

## **Foreword**

This national standard is the update of Philippine National Standard 144:1988. The updating of PNS 144 was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) with funding from the Department of Agriculture.

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:

Takao, Hironoshin. Paddy Husker, Group Training Course in Postharvest Rice Processing. Institute of Agricultural Machinery, 1985.

Wimberly, James E. Technical Handbook for the Paddy Rice Postharvest Industry in Developing Countries, International Rice Research Institute, Los Baños, Laguna, 1983.

**Agricultural Machinery – Rubber Roll for Rice Mill – Specifications**

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**1 Scope**

This standard specifies the requirements for rubber rolls for rice mills.

**2 Reference**

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

|                       |  |
|-----------------------|--|
| <b>PAES 102: 2000</b> | Agricultural Machinery – Operator’s Manual – Content and Presentation  |
| <b>PAES 103:2000</b>  | Agricultural Machinery – Method of Sampling                            |
| <b>PAES 215:2004</b>  | Agricultural Machinery – Rubber Rolls for Rice Mills – Methods of Test |

**3 Definition**

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

**3.1**

**metal drum core**

cylinder where rubber is bonded

**3.2**

**rubber roll**

component of rice mill made of rubber bonded to an inner metal drum core use for hulling

**3.3**

**rubber thickness**

depth of the rubber bonded on the metal drum core

**3.4**

**size**

specified by the width, by the outside diameter and by the core diameter of the rubber roll

**3.5**

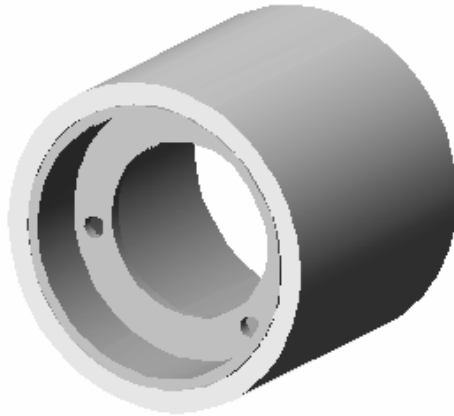
**width**

longitudinal dimension of a roll in right angle to the diameter

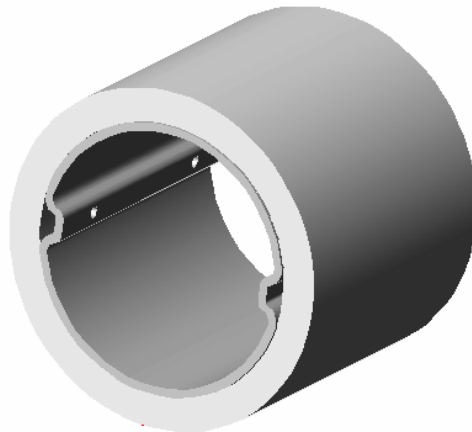
## 4 Classification

The rubber roll shall be classified as:

### 4.1 Centered



### 4.2 Off-centered



## 5 Material of construction

Natural or synthetic rubber or a blend of both shall be used in the manufacture of rubber with either steel/aluminum or cast iron drum core.

## 6 Physical properties

6.1 The rubber shall have a minimum thickness of 15 mm.

6.2 The rubber hardness shall be between 80 shore to 90 shore in the case of elastomers and 85 shore for press-cured rubber mixes.

6.3 When the rubber is subjected to heating test, the minimum value of hardness shall be 70 shore with maximum hardness drop of 10 shore.

6.4 The tensile stress of the rubber roll shall be 6200 kPa to 8268 kPa.

6.5 The specific gravity of the rubber shall be 1.2 to 1.3.

6.6 The modulus of elasticity of the rubber shall be 482 kPa to 689 kPa.

## 7 Design, Workmanship and Construction

7.1 When the cast iron is used for the drum core, it shall be at least gray pig cast iron.

7.2 When the iron sheet is used for the drum core, it shall be at least 0.6 mm cold rolled carbon steel.

7.3 The rubber thickness shall be uniform and symmetrical.

7.4 The rubber shall be bonded firmly to the metal drum core.

7.5 The hole diameter of the metal drum core shall be snug fit with the bolts that hold the rubber roll.

7.6 The rubber roll shall be free from defects such as surface roughness and holes which maybe detrimental to its use.

7.7 The rubber roll shall be dynamically balanced.

## 8 Performance Requirement

8.1 The rubber roll when tested in accordance with PAES 215 shall have hulling efficiency of at least 80%.

8.2 The rubber roll shall be able to process the input capacity shown in Table 1 with 7% maximum broken brown rice.

**Table 1 – Rubber roll input capacity**

| Size<br>mm x mm x mm | Input capacity<br>kg/h |
|----------------------|------------------------|
| 64 x 152 x 60/73     | 350 – 400              |
| 102 x 165/222        | 450 – 700              |
| 152 x 222 x 174      | 850 – 1000             |
| 203 x 220/254        | 1100 – 1400            |
| 254 x 254            | 1700 - 2200            |

**8.3** For every 2 g reduction in weight of the rubber roll, the brown rice processed shall be at least 60 kg.

## **9 Sampling**

The rubber rolls shall be sampled for testing in accordance with PAES 103.

## **10 Testing**

Sampled rubber rolls shall be tested in accordance with PAES 215.

## **11 Marking**

Rubber roll shall be marked with the following information:

**11.1** Marking on the metal drum core if the rubber roll is originally manufactured:

**11.1.1** Registered trademark of the manufacturer

**11.1.2** Type

**11.1.3** Size, (width, outside diameter and core diameter in that order, in mm)

**11.1.4** Serial number

**11.1.5** Date manufactured

**11.1.6** Name and address of the manufacturer

**11.1.7** Name and address of the importer, if imported

**11.1.8** Country of manufacture (if imported) / “Made in the Philippines” (if manufactured in the Philippines)

**11.2** Marking on the packaging of the rubber roll if the rubber roll is re-banded:

**11.2.1** Name and address of the company

**11.2.2** Date re-banded