as an Entity/Farmer Group/ Farmer Cooperative — Management systems and Performance

ARS 1001-2 Sustainable cocoa — Part 2: Requirements for Cocoa Quality and Traceability

ARS 1001-3 Sustainable cocoa — Part 3: Requirements for Cocoa Certification Scheme

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National Implementation Guide for GS ARS 1000 — Part 2: Requirements for Cocoa Quality and Traceability

1 Scope

This African Standard specifies the requirements for quality including classification, sampling, test methods, packaging and marking of cocoa beans *(Theobroma cacao* Linnaeus). It also specifies the basic requirements for the design and implementation of one or more traceability systems within the cocoa supply chain for sustainably produced cocoa beans from farm to the point of export (Free On Board), as well as to the factory gate at the local level for grinders.

2 Normative references

The following referenced documents are indispensable for the application of this Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 1000-1, *Sustainable cocoa — Part 1 Requirements for cocoa farmer as an entity, farmer group, farmer cooperative — Management systems and performance.*

3 Terms and definitions

For the purpose of this Standard the following terms and definitions apply.

3.1
adulteration
alteration of the composition of a lot (3.26) of cocoa by deliberate mixing.

3.2
audit
systematic, independent and documented process for obtaining objective evidence and evaluating it objectively to determine the extent to which the audit criteria (3.3) are fulfilled. An audit could be internal or external.

3.3
audit criteria
set of requirements used as a benchmark against which objective evidence (3.4) is compared.

3.4
audit evidence
any objective document or instrument that is used to evaluate how well audit criteria (3.3) are being met.

Note 1: Audit evidence may be qualitative or quantitative

Note 2: As defined in ISO 19011.

3.5
bean count
total number of whole beans per 100 g determined under specific conditions.

Note: The specific conditions and the test method are specified in Annex D.

3.6
bean cluster

two or several beans joined together which cannot be easily separated by using the finger and thumb of both hands.

3.7
broken bean
cocoa bean (3.9) of which the fragment (3.22) is missing, the remaining part being more than half of the whole bean.

3.8
cocoa
cocoa beans (3.9) or derived products from cocoa.

3.9
cocoa bean
commercial term designating the whole seed of the cocoa tree *(Theobroma cacao Linnaeus*) which has been fermented and dried.

3.10
cocoa bean fermentation
process of spontaneous processing from the mucilaginous pulp of the accumulated fresh cocoa beans until the typical characteristics are obtained, such as swelling of the beans, odour of the mass, brown colouring of the cotyledons and drop in temperature.

3.11
cocoa related matter
bean clusters (3.6), broken beans (3.7) and associated fragments (3.22) and/or pieces of shell that do not pass through the sieve (3.34).

3.12
cocoa supply chain
sequence of the stages and operations involved in the movement and processing of cocoa (3.8), from cocoa farm to export of sustainable cocoa beans and/or by products.

3.13
cocoa supply chain actor
person or entity that physically handles or takes legal ownership or makes claims of sustainably produced cocoa (3.8).

3.14
conformity
fulfilment of a requirement.

3.15
contamination
presence of a smoky, hammy or other smell not typical to cocoa, or a substance not natural to cocoa, which is revealed during the cut test (3.17) or physical inspection of a reference sample (3.32).

3.16
corrective action
action to eliminate the cause of a non-conformity and to prevent recurrence

Note 1: There can be more than one cause for non-conformity.

Note 2: Corrective action (3.16) is taken to prevent recurrence whereas preventive action is taken to prevent occurrence.

3.17
cut test

procedure by which the cotyledons of cocoa beans (3.9) are exposed for the purpose of determining the incidence of defective and or slaty beans (3.37), violet or purple beans (3.42) and or presence of contamination within a test sample (3.39).

3.18
dry cocoa
commercial term designating cocoa beans (3.1) which have been evenly dried throughout and of which the moisture content corresponds to the requirements of this African Standard.

3.19
external audits
audits (3.2), which include those generally, called second and third party audits. Second party audits are conducted by parties having an interest in the recognized entity, such as customers or by other persons on their behalf. Third party audits are conducted by external, independent auditing organizations.

3.20
flat bean
cocoa bean (3.9) that is too thin to be cut to give a complete surface of the cotyledon

3.21
foreign matter
any substance other than cocoa beans (3.9).
Note: Cocoa related matter, sieving, husk and placenta are to be considered as foreign matter.

3.22
fragments
piece of cocoa bean equal to or less than half the original bean.

3.23
germinated bean
cocoa bean (3.9) of which the seed germ has pierced the shell as evidenced either by the physical presence of the seed germ or by a hole in the shell following its detachment.

3.24
insect-damaged bean [infested bean]
cocoa bean (3.9) damaged by insects (infested beans) of which the internal parts are found to contain insects or mites at any stage of development, or show signs of damage caused thereby, which are visible to the naked eye.

3.25
internal audit
audit conducted by the recognised entity itself, or by an external party on its behalf.

3.26
lot
quantity of cocoa beans (3.9) in bags or in bulk established at any point in the cocoa supply chain and from which primary samples and/or incremental samples are to be drawn for quality analysis purposes.

