

PHILIPPINE NATIONAL STANDARD

PNS/PAES 206:2015
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ICS 65.060.01

Agricultural machinery – Rice mill – Specifications



BUREAU OF PRODUCT STANDARDS*

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National Foreword

The Philippine Agricultural Engineering Standards PAES 206:2015, Agricultural machinery – Rice mill – Specifications was approved for adoption as Philippine National Standard by the Bureau of Philippine Standards upon the recommendation of the Agricultural Machinery Testing and Evaluation Center (AMTEC) and the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (PCAARRD-DOST).

This standard cancels and replaces PNS/PAES 206:2003 (PAES published 2000).

PHILIPPINE AGRICULTURAL ENGINEERING STANDARDS PNS/PAES 206:2015
Agricultural Machinery – Rice Mill – Specifications

Foreword

The revision of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled “Development of Standards for Rice Production and Postproduction Machinery” which was funded by the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) of the Department of Science and Technology (DOST).

This standard has been technically prepared in accordance with PAES 010-2 – Rules for the Structure and Drafting of International Standards.

The word “shall” is used to indicate mandatory requirements to conform to the standard.

The word “should” is used to indicate that among several possibilities one is recommended as particularly suitable without mentioning or excluding others.

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

Camacho, I. Hidalgo, P. Duff, B. and Lozada, E. 1978. A Comparison of Alternative Rice Milling Systems in the Bicol Region. Proceedings of the Workshop on Grain Post-harvest Technology. June 1978. Bangkok, Thailand

Milling. IRRI Rice Knowledge Bank (<http://www.knowledgebank.irri.org/step-by-step-production/postharvest/milling>)

Codex Standard for Rice. 198-1995

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

Rice Postharvest Technology. 1995. The Food Agency Ministry of Agriculture, Forestry and Fisheries. Tokyo, Japan.

Rice Postproduction Technology A Technical Reference Guide. 2003. Philippine Rice Postproduction Consortium. Japan Grain Inspection Association. National Food Authority. Quezon City.

K. Dippon. 1990. Development of an animal-powered rice-huller. In *Research for development of Animal Traction in West Africa*. Proceedings of the Fourth Workshop of the West Africa Animal Traction Network held in Kano, Nigeria, 9-13 July 1990. (<http://www.fao.org/wairdocs/ilri/x5483b/x5483b0j.htm>)

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Agricultural Machinery – Rice Mill – Specifications

1 Scope

This standard specifies the requirements for rice mill.

2 References

The following normative documents contain provisions, which through reference in this text constitute provisions of this National Standard:

- PNS/PAES 101:2000** Agricultural Machinery –Technical Means for Ensuring Safety – General
- PNS/PAES 102:2000** Agricultural Machinery – Operator’s Manual – Content and Presentation
- PNS/PAES 103:2000** Agricultural Machinery – Method of Sampling
- PNS/PAES 138:2004** Agricultural Machinery – Guidelines on After Sales Service
- PNS/PAES 202:2015** Agricultural Machinery – Heated–Air Mechanical Grain Dryer – Methods of Test
- PNS/PAES 207:2015** Agricultural Machinery – Rice Mill – Methods of Test
- PNS/PAES 214:2004** Agricultural Machinery – Rubber Roll for Rice Mill – Specifications

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

pieces of grains smaller than three-fourths (3/4) of the average length of the unbroken kernels

3.3

brown rice

dehulled rice

cargo rice

dehusked rice

rice kernels from which only the hull has been removed and with the bran layer still intact

3.4

coefficient of hulling

ratio of the dehulled grains to the total amount of grain input, expressed in percent

3.5

coefficient of wholeness

ratio of the whole brown rice to the total amount of dehulled grains, expressed in percent

3.6

head rice

grain or a piece of a grain with its length equal to or greater than three-fourths ($3/4$) of the average length of the whole kernels

3.7

huller

husker

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 paddy per unit loading time into the huller, expressed in metric tons per hour

3.10

milled rice

white rice

grains obtained after the removal of hull, bran and germ

3.11

milling capacity

quantity of paddy that the rice mill can process to a specified quality per total milling time, expressed in metric tons 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 paddy, 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/polishing machines

3.16

paddy

rough rice

“palay”

unhulled grain of *Oryza sativa*, which means, grain with the glumes enclosing the kernel

3.17

percent head rice

ratio of the weight of grains with a size of three-fourths ($3/4$) 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

device of a rice mill, which removes the remaining bran on the milled rice and produces a glossy appearance

3.20

rice hull

rice husk

outer most rough covering of the paddy 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 paddy 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 (Figure 1)

