Second Edition

OIL PALM FRUIT GRADING MANUAL

MALAYSIAN PALM OIL BOARD (MPOB)
Ministry of Primary Industries, Malaysia

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FOREWORD

The Malaysian palm oil industry has grown by leaps and bounds and is the most important source of export revenue in the agricultural sector. At the moment, the country is not only the world's leading producer and exporter of palm oil but also the biggest exporter of oils and fats in the world. In the year 2005, the area planted with oil palm is expected to increase to 3.2 million hectares and similarly, the production of crude palm oil is expected to reach 13.3 million tonnes.

In keeping with its status as a world leader in the production of quality palm oil, those involved in the industry including the plantation sector must play a major role to further improve the quality of Malaysian palm oil. The Malaysian Palm Oil Board (MPOB) has initiated an effort to publish this revised **Oil Palm Fruit Grading Manual Second Edition** so as to promote quality awareness amongst the mills, the plantations and the smallholding sectors. This manual explains the grading procedures such as sampling and grading methods, calculation of extraction rates and documents that are required for grading.

This manual is published as a reference especially for those that do not have their own grading schemes. For mills and estates that have their own grading schemes, this manual can serve as an alternative when they purchase fruits from outside suppliers.

1 INTRODUCTION

This manual serves as a practical guide for the grading of oil palm fruit in the mills. It was jointly prepared by a working technical committee, which comprised representatives from the palm oil industry and was based on studies carried out by MPOB and industry on mills and plantations / estates throughout Malaysia that practiced oil palm fruit grading.

2 OBJECTIVE

The main aim of this manual is to improve the quality and quantity of crude palm oil and palm kernel production in Malaysia.

The specific of objectives are as follows :-

i. To improve the quality of oil palm fruits and fresh fruit bunches received at the mills.

ii. To improve the quality of Malaysian crude palm oil

iii. To improve the efficiency of oil and kernel extraction rates in the mills.

iv. To ensure that the suppliers and millers obtain a fair deal from their transactions.

3 IMPLEMENTATION OF THE GRADING SCHEME

3.1 Site of Grading

Grading can be done anywhere inside the premises of the mill or its agent. It is best done on a platform beside the loading ramp.

3.2 Who Can Perform the Grading

Grading can only be done by the grading staff of the mill or an agent appointed mill who has the capability and experience in the grading of fresh fruit bunches.

3.3 Documents Required

Documents that are required for grading are the Grading Form *(Appendix I)*, weighbridge ticket and supplier's agreement documents *(if any)*. Only fruits received from suppliers with valid MPOB licences are to be graded.

4 GRADING PROCEDURES

4.1 Sampling Procedures

4.1.1 Select about 50-100 bunches at random as sample from each consignment to be graded. The sample taken should represent the top, middle and bottom portions of the consignment.

4.1.2 The minimum sample size of each consignment to be graded should be determined based on the following criteria :-

i. If the net weight of the consignment is less than 5 tonnes, the minimum sample size should be 50 bunches.

ii. If the net weight of the consignment is 5 tonnes or more, the minimum sample size should be 100 bunches.

The sample size should be economical, practical and able to detect any change in the bunch quality, especially the degree of ripeness at 95% level of confidence.

4.1.3 Separate the bunches that have been sampled for grading from the rest of the bunches.

4.2 Grading Frequency

4.2.1 The minimum grading frequency for each supplier of fresh fruit bunches (FFB) with long term contract should not be less than 10% of the total consignments or at a the ratio of 1:10 lorries. If there is variation in the quality of fresh fruit bunches supplied or doubts regarding the bunch quality, the grading fequency should be increased to fifty percent (50%) of the total consignment or at of 1:2 lorries.

4.2.2 For suppliers without long term contracts, grading should be done on all consignments.

4.3 Bunch Classifications

Fresh fruit bunch (FFB) can be classified and graded according to the following criteria :-

i. Ripe Bunch

Ripe bunch is a fresh bunch which has reddish orange colour and the outer layer fruitlet's mesocarp is orange in colour. This bunch has at least 10 fresh sockets of detached fruitlets and more than fifty percent (50%) of the fruits still attached to the bunch at the time of inspection at the mill. The bunch and the loose fruits are to be sent to the mill within 24 hour after harvesting.

ii. Underripe Bunch

Underripe bunch is a fresh bunch which has reddish orange colour or purplish red colour and the outer layer fruitlet's mesocarp is yellowish orange in colour. This bunch has less than 10 fresh sockets of detached fruitlets at the time of inspection at the mill. The bunch and the loose fruits are to be sent to the mill within 24 hour after harvesting.