3.27
main crop

Beans with a lower bean count (per 100g)/ larger size.

Note 1: Beans produced during the main crop are usually of a lower bean count (per 100 g)/larger size.

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Note 2: Light/mid-crop beans produced during the light/mid harvest period of that particular origin.

Note 3: Beans produced during the light/mid-crop are usually of a higher bean count (per 100 g)/smaller size.

3.28
mouldy bean
cocoa bean (3.9) on the internal parts of which mould is visible to the naked eye.

Note: Mould is not to be confused with white spot, which is a concentration of theobromine or cocoa fat.

3.29
one step forward and one step back
identification from where the cocoa (3.8) came and to where the cocoa went.

3.30
preliminary test sample
quarter of the reference sample (3.33) obtained by using a splitter/divider, which can be less than 600g.

3.31
process
set of interrelated or interacting activities which transforms inputs into outputs.

Note: 1 Inputs to a process are generally the outputs of other processes.

Note: 2 Processes in an organization are generally planned and carried out under controlled conditions to add value.

3.32
reference sample
representative sample prepared by successively quartering the composite sample such that a minimum of 2 kg net remains.

3.33
segregation
process (3.31) that separates conforming from non-conforming cocoa.

3.34
sieve
screen with round holes, the diameter of which are 5.0mm.

3.35
sieving
Materials (3.36) that passes through sieve (334).

3.36
sieving waste
any material, debris passing through the sieve with round holes, the diameter of which are 5.0 mm.

3.37
slaty bean
cocoa bean (3.9) that shows a slaty colour on at least half of the surface of the cotyledon exposed by the cut test (3.17) irrespective of texture.

3.38
sustainably produced cocoa

cocoa beans (3.9) that are produced in an economically viable, environmentally sound and socially responsible manner, by the Recognized entity.

3.39
test sample
not less than 600g of cocoa beans (3.9) drawn from the reference sample (3.32) by using a flat-bottomed shovel drawn across the middle of the reference sample. Test sample shall be obtained after sieving in accordance with the method specified in Annex B and after removing the cocoa related matter (3.11), flat beans (3.20) and foreign matter (3.21).

3.40
traceability
ability to follow the physical movement of sustainably produced cocoa (3.38) through specified stage(s) of production, marketing and processing.

3.41
traceability system
totality of data and operations that is capable of maintaining desired information about sustainably produced cocoa and its components through production and/or supply chain.

3.42
violet or purple bean
cocoa bean (3.9) that shows a violet or purple colour on at least half of the surface of the cotyledon exposed by the cut test (3.17).

ARS 1000-2 **4 Requirements for the registration of cocoa supply chain actors** As a pre-requisite for undertaking any sustainable cocoa supply chain operations, supply chain actors shall approach the Regulator/Legal Entity for the purpose of being registered.
Guidance
Year of Application Year 1

ARS 1000-2 **5 Condition for obtaining quality cocoa beans** The quality of cocoa beans starts from production through harvesting, processing, pod-breaking, fermentation, drying, packaging and storage in compliance to clauses 11.3.6 to 11.3.10 of ARS 1000-1. Cocoa beans shall be fermented and dried until their moisture content no longer exceeds the percentage as specified in Table 1. Cocoa beans prepared in this manner are commercially referred to as dry cocoa.
Guidance The Regulator should sensitize farmers on cocoa bean production to acceptable quality.
Year of Application Year 1

ARS 1000-2

6 Requirements for quality

6.1 General requirements

Lots of cocoa beans shall be:

a) free from smoky or other smell not typical to cocoa, or a substance not natural to cocoa, free from any evidence of adulteration.

b) virtually free from live insects, insect eggs, larvae, pupae, mites, rodents, or other types of infestation.

c) within the range for violet or purple beans, if specified, typical for the grade or origin

d) practically free from germinated beans,

e) practically uniform in size and colour, good fermented, fit for production of foodstuff

Guidance

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ARS 1000-2

6.2 Specific requirements

Cocoa bean shall comply with the specific requirements stipulated in Table 1 below.

Table 1 — Specific requirements for cocoa

Parameter	Maximum limit	Methods of test
Cocoa related matter	3,5 % of the mass of the reference sample representing the lot	Annex C
Flat beans	1.5 % of the mass of the reference sample representing the lot.	Annex C
Foreign matter	0.75 % of the mass of the reference sample representing the lot.	Annex C
Moisture content	8% by mass	Annex F
Debris	1.5 % of the mass of the reference sample representing the lot.	Annex B
Note: Both supplier and buyer should agree on what to deliver if 1.5% standard cannot be achieved especially during light crop season.		

Guidance

Year of Application

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ARS 1000-2

6.3 Grade determination

6.3.1 Classification for cocoa beans

Cocoa beans grades shall be classified in accordance with Table 2 and 3 and tested in accordance with methods prescribed in Annex E.

Table 2 — Producing country internal classification for fermented beans

Grade	Maximum Percentage of beans			Method of test
	Mouldy	Slaty	Insect-damaged and/or germinated	Annex E
1	3	3	3	
2	4	8	6	

Note 1: The Maximum percentage of beans". given in the last column apply to the combined total of all the defects specified in the column header.

