

PHILIPPINE NATIONAL STANDARD

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Agricultural machinery – Coconut Coir Decorticator – Specifications



BUREAU OF PRODUCT STANDARDS

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National Foreword

This Philippine Agricultural Engineering Standards PAES 250:2011, Agricultural machinery – Coconut Coir Decorticator – Specifications was approved for adoption as Philippine National Standard by the Bureau of Product Standards upon the recommendation of the Agricultural Machinery Testing and Evaluation Center (AMTEC) and the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development of the Department of Science and Technology (PCARRD-DOST).

Foreword

The formulation of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) through the project “Development of Standards for Agricultural Production and Postharvest Machinery” funded by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development – Department of Science and Technology (PCARRD-DOST)

This standard has been technically prepared in accordance with BPS Directives Part 3:2003 – 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 the preparation of this standard, the following documents/publications were considered:

PAES 228:2005 Agricultural Machinery – Fiber Decorticator – Specifications

PAES 244:2010 Agricultural Machinery – Biomass Shredder – Specifications

Becina, Ariel Dexter Janairo. *Testing and evaluation of a coconut husk decorticator*. Undergraduate thesis. Agricultural and Bio-Process Division, Institute of Agricultural Engineering, College of Engineering and Agro-Industrial Technology, University of the Philippines Los Baños. June 1998.

Coconut coir decorticator plant.

<http://bicol.da.gov.ph/News/2005news/1qtr05/cococoir.html>. <accessed on June 01, 2009>

Coconut decorticator cum

shredder. <http://www.bioenergylists.org/files/Coconut%20Decorticator%20cum%20Shredder.pdf>. <accessed on June 01, 2009>

Fabrication and piloting of coconut husk

decorticators. <http://www.neda.gov.ph/Knowledge-emporium/details.asp?DataID=446>. <accessed on June 01, 2009>

Piloting and commercialization of coconut husk

decorticator. www.neda.gov.ph/knowledge-emporium/deco-machine.pps. <accessed on June 01, 2009>

1 Scope

This standard specifies the manufacturing and performance requirements for coconut coir decorticator.

2 References

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

AWS D1.1:2000	Structural Welding Code - Steel
PAES 102:2000	Agricultural Machinery – Operator’s Manual – Content and Presentation
PAES 103:2000	Agricultural Machinery – Method of Sampling
PAES 311:2001	Engineering Materials - Screws for Agricultural Machines – Specifications and Applications
PAES 313:2001	Engineering Materials – Bolts and Nuts for Agricultural Machines – Specifications and Applications
PAES 251:2010	Agricultural Machinery – Coconut Coir Decorticator – Methods of Test

3 Definitions

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

3.1

coconut husk

fibrous covering of a coconut fruit comprising of 30% fiber and 70% parenchymatous cells

3.2

coconut coir

slender and elongated fibrous materials extracted from coconut husk

3.3

coconut peat

fine and powder-like particles parenchymatous cells that are extracted from the coconut husk

3.4

coconut coir decorticator

machine to crush matured coconut husk through impact or beating action to separate coco fiber and coconut peat from the husk

3.5

decorticating efficiency

ratio of the weight of the input coconut husk partially and totally undecorticated coconut husk to the total weight of the input coconut husk to the decorticator, expressed in percent

3.6

coir quality

refers to the physical and morphological (e.g. tensile strength, maturity, color, fiber length and cleanliness) properties of fibers extracted

3.7

input capacity

weight of coconut husk fed into the decorticator expressed in kilogram per hour

4 Classification

The classification of coconut coir decorticator shall be based according to the following:

4.1 Method of feeding

4.1.1 Manual feeding

Operation of the decorticator shall require the manual feeding of coconut husk to the hopper. (see Fig. 1)

4.1.2 Mechanical feeding

Operation of the decorticator require mechanical means of feeding the coconut husk to the hopper (e.g. conveyor).

4.2 Mode of Installation

4.2.1 Stationary type (Fig. 1a and 1b)

Coconut coir decorticator without transport mechanism (e.g. pneumatic tires).

