ICS 67.060

DMS 179:2016
Second edition

DRAFT MALAWI STANDARD

Rice – Specification

NOTE: This is a draft proposal and it shall neither be used nor regarded as a Malawi Standard

ICS 67.060 DMS 179:2016

Rice – Specification

PUBLIC REVIEW DRAFT

Obtainable from the
Malawi Bureau of Standards
P O Box 946
BLANTYRE

Tel: +265 1 870 488
Fax: +265 1 870 756
E-mail: mbs@mbsmw.org
Website: www.mbsmw.org

Price based on 15 pages

© Copyright reserved

TABLE OF CONTENTS

Content **Page**

Foreword i
Technical Committee i
Scope 1
Normative reference 1
Definitions 1
Contaminants 5
Hygiene 6
Packaging 6
Labeling 6
Methods of sampling and analysis 7
Annex A (Normative) Classification of rice 8
Annex B **-** Methods of analysis for rice specifications 9
Annex C (Normative) Determination of waxy rice in parboiled rice 18

FOREWORD

This text is a Common Market for Eastern and Southern Africa (COMESA) Draft Harmonized Text providing requirements for rice.

The harmonization of standards and technical regulations in the COMESA region is an obligation under the COMESA Treaty in order to promote the achievement of the aims and objectives of the Common Market as set out in Article 3 of COMESA Treaty.

This standard is an adaption of the following international and regional standards:

ISO 7301:2002, *Rice – Specification;*

CODEXSTAN 198:1995, Codex Standard for rice;

EAS 128:2011, *East African Standard for milled rice*;

EAS 764:2011, *East African Standard for rough (paddy) rice*;

EAS 765:2011, *East African Standard for brown rice*.

The East African Standards have been used for the specific requirements with respect to grading only.

Acknowledgement is made for the use of the information.

TECHNICAL COMMITTEE

This Malawi Standard was prepared by the Technical Committee MBS/TC 16, *Primary agricultural products* and the following companies, organizations and institutions were represented:

- ADMARC Limited;
- Agricultural Commodity Exchange for Africa;
- Auction Holdings Commodity Exchange;
- Bakhresa Grain Milling Malawi Limited;

PUBLIC REVIEW DRAFT

- Blantyre Agricultural Development Division;
- Bvumbwe Agricultural Research Station;
- Lilongwe University of Agriculture and Natural Resources (LUANAR) – Bunda Campus;
- Malawi Bureau of Standards;
- Malawi Investment and Trade Centre;
- National Smallholder Farmers' Association of Malawi (NASFAM);
- Rab Processors Limited; and
- Transglobe Produce Export Limited.

NOTICE

This standard shall be reviewed every five years, or earlier when it is necessary, in order to keep abreast of progress. Comments are welcome and shall be considered when the standard is being reviewed.

PUBLIC REVIEW DRAFT

DRAFT MALAWI STANDARD

Rice – Specification

1 SCOPE

This Draft Malawi Standard specifies the requirements for rice (*Oryza sativa L.*). It is applicable to husked rice and milled rice, parboiled or not, intended for direct human consumption. It does not apply to other products derived from rice or to glutinous rice.

2 NORMATIVE REFERENCE

The following standards contain provisions, which through reference in this text, constitute provisions of this Malawi standard. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this standard are encouraged to take steps to ensure the use of the most recent edition of the standard indicated below. Information on current valid national and international standards can be obtained from the Malawi Bureau of Standards.

MS 19: *Labeling of prepacked foods – General standard;*

MS 21: *Code of hygienic conditions for food and food processing units;*

MS 146: *Cereals – Methods of sampling as grain;*

MS 302: *Contaminants and toxins in food – General standard;*

ISO 712: *Cereals and cereal products – Determination of moisture content – Routine method;*

ISO 5223*: Test sieves for cereals;*

ISO 13690*: Cereals, pulses and milled products – Sampling of static batches.*

3 DEFINITIONS

For the purpose of this Malawi Standard, the following definitions shall apply:

3.1
paddy rice (rough rice)
rice which has retained its husk after threshing

3.2
husked rice (brown rice or cargo rice)
paddy rice from which the husk only has been removed

Note – The process of husking and handling may result in some loss of bran

3.3
milled rice (white rice)
husked rice from which all or part of the bran and germ or embryo have been removed by milling

3.4
parboiled rice
husked or milled rice processed from paddy or husked rice that has been soaked in water and subjected to a heat treatment so that the starch is fully gelatinized, followed by a drying process

PUBLIC REVIEW DRAFT

3.5
glutinous rice (waxy rice)
kernels of special varieties of rice which have a white and opaque appearance. The starch of glutinous rice consists almost entirely of amylopectin. It has a tendency to stick together after cooking

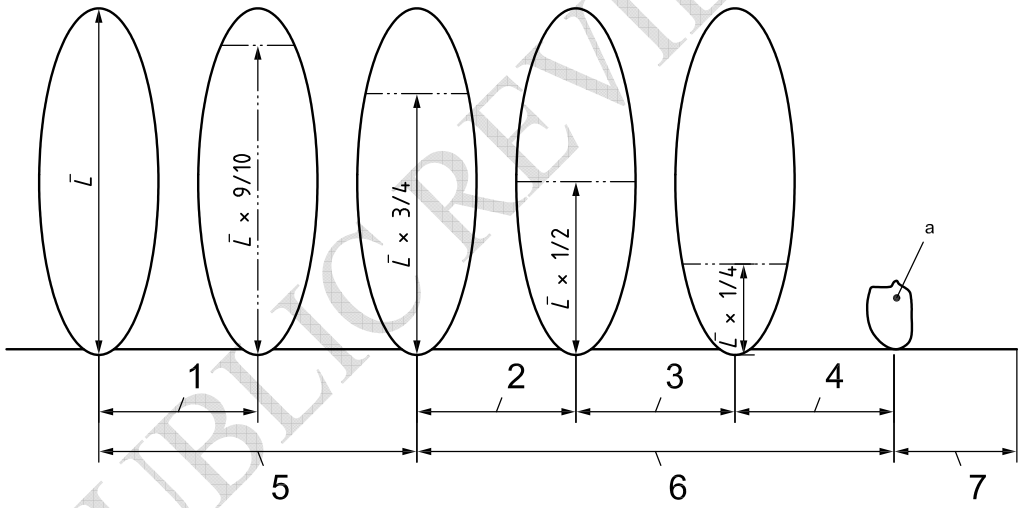
3.6
head rice (whole kernel)
husked or milled kernel without any broken part and parts of kernel with length greater than or equal to three-quarters of the average length (**3.11**) of the test sample

3.7
large broken kernel
part of the kernel with length less than three-quarters but greater than one-half of the average length (**3.11**) of the test sample

3.8
medium broken kernel
part of the kernel with length less than or equal to one-half but greater than one-quarter of the average length (**3.11**) of the test sample

3.9
small broken kernel
part of the kernel with length less than or equal to one-quarter of the average length (**3.11**) of the test sample but which does not pass through a metal sieve with round perforations 1.4 mm in diameter

3.10
chip
part of the kernel which passes through a metal sieve with round perforation 1.4 mm in diameter



Key

1	whole kernel (3.6)	5	head rice (3.7)
2	large broken kernel (3.8)	6	broken kernel
3	medium broken kernel (3.9)	7	chips (3.11)
4	small broken kernel (3.10)	$\bar{L}$	average length

[a] Not passing through a test sieve with round apertures having diameter 1,4 mm.

