SRI LANKA STANDARD 612:1983

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SPECIFICATION FOR
COPRA

BUREAU OF CEYLON STANDARDS

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SLS 612:1983

Gr. 9

BUREAU OF CEYLON STANDARDS
53, Dharmapala Mawatha,
Colombo 3,
Sri Lanka

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FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Bureau of Ceylon Standards on 1983-06-30, after the draft, finalized by the Drafting Committee on Copra had been approved by the Agricultural and Food Products Divisional Committee.

This specification is subject to the regulations laid down by the Coconut Development Authority under the Coconut Development Act No. 46 of 1971, and also to the restrictions imposed under the Food Act No. 26 of 1980 and the regulations framed thereunder.

A guide for the calculation of price differentials for local milling copra, based on driage and oil quality factor is given in Appendix J.

The standard values specified in this specification are in SI units.

For the purpose of deciding whether a particular requirement of this specification is complied with, the final value, observed or calculated, expressing the result of analysis shall be rounded off in accordance with CS 102. The number of significant places retained in the rounded off value should be the same as that of the specified value in this specification.

In the preparation of this specification, the assistance obtained from the Coconut Development Authority, the Coconut Research Board and the Ceylon Oils and Fats Corporation is gratefully acknowledged.

1 SCOPE

1.1 This specification prescribes the requirements and methods of sampling and test for copra.

2 REFERENCES

CS 102 Presentation of numerical values

CS 124 Test sieves

SLS 428 Random sampling methods

SLS 467 Labelling of prepackaged foods

3 DEFINITIONS

For the purpose of this specification, the following definitions shall apply:

3.1 coconut : The fruit of the coconut palm, *Cocos nucifera* Linn.

3.2 kernel : This is the endosperm of the coconut with the husk and shell removed, consisting of the white meat with its outer brown skin (testa).

3.3 copra : The product obtained from kernels of de-husked coconuts split into two parts and dried to specified moisture levels.

3.4 cups : Each part so obtained as described in **3.3**.

3.5 discoloured cups : These shall include cups in which the inner surface exhibits scratch marks.

3.6 mouldy cups : These shall include cups in which the inner surface is partially or wholly covered with mould.

3.7 wrinkled cups : These shall include cups that are shrunk and misshapen **and/or** wholly covered with mould.

3.8 pieces : These shall include broken cups and shavings which may carry the other defects stated under **3.5**, **3.6** and **3.7**.

3.9 impurities : Material other than copra which could consist of sand, fibre, shell and other foreign bodies.

3.10 slight mould copra : Copra, with slight surface mould or bacterial attack, the latter being recognized by a sticky inner surface. Also copra discolqured by bacterial action.

3.11 severe mould copra : Copra in which mould has clearly penetrated the inner surface even if only in a small area but excluding breaks formed without mould attack.

NOTE - For the purpose of grading, burnt and off colour rubbery copra is grouped under severe mould copra.

3.12 driage : This is loss in mass between purchase and processing under normal storage conditions.

4 TYPES AND GRADES

4.1 Types

4.1.1 Copra shall be of the following 4 types:

4.1.1.1 White edible copra;

4.1.1.2 Edible copra;

4.1.1.3 Milling superior; and

4.1.1.4 Milling ordinary.

4.2 Grades

4.2.1 Milling superior copra shall have the following grades:

4.2.1.1 Grade 1;

4.2.1.2 Grade 2; and

4.2.1.3 Grade 3.

4.2.2 Milling ordinary copra shall have the following grades:

4.2.2.1 Grade 1;

4.2.2.2 Grade 2;

4.2.2.3 Grade 3; and

4.2.2.4 Grade 4.

5 REQUIREMENTS

5.1 General requirements

5.1.1 The copra may be sun-dried, hot air-dried or smoke dried.

5.1.2 The material shall be in sound merchantable condition, well-dried and reasonably firm.

5.2 Requirements for white edible and edible copra

5.2.1 *Physical requirements for white edible*

The cups shall be smooth, hard, clean and shall have a white bloom on the interior surface, all cups shall be free of any type of mould or discolouration. It shall not contain cups showing signs of scorching, germinated cups, wrinkled cups, pieces or any impurities.