Note 2: National regulations apply if percentage range is different from above.

Table 3 — International trade classification for fermented beans

Grade	Maximum Percentage of beans		Method of test
	Slaty	Mouldy and/or Insect-damaged	Annex E
Good	5	5	
Fair	10	10	

Note: The percentages given in the last column applies to the combined total of all the defects specified in the column header.

Guidance

To maintain the high quality of Ghana's cocoa beans, Ghana's cocoa beans specification should be conformed to.

Grade	Mouldy (%)	Salty (%)	Other Defects (%)
Grade I	3	3	3
Grade II	4	8	6

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ARS 1000-2

6.3.2 Substandard cocoa

Fermented cocoa beans grades that exceed the grade 2 limits prescribed in Table 2 shall be regarded as substandard. Any cocoa beans that exceed the limits prescribed in Table 3 shall not be exported unless a buyer so requests for such categories.

Note: Substandard is marked "SS" for English- and Spanish-speaking countries. For French-speaking countries it is marked "HS" (hors standard).

Guidance

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6.4 Bean size

Bean size is defined by the bean count and is usually expressed by the number of beans per 100 grams.

a) Premium size beans: bean count of 80-90;

b) Standard size beans: bean count of 91 – 105;

c) Medium size beans: bean count of 106 -110;

d) Small size beans: bean count of 111 - 120;

e) Very small size beans: bean count greater than 120.

Guidance

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ARS 1000-2

7 Sampling

Sampling shall be carried out in accordance with the requirements of ISO 2292. Annex A shows flowcharts of derivative samples when sampling from bags or bulk.

For all the test methods described in Annexes B to F, the reference sample shall be prepared in accordance with the method described in ISO 2292.

Guidance

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ARS 1000-2

8 Packaging

Bags for packaging shall be clean and strong enough, intended to come into contact with foodstuffs and properly sewn and sealed. Cocoa beans shall be shipped in new bags only. Bags woven from natural fibres (or liners where applicable per international contract) suited to food contact and properly sewn or sealed. Ink or paint used for marking shall be of food grade quality.

Guidance
In order to promote food-grade packaging, vegetable oil treated bags should be used for cocoa bean packaging.

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ARS 1000-2

9 Marking

Each bag of cocoa beans shall be sewn and sealed. The sewn or sealed bag may show the following or some of this information:

a) the producing country;

b) the name of the product;

c) the grade of the product

d) crop year of the product

e) shipping marks when applicable;

f) any other applicable identification marks, including the types of verification (E.G ARS1000).

g) net weight;

h) ARS

Note 1: Bags Marked ARS contain conforming cocoa

Note 2: National regulations can apply to identification markings for the bags/seals.

Guidance

In Ghana, the Regulator is responsible for generating marks for bags of cocoa beans as listed in clause 9. The station mark provided by the Regulator, bean size and lot number should also be indicated on the bags

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ARS 1000-2

10 Test report

The test report is a document that records data obtained from an evaluation of specific parameters in an organized manner and describes the environmental or operating conditions.

The test report shall include at least the following:

a) all details required for complete identification of the reference sample;

b) the methods used and the results obtained;

c) mention of any details of procedures not specified in this document, or regarded as optional;

d) any circumstances that may have influenced the result.

Guidance

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ARS 1000-2

11 Principles of traceability

Traceability relates to the origin of the sustainably produced cocoa, processing history or movement of the cocoa along the supply chain, and addresses at least one step forward and one step back for each actor in the cocoa supply chain.

In agreement among the cocoa supply chain actors concerned, it may apply to more than one part of the cocoa supply chain. The cocoa supply chain actor identifies the relevant cocoa for which the objectives of its traceability system for sustainably produced cocoa apply.

Each element of a traceability system for sustainably produced cocoa is considered and justified on a case-by-case basis, taking into account the objectives to be achieved.

Traceability systems for sustainably produced cocoa shall be able to:

a) document the history of the cocoa or locate the cocoa along the cocoa supply chain.

b) contribute to the identification of the cause of non-conformity.

c) improve appropriate use and reliability of information, effectiveness and efficiency of the cocoa supply chain actor.

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ARS 1000-2

12 Objectives of traceability

The objective of traceability is to improve transparency and contribute to accountability in the supply chain. The cocoa supply chain actor shall establish specific traceability objectives at relevant functions, levels and processes needed for the traceability system.

The specific traceability objectives shall be:

a) measurable;

b) monitored;

c) communicated to relevant internal and external interested parties;

d) updated as appropriate.

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Guidance

The cocoa supply chain actor shall maintain documented information on the cocoa traceability objectives.

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13 Requirements for traceability

13.1 General requirements

13.1.1 Traceability system attributes

The traceability system for sustainably produced cocoa shall include:

a) objectives, including provisions to ensure the integrity of the sustainably produced cocoa;

b) documented information about the cocoa at every level in the cocoa supply chain, from cocoa farm to export point (Free On Board), as well as at local level for grinders;

c) procedures needed for the effective operation of the traceability system.

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13.1.2 Requirements of Traceability system

The traceability system for sustainably produced cocoa shall be:

a) verifiable ;

b) applied consistently and equitably ;

c) implementable ;

d) effective and result oriented ;

e) balanced, technical feasible and economical viable.