Figure 1 — Size of kernels, broken kernels and chips

3.11
average length

PUBLIC REVIEW DRAFT

arithmetic mean of the length of the test sample kernels that are not immature or malformed (**3.15**) and without any broken parts (**3.7, 3.8**, and **3.9**)

3.12
extraneous matter
organic and inorganic components other than kernels of rice, whole or broken

Note:

1 Organic extraneous matter are foreign seeds, husks, parts of straw, etc.

2 Inorganic extraneous matter are stones, sand, dust, etc.

3.13
heat-damaged kernels
head rice or broken rice that has changed its normal colour as a result of a microbiological heating

Note - This category includes kernel that is yellow /dark yellow in the case of milled non-parboiled rice and orange/dark orange in the case of milled parboiled rice, due to microbiological alteration.

3.14
damaged kernels
head rice or broken kernels showing evident deterioration due to moisture, pests, disease or other causes, but excluding heat damaged kernels (**3.13**)

3.15
immature kernel, malformed kernel
head rice or broken rice which is unripe and/or badly developed

3.16
chalky kernel
head rice or broken kernel of non-parboiled rice, except waxy rice (**3.5**), whose surface has an opaque and floury appearance

3.17
red kernel
head rice or broken kernel having a red bran covering more than one-quarter of its surface

3.18
red streaked kernel
head rice or broke kernel with red bran streaks of length greater than or equal to one-half of that of the whole kernel, but where the surface covered by these red streaks is less than one-half of the total surface

3.19
partly gelatinized kernel
head rice or broken kernel of parboiled rice of which is not fully gelatinized and shows a distinct white chalky area

3.20
peck
head rice or broken kernel of parboiled rice of which more than one-quarter of the surface is dark brown or black in colour due to parboiling process

3 ESSENTIAL COMPOSITION AND QUALITY FACTORS

4.1 Quality factors – General

4.1.1 Rice shall be safe and suitable for human consumption

4.1.2 Rice shall be free from abnormal flavours, odours, insects and mites.

4.2 Quality factors – Specific

4.2.1 Moisture content shall not be greater than 13 % (m/m).

PUBLIC REVIEW DRAFT

Note - Lower moisture content may be required for certain destinations depending on climate, duration of transport and storage.

4.2.2 The defects tolerance for the categories considered and determined in accordance with the method described in Annex B shall not exceed the limits given in Tables 1 to 4.

Table 1: Specification of milled rice

S/N	Characteristics	Maximum limits			Method of test
		Grade 1	Grade 2	Grade 3	
1	Broken, %, max	5	7	15	ISO 605
2	Heat damaged rice, %, max	1.5	1.5	2	
3	Damaged rice, %, max	1.5	2	3	
4	Chalky[a] %, max	2	4	10	
5	Red or red streaked, %, max.	2	6	12	
6	immature grains, %, max	1	1.5	2	
7	Other contrasting varieties, % max	1	2	3	
8	Organic matter, %, max	0.1	0.5	1	
9	Inorganic matter, %, max	0.1	0.1	0.1	
10	Live weevils/kg, max	Nil	Nil	Nil	
11	Filth, %, max	0.1	0.1	0.1	
12	Paddy grains, %, max.	1	2	2.5	
13	Moisture content, %, max	13	13	13	
14	Total Aflatoxin (AFB1+AFB2+AFG1 +AFG2)), ppb	15			ISO 16050
15	Aflatoxin B1 only, ppb	5			
16	Fumonisin, ppm	2			

Table 2: Specification of brown rice

S/N	Characteristics	Maximum limits			Method of test
		Grade 1	Grade 2	Grade 3	
1	Broken, %, max	2	5	7	ISO 605
2	Heat damaged rice, %, max	1.5	1.5	2	
3	Damaged rice, %, max	1	2	4	
4	Chalky[a] %, max	2	4	6	
5	Red or red streaked, %, max.	1	4	12	
6	immature grains, %, max	2	6	12	
7	Other contrasting varieties, % max	1	2	5	
8	Organic matter, %, max	0.1	0.5	1	
9	Inorganic matter, %, max	0.1	0.1	0.1	
10	Live weevils/kg, max	Nil	Nil	Nil	
11	Filth, %, max	0.1	0.1	0.1	
12	Paddy grains, %, max.	1	2	2.5	
13	Moisture content, %, max	13	13	13	
14	Total Aflatoxin (AFB1+AFB2+AFG1 +AFG2)), ppb	15			ISO 16050
15	Aflatoxin B1 only, ppb	5			
16	Fumonisin, ppm	2			

PUBLIC REVIEW DRAFT

Table 3: Specification of rough (paddy) rice

S/N	Characteristics		Maximum limits			Method of test
			Grade 1	Grade 2	Grade 3	
1	Foreign matter, %, max	Organic	1	1.5	2	ISO 605
		Inorganic	0.25	0.25	0.5	
2	Pest damaged grains, %, max		0.5	0.75	1	
3	Discoloured grains, %, max		0.1	0.1	0.1	
4	Immature/Shriveled grains, %, max		Nil	Nil	Nil	
5	Moisture content, %, max		13	13	13	
6	Total Aflatoxin (AFB1+AFB2+AFG1 +AFG2)), ppb		15			ISO 16050
7	Aflatoxin B1 only, ppb		5			
8	Fumonisin, ppm		2			