iii. Unripe Bunch

Unripe bunch is a fresh bunch which has black or purplish black fruits and the outer layer fruitlet's mesocarp is yellowish in colour. This bunch does not have any fresh sockets of detached fruitlets at the time of inspection at the mill. The sockets (if any) on the bunch is not due to normal ripening process.

iv. Overripe Bunch

Overripe bunch is a fresh bunch which has darkish red-coloured fruits and has more than fifty percent (50%) of detached fruitlets but with at least ten percent (10%) of the fruits still attached to the bunch at the time of inspection at the mill. The bunch and the loose fruits are to be sent to the mills within 24 hour after harvesting.

v. Empty Bunch

Empty bunch is a bunch with has more than ninety percent (90%) of detached fruitlets at the time of inspection at the mill.

vi. Rotten Bunch

Rotten bunch is a bunch partly or wholly and together with its loose fruits, has turn blackish in colour, rotten and mouldy.

vii. Long Stalk Bunch

Long stalk bunch is a fresh bunch which has a stalk of more than 5 cm in length (measured from the lowest level of the bunch stalk).

viii. Unfresh Bunch

Unfresh bunch is a bunch which has been harvested and left at the field for more than 48 hour before being sent to the mill. The whole fruit or part of it together with its stalk has dried out. Normally, this type of bunch is dry and blackish in colour.

ix. Old Bunch

Old bunch is a bunch which has been harvested and left at the field before being sent to the mill. The fruitlets still remaining on the bunch are dry and brownish black in colour. The stalk is also dry, soft, fibrous and blackish in colour.

x. Dirty Bunch

Dirty bunch is a bunch with more than half of its surface covered with mud, sand, other dirt particles and mixed with stone or other foreign matters.

xi. Small Bunch

Small bunch is a bunch which has small fruits and weigh less than 2.3 kg. (5 lb.)

xii. Pest Damaged Bunch

Pest damaged bunch is a bunch with more than thirty percent (30%) of its fruits damaged by pest attack such as rats, etc.

xiii. Diseased Bunch

Diseased bunch is a bunch which has more than fifty percent (50%) parthenocarpic fruits and is not normal in terms of its size or its density.

xiv. Dura Bunch

Dura bunch has fruits with the following characteristics :-

a.	Shell thickness	2–8 mm
b.	Ratio of shell to fruit	25–50%
c.	Ratio of mesocarp to fruit	20–60%
d.	Ratio of kernel to fruit	4–20%
e.	No fibre ring around the shell	

xv. Loose Fruit

Loose fruit is a fruit detached from a fresh fruit bunch because of ripeness and is reddish orange in colour. All loose fruits have to be sent to the mill within 24 hours after harvesting.

xvi. Wet Bunch

Wet bunch refers to a consignment of fresh fruit bunches (FFB) which has excessive free water.

5 GRADING METHODS

The sample that has been selected will be graded to determine the quality of the bunches and the extraction rate that can be given to the supplier. During grading the following practices should be carried out :

a. Inspection and Assessment of the Bunch Quality.
b. Calculation of Penalty for Poor Quality Bunch.
c. Determination of the Basic Extraction Rate.
d. Calculation of the Graded Extraction Rate.

5.1 Inspection and Assessment of the Bunch Quality

5.1.1 The grading of the consignment of fresh fruit bunches should be done in the presence of the supplier or his representative such as the lorry driver or his attendant.

5.1.2 The lorry with the consignment of fresh fruit bunches which has been selected to be graded is directed to unload to the platform near the loading ramp. Ensure that the bunches are evenly laid out and no overlapping or layering should occur.

5.1.3 Count the number of bunches in the consignment and calculate the average bunch weight with the following formula :-

$$\text{Average Bunch Weight} = \frac{\text{Net Weight (kg) as per Weighbridge Ticket}}{\text{Total Number of Bunches}}$$

Record the information in the Grading Form as shown in *Appendix I*.

5.1.4 From these bunches, select at random 50-100 sample bunches and separate them from the rest of the bunches. Selection of the minimum sample size should be based on the net weight of the consignment as shown in paragraph 4.1.2.

5.1.5 Grade, classify and count the sampled bunches into 5 groups based on the criteria of bunch classifications as stated in paragraph 4.3 as follows :-

i. Ripe Bunch
ii. Underripe Bunch
iii. Unripe Bunch
iv. Empty Bunch
v. Rotten Bunch

Inspection and assessment of the bunch quality should be done quantitatively.