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ARS 1000-2

13.2 Organizational requirements

The Regulator/Legal Entity, the Recognized entity and other cocoa supply chain actors shall demonstrate their commitment to the implementation of a traceability system for sustainably produced cocoa by:

a) assigning a management representative with the overall responsibility for ensuring that the cocoa supply chain actor, inclusive of all operational units, fulfil the requirements of this Standard;

b) defining and assigning tasks and responsibilities for the effective implementation and operation of the traceability system;

c) providing resources necessary for the effective implementation and operation of the traceability system.

The Regulator/Legal Entity, the Recognized entity, certification body and auditors authorised by the Regulator shall determine applicable statutory and regulatory requirements relevant in relation to traceability of sustainably produced cocoa. It shall ensure that these requirements are understood and constantly met by its personnel and/or subcontractors.

The Regulator/Legal Entity, the Recognized entity and other cocoa supply chain actors shall ensure that the persons/entities performing work under their control that affects the performance and effectiveness of the traceability system are competent on the basis of appropriate education, training and/or experience.

The Regulator/Legal Entity, the Recognized Entity and actors in the cocoa supply chain must ensure that the person/entities that carry out a work under their control and which affect the performance and efficiency of the Traceability System, are competent on the basis of their education, training and/or proven experience and are free from any form of conflict of interest

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ARS 1000-2

13.3 Specific requirements

13.3.1 Documentation

The Recognized entity and cocoa supply chain actors shall determine the information to be:

a) obtained from its suppliers;

b) collected concerning the cocoa and process history;

c) provided to its customers and/or suppliers.

In the development and implementation of a traceability system for sustainably produced cocoa, the Recognized entity and cocoa supply chain actors shall take into consideration their existing operations and management systems.

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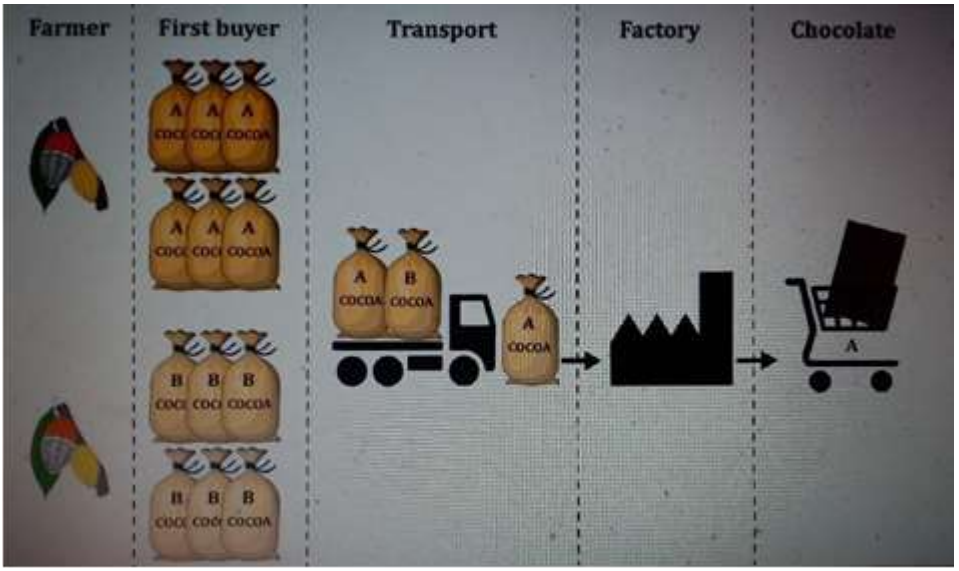
ARS 1000-2

14 Physical traceability — Cocoa segregation

The Recognized entity and stakeholders in the cocoa supply chain shall ensure and verify through procedures and documentation that conforming cocoa is separated from non- conforming cocoa from the cocoa farm to the point of export (Free On Board) (see Figure 1).

Note: Each country shall address traceability within the country implementation guidelines with regards to supply chain of conforming and non-conforming cocoa.



Key
A conforming cocoa B non-conforming cocoa

Figure 1 — Schematic presentation of segregation

Guidance

The Regulator would work to establish a differentiated producer price for sustainably produced cocoa beans and conventional cocoa beans and announce this annually to recognized entities and registered farmers.

The recognized entity may choose a Licensed Buying Company to which its registered farmers would sell its sustainably produced cocoa beans. This decision should be taken at a General Assembly and documented. The chosen LBC should have the necessary logistical resources to buy, collect and store sustainably produced cocoa beans in the catchment area of the recognized entity and its registered farmers. The recognized entity should ensure that its registered farmers sell their sustainably produced beans to the chosen LBC only.

Purchasing Clerks (PCs) should have a list of all recognized entities, their registered farmers and production estimates for due diligence. The PCs would ascertain the quality of cocoa beans before accepting to purchase. On purchase, the PC will record the weights, date and amount paid for sustainably produced cocoa beans purchased in the registered farmers pass book and PCs ledger. The PC will aggregate sustainably produced cocoa beans from registered farmers of the same recognized entity in bags. The code of the recognized entity issued by the Regulator should be marked on the bag(s). PCs should not aggregate sustainably produced cocoa beans of registered farmers of different recognized entities in the same bag.