Table 4: Specification for husked and milled parboiled rice

S/N	Characteristics	Maximum limits		Method of test
		Husked rice parboiled	Milled rice parboiled	
1	Inorganic extraneous matter, % max	0.5	0.5	ISO 605
2	Organic extraneous matter, % max	1.0	0.5	
3	Paddy, %, max	2.5	0.3	
4	Husked rice non-parboiled, % max	1.0	1.0	
5	Milled rice non-parboiled, % max	1.0	1.0	
6	Husked rice parboiled, % max	—	1.0	
7	Milled rice parboiled, % max	1.0	—	
8	Chip, %, max	0.1	0.1	
9	Heat-damaged kernel, %, max	2.0[a]	2.0	
10	Damaged kernel, %, max	4.0	3.0	
11	Immature or malformed kernel, %, max	12.0[b]	12.0	
12	Red kernel and red-streaked kernel, %, max.	11.0[a]	11.0	
13	Partly gelatinized kernel, %, max	4.0	2.0	
14	Peck, %, max	1.0[a]	1.0	
15	Waxy rice, %, max	12.0[b]	12.0	
16	Total Aflatoxin (AFB1+AFB2+AFG1 +AFG2)), ppb	15		ISO 16050
17	Aflatoxin B1 only, ppb	5		
18	Fumonisin, ppm	2		

a. After milling.
b. Only full red husked (cargo) rice is considered here.

Note – The worst parameter will determine the grade.

5 CONTAMINANTS

PUBLIC REVIEW DRAFT

Products covered by this Malawi Standard shall comply with maximum limits of contaminants established by Codex Alimentarius Commission.

5.1 Heavy metals

Products covered by this Malawi Standard shall comply with the maximum limits indicated in MS 302.

5.2 Mycotoxins

Rice shall comply with mycotoxins maximum limits indicated in MS 302.

5.3 Pesticides residues

Rice shall comply with the maximum residue limits established by Codex Alimentarius Commission.

6 HYGIENE

6.1 Rice shall be produced, handled in accordance with the appropriate sections of MS 21 and other Codes of practice recommended by the Codex Alimentarius Commission which are relevant to this product.

6.2 To the extent possible in Good Manufacturing Practice, the product shall be free from objectionable matter.

6.3 When tested by appropriate methods of sampling and examination, the product shall conform to the requirements outlined in Table 5.

Table 5: Microbiological requirements for rice

Microbiological parameter	Limit per g
Moulds	10^2
Bacillus cereus	$<10^3$

7 PACKAGING

7.1 Rice shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the food.

7.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They shall not impart any toxic substance or undesirable odour or flavour to the product.

7.3 When the product is packaged in sacks, these shall be clean, sturdy, and strongly sewn or sealed.

8 LABELING

In addition to the provisions of MS 19, the following specific particulars shall be legibly and indelibly labeled on the container:

8.1 Name of the product and variety

The name of the product to be shown on the label shall be in accordance with clause **3.1 – 3.5**. The alternative name given parenthesis shall also be used.

8.2 Labeling of non-retail

Information on non-retail containers shall be either on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer

PUBLIC REVIEW DRAFT

may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

9 METHODS OF SAMPLING AND ANALYSIS

9.1 Sampling of rice shall be in accordance with MS 146.

9.2 Moisture content shall be determined in accordance with ISO 712.

PUBLIC REVIEW DRAFT

ANNEX A
(Normative)

CLASSIFICATION OF RICE

If rice is classified as long grain, medium grain or short grain, the classification shall be in accordance with one of the following specification;

A1 KERNEL LENGTH/WIDTH RATIO

A1.1 Long grain rice

A1.1.1 Husked rice or parboiled husked rice with length/width ratio of 3.1 or more.

A1.1.2 Milled rice or parboiled milled rice with a length/width ratio of 3.0 or more.

A1.2 Medium grain rice

A1.2.1 Husked rice or parboiled husked rice with a length/width ratio of 2.1 – 3.0.

A1.2.2 Milled rice or parboiled milled rice with length/width ratio of 2.0 – 2.9.

A1.3 Short grain rice

A1.3.1 Husked rice or parboiled husked rice with a length/width ratio of 2.0 or less.

A1.3.2 Milled rice or parboiled milled rice with a length/width ratio of 1.9 or less.

A2 MILLING DEGREE

Milled rice (white rice) may be further classified into the following degrees of milling:

A2.1 Undermilled rice

Rice obtained by milling husked rice but not to the degree necessary to meet requirements of well-milled rice.

A2.2 Well milled rice

Rice obtained by milling husked rice in such a way that most of the bran and part of the embryo have been removed.

A2.3 Extra-well-milled rice

Rice obtained by milling husked rice in such a way that all of the bran and almost all the embryo have been removed.

PUBLIC REVIEW DRAFT

ANNEX B

METHODS OF ANALYSIS FOR RICE SPECIFICATIONS

B1 PRINCIPLE

Manual separation and weighing of the broken kernels and of the categories in Table 1.

B2 APPARATUS

B2.1 Sample divider.

B2.2 Conical sampler or multiple-slot sampler, with a distribution system in accordance with ISO 13690.

B2.3 Tweezers, scalpel and paint brush.

B2.4 Small bowls.

B2.5 Balance, capable of weighing to the nearest 0.01 g.

B2.6 Tray, or other means, coloured in contrast with the colour of the rice to be evaluated.

B2.7 Micrometer, or other measuring device not deforming the kernels and capable of being read to the nearest 0.01 mm.

B3 SAMPLING

Sampling shall be in accordance with ISO 13690. It is important that the laboratory receives a sample which is truly representative of the lot and has not been damaged or changed during transport or storage.

B4 PROCEDURE

B4.1 General

a) Note if an odour, particular or foreign to rice, is detected, as well as the presence of all anomalities.

b) Verify the presence of living or dead insects by visual examination and report their number.

B4.2 Preparation of test sample

a) Weigh and carefully mix the laboratory sample to make it uniform as possible. Then proceed to reduce it, if necessary, using a sample divider **(B2.1**) to obtain a quantity of about 800 g.

b) Divide the test sample so obtained into two equal test portions of about 400 g, using the sample divider (**B2.1**).

B4.3 Determination

B4.3.1 General

a) When a kernel has several defects, it shall be classified in the category where the maximum permissible value is the lowest (see Table 1)

b) All parts of kernels which get stuck in the perforation sieve shall be considered to be retained by the sieve.