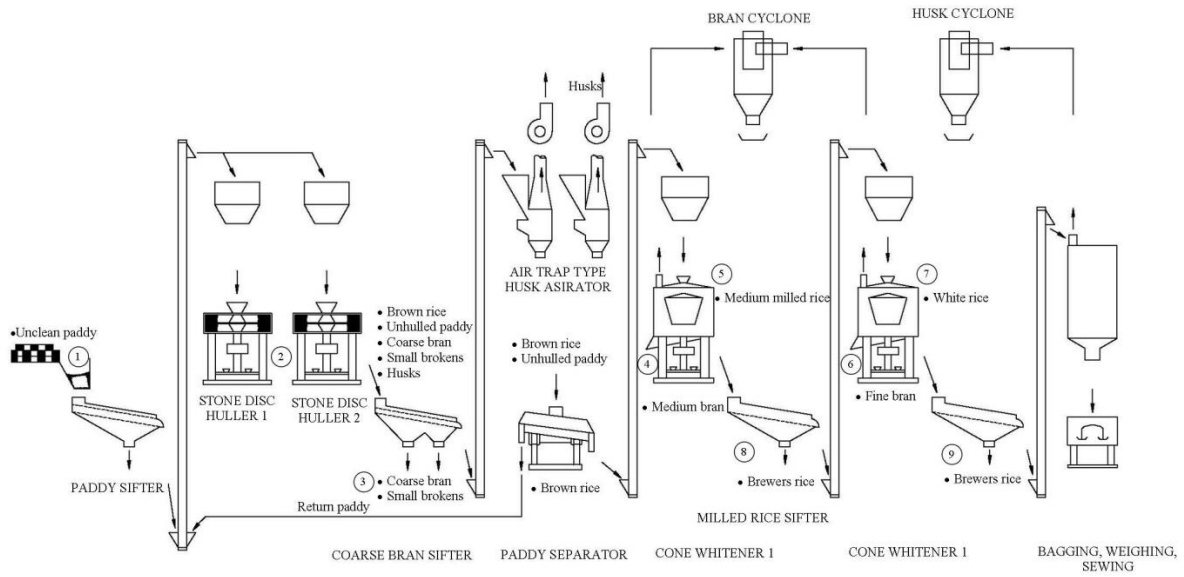


Figure 1 - Layout of a cone type rice mill

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 (Figure 2)

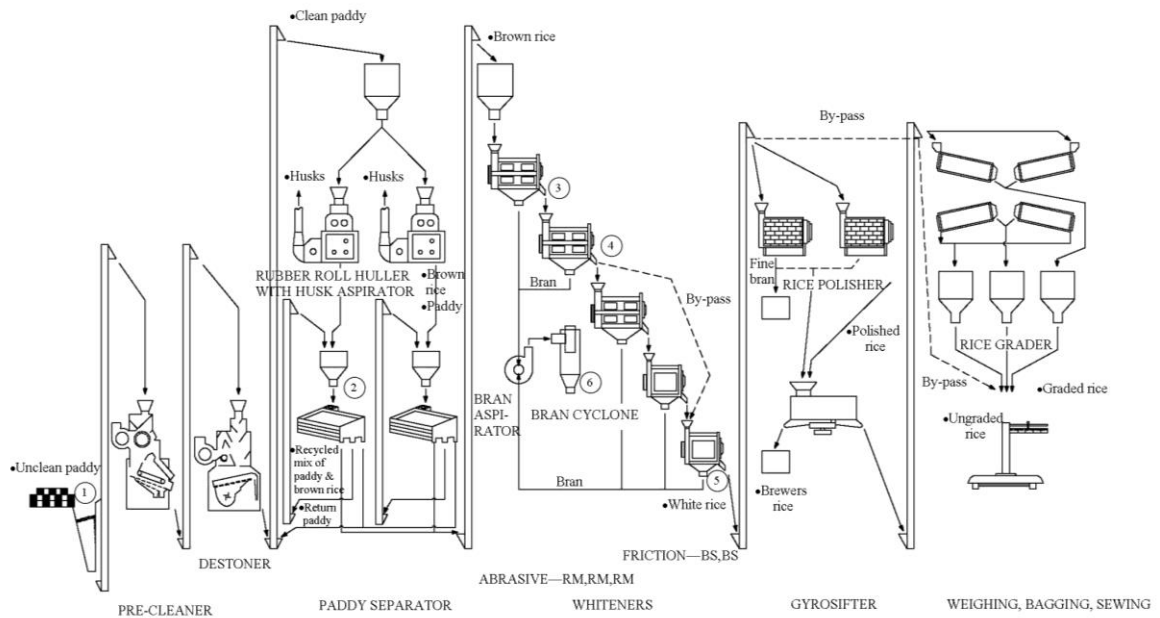


Figure 2 - Layout of a rubber roll multipass rice mill

**3.21.3
centrifugal type**

type of a huller with rotating blades and utilizes pressure such as Coriolis' force, frictional force from the blades, or impact force at collision with the blades and the peripheral surface (Figure 3)