Bags of sustainably produced cocoa beans from farmers of different recognized entities may be transported and stored together but must be segregated from bags of conventional cocoa beans. Sustainably produced cocoa beans in bags transported from PCs to depots should be accompanied by a signed way bill. The way bill should

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contain the weight of the sustainably produced cocoa beans, the names of all registered farmers whose beans make up the consignment, date, the type of cocoa beans (i.e. Sustainably Produced Cocoa Beans), serial number of way bill and any other relevant information.

Bulking at depots should be carried out according to recognized entities' codes. Bags used for re-bagging should be marked with the recognized entity's codes. District managers of depots should pack bags of sustainably produced cocoa beans, of the same recognized entity code, in lots of 30 for the main crop season and 15 for the light crop season.

Depots should keep copies of way bills of sustainably produced cocoa beans from PCs and record details in a depot ledger. Depots should generate way bills for secondary evacuation. Depot way bills should contain the entity codes and number of bags, the date, the vehicle number, driver's name, the district, LBC, take over centre, serial number of way bill, the type of cocoa beans (i.e. Sustainably Produced Cocoa Beans) and any other relevant information. Depot way bills will be accompanied by a QCC Evacuation Certificate.

Provide requirements for hauliers.

Year of Application

Year 1

ARS 1000-2

15 Monitoring and improvement

15.1 Monitoring

The Recognized entity and cocoa supply chain actors shall monitor the effectiveness of the traceability system for sustainably produced cocoa.

Guidance

Year of Application

Year 5

ARS 1000-2

15.2 Internal audit

15.2.1 The Recognized entity and cocoa supply chain actors shall conduct internal audits at planned intervals of not more than 12 months to provide information on whether the traceability system:

a) conforms to the requirements of this document;

b) conforms to the cocoa supply chain actor's own procedures;

c) is effectively implemented and maintained

15.2.2 The Recognized entity and cocoa supply chain actors shall:

a) establish and implement internal audit plan(s) and programme(s), including the frequency, methods, responsibilities, planning requirements and reporting, which shall take into consideration the management objectives, the importance of the processes concerned, changes impacting the farmer group, and the results of previous audits;

b) ensure that the results of the internal audits are reported to top management;

c) take appropriate corrective actions within a reasonable timeframe;

d) retain documented information as evidence of the implementation of the internal audit;

e) identify opportunities for improvement.

Guidance

Year of Application

Year 5

ARS 1000-2

15.3 Improvement

15.3.1 Non-conformity and corrective actions

15.3.1.1 Non-conformity

When a non- conformity occurs, the stakeholder in the cocoa supply chain shall document the entire process of analysis and handling of the non- conformity:

a) take notice to the non-conformity, and, as applicable-

1) take action to control and correct it;

2) deal with the consequences;

b) evaluate the need for action to eliminate the cause(s) of the non-conformity, in order that it does not recur or occur elsewhere, by:

1) reviewing and analysing the non-conformity;

2) determining the causes of the non-conformity;

3) determining if similar non-conformities exist, or could potentially occur;

c) implement any action needed;

d) review the effectiveness of any corrective action taken;

e) make changes to the traceability system for sustainably produced cocoa, if necessary.

15.3.1.2 Corrective actions

a) Corrective actions shall be appropriate to the effects of the nonconformities encountered.

b) The Recognized entity and cocoa supply chain actors shall retain documented information as evidence of:

1) the nature of the non-conformities and any subsequent actions taken;

2) the results of any corrective action.

Guidance

Year of Application

Year 5

ARS 1000-2

15.3.2 Continual improvement

The Recognized entity and cocoa supply chain actors shall continually improve the suitability, adequacy and effectiveness of the traceability system for sustainably produced cocoa.

Guidance

The Regulator would monitor and audit the effectiveness of the traceability system for sustainably produced cocoa in Ghana.

Year of Application

Year 5

ARS 1000-2

16 Review

The Recognized entity and cocoa supply chain actors shall review the traceability system for sustainably produced cocoa at appropriate intervals to ensure continual improvement.

This review shall include, but is not limited to, the following traceability-related aspects:

a) audit results;

b) changes to cocoa or processes;

c) information provided by other cocoa supply chain actors;

d) corrective actions;

e) customer feedback, including complaints;

f) new or amended regulations affecting traceability

Guidance

The Regulator would review the traceability system for sustainably produced cocoa in Ghana.

Year of Application

Year 5

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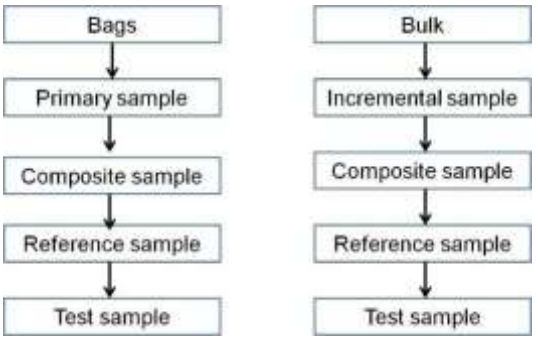
Annex A
(normative)

Flowcharts

Figure A.1 shows flowcharts of derivative samples when sampling from bags or bulk. See ISO 2292 for further descriptions and requirements for the different types of samples. Figure A.2 shows a flowchart of the sequence of testing that shall be followed for the test methods specified in Annexes B to F of this document.



