Foreword

The revision of this standard PAES 206:2000, Agricultural Machinery: Rice Mill – Specifications was initiated by Agricultural Machinery Testing and Evaluation Center (AMTEC) through the project "Standardization of Postharvest Machinery Testing and Evaluation" funded by the Bureau of Postharvest Research and Extension (BPRE) of the Department of Agriculture (DA).

This standard was reviewed by the Study Team on Formulation of Standard for Rice Mill and by the Technical Committee for Postharvest Machinery and was circulated to various private and government agencies/organizations concerned for their comments and reactions. This standard was presented to the Philippine Society of Agricultural Engineers (PSAE) and subjected to a public hearing organized by the National Agriculture and Fisheries Council (NAFC).

This second revision has been technically revised in accordance with PNS 01: Part 4:1998 – Rules for the Structure and Drafting of Philippine National Standards.

The comments and reactions received during the presentation and public hearing were taken into consideration in the finalization of this standard. The following were the modifications to this standard:

- criteria for performance;
- under Classification of rice mill based on method of operation single-pass and multi-pass were included and based on type of huller, the under-runner stone disc and rubber roll type were considered;
- the crop conditions to be used in the test were specified;
- requirements for safety was included;
- warranty period provided to parts and services were specified;
- basic tools, operation and parts manual were required.

In the preparation of this standard, the following publications/documents were consulted/considered:

Part 18 of the Regional Network for Agricultural Machinery Test Codes and Procedures for Rice Mill.

Primer on Philippine Grains Standardization Program of the National Food Authority.

PHILIPPINE AGRICULTURAL ENGINEERING STANDARD PAES 206:2000

Agricultural Machinery – Rice Mill – Specifications

1 Scope

This standard specifies the requirements for rice mill.

2 Reference

The following document contains provisions, which, through reference in this text, constitute provisions of this Standard:

PAES 207:2000 Agricultural Machinery: Rice Mill – Methods of Test

3 Definitions

For the purpose of this standard the following definitions shall apply:

3.1
bran
outer layer of the brown rice consisting of the aleurone cells covering the endosperm of the rice grain

3.2
broken grains
grains that break in the process of milling which have a size of less than eight-tenth (8/10) of the average length of whole grain

3.3
brown rice
dehulled palay (husk/hull removed) with the bran layer still intact

3.4
coefficient of hulling
measure of the ability of the machine to remove the hulls

3.5
coefficient of wholeness
measure of the ability of the machine to remove the hulls without breaking the grain

3.6
head rice
grain or fraction of grain with its length equal to or greater than eight-tenth (8/10) of the average length of the whole grain

3.7
huller
dehuller
component of a rice mill that removes the hulls (palea and lemma) from the grains

3.8
hulling efficiency
product of the coefficient of hulling and the coefficient of wholeness of grains, expressed in percent

3.9
input capacity
weight of palay per unit loading time into the hopper/intake pit, expressed in kilogram per hour

3.10
milled rice
grains obtained after the removal of hull and bran

3.11
milling capacity
quantity of palay that the rice mill can process to a specified quality per total milling time, expressed in kilogram per hour

3.12
milling degree
extent or degree by which the bran layer of the brown rice is removed as a result of whitening

3.13
milling recovery
ratio of the weight of milled rice to the total weight of palay, expressed in percent

3.14
milling recovery index
ratio of the milling recovery obtained in actual testing, to the milling recovery obtained from the laboratory test mill

3.15
multi-pass rice mill
rice mill that employs a series of two or more whitening machines

3.16
palay
paddy
rough rice
unhulled grain of *Oryza sativa L.*, that is grain with the hull/husk enclosing the grain

3.17
percent head rice
ratio of the weight of grains that do not break in the process of milling and with a size of three-fourth (3/4) or more of the whole grain to the total weight of milled rice, expressed in percent

3.18
percent head rice index
ratio of the percent head rice obtained in actual testing, to the percent head rice obtained from the laboratory test mill

3.19
polisher
auxiliary device of a rice mill, which removes the remaining small bran particles on the milled rice and gives it a glossy appearance

3.20
rice hull
outermost rough covering of the palay grain (palea and lemma) consisting of the empty glumes, floral glumes, and awn