B4.3.2 Average length

On one of the test portions (**B4.2**):

PUBLIC REVIEW DRAFT

a) Separate two sets of 100 kernels without any broken part, by random sampling;

b) Measure the length of the kernels using a micrometer (**B2.7**) and calculate the arithmetic means of the length for the both sets of kernels ($L_1 + L_2$);

c) Calculate the average length (**3.11**) of the two sets of kernels (L_1+L_2)/2; if the value (L_1-L_2)/ (L_1+L_2/ 2 x 100 is higher than 2, return all the kernels to the tray and repeat from step a).

d) Return all the kernels to the test portion

B4.3.3 Husked rice, non-parboiled (see figure A1)

a) Weigh one of the test portions (**B4.2**) to the nearest 0.1 g (m_w) and spread it on the tray (**B2.6**). separate the organic extraneous matter (**3.12 Note 1**), the inorganic extraneous matter (**3.12 Note 2**), the paddy (**3.1**), the milled rice, non-parboiled (**3.3**), the husked rice, parboiled (**3.4**) and the milled rice, parboiled (**3.4)** into small bowls (**B2.4**) with the aid of tweezers, scalpel and paint brush(**B2.3**). Weigh the six fractions obtained to the nearest 0.01g (m_1, m_2, m_3, m_4, m_5 and m_6).

b) Divide the second test portion with the divider (**B2.1**) in order to obtain for different aliquot parts of about 100g each.

c) Weigh the first aliquot part to the nearest 0.01 g (m_x). Spread it out and separate the damaged kernels (**3.14**), the immature and/or malformed kernels (**3.15**), and the red kernels (**3.17**) together with the red streaked kernels (**3.18**) into small bowls. Weigh the three fractions so obtained to the nearest 0.01 g (m_7, m_8 and m_9).

d) Weigh the second aliquot part to the nearest 0.01g (m_y). Separate the chips (**3.10**) by metal sieve (**B2.2**) then spread out the remainder and separate the broken kernels, classifying them into large broken kernels (**3.7**), medium broken kernels (**3.8**) and small broken kernels (**3.9**). Put the fractions so obtained into small bowls (**B2.4**). Weigh the four fractions to the nearest 0.01 g (m_{10}, m_{11}, m_{12} and m_{13}).

e) Proceed with the laboratory milling of a third aliquot part. Weigh the obtained milled rice to the nearest 0.01 g (m_z). Spread it out and separate the heat-damaged kernels (**3.13**), the chalky kernels (**3.16**) and waxy rice (**3.5**) into small bowls. Weigh the three fractions so obtained to the nearest 0.01 g (m_{14}, m_{15} and m_{16}).

B4.3.4 Milled rice, non-parboiled (see Figure B2)

a) Weigh one of the test portions (**B4.2**) to the nearest 0.1g (m_w) and spread it on a tray (**B2.6**). Separate the organic extraneous matter (**3.12 Note 1**), the inorganic extraneous matter **(3.12, Note 2**) the paddy (**3.1**) the husked rice, non-parboiled (**3.2),** the husked rice, parboiled (**3.4**), and the milled parboiled (**3.3** and **3.4**) into small bowls, with the aid of tweezers, scalpel and paint brush (**B2.3**). Weigh the six fractions so obtained to the nearest 0.01 g (m_1, m_2, m_3, m_4, m_5 and m_6).

b) Divide the second test portion with the divider (**B2.1**) in order to obtain four different aliquot parts about 100 g each.

c) Weigh the first aliquot part to the nearest 0.01 g (m_x). Spread it out and separate the heat-damaged kernels (**3.13**), the damaged kernels (**3.14**), the immature and/or malformed kernels (**3.15**), the chalky kernels (**3.16**), the red kernels (**3.17**) together with the red streaked kernels (**3.18**) and the waxy rice (**3.5**) into small bowls. Weigh the six fractions so obtained to the nearest 0.01 g (m_7, m_8, m_9, m_{10}, m_{11}, and m_{16}).

d) Weigh the second aliquot part to the nearest 0.01g (m_y). Separate the chips (**3.10**) by metal sieve (**B2.2**) then spread out the remainder and separate the broken kernels, classifying them into large broken

PUBLIC REVIEW DRAFT

kernels (**3.7**), medium broken kernels (**3.8**) and small broken kernels (**3.9**). Put the fractions so obtained into small bowls. Weigh the four fractions to the nearest 0.01g (m_{12}, m_{13}, m_{14} and m_{15}).

B4.3.5 Husked rice, parboiled (see Figure A3)

a) Weigh one of the test portions (**B4.2**) to the nearest 0.1g (m_w) and spread it on the tray (**B2.6**). separate the organic extraneous matter (**3.12 Note 1**), the inorganic extraneous matter (**3.12 Note 2**), the paddy (**3.1**), the milled rice, non-parboiled (**3.3**), the husked rice, parboiled (**3.4**) and the milled rice, parboiled (**3.4)** into small bowls (**B2.4**) with the aid of tweezers, scalpel and paint brush(**B2.3**). Weigh the six fractions obtained to the nearest 0.01 g (m_1, m_2, m_3, m_4, m_5 and m_6).

b) Divide the second test portion with the divider (**B2.1**) in order to obtain for different aliquot parts of about 100 g each.

c) Weigh the first aliquot part to the nearest 0.01 g (m_x). Spread it out and separate the damaged kernels (**3.14**), the immature and/or malformed kernels (**3.15**), the red kernels (**3.17**) together with the red streaked kernels (**3.18**) into small bowls. Weigh the three fractions so obtained to the nearest 0.01 g (m_7, m_8 and m_9).

d) Weigh the second aliquot part to the nearest 0.01 g (m_y). Separate the chips (**3.10**) by metal sieve (**B2.2**) then spread out the remainder and separate the broken kernels, classifying them into large broken kernels (**3.7**), medium broken kernels (**3.8**) and small broken kernels (**3.9**). Put the fractions so obtained into small bowls. Weigh the four fractions to the nearest 0.01 g (m_{10}, m_{11}, m_{12} and m_{13}).

e) Proceed with the laboratory milling of a third aliquot part. Weigh the obtained milled rice to the nearest 0.01g (m_z). Spread it out and separate the heat-damaged kernels (**3.13**), the chalky kernels (**3.16**) and waxy rice (**3.5**) into small bowls. Weigh the three fractions so obtained to the nearest 0.01 g (m_{14}, m_{15} and m_{16}).

f) Proceed with the milling of the fourth aliquot part and determine the percentage of waxy rice (**3.5**) according to annex C.