5.2.2 *Physical requirements for edible*

The cups shall be smooth, clean and shall have a pale grey to dull white interior surface. All cups shall be free from any type of mould. It shall not contain cups showing signs of scorching, germinated cups, wrinkled cups, pieces or any impurities.

5.2.3 *Chemical requirements for white edible and edible*

The moisture and the oil content (moisture free basis) of the material when tested according to Appendix B and Appendix C respectively shall be as follows :

a) Moisture per cent by mass, max. 6.0, and

b) Oil content per cent by mass min. 68.0 .

5.3 Requirements for milling copra

5.3.1 *Milling superior*

5.3.1.1 Milling superior copra shall comply with the requirements specified in Table 1.

TABLE 1 - Requirements for milling superior copra

Sl No.	Characteristics	Requirements			Method of test (Ref. to Appendix)
		Grade 1	Grade 2	Grade 3	
(1)	(2)	(3)	(4)	(5)	(6)
i	Moisture, per cent by mass, max.	6.0	6.0	6.0	B
ii	Oil content (moisture free basis) per cent by mass, min.	68.0	68.0	68.0	C
iii	Free fatty acid (as lauric acid) of extracted oil per cent by mass, max.	0.8	0.8	0.8	D
iv	Impurities, per cent by mass, max.	0.5	1	1	E
v	Broken cups or chips per cent by number, max. (passing through a 9.5-mm sieve)	10	15	15	F
vi	Mouldy cups, per cent by count max.	10	15	20	G
vii	Lovibond colour, in a 25-mm cell expressed of Y + 5R, max.	4	4	4	H

5.3.2 *Milling ordinary*

5.3.2.1 Milling ordinary copra shall comply with requirements specified in Table 2.

TABLE 2 - Requirements for milling ordinary copra

Sl. No.	Characteristics	Requirements				Method of test (Ref. to Appendix)
		Grade 1	Grade 2	Grade 3	Grade 4	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i	Moisture, per cent by mass, max.	10	10	10	10	B
ii	Oil content (moisture free basis) per cent by mass, min.	68.0	68.0	68.0	68.0	C
iii	Free fatty acid (as lauric acid) per cent by mass, max.	Not specified	Not specified	Not specified	Not specified	-
iv	Impurities, per cent by mass, max.	Not specified	Not specified	Not specified	Not specified	-
v	Broken cups or chips per cent by number, max. (passing through a 9.5-mm sieve)	Not specified	Not specified	Not specified	Not specified	-
vi	Mouldy cups*, per cent by count, max.	20	50	80	100	G
vii	Lovibond colour, in a 25-mm cell, expressed as Y + 5R, max.	Not specified	Not specified	Not specified	Not specified	-

* *The presence of pink coloured mould (Aspergillus cinnamomeus) shall not be counted.*

6 PACKAGING AND MARKING

6.1 Packaging

6.1.1 Copra shall be supplied in suitable containers, as agreed to between the purchaser and the supplier.

6.1.2 Copra may also be supplied in bulk.

6.2 Marking

6.2.1 The following shall be marked legibly and indelibly on the containers.

a) The name and the type of the material;

b) The name and address of the manufacturer;

c) Type and grade; and

d) Net mass in kg .

6.2.2 The marking and labelling shall be in accordance with **SLS 467**.

7 SAMPLING

7.1 Representative samples of copra shall be drawn as specified in Appendix **A**.

8 METHODS OF TEST

8.1 Tests shall be carried out as prescribed in the appropriate appendices specified in **5.2.3**, Table 1 and Table 2.

9 CRITERIA FOR CONFORMITY

9.1 The lot shall be considered in conforming with the requirements of this specification if the following conditions are satisfied.