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

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

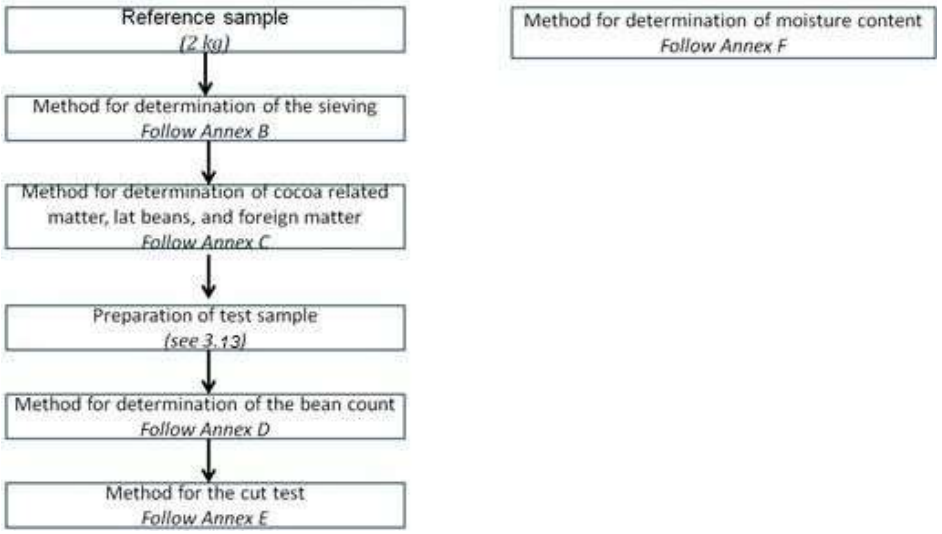


Figure A.2 — Flowchart of sequence of test methods

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Annex B
(normative)

Method for determination of the sieving note

B.1 Procedure

Weigh the entire reference sample (m_{TOTAL}) and then sieve through a sieve. Collect and weigh the quantity passing through the sieve, which is known as “the sieving”.

Obtain the percentage of the sieving by comparing the mass of the sieving against the total net mass of the reference sample multiplied by 100.

Once the measurement has been taken, do not re-integrate the sieving into the remainder of the reference sample (Derivative 1).

B.2 Expression of result

The rate of the sieving, S (%), is given by formula below:

$$S = \frac{\mathrm{m\ x\ 100}}{\mathrm{m\ TOTAL}}$$

where

m is the mass of the sieving, in g;
m_{TOTAL} is the total net mass of the reference sample, in g.

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Annex C
(normative)

Method for determination of foreign matter including cocoa related matter and flat beans

C.1 Procedure

Empty the remainder of the reference sample in Annex B (Derivative 1) onto a tray of sufficient size to facilitate the measurement of cocoa related matter, flat beans and foreign matter.

Separate, aggregate and weigh each category, i.e. cocoa related matter, flat beans and foreign matter, and express the mass of the quality parameter in relation to the net mass of the reference sample (mTOTAL) in Annex B multiplied by 100.

Once the measurement has been taken, do not re-integrate the matter that has been extracted for testing into the remainder of the reference sample (Derivative 2).

C.2 Expression of result

The quality parameter, $P_{QUALITY}$ (%), is given by formula below:

$$PQUALITE = \frac{\mathrm{mQP\ x\ 100}}{\mathrm{mTOTAL}}$$

where

$\underline{mQP}$ is the mass of the quality parameter, in g;
mTOTAL is the total net mass of the reference sample, in g.

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Annex D
(normative)

Method for determination of the bean count

D.1 Procedure

The bean count determines the average number of whole cocoa beans that weigh 100 g. After sieving in accordance with Annex B and removing cocoa related matter, flat beans and foreign matter in accordance with Annex C, empty the remainder of the reference sample (Derivative 2) onto a clean, dry, flat surface and thoroughly mix. Take a test sample of not less than 600 g cocoa beans from the reference sample by using a flat-bottomed shovel drawn across the middle of the remainder of the reference sample (Derivative 2).

D.2 Determination

Remove any cocoa related matter, flat beans and foreign matter still remaining following the procedure set out in Annex C from the test sample, and then weigh and replace by an equivalent mass of whole beans taken randomly from the remainder of the reference sample (Derivative 2). Then count the total number of beans in the test sample. The resulting number is known as the bean count.

D.3 Expression of result

The bean count, nBEAN, shall be expressed as number of beans per 100 g, as given by formula below:

where

$\underline{n}_{WHOLE}$ is the mass of the number of whole beans;
m_{WHOLE} is the total net mass of whole beans.

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Annex E
(normative)

Method for the cut test

E.1 Procedure

The cut test is conducted on the test sample of whole beans from the determination of the bean count in Annex D. Select 300 whole beans irrespective of size, shape and condition, from the test sample.