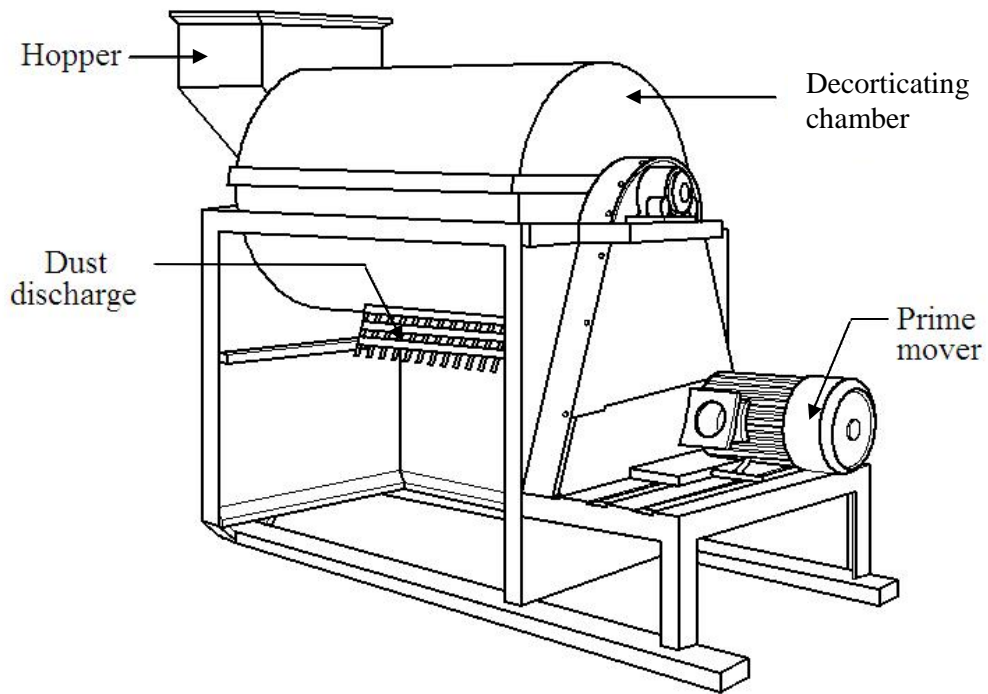


Figure 1a. Stationary decorticator

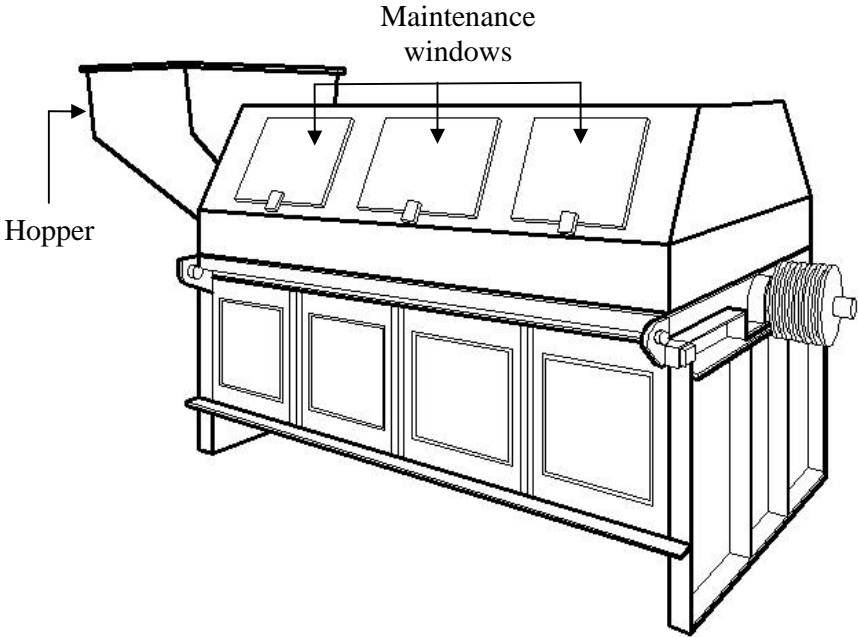


Figure 1b. Stationary decorticator with maintenance windows

4.2.2 Mobile type (Fig. 2)

Coconut coir decorticator with pneumatic tires.