3.21
rice mill
machine used to remove the hull and bran of the palay to produce milled rice and consists mainly of hulling and whitening assembly

3.21.1
cone "cono" type
type of rice mill having an under-runner stone disc huller and vertical cone whitener

3.21.2
rubber roll type
type of rice mill using rubber roll huller and utilizes friction and/or combination of other types of whitener

3.22
single-pass rice mill
rice mill that employs only one whitening machine

3.23
well-milled rice
rice grain from which the hull, the germ, the outer bran layers, and the greater part of the inner bran layer have been removed, but part of the lengthwise streaks of the bran layers may still be present on less than 15% of the sample grains

3.24
whitener
component of a rice mill that removes the bran layer in the brown rice

3.24.1
abrasive type
type of whitening machine consisting of a cylinder or cone coated with abrasive material such as emery stone or any similar materials enclosed in a perforated steel housing

3.24.2
friction type
type of whitening machine consisting of a ribbed cylinder enclosed in a perforated steel housing

4 Classification

The classification of rice mill, shall be based on the following:

4.1 Method of operation

4.1.1 Single-pass rice mill

4.1.2 Multi-pass rice mill

4.2 Type of huller

4.2.1 Under-runner stone disc

4.2.2 Rubber roll type

5 Material of construction

Steel, cast iron or any other suitable materials shall be generally used for the manufacture of the different components of the rice mill.

6 Performance and other requirements

6.1 The performance criteria for rice mill shall be as specified in Table 1.

6.2 The specified capacity at the brown rice output of the paddy separator must be attained, with maximum of 10 pieces of palay per kilogram of brown rice output.

6.3 There shall be provisions for lubrication of non-sealed type bearings and belt tightening.

6.4 Provisions for safety of the operator from all moving components of the rice mill such as belt guard or cover shall be included.

Table 1 – Performance Criteria for Rice Mill

Criteria	Performance			
	Single pass		Multi-pass	
	Cono	Rubber Roll	Cono	Rubber Roll
Milling Recovery Index, minimum	0.97	0.98	0.97	0.98
Percent Head Rice Index, minimum	0.90	0.90	0.90	0.90
Hulling Efficiency percent, minimum	80	80	80	80
Noise level, db(A), maximum	92*	92*	92*	92*
Milling Degree	Well-milled	Well-milled	Well-milled	Well-milled

* Allowable noise level for six hours of continuous exposure based on Occupational Safety and Health Standards, Ministry of Labor, Philippines, 1983.

7 Workmanship and finish

7.1 Rice mill shall be free from manufacturing defects that may be detrimental to its operation.

7.2 Any uncoated metallic surfaces shall be free from rust and shall be painted properly.

7.3 Rice mill shall be free from sharp edges and surfaces that may injure the operator.

8 Warranty for construction and durability

8.1 The construction of the rice mill shall be rigid and durable without major breakdown of the hulling, whitening, separating, aspirating, and conveying mechanism within six months.

8.2 Warranty shall be provided for parts and services within six (6) months after the installation and acceptance by the user, except on easy to wear parts such as belts, rubber rolls, and screens.

9 Maintenance and operation

9.1 Each rice mill shall be provided with at least three (3) pieces of dust masks and the following basic tools: three (3) pieces of different sizes of open wrenches; one (1) piece each philips and flat screw drivers; and three (3) pieces of different sizes of allen wrenches.

9.2 An instruction manual which conforms to PAES 102:2000 shall be provided.

10 Sampling

The rice mill shall be sampled for testing in accordance with PAES 103:2000 – Agricultural Machinery – Method of Sampling.

11 Testing

The sampled rice mill shall be tested in accordance with PAES 207: 2000 – Agricultural Machinery: Rice Mill – Methods of Test

12 Marking and labeling

Each unit of rice mill shall be marked at prominent place with the following information:

12.1 Registered trademark of the manufacturer

12.2 Brand

12.3 Model

12.4 Serial number

12.5 Name and address of the manufacturer

12.6 Name and address of the importer

12.7 Country of manufacture /Made in the Philippines

12.8 Input capacity, t/h

12.9 Power requirement, kW

12.10 Safety/Precautionary markings