E.2 Determination

Open or cut these 300 beans lengthwise through the middle, so as to expose the maximum cut surface of cotyledons. Visually examine both halves of each bean in full daylight or equivalent artificial light. Count separately each defective type of bean, i.e. those that are mouldy, slaty, insect-damaged (or germinated, flat).

When a bean is defective in more than one respect, count only the defect that appears first in the list of defects expressed in their decreasing order of gravity, as specified in 6.3.1.

E.3 Expression of result

Express the result for each kind of defect as a percentage of the 300 beans examined.

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Annex F
(normative)

Method for determination of moisture content (oven method)

F.1 General

This annex specifies the oven method for the determination of the moisture content of cocoa beans. The moisture content of cocoa beans is, conventionally, the loss in mass determined by the method specified in this annex, and expressed as a percentage by mass.

In addition to the oven method, there are alternative methods of moisture determination using machines or other apparatuses applying technologies such as infrared, capacitance measurement, conductivity, dielectric, nuclear magnetic resonance or neutron probe. Such machines and apparatuses may be used provided that such other technology is correlated to the oven method by a methodology published by the manufacturer together with operational instructions as to frequency and procedure for calibration thereof.

The oven method, however, is the standard reference method and other machines or apparatuses should as far as possible be correlated therewith.

F.2 Principle

After grinding, weighing and drying of cocoa beans for 16 h in a ventilated oven controlled at 103 °C ± 2 °C, determine the moisture content by calculating the difference in mass.

F.3 Apparatus

Usual laboratory equipment and the following:

F.3.1 Grinder, which allows the beans to be ground without heating.

F.3.2 Ventilated oven, preferably fitted with a fan, capable of being controlled at 103 °C ± 2 °C.

F.3.3 Dish with lid, of metal, resistant to attack under the conditions of the test, or of glass, with at least 35 cm^2 of useful surface (for example minimum diameter 70 mm) and 20 mm to 25 mm deep.

F.3.4 Desiccator, containing an efficient desiccant.

F.3.5 Analytical balance, with a readability of 1 mg.

F.4 Procedure

F.4.1 General

Grind a fraction of one quarter of the reference sample with a grinder (F.3.1) to form particles that do not exceed 5 mm, but avoiding the formation of a paste. The beans used shall be representative of the reference sample.

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F.4.2 Test portion

Weigh the previously dried empty dish with lid (F.3.3). After grinding the beans in accordance with F.4.1 quickly place in the dish a test portion of 10 g. Weigh the dish with lid, containing the grinded test portion, to the nearest 1 mg.

F.4.3 Determination

Place the dish (F.3.3) containing the test portion on its lid in the ventilated oven (F.3.2) controlled at 103 °C ± 2 °C. Leave for 16 h ± 1 h, taking care not to open the oven. At the end of this period, remove the dish, cover it immediately with its lid and place it in the desiccator (F.3.4). Allow to cool to ambient temperature (approximately 30 min to 40 min after placing in the desiccator) and weigh, still covered, to the nearest 1 mg.

F.4.4 Number of determinations

Carry out two determinations with test portions from the quartered reference sample after grinding, each on a quantity of beans that has been treated individually, i.e. grinding, taking the test portion and drying.

F.5 Note on procedure

The grinding and weighing operations for each determination shall be carried out as rapidly as possible, and in any event within 5 min. When it is not possible to perform the weighing operation within 5 min, the test portion shall be stored in a plastic bag or air-tight container for a maximum period of 2 h. After weighing the test portion, the dish with lid may be left to stand, for example in the case of a series of weighing.

F.6 Expression of result

F.6.1 Method of calculation and formula

The moisture content of the reference sample, expressed as a percentage by mass, is given by Formula below:

where

m_0 is the mass of the empty dish with lid, in g;
m_1 is the mass of the dish with lid and the test portion before drying, in g;
m_2 is the mass of the dish with lid and the test portion after drying, in g.

Take as the result the arithmetic mean of the two determinations (see F.4.4), provided that the requirement for repeatability (see F.6.2) is satisfied. If not, repeat the determinations. Report the result to one decimal place.

F.6.2 Repeatability

The difference between the results of two determinations, carried out simultaneously or in rapid succession by the same analyst, shall not exceed 0,3 g loss in mass per 100 g of the quartered reference sample.

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Annex G
(normative)

Storage of bagged cocoa

Cocoa beans should be placed in warehouses constructed and used in such a way so as to maintain the moisture content as specified in 5.2.4.

The beans should be stored on gratings or deckings giving a clear space above ground of at least 7 cm for air circulation.

Measures should be taken to prevent infestation by insects, rodents and other pests.

The bags of cocoa beans should be stacked in such a way that

a) individual grades and brands are separated by a passage at least 60 cm wide, similar to that which should be left between the bags and the walls of the warehouse

b) disinfestation by fumigation and/or careful spraying with suitable insecticides can be carried out if necessary (see Annex H), and

c) contamination by odours or flavours, or by dust from other products such as other foods, or by products such as oil, cement, and tar should be avoided.

d) Sustainable cocoa must be separated from non-sustainable cocoa

Periodically during storage, immediately before shipment and on discharge outside the producing country, the moisture content of each lot should be checked.