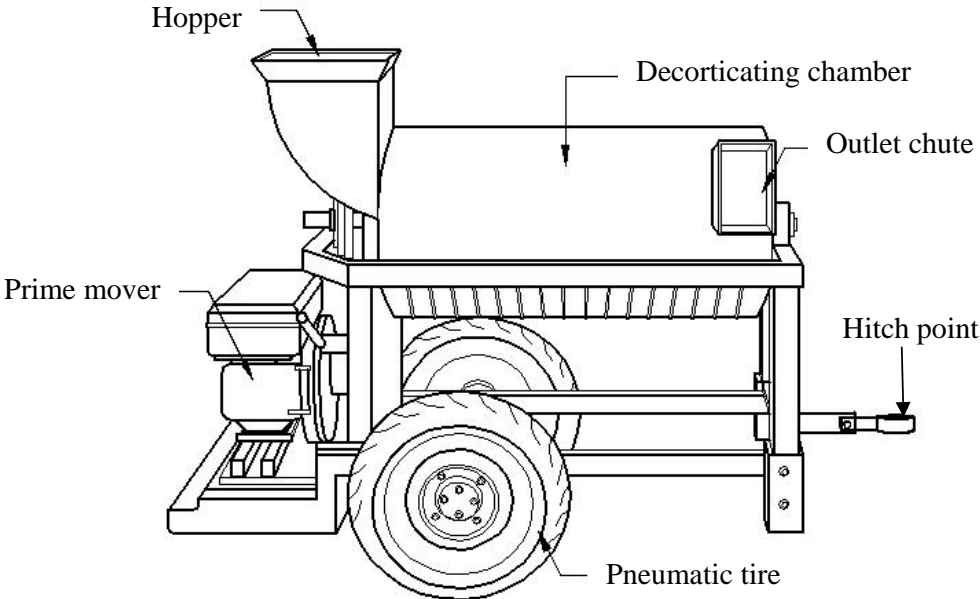


Figure 2. Mobile decorticator

4.3 Mode of Attachment of Decortivating Blades

4.3.1 Attached to open cylinder (Fig. 3)

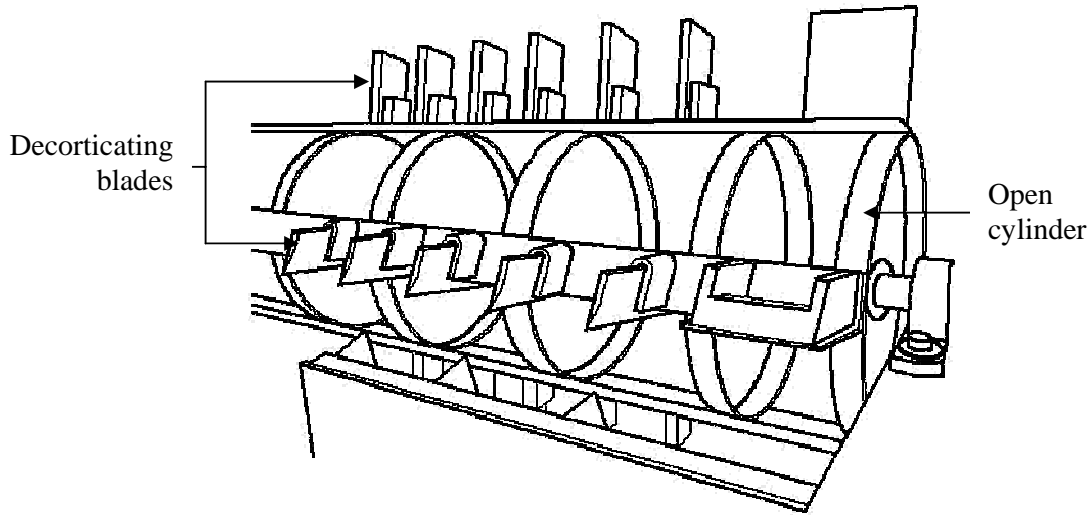


Figure. 3. Decortivating blades attached to an open cylinder

4.3.2 Bolted to plates (Fig. 4a, 4b and 4c)

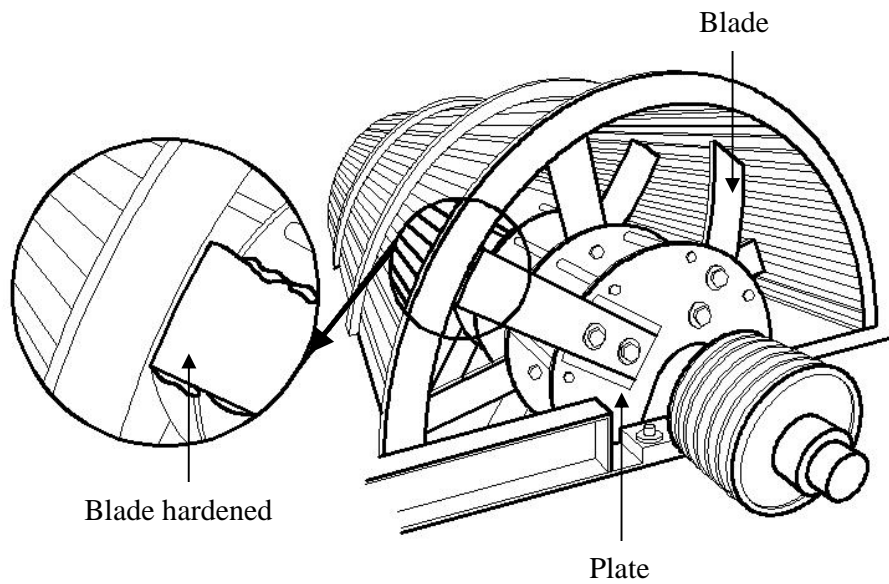


Figure. 4a. Decortivating blades bolted to large circular plates

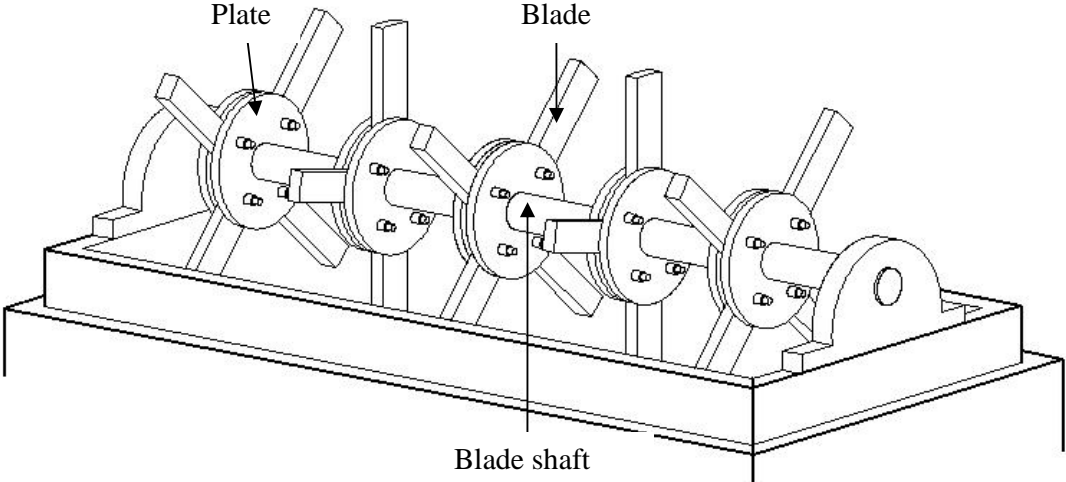


Figure. 4b. Decortivating blades bolted to small circular plates

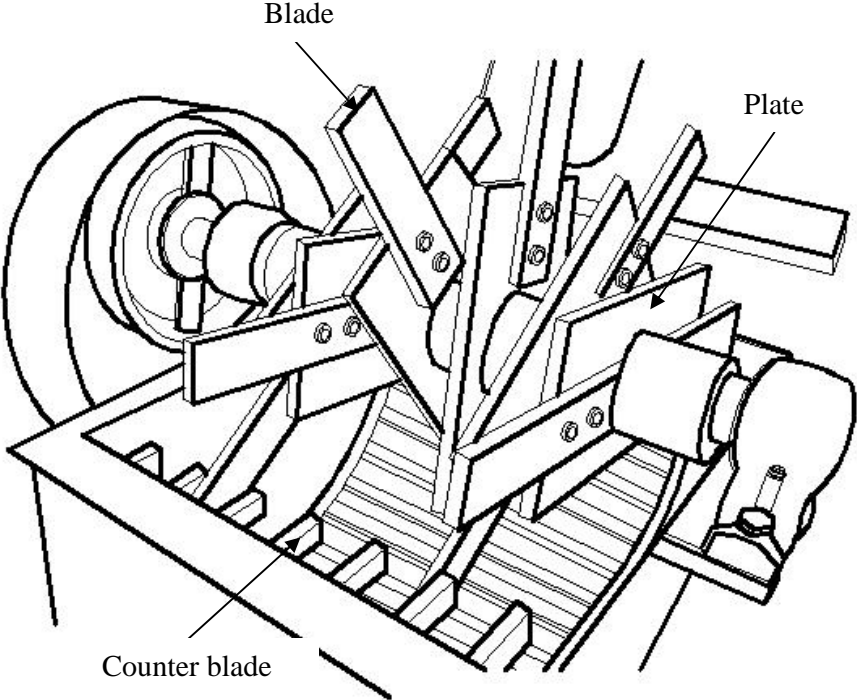


Figure. 4c. Decortivating blades bolted to rectangular plates

4.4 Arrangement of Blades

4.4.1 Radial arrangement (see Fig. 3)

Blades are arranged symmetrically around a shaft or to an open cylinder.

4.4.2 Spiral arrangement (see Fig. 4a, 4b and 4c)

Each set of blades are arranged spirally along the axis of the shaft.