5.1.6 Record the number and the percentage of each group in the Grading Form as shown in *Appendix I*. The total percentage of the 5 groups must be one hundred percent (100%).

5.1.7 Grade, classify and count again all the sampled bunches into 5 groups as follows :-

i. Long Stalk Bunch
ii. Dirty Bunch
iii. Dura Bunch
iv. Old Bunch
v. Wet Bunch

The grading should be based on the criteria of bunch classification as stated in paragraph 4.3.

5.1.8 Record the number and percentage of each group in the Grading Form as shown in *Appendix I*. The percentages of the 5 groups of bunch quality in paragraph 5.1.5. are calculated based on the total number of sampled bunches as in paragraph 5.1.4.

5.2 Calculation of Penalty for Poor Quality Bunch

5.2.1 A penalty based on the discount system, as shown in *Tables III - XI*, will be imposed on the poor quality bunches. The penalty imposed will depend on the results of the grading as stated in the Grading Form. Check these results with the Penalty Tables *(table III - table XI)* and from there get the actual penalty value that can be imposed on each category of poor quality bunches.

Bunch Category	Penalty
Unripe Bunch	Table III
Underripe Bunch	Table IV
Empty Bunch	Table V
Rotten Bunch	Table VI
Long Stalk Bunch	Table VII
Dirty Bunch	Table VIII
Dura Bunch	Table IX
Old Bunch	Table X
Wet Bunch	Table XI

5.2.2 Consignment of fresh fruit bunches (FFB) that has poor quality bunches and exceeding :

i. The 20% of maximum allowable limit for empty bunches or;
ii. The 30% of maximum allowable limit for dirty bunches

should be rejected. Return the whole load to the supplier.

5.2.3 In practice, it is not possible to obtain one hundred percent (100%) good quality bunches and hence a reasonably good quality consignment should comprise the following combination of bunch quality.

Bunch Category	**Limit**
Ripe Bunch	≥90%
Underripe Bunch	≤10%
Long Stalk Bunch	≤5%
Unripe Bunch	0%
Dura Bunch	0%
Empty Bunch	0%
Rotten Bunch	0%
Dirty Bunch	0%
Old Bunch	0%
Wet Bunch	0%

5.3 Determination of the Basic Extraction Rate

The basic extraction rate is the theoretical extraction rate which is also the maximum extraction rate of the oil and kernel. This extraction rate can be determined in 2 ways; that is, by the age of the palm and the bunch weight.

5.3.1 Determination of the Basic Extraction Rate Based on the Age of the Palm

The basic extraction rate can be determined by the age of the palm, provided that the information regarding the year when the oil palm was planted is known (Refer to *Table I*). This method is suitable for mills that receive fruits from their own estates.

5.3.2 Determination of the Basic Extraction Rate Based on the Bunch Weight

This method is suitable for mills that receive their supplies from outside estates and dealers who do not have information regarding of the oil palm (Refer to *Table II*). The average bunch weight can be calculated by dividing the net weight (as stated in the weighbridge ticket) with the total number of bunches.

5.4 Calculation of the Graded Extraction Rate

5.4.1 The graded oil and kernel extraction rate that can be given to a supplier after the grading of the fresh fruit bunches (FFB) can be calculated based on the discount system as follows :-

Graded Extraction Rate = Basic Extraction Rate - Penalty

5.4.2 The graded extraction rate should be recorded in the Monthly Grading Summary Form as stated in *Appendix II*, for the purpose of payment to the suppliers.

6 GRADING REPORT

6.1 Grading Form

6.1.1 All observations and calculations during grading must be recorded in the Grading Form as shown in *Appendix I*.

6.1.2 Particulars that have to be recorded are as follows :

a. Net weight
b. Number of bunches
c. Average bunch weight
d. Number and percentage of unripe bunch
e. Number and percentage of underripe bunch
f. Number and percentage of ripe bunch
g. Number and percentage of empty bunch
h. Number and percentage of rotten bunch
i. Number and percentage of long stalk bunch
j. Number and percentage of dirty bunch
k. Number and percentage of Dura bunch
l. Number and percentage of old bunch
m. Number and percentage of wet bunch
n. Observations on bunch quality
o. Name and signature of Grading Officer

6.1.3 Use separate Grading Form (*Appendix I*) for each grading consignment.

6.1.4 This form is to be filled in duplicates. The original copy is to be kept by the mill and the second copy to be given to the supplier or its representative.

