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## Committee representation

The Food and Agricultural Industry Standards Committee (ISC A) under whose authority this Malaysian Standard was developed, comprises representatives from the following organisations:

Department of Agriculture Malaysia  
Department of Standards Malaysia  
Education and Research Association for Consumers Malaysia  
Federal Agricultural Marketing Authority  
Federation of Malaysian Manufacturers  
Malaysia Palm Oil Association  
Malaysian Agricultural Research and Development Institute  
Ministry of Agriculture and Agro-Board Industry  
Ministry of Health  
Ministry of International Trade and Industry  
Universiti Kebangsaan Malaysia  
Universiti Putra Malaysia

The Technical Committee on Cocoa Products and Chocolate which developed this Malaysian Standard consists of representatives from the following organisations:

Cadbury Confectionery (M) Sdn Bhd  
Department of Agriculture Malaysia  
KL-Kepong Chocolate Products Sdn Bhd  
Malaysia Cocoa Manufacturing Sdn Bhd  
Malaysian Agricultural Research and Development Institute  
Malaysian Cocoa Board  
Ministry of Health  
SIRIM Berhad (Secretariat)  
SIRIM QAS International Sdn Bhd  
Universiti Kebangsaan Malaysia  
Universiti Putra Malaysia

### Co-opted member:

Malaysian Palm Oil Board

## FOREWORD

This Malaysian Standard was developed by the Technical Committee on Cocoa Products and Chocolate under the authority of the Food and Agricultural Industry Standards Committee.

This Malaysian Standard is the fourth revision of MS 293, *Specification for grading of Malaysian cocoa beans*.

Major modifications in this revision are as follows:

- a) the definition for "broken bean" has been inserted;
- b) the Standard Malaysian Cocoa grades have been reduced to three types of grades;
- c) the packaging of cocoa beans for grading has been restricted to new gunny bags. The allowance to use other form of packaging materials have been removed;
- d) the information on destination of produce has been added in the labelling requirements; and
- e) the test methods have been amended according to current practice by the certification body.

This revised Malaysian Standard cancels and replaces MS 293:1995, Specification for grading of Malaysian cocoa beans (Third revision).

This Malaysian Standard aims to provide the cocoa producer and exporter with a set of criteria for the grading of Malaysia cocoa beans entering domestic and international trade.

Compliance with a Malaysian Standard does not of itself confer immunity from legal obligations.

## COCOA BEANS – SPECIFICATION FOR GRADING (FOURTH REVISION)

### 1. Scope

This Malaysian Standard specifies the requirements for grading cocoa beans and describes the methods of test for the bean count, the cut test, the determination of moisture content of cocoa beans and the determination of waste in cocoa beans consignment. This standard also describes recommendations for storage of cocoa beans given in Annex E.

### 2. Normative reference

The following normative reference is indispensable for the application of this standard. For dated reference, only the edition cited apply. For undated reference, the latest edition of the normative reference (including any amendment) apply.

MS 230, *Method of sampling cocoa beans*

### 3. Definitions

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

#### 3.1 Adulteration

Adulteration of the composition of graded cocoa beans by any means whatsoever so that the resulting mixture or combination is not of the grade prescribed, or affects adversely the quality, flavour, or alters the bulk or mass.

#### 3.2 Bean cluster

Bean clump which consists of three or more beans fused together.

#### 3.3 Bean count

The total number of whole cocoa beans required to make a weight of 100 g in accordance to Annex A.

#### 3.4 Broken bean

Cocoa bean of which a fragment is missing, the missing part being equivalent to less than half of the bean.

#### 3.5 Cocoa bean

The fermented and dried, whole seed of *Theobroma cacao* L.

**3.6 Defective bean**

Cocoa bean which is internally mouldy, slaty, insect damaged and germinated.

**3.7 Double bean**

Two beans fused together which cannot be separated by hand.

**3.8 Fermented bean**

Cocoa bean of which the colour of the cotyledons should range from partly purple and partly brown to a fully brown.

**3.9 Flat bean**

Cocoa bean of which the cotyledons are too thin to be cut to give a full length of the cotyledon surface.

**3.10 Foreign matter**

Any material and particle other than cocoa beans and waste.

**3.11 Fragment**

A piece of cocoa bean less than half the original bean.

**3.12 Germinated bean**

Cocoa bean of which the shell has been pierced, slit or broken by the growth of the seed germ.

**3.13 Insect damaged bean**

Cocoa bean, of which the internal parts are found to have been infested by insects which have inflicted damage visible to the naked eye or contain insect including mites, at any stage of development.

**3.14 Mouldy bean**

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

**3.15 Piece of shell**

Part of the shell without adhering cotyledons.

**3.16 Slaty bean**

Cocoa bean which shows a slaty colour on half or more of the surface.