5 Manufacturing Requirements

- 5.1** Steel bars, metal sheet or plate and heavy-duty mild steel shall be generally used for the different components of the coconut coir decorticator.
- 5.2** Coconut coir decorticator shall be provided with outlet chute
- 5.3** The body of the blades or decorticating mechanism shall be made of mild steel and the tips shall be hardened by heat treatment or by welding using high carbon steel or tool steel welding rod (see Fig. 4a). The pitch of blades shall have at most 5° inclination.
- 5.4** For decorticating blades bolted to large plates, there shall be provision for support bar between plates to avoid deformation.
- 5.5** Cover for the decorticating blades shall be made of at least 2.5 mm MS plate and/or BI plate or its equivalent material to provide safety for operator during decorticating process. Clamps should be used for easy opening of the cover and to secure it in place during operation.
- 5.6** There shall be provision for stationary counter blades welded to the lower concave.
- 5.7** Lower concave grills spacing for coconut peat outlet shall range from 12 mm to 25 mm.
- 5.8** Bolts and screws to be used shall conform to the requirements of PAES 311 and 313.
- 5.9** Sizes of the parts of the coconut coir decorticator shall conform to the manufacturer's specifications.

6 Performance Requirements

The coconut coir decorticator when tested in accordance with PAES 251 shall conform to the following requirements:

- 6.1 The noise emitted by the coconut coir decorticator shall not be more than 96 dB(A).
- 6.2 Input capacity shall meet the specifications of the manufacturer.
- 6.3 The minimum fiber grade/fiber quality of the fiber from the coconut coir decorticator outlet shall be CH-3 class or mixed fiber as shown in table 1.