6.2 Monthly Grading Summary Form

6.2.1 All observations and calculations recorded in the Grading Form have to be summarised and recorded in the Monthly Grading Summary Form *(Appendix II)*.

6.2.2 The particulars that have to be recorded are as follows :-

a. Amount of fresh fruit bunches received.
b. Amount and percentage of fresh fruit bunches graded
c. Crude palm oil produced
d. Oil and kernel extraction rates archieved
e. Average bunch weight and age of palm
f. Percentage and penalty (if any) for unripe bunch
g. Percentage and penalty (if any) for underripe bunch
h. Percentage of ripe bunch
i. Percentage and penalty (if any) for empty bunch
j. Percentage and penalty (if any) for rotten bunch
k. Percentage and penalty (if any) for long stalk bunch
l. Percentage and penalty (if any) for dirty bunch
m. Percentage and penalty (if any) for Dura bunch
n. Percentage and penalty (if any) for old bunch
o. Percentage and penalty (if any) for wet bunch
p. Graded extraction rate for oil and kernel given to the supplier
q. Name and signature of the mill manager

6.2.3 Only one copy of this form is to be filled for record purposes and retention by the mill.

7 LIST OF TABLES

Table I

Basic Extraction Rate for Oil & Kernel Based on Age of Palm Tenera (DxP)* Progeny

AGE OF PALM (YEARS)	PENINSULAR		SABAH/SARAWAK	
	EXTRACTION RATE		EXTRACTION RATE	
	OIL (%)	KERNEL (%)	OIL (%)	KERNEL (%)
<3	16 – 18	4.0	17 – 19	3.0
3 – 4	18 – 20	5.0	19 – 21	4.0
4 – 18	20 – 21	5.5	21 – 22	5.0
>18	19 – 20	5.5	20 – 21	5.0

* For good quality FFB

Table II

Basic Extraction Rate for Oil & Kernel Based on Bunch Weight Tenera (DxP)* Progeny

BUNCH WEIGHT (KG)	PENINSULAR		SABAH/SARAWAK	
	EXTRACTION RATE		EXTRACTION RATE	
	OIL (%)	KERNEL (%)	OIL (%)	KERNEL (%)
<5	16 – 17	4.0	17 – 18	3.0
5 – 7	17 – 18	4.5	18 – 19	3.5
7 – 10	18 – 20	5.0	19 – 21	4.0
10 – 25	20 – 21	5.5	21 – 22	5.0
>25	19 – 20	5.5	20 – 21	5.0

* For good quality FFB

Table III

Deduction Imposed on the Basic Oil Extraction Rate Based on the Percentage of Unripe Bunch

	0	10	20	30	40	50	60	70	80	90
0	0	1.20	2.40	3.60	4.80	6.00	7.20	8.40	9.60	10.80
1	0.12	1.32	2.52	3.72	4.92	6.12	7.32	8.52	9.72	10.92
2	0.24	1.44	2.64	3.84	5.04	6.24	7.44	8.64	9.84	11.04
3	0.36	1.56	2.76	3.96	5.16	6.36	7.56	8.76	9.96	11.16
4	0.48	1.68	2.88	4.08	5.28	6.48	7.68	8.88	10.08	11.28
5	0.60	1.80	3.00	4.20	5.40	6.60	7.80	9.00	10.20	11.40
6	0.72	1.92	3.12	4.32	5.52	6.72	7.92	9.12	10.32	11.52
7	0.84	2.04	3.24	4.44	5.64	6.84	8.04	9.24	10.44	11.64
8	0.96	2.16	3.36	4.56	5.76	6.96	8.16	9.36	10.56	11.76
9	1.08	2.28	3.48	4.68	5.88	7.08	8.28	9.48	10.68	11.88

Table IV

Deduction Imposed on the Basic Oil Extraction Rate Based on the Percentage of Underripe Bunch

% UNDERRIPE BUNCH	0	10	20	30	40	50	60	70	80	90
0	0.00	0.00	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70
1	0.00	0.33	0.63	0.93	1.23	1.53	1.83	2.13	2.43	2.73
2	0.00	0.36	0.66	0.96	1.26	1.56	1.86	2.16	2.46	2.76
3	0.00	0.39	0.69	0.99	1.29	1.59	1.89	2.19	2.49	2.79
4	0.00	0.42	0.72	1.02	1.32	1.62	1.92	2.22	2.52	2.82
5	0.00	0.45	0.75	1.05	1.35	1.65	1.95	2.25	2.55	2.85
6	0.00	0.48	0.78	1.08	1.38	1.68	1.98	2.28	2.58	2.88
7	0.00	0.51	0.81	1.11	1.41	1.71	2.01	2.31	2.61	2.91
8	0.00	0.54	0.84	1.14	1.44	1.74	2.04	2.34	2.64	2.94
9	0.00	0.57	0.87	1.17	1.47	1.77	2.07	2.37	2.67	2.97