**3.17 Smoky bean**

Cocoa bean which has a smoky smell or taste.

### 3.18 Waste

Flat bean, fragment, piece of shell, dried placenta and dried pulp.

## 4. Quality requirements

4.1 The cocoa beans shall be from ripe pods and adequately fermented, free from smoky smell, free from objectionable or foreign odour and free from any evidence of adulteration.

4.2 The cocoa beans shall be evenly dried throughout. The moisture content shall be less than or equal to 7.5 %.

4.3 The cocoa beans shall be reasonably uniform in size.

4.4 The consignment shall be free from bean clusters and reasonably free from double bean.

4.5 The consignment shall contain less than or equal to 2 % waste by weight.

4.6 The consignment shall be free from insects including mites.

4.7 The consignment shall be free from foreign matter.

## 5. Grading

5.1 The grading specifications are given in Table 1.

**Table 1. Grade specifications**

Standard Malaysian Cocoa Grades	Bean count (100 g)	Mouldy beans (% max.)	Slaty beans (% max.)	Insect damaged and germinated beans (% max.)
SMC 1	≤ 100	≤ 3	≤ 3	≤ 2.5
SMC 2	> 100 ≤ 110	≤ 3	≤ 3	≤ 2.5
SMC 3	> 110 ≤ 120	≤ 3	≤ 3	≤ 2.5

NOTES:

1. SMC denotes Standard Malaysian Cocoa.

2. All percentages in the grade specifications are by count. The percentage given in the last column applies to all the mentioned therein, taken together.

5.2 A bean with multiple defects shall be recorded in one category only, i.e. the least favourable. The decreasing order of gravity is as follows:

- a) mouldy bean;
- b) slaty bean; and
- c) insect damage and germinated bean.

### **5.3 Sub-standard cocoa beans**

Any consignment of cocoa beans which cannot meet the specifications in Table 1 shall be regarded as sub-standard and marked 'SS'.

## **6. Legal requirements**

The cocoa beans in all other aspects shall comply with the requirements of the legislation currently in force in Malaysia.

## **7. Sampling**

Sampling shall be carried out in accordance with MS 230 or to the requirements of the certification body or regulatory authority.

## **8. Test methods**

The method of test shall be carried out in accordance with the relevant annexes of this Malaysian Standard.

## **9. Packaging and labelling**

### **9.1 Packaging**

Cocoa beans shall be packed in new gunny bags which are clean, sound, sufficiently strong and properly sewn and sealed. The bags and liners shall be made of non-toxic materials.

### **9.2 Labelling**

**9.2.1** Each bag of cocoa beans shall be securely sealed and marked clearly and indelibly to show the following information:

- a) grade;
- b) name of producer/exporter and relevant licence number;
- c) consignment or lot or contract number as applicable;



- d) destination;
- e) the words 'Produce of Malaysia'; and
- f) nett weight in kilogrammes.

**9.2.2** Only non-toxic ink or paint shall be used for marking and shall not be allowed to come into contact with the beans.

## **10. Certification mark**

Each product may by arrangement with a recognised certification body, be marked with the certification mark of that body, provided the product conforms to the requirements of this standard.

**Annex A**  
(normative)

**Bean count**

**A1. Principle**

The bean count is determined by the number of whole cocoa beans to make the weight of 100 g.

**A2. Preparation of test sample**

Obtain the test sample according to Clause 7. Mix the test sample thoroughly.

**A3. Procedure**

**A3.1** Reduce the thoroughly mixed samples by quartering, or by means of a suitable dividing apparatus, to just over 250 beans per quarter.

**A3.2** Remove all broken beans, double beans, waste and foreign matters. Then, count the number of whole beans.

**A3.3** Weigh the whole beans to the nearest 0.05 g.

**A4. Expression of result**

**A4.1** The bean count shall be expressed as number of whole beans per 100 g.

$$\text{Bean count} = \frac{\text{Number of whole beans}}{\text{Weight of whole beans (g)}} \times 100$$

**A4.2** Calculate bean count for all four quarters and obtain average result.

**A5. Test report**

Report the average number of bean count of all four quarters.

## Annex B (normative)

### Determination of waste

#### B1. Principle

Waste is determined by the percentage by weight removed from whole cocoa beans and broken beans.

#### B2. Preparation of test sample

The test samples used in bean count (Annex A) is used in determination of waste.

#### B3. Procedure

B3.1 Weigh each quartered sample.

B3.2 Separate the waste in each quarter and weigh it according to each quarter.

#### B4. Expression of result

B4.1 Waste shall be expressed as percentage by weight of beans examined.

$$\text{Waste, \%} = \frac{W - W_1}{W} \times 100$$

where,

$W$  is the weight of sample; and

$W_1$  is the weight of whole beans and broken beans.

B4.2 Calculate waste for all four quarters and obtain average result.