9.1.1 *General requirements and physical requirements and colour*

9.1.1.1 All the test results for the above characteristics satisfy the relevant requirements of this specification.

9.1.2 *Moisture content, free fatty acid*

9.1.2.1 The calculated expression $\bar{X} + 0.4R$ for each requirement is less than or equal to the corresponding limit.

9.1.3 *Oil content*

9.1.3.1 The calculated expression $\bar{X} - 0.4R$ is greater than or equal to the corresponding limit.

NOTES

1 *Mean* $(\bar{X}) = \frac{\text{Sum of the test results}}{\text{Number of test results}}$

2 *Range (R) = Difference between the maximum and the minimum of the test results*

APPENDIX A

METHODS OF SAMPLING

A.1 CONSIGNMENT

A.1.1 The entire quantity of copra received at one time under a particular contract shall constitute a consignment. The consignment of copra may be in packaged form or in bulk.

A.2 LOT

A.2.1 In a consignment the entire quantity of copra belonging to the same type and grade shall constitute a lot.

A.3 SCALE OF SAMPLING

A.3.1 Each lot shall be kept separately either in a stock or a heap for sampling.

A.3.2 The conformity of a lot to the requirements of this specification shall be determined on the basis of tests carried out on the samples selected from the lot.

A.3.3 Sampling from packages (bags)

A.3.3.1 The number of bags to be selected from the lot shall be in accordance with the Table 3.

TABLE 3 - Scale of sampling for packages

Number of bags in the lot	Number of bags to be selected
Up to 50	03
51 to 100	04
101 to 300	05
301 to 500	07
501 and above	10

A.3.3.2 These bags shall be selected at random. In order to ensure randomness of selection, random number tables as given in **SLS 428** shall be used.

A.3.3.3 Each bag selected shall be emptied. From different parts of the contents so emptied, a sufficient quantity of copra (5 kg to 6 kg or 50 cups) shall be obtained to form a sample to represent that particular bag.

A.3.3.4 These samples shall be placed in suitable sample containers or polythene bags and shall be sealed air-tight and marked with at least the following information:

a) Type and grade of copra;

b) Lot size;

c) Date of sampling;

d) Place of sampling;

e) Signature of sampler; and

f) Sample number or other distinguishing mark.

A.3.4 Sampling from bulk

A.3.4.1 The number of samples to be drawn from a bulk shall depend on the mass of the lot and shall be in accordance with the Table 4.

A.3.4.2 These samples each of 5 kg to 6 kg or 50 cups shall be collected from the different sides and depths in the heap by using a wooden or a metal shovel.

TABLE 4 - Scale of sampling for bulk

Mass of the bulk in kg	Number of samples to be selected
Up to 2 500	03
2 501 to 5 000	04
5 001 to 15 000	05
15 001 to 25 000	07
25 001 and above	10

A.3.4.3 Each sample shall be placed in suitable sample containers or polythene bags and shall be sealed air-tight and marked with details as given in A.3.3.4.

A.4 NUMBER OF TESTS

A.4.1 Each sample selected as in A.3.3.1 or A.3.4.2 shall be individually tested for general requirements and the requirements given below.

a) Impurities;

b) Broken cups or chips; and

c) Mouldy cups.

A.4.2 Each sample shall be prepared separately as in A.5 and individually tested for requirements given below.

a) Moisture content;

b) Oil content;

c) Free fatty acid; and

d) Colour.

A.5 PREPARATION OF SAMPLE FOR DETERMINATION OF CHEMICAL REQUIREMENTS

A.5.1 All the kernels of the sample shall be vertically cut and quarter taken from each kernel shall be grated by hand operated shredding contrivance or made into slices less than 1 mm in thickness using a sharp knife. This material shall be thoroughly mixed.

APPENDIX B

DETERMINATION OF MOISTURE

B.1 OVEN METHOD (Reference method)

B.1.1 Procedure

B.1.1.1 Weigh to the nearest mg about 5 g of the copra in a tared flat-bottomed dish of not less than 63.5-mm diameter provided with a close fitting but easily removable lid. Heat the uncovered dish with its lid in a well ventilated oven at 100 °C to 102 °C for a period of two hours. Cover the dish while still in oven, transfer to desiccator and weigh soon after reaching room temperature.