Table 1. Description of standard grade of coir base on Fiber Industry Development Authority, FIDA

Standard Grade of Coconut Coir	Descriptions
CH-1 (Coir Good)	<ul style="list-style-type: none"> -highest grade of coir -fiber is of good cleaning with little or no pulp present in the bristle -color ranges from light brown to almost dark brown -length of fiber or bristle shall not be less than 5 in. -texture maybe described as medium harsh -no crumpled or tangled fiber
CH-2 (Coir Fair)	<ul style="list-style-type: none"> -bristle is of fair cleaning -fiber is stuck together and considerable pulps are present -strips shall not exceed 1 mm in width on the average -texture is harsh -length shall be not less than 5 in. -color ranges from dull brown to dark brown approaching black -no crumpled or tangled fiber
CH-3 (Coir Mixed)	<ul style="list-style-type: none"> -mixture of bristle and mattress fiber -generally, crumpled and tangled -of good and fair cleaning -color ranges from light brown to dull brown -texture is medium harsh -free from coir peat and hard, unfibered portion of the husk
CH-4 (Coir Mattress)	<ul style="list-style-type: none"> -mostly short crumpled fiber with average length of not less the 2 ½ in. -generally used for mattress -shall be free from coir peat and hard, undefibered husk
CH-W (Coir Waste)	<ul style="list-style-type: none"> -fibers less than 2 ½ in. long -fibers with partially defibered portion of husk mixed with proportionate weight of coir peat -predominant coir peat is not included in the grade

- 6.4 Peripheral speed of the blades should be 25 m/s.
- 6.5 There shall be no clogging during normal operating condition.

7 Safety, Workmanship and Finish

- 7.1** The base of coconut coir decorticator shall be rigid and its rotating components shall be statically and dynamically balanced.
- 7.2** The coconut coir decorticator shall be free from manufacturing defects to ensure safety to its operators.
- 7.3** Decorticating blade shall be replaceable.
- 7.4** All surfaces shall be free from rust and shall be coated with a suitable paint material.
- 7.5** The external parts of the decorticator shall be free from sharp edges and rough surfaces.
- 7.6** Belt cover or guard shall be provided.
- 7.7** There shall be provision for belt tightening and adjustments.
- 7.8** There shall be provision for the safety of the operators in the feeding port and other moving parts.
- 7.9** Mechanism for immediate disengagement between prime mover and coconut coir decorticator shall be provided.
- 7.10** All welded parts shall be water-tight and smoothly polished and it shall pass visual inspection criteria (AWS D1.1:2000) for discontinuity of materials.
- 7.11** Welded joints shall not be less than 4 mm (1/8 inch) side fillet welded. Undercut shall not exceed 2 mm (1/16 inch) for any length of weld.

8 Warranty for Manufacturing and Durability

- 8.1** Warranty against defective materials and workmanship shall be provided for parts and services except for normal wear and tear of consumable maintenance parts such as belts within six months from the date of purchase.
- 8.2** The construction shall be rigid and durable without breakdown of its major components for at least six months from the date of purchase.

9 Maintenance and Operation

- 9.1** Each coconut coir decorticator unit shall be provided with a set of standard tools prescribed by the manufacturer.
- 9.2** An operator's manual which conform to PAES 102, shall be provided.
- 9.3** The coconut coir decorticator shall be easy to clean and operate.

10 Testing

Coconut coir decorticator shall be tested in accordance with PAES 251.

11 Marking

- 11.1** Each coconut coir decorticator shall be marked in English with the following information using a stencil or by directly punching it on a plate and shall be positioned at a most conspicuous place:
 - 11.1.1** Registered trademark of the manufacturer
 - 11.1.2** Brand
 - 11.1.3** Model
 - 11.1.4** Serial number
 - 11.1.5** Input capacity, kg/h
 - 11.1.6** Recommended decorticating speed, rpm
 - 11.1.7** Power requirement, kW
 - 11.1.8** Name and address of the manufacturer
 - 11.1.9** Name and address of the importer, if imported
 - 11.1.10** Country of manufacture (if imported) / "Made in the Philippines" (if manufactured in the Philippines)
- 11.2** Appropriate safety precautions shall be provided. Marking shall be stated in English and/or Filipino and shall be printed in red color with a white background.
- 11.3** The markings shall have a durable bond with the base surface material.
- 11.4** The markings shall be all weather resistant and under normal cleaning procedures, it shall not fade, discolor, crack or blister and shall remain legible.

Philippine Agricultural Engineering Standards

AMTEC-UPLB – PCARRD Project: “Development of Standards for Agricultural Production and Postharvest Machinery”

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