

---

---

## Cocoa beans — Specification

*Fèves de cacao — Spécifications*

STANDARDSISO.COM : Click to view the full PDF of ISO 2451:2014



STANDARDSISO.COM : Click to view the full PDF of ISO 2451:2014



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
Foreword .....	iv
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Preparation</b> .....	<b>3</b>
<b>5 Requirements</b> .....	<b>3</b>
5.1 General requirements .....	3
5.2 Moisture content .....	4
5.3 Other quality characteristics .....	4
5.4 Grade standards .....	4
5.5 Bean size standards .....	5
5.6 Sieving standards .....	5
<b>6 Sampling</b> .....	<b>5</b>
<b>7 Methods of test</b> .....	<b>5</b>
<b>8 Packaging</b> .....	<b>5</b>
<b>9 Marking</b> .....	<b>6</b>
<b>Annex A (informative) Storage</b> .....	<b>7</b>
<b>Annex B (informative) Disinfestation</b> .....	<b>8</b>
<b>Annex C (normative) Method for assessing the bean count</b> .....	<b>9</b>
<b>Annex D (normative) Method for assessing the sievings</b> .....	<b>10</b>
<b>Annex E (normative) Method for assessing residue, flat beans, bean clusters, foreign matter</b> .....	<b>11</b>

STANDARDSISO.COM : Click to view the full PDF of ISO 2451:2014

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 34, *Food products*, Subcommittee SC 18, *Cocoa* (former WG 4, *Cocoa*, of ISO/TC 34).

This second edition cancels and replaces the first edition (ISO 2451:1973), which has been technically revised.

# Cocoa beans — Specification

## 1 Scope

This International Standard specifies the requirements, classification, test methods, sampling, packaging, and marking for cocoa beans.

Recommendations relating to storage and disinfestation are given as a guide in [Annexes A](#) and [B](#) respectively.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1114, *Cocoa beans — Cut test*

ISO 2291, *Cocoa beans — Determination of moisture content (Routine method)*

ISO 2292, *Cocoa beans — Sampling*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1 adulteration

alteration of the composition of graded cocoa by any means whatsoever so that the resulting mixture or combination is either not of the grade prescribed, or its quality or flavour is injuriously affected, or its bulk or mass is altered

### 3.2 bean cluster

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

### 3.3 bean count

total number of whole beans per 100 g derived in accordance with the test method specified in [Annex C](#)

### 3.4 broken bean

cocoa bean of which a fragment is missing, the remaining part being more than half of a whole bean

### 3.5 cocoa bean

seed of the cocoa tree (*Theobroma cacao* Linnaeus)

Note 1 to entry: Commercially, and for the purposes of this International Standard, the term refers to the whole seed, which has been fermented and dried.

### 3.6 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 or physical inspection of a sample

3.7

**cut test**

procedure by which the cotyledons of cocoa beans are exposed for the purpose of determining the incidence of defective and/or slaty cocoa beans, and/or violet or purple beans, and/or the presence of contamination within a sample

3.8

**defective bean**

internally mouldy or insect-damaged bean

3.9

**dry cocoa**

commercial term designating cocoa beans which have been evenly dried throughout and of which the moisture content corresponds to the specified requirements as in [5.2](#)

3.10

**fair fermented beans**

cocoa beans that are not more than 10 % slaty and 10 % defective by count of the sample

3.11

**flat bean**

cocoa bean that is too thin to be cut to give a complete surface of the cotyledons

3.12

**foreign matter**

any substance other than cocoa beans and residue

3.13

**fragment**

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

3.14

**germinated bean**

cocoa bean of which the shell has been pierced, split, or broken by the growth of the seed-germ

3.15

**good fermented beans**

cocoa beans that are not more than 5 % slaty and 5 % defective by count of the sample

3.16

**insect-damaged/infested bean**

a cocoa bean 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

3.17

**main crop**

the bean count consistent/typical for the main crop period during peak harvest for that particular origin

3.18

**mouldy bean**

cocoa bean on the internal parts of which mould is visible to the naked eye

Note 1 to entry: Mould is not to be confused with white spot, which is a concentration of theobromine or cocoa fat.

3.19

**piece of shell**

part of the shell without any of the kernel

**3.20  
residue**

any cocoa element other than whole cocoa beans, flat beans, and clusters which does not pass through the sieve (broken beans, fragments, and pieces of shell) with the exception of husk or placenta which is to be considered as foreign matter

**3.21  
sieve**

screen with round holes the diameter of which shall be 5,0 mm

**3.22  
sieving**

material that passes through the sieve

**3.23  
slaty bean**

cocoa bean that shows a slaty colour on at least half of the surface of the cotyledons exposed by the cut test

**3.24  
smoky bean**

cocoa bean with a smoke-off flavour

Note 1 to entry: A flavour which is reminiscent of wood smoke, acrid smoke, burnt rubber, smoked bacon, or soot.

**3.25  
violet or purple bean**

cocoa bean that shows a violet or purple colour on at least half of the surface of the cotyledons exposed by the cut test

## 4 Preparation

Cocoa beans shall be fermented and then dried until their moisture content no longer exceeds that specified in [5.2](#).

## 5 Requirements

### 5.1 General requirements

#### 5.1.1 Odour

Lots of cocoa beans shall be free from contamination.