B.1.2 Calculation

$$\text{Moisture content per cent by mass} = \frac{m_1 - m_2}{m_1} \times 100$$

where,

m_1 = mass, in g, of the copra used; and

m_2 = mass, in g, after heating.

B.2 MOISTURE PROBE METHOD (Routine method)

B.2.1 The moisture probe shall be calibrated to the results given by the oven method B.1.

B.2.2 Remove 30 cups at random from the sample while it is still in the bag. The cups shall be taken without visual aid taking the first cups that come to hand. Record the moisture content of each cup and the average calculated. The average is rounded to the nearest whole or 0.5 per cent.

B.3 INFRA-RED MOISTURE BALANCE METHOD (Routine method)

B.3.1 The balance, which should be sensitive to 0.1 per cent is calibrated to the results given by the oven method B.1. Settings of heat and time should be such as to minimise scorching.

B.3.2 The result is rounded to the nearest whole or 0.5 per cent.

APPENDIX C

DETERMINATION OF OIL CONTENT

C.1 REAGENT

C.1.1 *Petroleum ether*, b.p. 40 °C of recognized analytical reagent quality shall be used.

C.2 PROCEDURE

C.2.1 Weigh to the nearest mg about 10 g of the copra in an extraction thimble and dry for two hours at 100 °C to 102 °C. Place the thimble in a fat extractor and extract with petroleum ether for one hour. At the end of this period, remove the thimble from the extractor and dry it until the contents are crisp. Transfer the contents quickly to a glass mortar and grind as finely as possible.

C.2.2 Return the ground material to the thimble, washing out the mortar with petroleum ether and adding to the extractor. Repeat the extraction for two hours. The extract should be free from suspended matter. Evaporate off, the solvent and while still hot, blow dry air for a minute to remove last traces of the solvent. Dry the oil at 100 °C to 102 °C for two hours. Cool until constant mass is obtained. Reserve the oil for the determination of the acidity of extracted oil.

C.3 CALCULATION

$$\text{Oil content per cent by mass} = \frac{m_2}{m_1} \times 100$$

where,

m_1 = mass, in g, of copra used; and

m_2 = mass, in g, of oil.

APPENDIX D

DETERMINATION OF FREE FATTY ACID CONTENT IN THE EXTRACTED OIL

D.1 REAGENTS

D.1.1 The following reagents which shall be of recognized analytical reagent quality shall be used.

D.1.1.1 *Sodium hydroxide (or potassium hydroxide)*, approximately decinormal aqueous solution;

D.1.1.2 *Phenolphthalein*, 1 per cent alcoholic solution; and

D.1.1.3 *Ethyl alcohol*, 95 per cent to 100 per cent (*V/V*), boiled and neutralized immediately before use.

D.2 PROCEDURE

D.2.1 Weigh to the nearest mg, about 5 g of the oil extracted by the method given in Appendix C in a 250-ml flask. Add 50 ml of neutralized alcohol and bring to boil on a water bath. Add 2 to 3 drops of phenolphthalein indicator and while as hot as possible titrate with the alkali solution shaking vigorously during the titration. The end of the titration is reached when the addition of a single drop produces a slight but definite colour change, persisting for at least 15 seconds.

D.3 CALCULATION

D.3.1 The free fatty acid content is calculated as lauric acid (equivalent weight 200).

$$\text{Free fatty acid} = \frac{V \times N \times 200 \times 100}{1000 \times m}$$

where,

V = volume, in ml, of alkaline solution required for test;

N = normality of alkaline solution; and

m = mass, in g, of oil taken.

APPENDIX E
DETERMINATION OF IMPURITIES

E.1 Weigh the kernels constituting the test sample. Brush them thoroughly so as to remove all adhering impurities, both from internal and external surface of the kernel. Examine the sample left for other impurities like shell, straw and other extraneous matter. Separate these by hand picking or with the help of a pair of forceps. Collect the impurities and weigh. Determine the percentage of impurities to the nearest 0.01 per cent.