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Annex H
(informative)

Disinfestation

The use of pesticides to control insects, rodents and other pests in cocoa is necessary. Great care should be exercised in the choice of pesticides and in the technique of their application to avoid incurring risk of tainting or the addition of toxic residues to cocoa.

Note: Importing countries have specific food safety regulations.

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Annex I
(informative)

Procedure and flowchart for preliminary quality analysis

1.1 General
This annex shows a flowchart of the sequence of testing that may be followed in accordance with the test methods specified in Annexes B to F using preliminary test samples of 500 g or more, quartered from the reference sample. Annex I may be used for preliminary quality analysis to establish whether lots of cocoa beans meet the requirements of this document.

1.2 Procedure
Obtain four preliminary test samples of 500 g or more by splitting/dividing the reference sample into quarter fractions using a splitter/divider. Conical divider quartering irons or other suitable dividing apparatuses are recommended for use. The preliminary test samples should be weighed; the masses of the quartered fractions may be different but should be a quarter of the total mass of the entire reference sample. At least one of the preliminary test samples should be safeguarded from drying out, which can be done by using a plastic bag or air-tight container.

Proceed with the determination of the moisture content using a fraction of the preliminary test sample (the one safeguarded from drying out) as described in Annex F (see Figure I.1). Use one of the preliminary test samples for the analyses as described in Annexes B to E as shown in Figure I.1. The remaining preliminary test samples can be used for the analysis of fat, pH and taste.

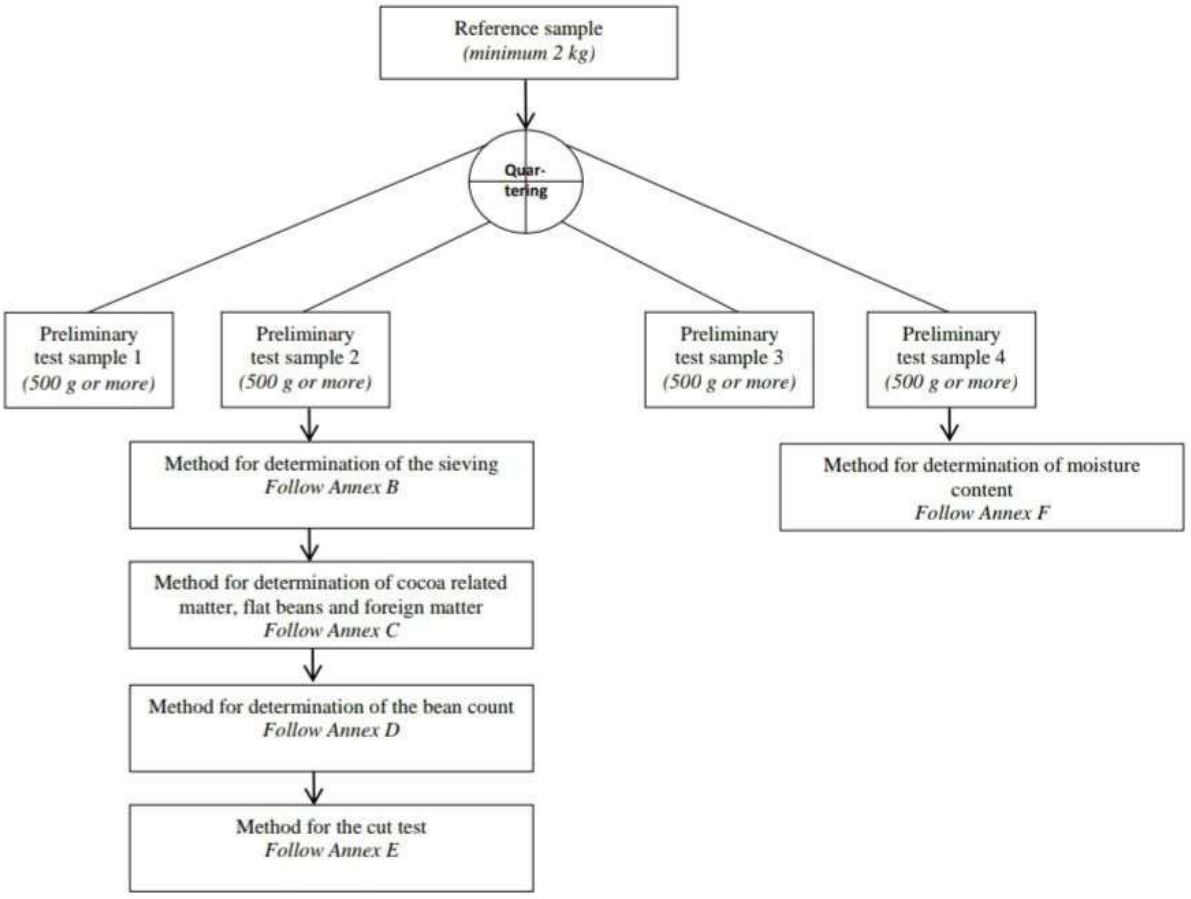

Figure I.1 — Flowchart of the sequence of testing after quartering the reference sample for preliminary quality analysis

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