#### B5. Test report

Report the average percentage of the waste of all four quarters sample.

## Annex C (normative)

### Cut test

#### C1. Principle

The cut test determines the percentage of defective beans from whole cocoa beans and the level of fermentation on cocoa beans.

#### C2. Preparation of test sample

The sample of whole cocoa beans from the bean count (Annex A) is used for the cut test. Select the quarter which contain the highest number of beans.

#### C3. Procedure

**C3.1** Cut all the beans lengthwise through the middle, so as to expose the maximum cut surface of the cotyledons.

**C3.2** Examine visually both halves of each bean in full daylight or under an equivalent artificial light for its level of fermentation and defects.

**C3.3** Count separately the number of defective beans i.e. mouldy beans, slaty beans, insect damaged beans and germinated beans. Where a bean has multiple defects, count only one defect which occurs according to the order in 5.2.

#### C4. Expression of result

**C4.1** The results for each kind of defect shall be expressed as percentage by the number of beans examined.

$$\text{Defective beans, \%} = \frac{\text{Number of defective beans}}{\text{Number of whole beans}} \times 100$$

**C4.2** The degree of fermentation shall be expressed as percentage by the number of beans examined.

$$\text{Fermented beans, \%} = \frac{\text{Number of fully brown beans}}{\text{Number of whole beans}} \times 100$$

**C5. Test report**

**C5.1** Report the percentage of defective beans i.e. mouldy beans, slaty beans, insect damaged beans and germinated beans.

**C5.2** The degree of fermentation for the cocoa beans consignment shall refer to Table C1. Report the percentage of fermentation level.

**Table C1. Degree of fermentation**

Fermentation level	Category
> 60 % of the cut bean is fully brown	Good
45 % - 60 % of the cut bean is fully brown	Moderately good
< 45 % of the cut bean is fully brown	Fairly good

**Annex D**  
(normative)

**Determination of moisture content**

**D1. Principle**

The moisture content is determined by the oven method. However, for quick certification purposes, the moisture content may be determined by the moisture meter or its equivalence.

**D2. Apparatus**

The usual laboratory equipment, and the following items:

**D2.1 Grinder**, which permit the beans to be ground without heating.

**D2.2 Ventilated oven**, fitted with a fan and able to maintain the temperature set at  $(103 \pm 2)$  °C.

**D2.3 Dishes with lids**, of corrosion-resistant metal or glass, with at least 35 cm<sup>2</sup> effective surface (e.g. diameter 70 mm, min) and depth of 20 mm to 25 mm.

**D2.4 Desiccator**

**D2.5 Analytical balance**, weighing to 1 mg.

**D3. Preparation of test sample**

Take one quarter of the test sample obtained according to Clause 7. By successive reductions of the one quarter, draw approximately 50 g of beans. Grind the beans roughly so that the greatest dimension of the particles does not exceed 5 mm. Avoid the formation of a paste.

**D4. Procedure**

**D4.1** Weigh a dry empty dish with lid and add in dish about 10 g of test sample prepared in C3. Cover the dish with lid and weigh to the nearest 1 mg.

**D4.2** Place the dish containing the test portion in the oven set at  $(103 \pm 2)$  °C. Remove the lid and leave it for  $(16 \pm 1)$  h. Do not open the oven.

**D4.3** Remove the dish and cover immediately with its lid. Cool the dish in the desiccator to room temperature approximately 30 min to 40 min.

**D4.4** Weigh dish with lid to the nearest 1 mg.

NOTE: The grinding and weighing operations should be carried out as rapidly as possible, and recommended within 5 min.

## D5. Expression of result

The moisture content of the sample shall be expressed as percentage by weight.

$$\text{Moisture content, \%} = (W_1 - W_2) \times \frac{100}{W_1 - W_0}$$

where,

$W_0$  is the weight, in grammes, of the empty dish with lid;

$W_1$  is the weight, in grammes, of the dish with lid and test sample before oven drying;  
and

$W_2$  is the weight, in grammes, of the dish with lid and test sample after oven drying.

## D6. Test report

Report the percentage of moisture content by weight.

**Annex E**  
**(informative)**

**Storage**

The recommended guidance for storage of cocoa beans are as follows:

- a) The consignments should be placed in warehouses constructed and used in such a way the moisture content is kept sufficiently low and consistent with local conditions.
- b) The storage facility should prevent any infestation by insects, rodents and other animal pests.
- c) The cocoa beans bags should be stacked on pallets adequately that:
  - i) a passage of at least 60 cm wide should separate the bags of individual grades and lots, and the walls of the storage facility;
  - ii) disinfestation by approved fumigant may be carried out; and
  - ii) contamination by odours or flavours, or by dust from other products or foods such as oil, cement and tar should be prevented.
- d) The moisture content of each lot should be periodically checked during storage and immediately before shipment.





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