APPENDIX F
DETERMINATION OF BROKEN CUPS AND CHIPS

F.1 Separate the broken cups and chips by means of a sieve of 9.5-mm conforming to CS 124 and calculate their number as per cent of the cups constituting the bulk sample.

APPENDIX G
DETERMINATION OF MOULDY CUPS

G.1 Separate the slight mould (3.10) and severe mould (3.11) cups and calculate their number as per cent of cups constituting the sample.

G.2 Calculate the percentage of mouldy cups by the addition of percentages of slight mould and severe mould cups. For the purpose of allocating the grades, round off the percentage of mouldy cups to the nearest five per cent.

G.3 For the purpose of calculating the price differentials (see Appendix J), the percentage values of slight and severe mould cups shall be expressed separately.

APPENDIX H
DETERMINATION OF COLOUR IN THE EXTRACTED OIL

H.1 GENERAL

H.1.1 This method determines the colour of the extracted oil by comparison with Lovibond glasses of known colour characteristics. The colour is expressed as the combination of the yellow and red slides used to match the colour of the oil in a cell of the specified size (25·mm) in the Lovibond tintometer.

H.2 PROCEDURE

H.2.1 Melt the sample, if it is not already liquid, and filter through a filter paper to remove any impurities and the last traces of moisture. Make sure that the sample is clear and free from turbidity. Clean the 25·mm glass cell with carbon tetrachloride and allow it to dry. Fill it with the clear filtered sample and place the cell in position in the tintometer. Place alongside of it such red and yellow Lovibond glass slides or any combination of these as are necessary to match the colour shade of the oil, observing the colour of the oil and of the combination of the glass slides through an eyepiece.

H.4 REPORT

H.4.1 Report the colour of the oil, in a 25-mm cell, in terms of the yellow and red values.

APPENDIX J
A GUIDE FOR THE CALCULATION OF PRICE DIFFERENTIALS

J.1 PREDICTED DRIAGE IN MILLING COPRA

J.1.1 Table 5 gives an estimate of driage predicted for copra of different grades for a range of moisture content. These may be utilized in grading as a guide for the calculation of price differentials.

TABLE 5 - Driage predictions for milling copra

Grade	1	2	3	4
% Moisture	% Driage			
5.0	0	0	0	0
5.5	0.5	0.5	0.5	0.5
6.0	1.0	1.0	1.0	1.0
6.5	1.6	1.8	1.9	2.0
7.0	2.2	2.5	2.8	2.9
7.5	2.7	3.2	3.6	3.9
8.0	3.4	3.9	4.5	4.9
8.5	3.9	4.6	5.4	5.8
9.0	4.5	5.4	6.2	6.8
9.5	5.0	6.1	7.1	7.8
10.0	5.7	6.8	8.0	8.7

J.2 OIL QUALITY FACTOR (MILLING COPRA)

J.2.1 One factor determining oil quality is the percentage of cups with severe mould attack (G.2). As a guide for the calculation of price differentials in internal grading, a 0.7 per cent price deduction for each 10 per cent of cups with severe mould attack (inclusive of inferior cups) is suggested to a maximum of 2.1 per cent at 30 per cent severe mould attack and above.

ERRATA

SLS 612:1983 SPECIFICATION FOR COPRA

Page 4, Clause 3.5

Should read as

"**discoloured cups** : These shall include cups in which the inner surface exhibits scorched marks."

Page 6, Clause 5.2.2

The first sentence should read as

"The cups shall be smooth, hard, clean and shall have a pale grey to dull white interior surface."

Page 6, Table 1, Column 2

Sl. No. vii, should read as

"Lovibond colour, in a 25-mm cell expressed as Y + 5R, max."

Page 7, Table 2, Column 2

Sl. No. iii should read as

"Free fatty acid (as lauric acid) of extracted oil per cent by mass, max."

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