#### 5.1.2 Adulteration

Lots of cocoa beans shall be free from any evidence of adulteration.

#### 5.1.3 Foreign matter

Lots of cocoa beans shall be virtually free from foreign matter.

#### 5.1.4 Living insects and other infestation

Lots of cocoa beans shall be virtually free from living insects, insect eggs, larvae, and any developmental stages, free from mites, rodents, or other types of infestation.

**5.1.5 Broken beans, fragments, and pieces of shell**

Lots of cocoa beans shall be reasonably free from broken beans, fragments, and pieces of shell.

**5.1.6 Violet or purple beans**

Lots of cocoa beans shall be within the standard for violet or purple beans, typical of the specified grade or origin.

**5.2 Moisture content**

The moisture content of lots of cocoa beans on loading in the producing country and on discharge outside the producing country, shall not exceed 7,5 % mass fraction.

**5.3 Other quality characteristics**

Lots of cocoa beans shall be reasonably

- uniform in size and
- fermented.

Lots of cocoa beans shall be

- fit for production of a foodstuff and
- reasonably free from bean clusters, flat beans, germinated beans, residue, and sieving.

**5.4 Grade standards**

**5.4.1 Classification for cocoa beans**

Any lot of cocoa beans shall be classified according to the categories listed below. Either [Table 1](#), [Table 2](#), or [Table 3](#) shall be used for the classification. For all three types of classifications, the proportion of defective beans shall be determined by the test method specified in ISO 1114. As an exception, for the purpose of [Table 3](#), germinated and flat beans shall not be considered defective.

**Table 1 — Producing country internal classification for fermented beans**

Grade	Percentage of beans		
	Mouldy	Slaty	Insect damaged, germinated, or flat
1	3	3	3
2	4	8	6

The percentages are the maximum. The percentages given in the last column apply to the combined total of all the defects specified in the column header.

**Table 2 — Producing country internal classification for unfermented beans**

Grade	Percentage of beans		
	Mouldy	Slaty	Insect damaged, germinated, or flat
1	3	≥20	3
2	4	≥20	6

The percentages are the maximum except for slaty, where the percentage is the minimum. The percentages given in the last column apply to the combined total of all the defects specified in the column header.

**Table 3 — International trade classification for fermented beans**

Grade	Percentage of beans	
	Slaty	Mouldy and/or insect damaged
Good fermented	5	5
Fair fermented	10	10

The percentages are the maximum. The percentages given in the last column apply to all the combined total of all defects specified in the column header.

When a bean has several defects, it shall be classified in one category only, i.e. the least favourable. The decreasing order of gravity is as follows:

- mouldy beans;
- slaty beans;
- insect-damaged beans;
- germinated beans, flat beans (not applicable to [Table 3](#)).

#### 5.4.2 Substandard cocoa (applicable to [Tables 1](#) and [2](#) only)

Any lot of fermented cocoa beans, which exceeds one of the limits accepted for grade 2 shall be regarded as substandard and marked "SS". Any lot of unfermented cocoa beans, which either does not meet the minimum level of slaty specified or exceeds one of the other limits accepted for grade 2 shall be regarded as substandard and marked "SS". Substandard cocoa shall only be marketed under special contract.

#### 5.5 Bean size standards

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

- a) Large beans: bean count of less or equal to 100.
- b) Medium beans: bean count of 101 to 120.
- c) Small beans: bean count greater than 120.

#### 5.6 Sieving standards

The mass of the sieving carried out in accordance with the method specified in [Annex D](#) should not exceed 1,5 % of the mass of the whole sample.

### 6 Sampling

Sampling shall be carried out in accordance with the requirements of ISO 2292.

### 7 Methods of test

Testing shall be carried out in accordance with the requirements of ISO 1114, ISO 2291, and the methods specified in [Annexes C](#) through [E](#).

### 8 Packaging

Bags for packaging shall be clean, sound, sufficiently strong, and properly sewn.

Cocoa shall be shipped in new bags only.

Bags and liners, if used, shall be of food grade materials.

Ink or paint used for marking shall be food grade.

## **9 Marking**

Each bag of cocoa beans shall be officially sealed. The bag or seal shall show at least the following information:

- a) the producing country;
- b) the name of the product and the grade or the marks to indicate substandard cocoa (“SS” for English-speaking countries; “HS” for French-speaking countries);
- c) any other identification marks necessary according to the national regulations in force;
- d) lot number.

STANDARDSISO.COM : Click to view the full PDF of ISO 2451:2014

## Annex A (informative)

### Storage

**A.1** Consignments of cocoa beans should be placed in warehouses constructed and used in such a way as to keep their moisture content sufficiently low and consistent with local conditions.

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.

**A.2** 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;
- 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.

**A.3** Periodically during storage and immediately before shipment, the moisture content of each lot should be checked.

STANDARDSISO.COM : Click to view the full PDF of ISO 2451:2014

**Annex B**  
(informative)

**Disinfestation**

If the use of pesticides to control insects, rodents, and other pests in cocoa is necessary, any residues should not exceed the maximum residue limits indicated for the pesticides used as prescribed by the FAO/WHO Codex Committee on Pesticides, FAO/WHO Expert Committee on Pesticide Residues, and by the Government of the importing country. 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.

STANDARDSISO.COM : Click to view the full PDF of ISO 2451:2014