Table V

Deduction Imposed on the Basic Oil Extraction Rate Based on the Percentage of Empty Bunch

% EMPTY BUNCH	0	10	20	30	40	50	60	70	80	90
0	0.00	1.00	2.00	•	•	•	•	•	•	•
1	0.10	1.10	•	•	•	•	•	•	•	•
2	0.20	1.20	•	•	•	•	•	•	•	•
3	0.30	1.30	•	•	•	•	•	•	•	•
4	0.40	1.40	•	•	•	•	•	•	•	•
5	0.50	1.50	•	•	•	•	•	•	•	•
6	0.60	1.60	•	•	•	•	•	•	•	•
7	0.70	1.70	•	•	•	•	•	•	•	•
8	0.80	1.80	•	•	•	•	•	•	•	•
9	0.90	1.90	•	•	•	•	•	•	•	•

NOTE : ● - reject load

Table VI

Deduction Imposed on the Basic Oil Extraction Rate Based on the Percentage of Rotten Bunch

% ROTTEN BUNCH	0	10	20	30	40	50	60	70	80	90
0	0.00	1.20	2.40	3.60	4.80	6.00	7.20	8.40	9.60	10.80
1	0.12	1.32	2.52	3.72	4.92	6.12	7.32	8.52	9.72	10.92
2	0.24	1.44	2.64	3.84	5.04	6.24	7.44	8.64	9.84	11.04
3	0.36	1.56	2.76	3.96	5.16	6.36	7.56	8.76	9.96	11.16
4	0.48	1.68	2.88	4.08	5.28	6.48	7.68	8.88	10.08	11.28
5	0.60	1.80	3.00	4.20	5.40	6.60	7.80	9.00	10.20	11.40
6	0.72	1.92	3.12	4.32	5.52	6.72	7.92	9.12	10.32	11.52
7	0.84	2.04	3.24	4.44	5.64	6.84	8.04	9.24	10.44	11.64
8	0.96	2.16	3.36	4.56	5.76	6.96	8.16	9.36	10.56	11.76
9	1.08	2.28	3.48	4.68	5.88	7.08	8.28	9.48	10.68	11.88

Table VII

Deduction Imposed on the Basic Oil Extraction Rate Based on the Percentage of Long Stalk Bunch

% LONG STALK BUNCH	0	10	20	30	40	50	60	70	80	90
0	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
1	0.00	0.11	0.21	0.31	0.41	0.51	0.61	0.71	0.81	0.91
2	0.00	0.12	0.22	0.32	0.42	0.52	0.62	0.72	0.82	0.92
3	0.00	0.13	0.23	0.33	0.43	0.53	0.63	0.73	0.83	0.93
4	0.00	0.14	0.24	0.34	0.44	0.54	0.64	0.74	0.84	0.94
5	0.00	0.15	0.25	0.35	0.45	0.55	0.65	0.75	0.85	0.95
6	0.06	0.16	0.26	0.36	0.46	0.56	0.66	0.76	0.86	0.96
7	0.07	0.17	0.27	0.37	0.47	0.57	0.67	0.77	0.87	0.97
8	0.08	0.18	0.28	0.38	0.48	0.58	0.68	0.78	0.88	0.98
9	0.09	0.19	0.29	0.39	0.49	0.59	0.69	0.79	0.89	0.99

Table VIII

Deduction Imposed on the Basic Oil Extraction Rate Based on the Percentage of Dirty Bunch

% DIRTY BUNCH	0	10	20	30	40	50	60	70	80	90
0	0	1.00	2.00	3.00	•	•	•	•	•	•
1	0.10	1.10	2.10	•	•	•	•	•	•	•
2	0.20	1.20	2.20	•	•	•	•	•	•	•
3	0.30	1.30	2.30	•	•	•	•	•	•	•
4	0.40	1.40	2.40	•	•	•	•	•	•	•
5	0.50	1.50	2.50	•	•	•	•	•	•	•
6	0.60	1.60	2.60	•	•	•	•	•	•	•
7	0.70	1.70	2.70	•	•	•	•	•	•	•
8	0.80	1.80	2.80	•	•	•	•	•	•	•
9	0.90	1.90	2.90	•	•	•	•	•	•	•