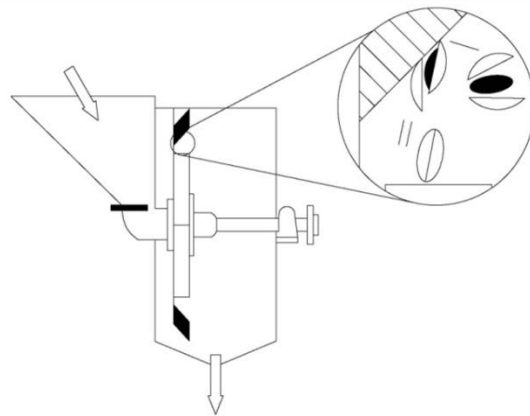


Figure 3 -Centrifugal huller

**3.22
single-pass rice mill**

rice mill that employs only one whitening machine (Figure 4)

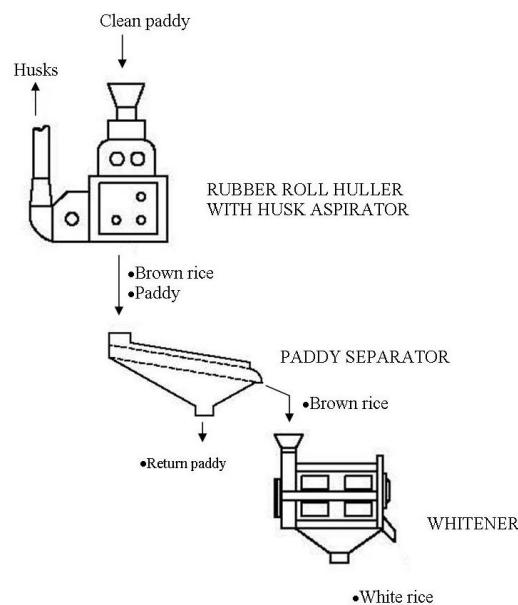


Figure 4 - Layout of a rubber roll single pass rice mill

**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 20% of the sample grains

3.24

whitener

component of a rice mill that removes the bran 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 ridged 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

4.2.3 Centrifugal type

5 Performance and Other Requirements

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

5.2 The specified capacity at the brown rice output of the paddy separator must be attained.

5.3 The rubber roll shall be able to process the input capacity as stated in PNS/PAES 214:2004 – Agricultural Machinery – Rubber Roll for Rice Mill – Specifications.

Table 1 – Performance Criteria for Rice Mill

CRITERIA	Performance Data			
	Single pass		Multi-pass	
	Rubber Roll	Centrifugal	Under Runner (Cone) Type	Rubber Roll
1. Hulling Efficiency (%), minimum	75	75	75	75
2. Milling Recovery Index, minimum	0.98	0.98	0.97	0.98
3. Percent Head Rice Index, minimum	0.90	0.90	0.90	0.90
4. Milling Degree	Well milled	Well milled	Well milled	Well milled
5. Noise Level, [dB (A)], maximum	92*	92*	92*	92*
6. No. of Paddy per kilogram milled rice	15	15	15	15

* Allowable noise level for six (6) hours of continuous exposure based on Occupational Safety HealthStandards, Department of Labor and Employment, Philippines, 2013.

Note : For other types of huller, refer to ISO Standard.

6 Workmanship and Finish

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

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

6.3 Rice mill shall be free from sharp edges and surfaces that may injure the operator. The warning notice shall be in accordance with PNS/PAES 101:2000 – Agricultural Machinery – Technical Means for Ensuring Safety – General.

7 Warranty for Construction and Services

7.1 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 (6) months.

7.2 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. General requirements of the warranty shall be in accordance with PNS/PAES 138:2004 – Agricultural Machinery – Guidelines on After Sales Service.

8 Maintenance and Operation

8.1 Each rice mill shall be provided with at least three (3) pieces of dust masks and the basic tools as specified by the manufacturer: one (1) set each of Allen and open wrenches and one (1) piece each of cross and flat screw driver

8.2 An instruction manual which conforms to PNS/PAES 102:2000 – Agricultural Machinery – Operator’s Manual – Content and Presentation shall be provided.

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

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

9 Sampling

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

10 Testing

The sampled rice mill shall be tested in accordance with PNS/PAES 207:2015 – Agricultural Machinery – Rice Mill – Methods of Test

11 Marking and Labeling

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

11.1 Registered trademark of the manufacturer

11.2 Brand

11.3 Model

11.4 Serial number

11.5 Name and address of the manufacturer

11.6 Name and address of the importer/distributor

11.7 Country of manufacture /Made in the Philippines

11.8 Input capacity, metric tons/h

11.9 Power requirement, kW

11.10 Safety/Precautionary markings

your partner in product quality and safety



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