B4.3.6 Milled rice, parboiled (see Figure A4)

a) Weigh one of the test portions (**B4.2**) to the nearest 0.1 g (m_w) and spread it on the tray (**B2.6**). separate the organic extraneous matter (**3.12 Note 1**), the inorganic extraneous matter (**3.12 Note 2**), the paddy (**3.1**), the milled rice, non-parboiled (**3.3**), the husked rice, parboiled (**3.4**) and the milled rice, parboiled (**3.4)** into small bowls (**B2.4**) with the aid of tweezers, scalpel and paint brush (**B2.3**). Weigh the six fractions obtained to the nearest 0.01 g (m_1, m_2, m_3, m_4, m_5 and m_6).

b) Divide the second test portion with the divider (**B2.1**) in order to obtain for different aliquot parts of about 100 g each.

c) Weigh the first aliquot part to the nearest 0.01 g (m_x). Spread it out and separate the heat-damaged kernels (**3.13**), the damaged kernels (**3.14**), the immature and/or malformed kernels (**3.15**), and the red kernels (**3.17**) together with the red streaked kernels (**3.18**), the partly gelatinized kernels (**3.19**) and the pecks (**3.20**) into small bowls. Weigh the six fractions so obtained to the nearest 0.01 g (m_7, m_8, m_9, m_{10}, m_{11}, and m_{12}).

d) Weigh the second aliquot part to the nearest 0.01 g (m_y). Separate the chips (**3.10**) by metal sieve (**B2.2**) then spread out the remainder and separate the broken kernels, classifying them into large broken kernels (**3.7**), medium broken kernels (**3.8**) and small broken kernels (**3.9**). Put the fractions so obtained into small bowls. Weigh the four fractions to the nearest 0.01 g (m_{13}, m_{14}, m_{15} and m_{16}).

PUBLIC REVIEW DRAFT

e) Weigh the third aliquot part to the nearest 0.01 g and determine the percentage of waxy rice (**3.5**) according to annex C.

B5 Expression of results

Express the result obtained for the categories given in Table B1 as mass fraction, in percentage of the product as received.

Table B1:

Categories	Husked rice non-parboiled [a]	Milled rice non-parboiled [b]	Husked rice parboiled [c]	Milled rice parboiled [d]
Organic extraneous matter (**3.12, Note 1**)	$\frac{m_1 \times 100}{m_w}$	$\frac{m_1 \times 100}{m_w}$	$\frac{m_1 \times 100}{m_w}$	$\frac{m_1 \times 100}{m_w}$
Inorganic extraneous matter **(3.12 Note 2)**	$\frac{m_2 \times 100}{m_w}$	$\frac{m_2 \times 100}{m_w}$	$\frac{m_2 \times 100}{m_w}$	$\frac{m_{10} \times 100}{m_w}$
Paddy (**3.1**)	$\frac{m_3 \times 100}{m_w}$	$\frac{m_3 \times 100}{m_w}$	$\frac{m_3 \times 100}{m_w}$	$\frac{m_3 \times 100}{m_w}$
Husked rice, non-parboiled **(3.2)**	N/A	$\frac{m_4 \times 100}{m_w}$	$\frac{m_4 \times 100}{m_w}$	$\frac{m_4 \times 100}{m_w}$
Milled rice, non-parboiled (**3.3**)	$\frac{m_4 \times 100}{m_w}$	N/A	$\frac{m_5 \times 100}{m_w}$	$\frac{m_5 \times 100}{m_w}$
Husked rice, parboiled (**3.4**)	$\frac{m_5 \times 100}{m_w}$	$\frac{m_5 \times 100}{m_w}$	N/A	$\frac{m_6 \times 100}{m_w}$
Milled rice parboiled (**3.4**)	$\frac{m_6 \times 100}{m_w}$	$\frac{m_6 \times 100}{m_w}$	$\frac{m_6 \times 100}{m_w}$	N/A
Heat damaged kernels (**3.13**)	$\frac{m_{14} \times 100}{m_Z}$	$\frac{m_7 \times 100}{m_X}$	$\frac{m_{14} \times 100}{m_Z}$	$\frac{m_7 \times 100}{m_X}$
Damaged kernels (**3.14**)	$\frac{m_7 \times 100}{m_X}$	$\frac{m_8 \times 100}{m_X}$	$\frac{m_7 \times 100}{m_X}$	$\frac{m_8 \times 100}{m_x}$
Immature and/or malformed kernels (**3.15**)	$\frac{m_8 \times 100}{m_X}$	$\frac{m_9 \times 100}{m_X}$	$\frac{m_8 \times 100}{m_X}$	$\frac{m_9 \times 100}{m_X}$
Chalky kernels (**3.16**)	$\frac{m_{15} \times 100}{m_Z}$	$\frac{m_{10} \times 100}{m_X}$	N/A	N/A
Partly gelatinized kernels (**3.19**)	N/A	N/A	$\frac{m_{15} \times 100}{m_Z}$	$\frac{m_1 \times 100}{m_X}$
Pecks (**3.20**)	N/A	N/A	$\frac{m_{16} \times 100}{m_z}$	$\frac{m_{12} \times 100}{m_x}$
Red and red streaked kernels (**3.17** and **3.18**)	$\frac{m_9 \times 100}{m_X}$	$\frac{m_{11} \times 100}{m_X}$	$\frac{m_9 \times 100}{m_X}$	$\frac{m_{10} \times 100}{m_X}$
Waxy rice (**3.5**)	$\frac{m_{16} \times 100}{m_z}$	$\frac{m_{16} \times 100}{m_x}$	$\frac{m_{17} \times 100}{m_{17} + m_{18}}$	$\frac{m_{17} \times 100}{m_{17} + m_{18}}$
Large broken kernels (**3.7**)	$\frac{m_{10} \times 100}{m_y}$	$\frac{m_{12} \times 100}{m_y}$	$\frac{m_{10} \times 100}{m_y}$	$\frac{m_{13} \times 100}{m_y}$

PUBLIC REVIEW DRAFT

Table B1 cont

Medium broken kernels (**3.8**)	$\frac{m_{11} \times 100}{m_y}$	$\frac{m_{13} \times 100}{m_y}$	$\frac{m_{11} \times 100}{m_y}$	$\frac{m_{14} \times 100}{m_y}$
Small broken kernels (**3.9**)	$\frac{m_{12} \times 100}{m_y}$	$\frac{m_{14} \times 100}{m_y}$	$\frac{m_{12} \times 100}{m_y}$	$\frac{m_{15} \times 100}{m_y}$
Chips (**3.10**)	$\frac{m_{13} \times 100}{m_y}$	$\frac{m_{15} \times 100}{m_y}$	$\frac{m_{13} \times 100}{m_y}$	$\frac{m_{16} \times 100}{m_y}$

[a] For the meaning of the symbols, refer to Figure A1

[b] For the meaning of the symbols, refer to Figure A2

[c] For the meaning of the symbols refer to Figure A3

[d] For the meaning of the symbols refer to Figure A4

Note - Report the result for each category to one decimal place by rounding it to the nearest integral multiple. If there are two successive integral multiples equally near to the given number the even integral multiple should be selected as the rounded number. Carry out the rounding always in one step

Example

Given number	Rounded number
18.23	18.2
18.26	18.3
18.37	18.4
18.25	18.2
18.35	18.4
18.347	18.3
18.251	18.3

B6 TEST REPORT

The test report shall specify the following:

B6.1 All information necessary for the complete identification of the sample;

B6.2 The sampling method used, if known;

B6.3 Test method used, with reference to this standard;

B6.4 The date of analysis;

B6.5 Any operating details not specified in this annex, or regarded as optional, together with details of any incidents likely to have influenced the results; and

B6.6 The test result obtained.