NOTE : ● - reject load

Table IX

Deduction Imposed on the Basic Oil Extraction Rate Based on the Percentage of Dura Bunch

% DURA BUNCH	0	10	20	30	40	50	60	70	80	90
0	0.00	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60
1	0.04	0.44	0.84	1.24	1.64	2.04	2.44	2.84	3.24	3.64
2	0.08	0.48	0.88	1.28	1.68	2.08	2.48	2.88	3.28	3.68
3	0.12	0.52	0.92	1.32	1.72	2.12	2.52	2.92	3.32	3.72
4	0.16	0.56	0.96	1.36	1.76	2.16	2.56	2.96	3.36	3.76
5	0.20	0.60	1.00	1.40	1.80	2.20	2.60	3.00	3.40	3.80
6	0.24	0.64	1.04	1.44	1.84	2.24	2.64	3.04	3.44	3.84
7	0.28	0.68	1.08	1.48	1.88	2.28	2.68	3.08	3.48	3.88
8	0.32	0.72	1.12	1.52	1.92	2.32	2.72	3.12	3.52	3.92
9	0.36	0.76	1.16	1.56	1.96	2.36	2.76	3.16	3.56	3.96

Table X

Deduction Imposed on the Basic Oil Extraction Rate Based on the Percentage of Old Bunch

% OLD BUNCH	0	10	20	30	40	50	60	70	80	90
0	0.00	0.80	1.60	2.40	3.20	4.00	4.80	5.60	6.40	7.20
1	0.08	0.88	1.68	2.48	3.28	4.08	4.88	5.68	6.48	7.28
2	0.16	0.96	1.76	2.56	3.36	4.16	4.96	5.76	6.56	7.36
3	0.24	1.04	1.84	2.64	3.44	4.24	5.04	5.84	6.64	7.44
4	0.32	1.12	1.92	2.72	3.52	4.32	5.12	5.92	6.72	7.52
5	0.40	1.20	2.00	2.80	3.60	4.40	5.20	6.00	6.80	7.60
6	0.48	1.28	2.08	2.88	3.68	4.48	5.28	6.08	6.88	7.68
7	0.56	1.36	2.16	2.96	3.76	4.56	5.36	6.16	6.96	7.76
8	0.64	1.44	2.24	3.04	3.84	4.64	5.44	6.24	7.04	7.84
9	0.72	1.52	2.32	3.12	3.92	4.72	5.52	6.32	7.12	7.92

Table XI

Deduction Imposed on the Basic Oil Extraction Rate Based on the Presence of Free Water

CONSIGNMENT OF FRESH FRUIT BUNCH	DEGREE OF FRESHNESS	
	FRESH	UNFRESH
DRIPPING WATER	0.4%	0.8%
NO DRIPPING WATER	0%	0%

8 LIST OF APPENDICES

Appendix I

Grading Form

GRADING FORM

NAME OF SUPPLIER : _____

PHASE/LOT : _____

MPOB LICENCE NO : _____

DATE : _____ DATE : _____

VEHICLE NO : _____ WEIGHBRIDGE TICKET NO : _____

PARTICULARS		
Net Weight	_____	tonnes
Total Bunches	_____	
Average Bunch Weight	_____	kilograms
FFB GRADING	**NUMBER**	**PERCENTAGE (%)**
(1) Unripe Bunches	_____	_____ %
(2) Underripe Bunches	_____	_____ %
(3) Ripe Bunches	_____	_____ %
(4) Rotten Bunches	_____	_____ %
(5) Empty Bunches	_____	_____ %
TOTAL		100 %
(1) Long Stalk Bunches	_____	_____ %
(2) Dirty Bunches	_____	_____ %
(3) Dura Bunches	_____	_____ %
(4) Old Bunches	_____	_____ %
(5) Wet Bunches	_____	_____ %
TOTAL		

REMARKS : _____

_____

_____

SIGNATURE : _____

NAME : _____

Appendix II

Monthly Grading Summary Form

MONTHLY GRADING SUMMARY FORM

FFB GRADING SUMMARY FOR THE MONTH OF _____ 20 ___

NAME OF FACTORY : _____

ADDRESS OF FACTORY : _____

_____

TEL : _____ FAX : _____

PARTICULARS		
FFB Received	_____ tonnes	
FFB Graded	_____ tonnes	
Percentage of FFB Graded	_____ %	
Crude Palm Oil Produced	_____ tonnes	
Crude Palm Oil Extraction Rate	_____ %	
Kernel Extraction Rate	_____ %	
Average Bunch Weight	_____ kilograms	
Average Age of Palm (if any)	_____ months	
FFB GRADING (Weighted Average)	PERCENTAGE (%)	PENALTY
(1) Unripe Bunches	_____ %	_____
(2) Underripe Bunches	_____ %	_____
(3) Ripe Bunches	_____ %	_____
(4) Rotten Bunches	_____ %	_____
(5) Empty Bunches	_____ %	_____
TOTAL	100 %	
Unsatisfactory Bunches : (Weighted Average)		
(1) Long Stalk Bunches	_____ %	_____
(2) Dirty Bunches	_____ %	_____
(3) Dura Bunches	_____ %	_____
(4) Old Bunches	_____ %	_____
(5) Wet Bunches	_____ %	_____
TOTAL		
Graded Extraction Rate :		
(1) Oil Extraction Rate (OER)	_____ %	
(2) Kernel Extraction Rate (KER)	_____ %	

SIGNATURE : _____

NAME OF REPORTING OFFICER : _____

POSITION HELD : _____

DATE : _____

Appendix III

Glossary

1. **Oil Palm Fruit**
   The unprocessed fruit of the oil palm, whether in bunches or in loose form and derived from the palm of the genus *Elaeis guineensis, Elaeis oleifera* and also includes hybrids of the two species.

2. **Basic Extraction Rate**
   The maximum theoretical percentages of crude palm oil and palm kernel that can be produced from a given amount of fresh fruit bunch (based on the age of the palm or bunch weight) processed in an oil palm mill.

3. **Kernel Extraction Rate**
   Percentage of palm kernel produced from a given amount of fresh fruit bunch processed in an oil palm mill.

4. **Oil Extraction Rate**
   Percentage of crude palm oil produced from a given amount of fresh fruit bunch processed in an oil palm mill.

5. **Graded Extraction Rate**
   The percentages of crude palm oil and palm kernel extraction rates that can be given to a supplier after deducting the penalty from the basic extraction rate arising from poor quality bunches.

6. **Mill**
   A mill for milling oil palm fruits.

7. **Long Term Contract**
   Agreement between a supplier and a mill for the sale/ purchase of fresh fruit bunches for a period of not less than 12 months.

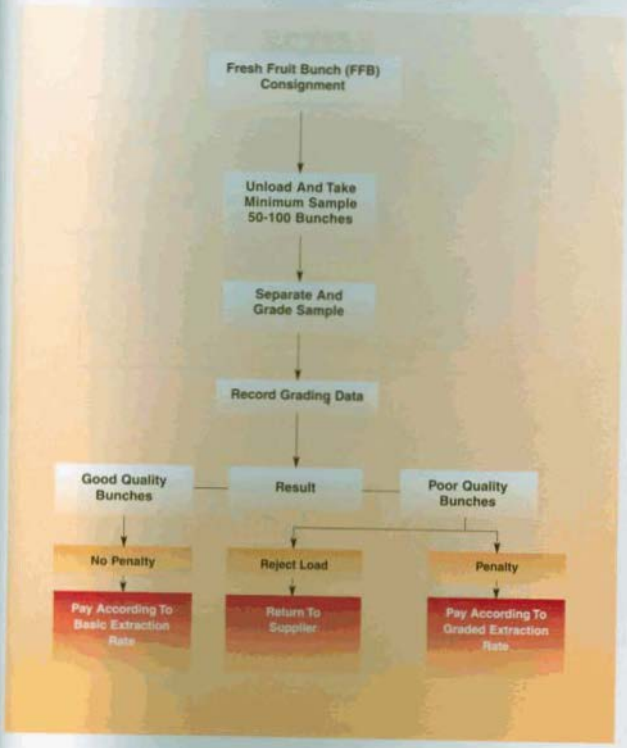
8. **Penalty**
   A percentage imposed on poor quality bunches sent to the mill to be deducted from the basic extraction rate.

9. **Grading**
   A process whereby fresh fruit bunches are assessed and classified according to the degree of ripeness and bunches quality criteria as stated in paragraph 4.3.

10. **Sample**
    A specimen of fresh fruit bunch selected at random for the purpose of examining and accessing as evidence of the quality of the whole.