PUBLIC REVIEW DRAFT

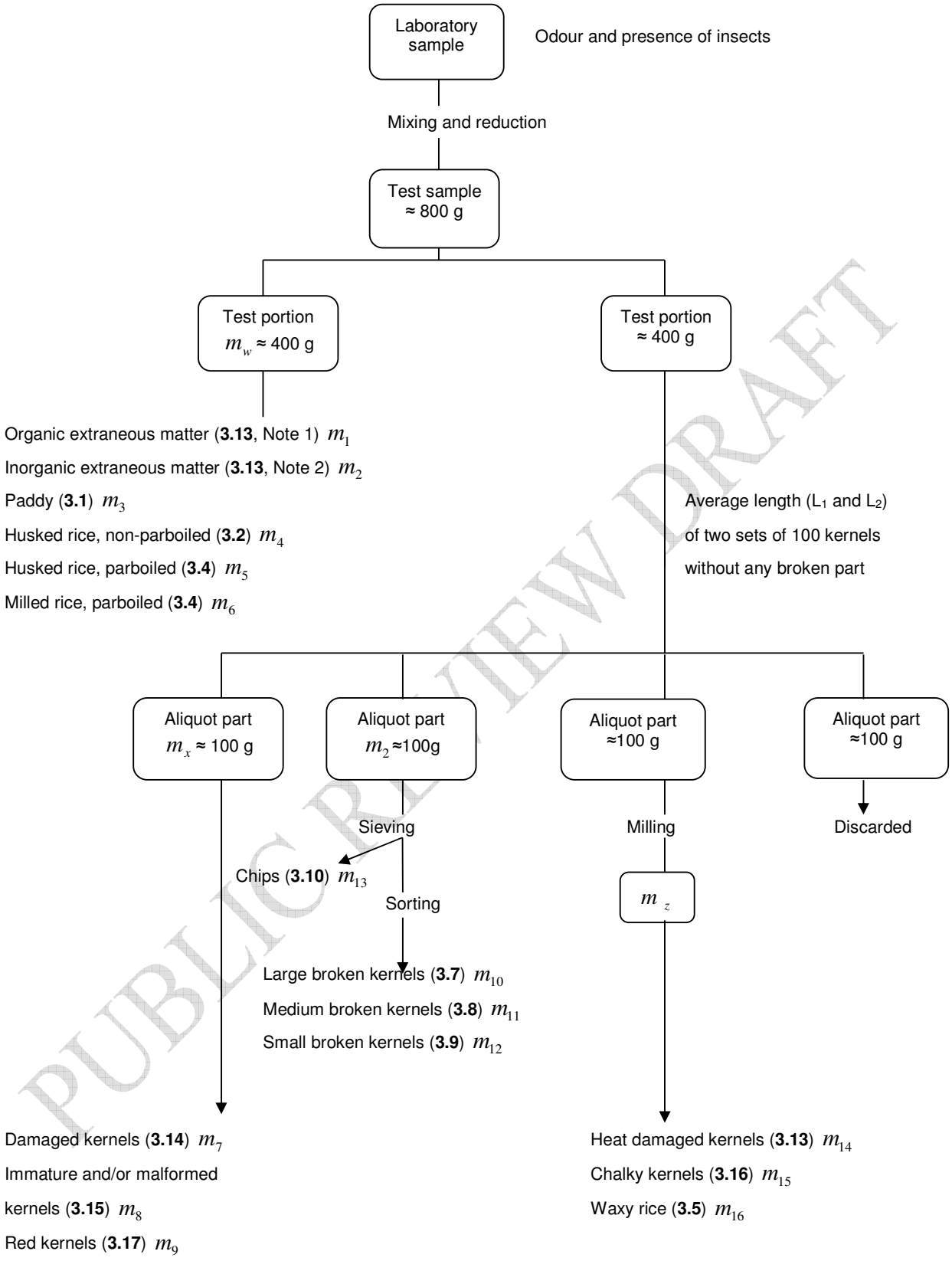


Figure A.1 – Scheme of procedure for husked rice, non-parboiled

PUBLIC REVIEW DRAFT

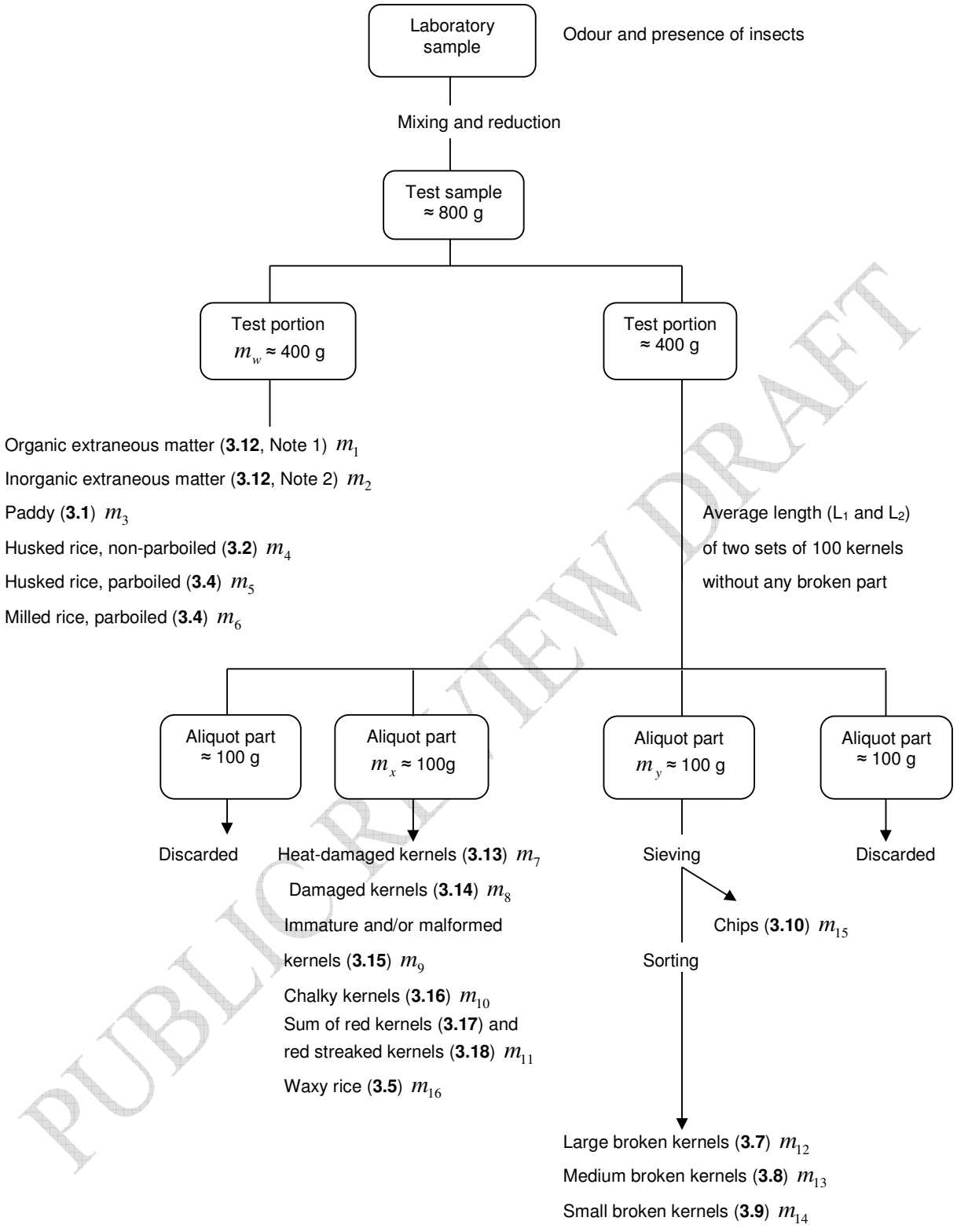