Appendix IV

Fresh Fruit Bunch Grading Flow-Chart



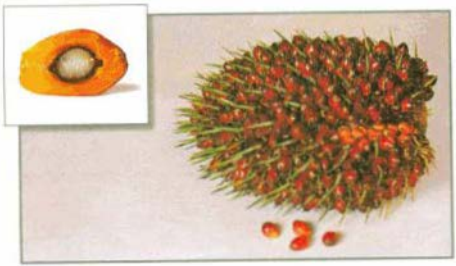
9 LIST OF PHOTOGRAPHS

Photograph 1

Ripe Bunch

Photograph 2

Underripe Bunch



Photograph 3

Unripe Bunch

Photograph 4

Overripe Bunch

Photograph 5

Empty Bunch

Photograph 6

Rotten Bunch

Photograph 7

Long Stalk Bunch

Photograph 8

Unfresh Bunch

Photograph 9

Old Bunch

Photograph 10

Dirty Bunch

Photograph 11

Small Bunch

Photograph 12

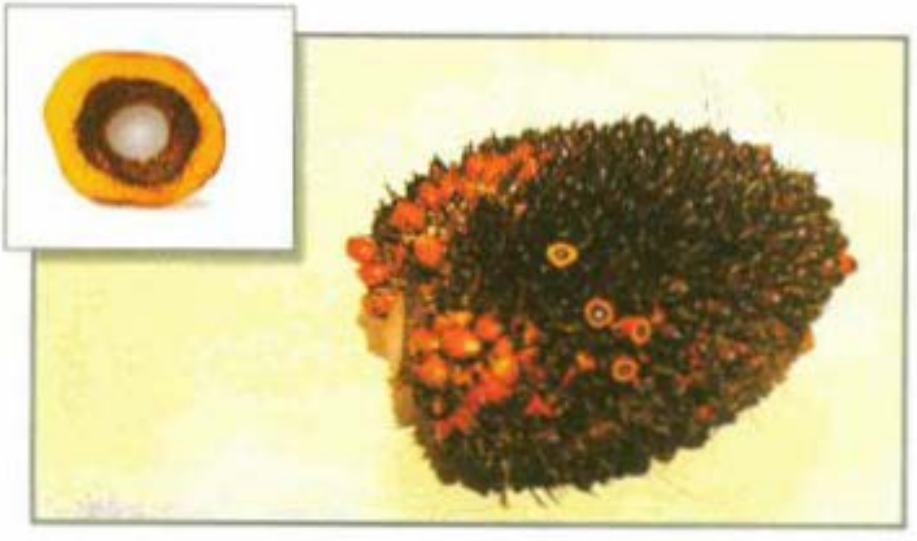
Pest Damaged Bunch

Photograph 13

Diseased Bunch

Photograph 14

Dura Bunch

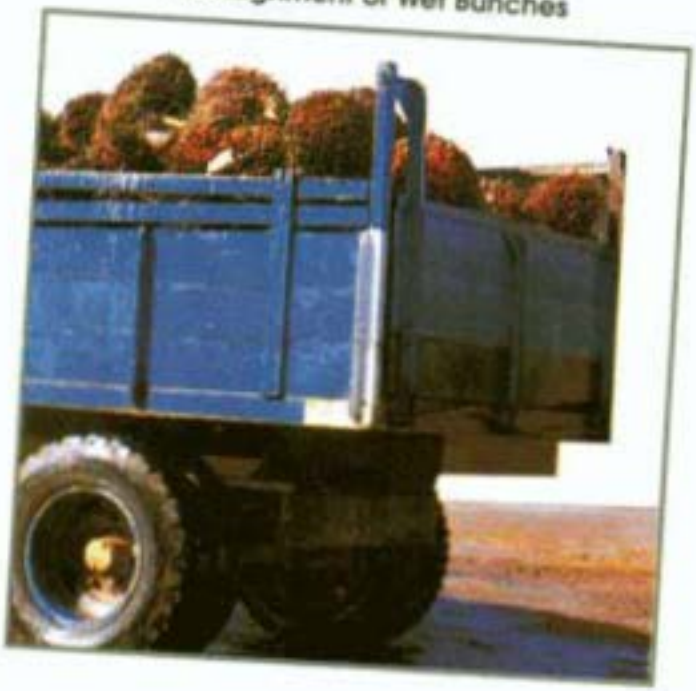


Photograph 15

Loose Fruits

Photograph 16

Consignment of Wet Bunches



10 MPOB OFFICES

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Licensing & Enforcement Division
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47301 Kelana Jaya
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Fax : 04-3230527
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Bandar Baru Teluk Intan
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Kuala Terengganu Subregion
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SARAWAK REGION
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MPOB Research Stations

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