Figure A.2 – Scheme of procedure for milled rice, non-parboiled

PUBLIC REVIEW DRAFT

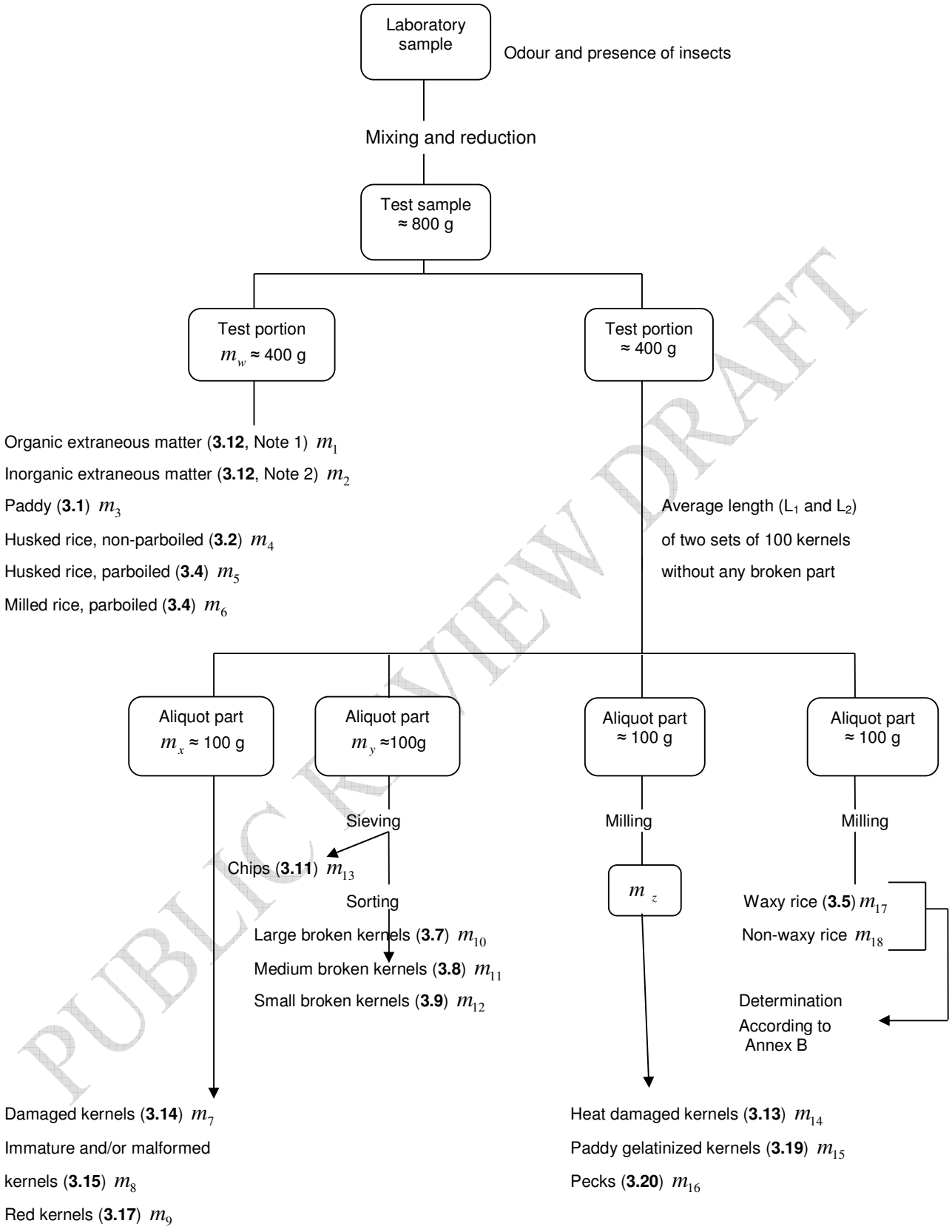
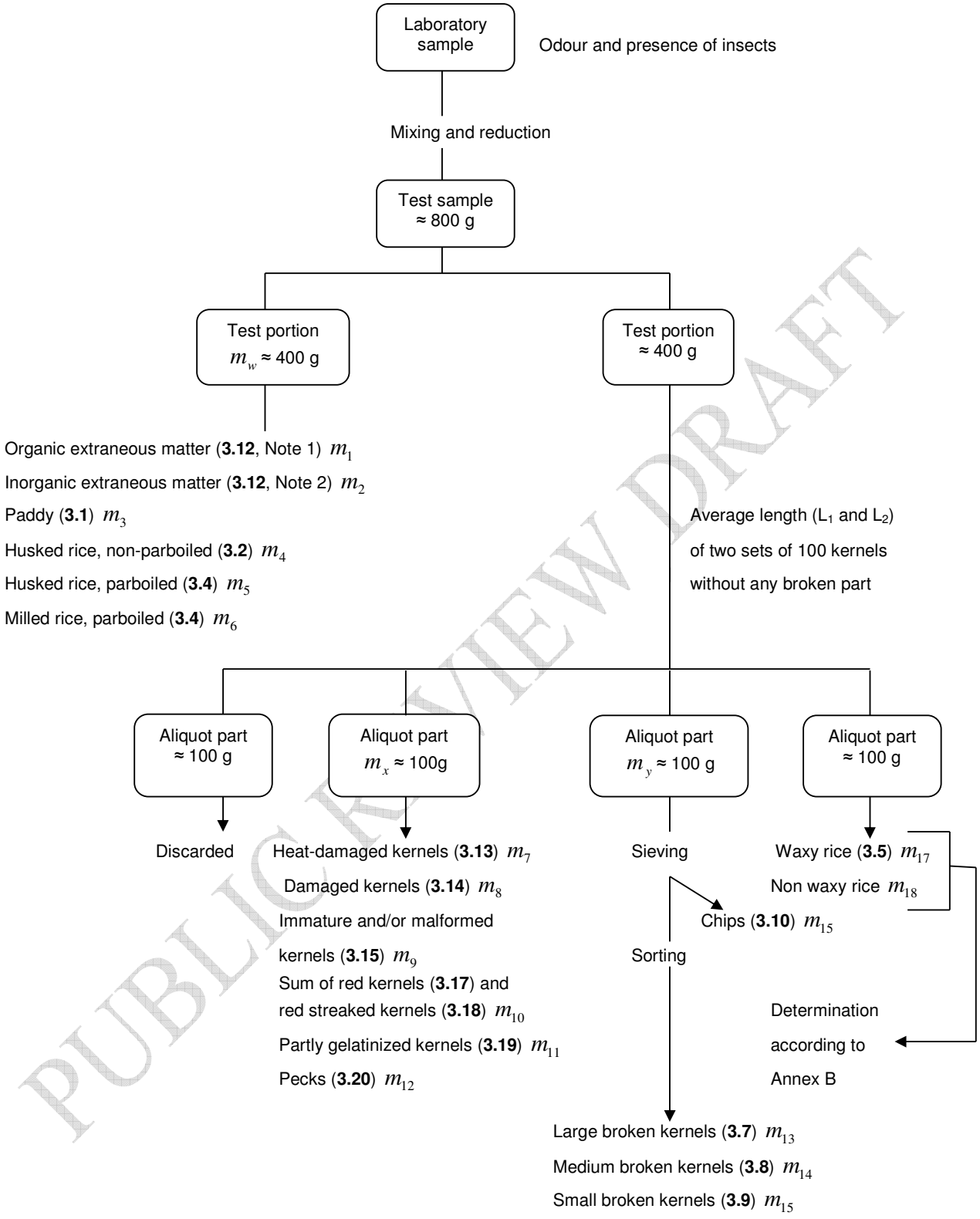


Figure A.3 – Scheme of procedure for husked rice, parboiled

PUBLIC REVIEW DRAFT



PUBLIC REVIEW DRAFT

Figure A.4– Scheme of procedure for milled rice, parboiled

ANNEX C

(Normative)

DETERMINATION OF WAXY RICE IN PARBOILED RICE

C1 PRINCIPLE

Waxy rice kernels have a reddish brown colour when stained in an iodine solution, while non-waxy kernels show a blue colour.

C2 APPARATUS

C2.1 Balance, capable of weighing to the nearest 0.01 g

C2.2 Glass beaker, capacity of 250 mℓ

C2.3 Small white colour bowls, or any white colour container.

C2.4 Wire basket.

C2.5 Stirring rod.

C2.6 Tweezers or forceps.

C2.7 Tissue paper.

C3 REAGENTS

C3.1 Iodine stock solution, containing 0.2 g iodine and 2.0 g potassium iodine in 100 mℓ of deionized water.

C3.2 Iodine working solution. Dilute the stock solution (**C3.1**) two times by volume with deionized water. Prepare daily.

C4 DETERMINATION

C4.1 Weigh a portion of about 100 g milled rice and put it into glass beaker (**C2.2**).

C4.2 Add approximately 88 mℓ of iodine working solution (**C3.2**) to soak kernels, and stir until all kernels are submerged under solution. Let the kernels soak in the solution for 30 seconds.

C4.3 Pour the rice and solution into a wire basket (**C2.4**), and shake the basket slightly in order to drain out the solutions. Then place the basket on a piece of tissue paper (**C2.7**) to absorb the excess liquid.

C4.4 Pour the stained kernels into a bowl (**C2.3**). Separate the reddish brown kernels of waxy rice from the dark blue kernels of non-waxy rice.

C4.5 Weigh the waxy rice portion (m_1) and the non-waxy rice portion (m_2) to the nearest 0.1 g.

C4.6 Calculate the percentage of the waxy rice, w , from the formula

$$w = \frac{m_1}{m_1 + m_2} \times 100\ \%$$

PUBLIC REVIEW DRAFT

ICS 67.140.10 DMS 179:2016

THE MALAWI BUREAU OF STANDARDS

The Malawi Bureau of Standards is the standardizing body in Malawi under the aegis of the Ministry of Industry and Trade. Set up in 1972 by the Malawi Bureau of Standards Act (Cap: 51:02), the Bureau is a parastatal body whose activities aim at formulating and promoting the general adoption of standards relating to structures, commodities, materials, practices, operations and from time to time revise, alter and amend the same to incorporate advanced technology.

CERTIFICATION MARK SCHEME

To bring the advantages of standardization within the reach of the common consumer, the Bureau operates a Certification Mark Scheme. Under this scheme, manufacturers who produce goods that conform to national standards are granted permits to use the Bureau's "Mark of Quality" depicted below on their products. This Mark gives confidence to the consumer of the commodity's reliability.

PUBLIC REVIEW DRAFT